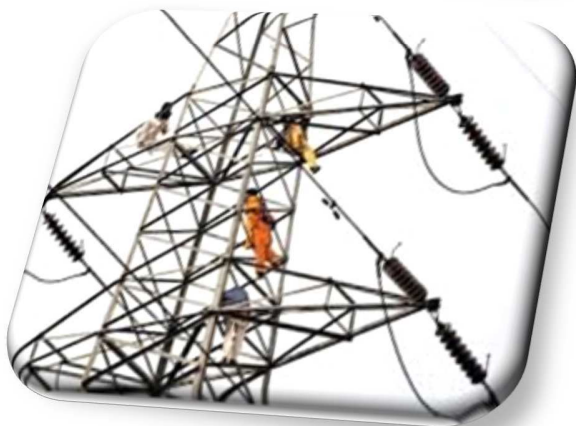


VISIT REPORT

National Transmission and Despatch Company Limited



**National Electric Power Regulatory
Authority**

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EXECUTIVE SUMMARY

This Report contains a summary of NTDC's ongoing power projects, loading position of transformers and transmission lines, system constraints, future system expansion plans and other related issues.

Following are some of the important observations:

- i. Most of developmental works of NTDC are delayed. Commitment charges are being paid due to delay in execution of projects. Total of 3.385 Million US dollars have been paid by NTDC in respect of commitment charges. This is a drain of public exchequer.
- ii. The projects which are already delayed from their contractual completion date are given as under:

Sr. No	Project Name	Contractual Completion Date	Progress (%) October 2015
1	220 kV Chishtian grid station along with associated T/Line.	Grid Station (G/S) 8.9.2013 Transmission Line (T/L) 21.8.2013	G/S - 80% T/L - 99%
2	220 kV Vehari grid station extension	8.9.2013	82 %
3	220 kV Gujrat grid station	21.03.2015	60 %
4	500 kV New Lahore grid station	17.11.2014	42%
5	Associated transmission lines for 500 kV New Lahore grid station and 220 kV Gujrat grid station	13.03.2015	73 %
6	500 kV Rahim Yar Khan grid station and associated transmission line	G/S - 30.01.2012 T/L - 24.11.2012	G/S - 85.33% T/L - 56.80%
7	500 kV Shikarpur grid station and associated transmission line	G/S - 2.8.2014 T/L - 26.6.2015.	G/S - 79.92% T/L - 52.65%
8	220 kV Dera Murad Jamali grid station and associated transmission line	5.2.2014	73.17%
9	Installation of Static Var Compensators at 220 kV New Kot Lakhat grid station	17.01.2014	76%

- iii. The practice of extending the due date of commissioning of projects of national interest has to be discouraged.

- iv. System constraints are posing serious threats to the system reliability.
- v. National Power Control Center (NPCC) up gradation project has been mishandled by NTDC. The SCADA project at the moment is short of at least 41 to 51 Remote Terminal Units (RTUs). SCADA system with existing number of RTUs seems insufficient for real time monitoring of power system or proper load flow studies at NPCC.
- vi. The interconnection arrangements for under mentioned power generation projects are behind schedule and cannot be commissioned before the expected commissioning of power houses. This will cause power evacuation problems.

Sr. No	Name of Project	Date of commissioning of plant	Date of completion of power evacuation project	Physical Progress as of September 2015
1	Jhimpir & Gharo Wind Clusters	July – December 2016	December 2016	5 %
2	Neelum Jhelum Hydro Power Project	November 2016	June 2016	47 %
3	Quaid-e-Azam Solar Park (600 MW)	July 2016 – February 2017	March 2016	40 %
4	Thar Coal based power generation projects	December 2017	June 2017	Bids under evaluation

- vii. Interim arrangement for Jhimpir & Gharo wind clusters which is expected to be commissioned by March 2016, will not be ample to evacuate almost 500 MW of power from wind power plants that are expected to be commissioned by July 2016. Moreover the completion of interim arrangement by March 2016 is also not visible.
- viii. Commissioning of 500 kV Shikarpur grid station seems to be delayed from expected completion date of March 2016. The system reliability will continue to persist in this winter due to absence of 500 kV Shikarpur grid station.
- ix. A system needs to be developed to assess the monetary loss incurred due to each and every tripping/fault in 220 & 500 kV network.
- x. Five number of 220 kV transmission lines of NTDC are overloaded.
- xi. NTDC has no specific plans for reduction of transmission losses.
- xii. The metering system at Common Delivery Points (CDPs) cannot be considered fully “secure”.

- xiii. Fault recorders are out of order at almost all grid stations of NTDC.
- xiv. Comments were solicited from NTDC regarding observation of NEPRA on issues highlighted in this report. NTDC submitted its response which has revealed that completion dates of following development works have been further extended by NTDC.
 - a. 220 kV Chistian substation and Vehari grid station extension project.
 - b. 220 kV Gujrat Substation.
 - c. 500 kV Lahore New grid station.
 - d. 500 kV Rahim Yar Khan Grid Station.
 - e. 500 kV switching station at Moro.
 - f. Associated transmission line from 500 kV Lahore New grid station and 220 kV Gujrat grid station.
 - g. Associated transmission line for 500 kV Rahim Yar Khan Grid Station.
 - h. Associated transmission line for 500 kV Shikarpur Grid Station.
 - i. Installation of Static Var Compensators at 220 kV New Kot Lakhpat grid station.
- xv. NTDC has not raised any objections/concerns on observations of NEPRA regarding issues highlighted in this report.

1. INTRODUCTION

The Authority desired visit of professionals of NEPRA to NTDC which was carried out on August 10-11, 2015. In this regard a presentation was made before the Authority on 25.08.2015.

The Authority directed to submit final report with all facts and figures after sharing the report with NTDC.

The comments are solicited from NTDC. It is pertinent to mention here that NTDC only provided its comments for Power Evacuation Projects and Development Works.

After incorporating comments of NTDC final report is placed here.

2. POWER EVACUATION PROJECTS

Timely completion of Power evacuation projects is extremely important for safe and reliable dispersal of power from a newly commissioned power plant. NTDC is obligated to complete the power evacuation arrangement for any upcoming power plant before its Commercial Operations Date (COD).

In the case of Uch-II Power (Pvt.) Limited and 747 MW Guddu power plant, it has been observed that NTDC has provided interim arrangement for power dispersal.

Interim arrangement is an arrangement with which power is dispersed from a power plant with certain technical limitations. In other words, interim arrangement is unreliable scheme for power dispersal from any power plant.

NTDC must stop the trend of providing interim arrangements for power dispersal as this may negatively affect the system reliability.

Following is the list of ongoing power evacuation projects along with their progress of work as of October 2015.

2.1 Power Evacuation from Uch-II Power Plant:

Uch-II power plant achieved COD on 04.04.2014. Uch-II is one of the most economical power plants of Pakistan. According to Power Purchase Agreement (PPA), NTDC was required to construct and complete 125 km 220 kV double circuit transmission line on twin bundled Rail conductor from Uch-II power project to Sibi, 150 days prior to COD of plant, for safe and reliable dispersal of power.

Contractor has been mobilized at site for construction of above mentioned 220 kV transmission line. The progress of work on said transmission line, as reported by NTDC in September 2015, is that only 3 out of 321 towers have been erected.

The power is being dispersed from Uch-II on interim arrangement. The abnormal delay in construction of 125 km D/C transmission line has affected system reliability as N-1 contingency is missing.

Further, due to non-commissioning of above mentioned transmission line, at times almost 375 MW of economical power from Uch-II has to be shed as there are severe transmission and transformation constraints in the area especially in winter season. In order to ensure system reliability in winter season, cross (X) trip schemes have been commissioned at Guddu power plant and Uch-II power plant in order to limit the generation in case of any transmission or transformation constraint and thus ensuring a safe and reliable network.

Observations of NEPRA:

- i. At times Uch-II power plant has to be shut down or operated below rated capacity due to system constraints of NTDC. Closure of Uch-II power plant causes loss of 0.375 Million units of energy per hour. Further, closure of Uch-II for one hour causes monetary loss of 1.5 Million Rupees.
- ii. The financial loss incurred during financial year 2014-15, due to transmission system constraints, is 6.472 Billion Rupees.
- iii. At least 115427 number of domestic consumers get affected due to closure of Uch-II power plant, this constitutes 0.57% of total consumers in PEPCO system.
- iv. Relying on the interim arrangement, NTDC is not giving priority to this project as it demands. The interim arrangement gets highly unreliable especially in winters.

Comments of NTDC:

- i. Contractor has been mobilized at site on 20th December 2014.
- ii. Soil investigation has been completed and conventional foundation for 76 out of 321 towers has been provided.
- iii. Security issues persists in the project area however NTDC is trying its level best to arrange security and expedite progress of work.
- iv. Expected Completion date of project is **April 2016**.

2.2 Power Evacuation from 747 MW Guddu Power Plant:

747 MW Guddu new power plant was commissioned in year 2014. NTDC was required to construct and commission 500 kV transmission line from Guddu new power plant to Muzafar Garh (256 km).

The progress of work on construction of said transmission line up to September 2015 is as follows.

- i. Tenders for construction of transmission line have been opened on 30.07.2015 and bids are under evaluation.
- ii. Tender for procurement of material opened on 30.07.2015 and bid evaluation report sent to Asian Development Bank for concurrence

At the moment power is being dispersed from power plant on interim arrangement by making In/Out arrangement of 500 kV Guddu-Multan transmission line at Guddu new power plant. The interim arrangement is not satisfactory due to absence of N-1 provision. Any fault on interim arrangement will result in closure of 747 MW Guddu Power Plant.

Observations of NEPRA:

- i. Absence of N-1 contingency provision on interim arrangement.

Comments of NTDC:

- i. Contract awarded for procurement of material.
- ii. Re-tendering under process for construction of transmission line.

2.3 Power Evacuation from Neelum Jhelum Hydro Power Project:

The Actual scope of work for power evacuation from Neelum Jhelum Hydro power project is 270 km, 500 kV D/C transmission line from Neelum Jhelum HPP to 500 kV Ghakkar (Gujranwala) grid station. However, NTDC plans to evacuate power by interim arrangement that includes construction of 500 kV Double Circuit Quad Bundle Transmission line from Neelum Jhelum to Domeli (145 km). NTDC is committed to construct and commission 145 km transmission line by June 2016.

The expected date of commissioning of Neelum Jhelum HPP is November 2016. The progress of work on construction of 145 km transmission line for Neelum Jhelum HPP is 50 % (i.e. up to September 2015).

At existing pace of work the transmission line may not available for cold start of plant.

Observations of NEPRA:

- i. The progress of work is likely to be hampered in winter (i.e. December 2015 to February 2016) due to extreme cold weather and snow fall in project area.
- ii. Any possible delay in commissioning of transmission line will deprive system from economical generation of Neelum Jhelum HPP (i.e. 969 MW).

Comments of NTDC:

- i. 365 out 419 towers concreted and 190 towers have been erected.
- ii. Heavy rain and mud sliding in the project area and ROW issues in Lot-I are major bottlenecks.
- iii. Expected completion **June 2016.**

2.4 Power Evacuation from 2x340 MW Chashma (C3 & C4) Power Plants:

The interconnection arrangement of Chashma (C3&C4) includes construction and commissioning of 220 kV D/C transmission line from Chashma to Bannu (126 km).

The transmission line was expected to be commissioned by October 2015 but the progress of work up to September 2015 is 90%. It has been learnt that only 16 km of stringing work is remaining.

Observations of NEPRA:

- i. The low voltage problem in the areas of Bannu will continue to persist till completion of said transmission line.
- ii. Low voltage is resulting in loss of energy and problem to end consumers.
- iii. More efforts are required as almost 90% of work is completed.

Comments of NTDC:

- i. Transmission line completed up to terminal tower at Chashma Power Plant however power house switchyard yet not commissioned.

2.5 Power Evacuation from Jhimpir and Gharo Wind Power Plants:

By December 2016 almost 1500 MW of wind power is expected into the network. Most of the wind power plants at Jhimpir and Gharo, Sindh are set to be commissioned by July 2016. The interconnection scheme for power evacuation from these wind power plants include following:

Sr. No	Interconnection	Date of Completion	Progress
1	220 kV Jhimpir New Grid Station	1.12.2016	Land acquired. Soil investigation completed and construction of boundary wall in progress.
2	220 kV Gharo New Grid Station	2016-17	Land acquired. Soil investigation under progress.
3	20 kV D/C transmission line from Jhimpir – Gharo (75 km)	24.02.2016	Tender for construction of line under evaluation.
4	220 kV D/C transmission line from Jhimpir New – Tando Muhammad Khan Road (70 km)	26.07.2016	Check survey and tower stacking in progress.
5	132 kV Jhimpir – Tando Muhammad khan D/C transmission line (82 km)	15.03.2016	Contract for construction of line awarded.

Almost 10 wind power plants (i.e. 480 MW) are expected to be commissioned by July 2016 but completion of power evacuation arrangements for these power plants is delayed by almost six (06) months. NTDC is committed to provide interim arrangement for power evacuation of these power plants by commissioning 132 kV Jhimpir to Tando Muhammad khan D/C transmission line (82 km) by March 2016.

Observations of NEPRA:

- Power will be evacuated on interim arrangement by commissioning 132 kV Jhimpir – Tando Muhammad khan Road D/C transmission line (82 km).
- Interim arrangement will not be ample to evacuate almost 500 MW of power from wind power plants that are expected to be commissioned by July 2016.
- The 132 kV transmission line from Jhimpir to Tando Muhammad Khan (82 km) meant for interim arrangement cannot be expected before December 2016 which it was due in March 2016.
- Severe voltage fluctuations are experienced due to absence of permanent arrangement in areas of Jhimpir and Gharo.

Comments of NTDC:

- Soil investigation completed and civil works in progress for 220 kV Jhimpir grid station.
- Soil investigation completed and electrical earth resistivity test completed.
- 117 out of 218 towers have been concreted for 220 kV transmission line from Jhimpir to Tando Muhammad Khan Road grid station, erection work not started yet.
- Expected completion date is March 2016.

2.6 Power Evacuation from Thar Coal Power Project:

Thar coal power project is Pak China Economic Corridor project. The power dispersal scheme for dispersing Thar coal based generation at Thar, Sindh includes construction and commissioning of a 500 kV D/C transmission line from Thar to Matiari (250 km) and two 500 kV line bays along with (3x37) MVAR shunt reactors at 500 kV Matiari switching station. The expected completion date of this project is June 2017.

The progress of work as reported by NTDC in September 2015 is that the bids are under consideration with BoD NTDC for approval.

660 MW Engro Thar coal plant and 1320 MW Sino Sindh Resources Limited are expected to commission in June 2017.

Observations of NEPRA:

- i. The transmission line is likely to be delayed further which will cause problems in power evacuation from coal power plants at Thar.

Comments of NTDC:

- i. Contract for Lot-I awarded in November 2015 whereas bids are under evaluation for Lot-II.
- ii. Expected commissioning date is 2016-17.

2.7 Power Evacuation from Quaid-e-Azam Solar Park (Evacuation of 600 MW Solar Power)

1000 MW Quaid-e-Azam solar power upon completion will be one of the world's largest solar park. The interconnection arrangement for initial 400 MW power generation is in the scope of MEPCO whereas, interconnection for 600 MW power generation from Quaid-e-Azam Solar Park is in the scope of NTDC. The MEPCO's scopes of work include:

Sr. No	Interconnection	Progress	Remarks
1	132 kV D/C T/Line for interconnection of first 2x50 MW Solar plants with proposed 132 kV Bahawalpur – Lal Suhanara S/C T/Line (4 km)	100 %	Completed
2	132 kV D/C T/Line for interconnection of 2x50 MW Solar plants with proposed 132 kV Bahawalpur – Lal Suhanara S/C T/Line (4 km)	100%	Completed
3	Extension at 220/132 kV Bahawalpur New Substation (two line bays)	100%	Completed
4	132 kV D/C T/line from Bahawalpur New to Lodhran (40 km)	95 %	In progress
5	132 kV D/C T/Line for interconnection of 4x50 MW Solar plants with proposed 132 kV Bahawalpur – Lal Suhanara S/C T/Line (8 km)	Physical Location of Grid gantries are yet to be provided by M/S Zonergy.	

NTDC's scope of work includes:

Sr. No	Interconnection	Date of Completion	Progress as on September 2015	Remarks
1	220 kV Lal-Suhanra grid station	February 2016	Civil work on foundation of grid station in progress (47%)	Project would be delayed further
2	220 kV Lal-Suhanra-Bahawalpur D/C transmission line (40 km)	March 2016	Towers concreted = 67/92 Towers erected = 30/92	Project would be delayed further
3	3x132 kV D/C transmission lines from solar project sites to 220 kV Lal Suhanara grid station (8 km each).	March 2016	Notice of award issued to contractor	--

Observations of NEPRA:

- MEPCO has almost completed their scope of work through which initial 400 MW of power from solar park can be evacuated.
- NTDC need to expedite the work for evacuation of the remaining 600 MW.
- The pace of work on 220 kV Lal Suhanra grid station is not satisfactory. The delay in commissioning of 220 kV Lal Suhanara station is likely to hamper the evacuation of power from Quaid-e-Azam Solar Park.

Comments of NTDC:

- i. Overall progress of work is 55%.
- ii. Expected completion date is April 2016

2.8 Power Evacuation from 1320 MW Port Qasim Power Project:

The 1320 MW Port Qasim power project is expected to be commissioned on December 2017. The power dispersal scheme for said project includes construction and commissioning of 500 kV D/C transmission line from Bin Qasim power plant to 500 kV Matiari switching station (180 km) and 500 kV line bays along with (3x37) MVAR shunt reactors at 500 kV Matiari switching station. The expected completion of the project is June 2017.

The progress of work up to September 2015 as reported by NTDC is as follows.

- i. Land acquisition for Matiari switching station is in progress.
- ii. The bids are under evaluation for construction of 500 kV Port Qasim – Matiari transmission line.

Two ± 600 kV HVDC Bipole Transmission Line with Takeoff Switching / Converter Stations at Matiari & Port Qasim and receiving Converter / Switching Station at Lahore and Faisalabad are to be constructed on BOOT basis as per Transmission Policy of GoP under CPEC project by an Independent Transmission Company (ITC) State Grid China to evacuation power from imported coal based power plants at Port Qasim & Hub, nuclear power plants K2/K3 near Karachi and indigenous Thar coal based power plants at Thar having total capacity of about 8000 MW. The expected completion date of HVDC transmission lines is December 2017.

Observations of NEPRA:

- i. The project area consists of rocky terrain due to which completion of transmission line within contractual completion date seems a challenge for NTDC.
- ii. HVDC transmission lines are expected to be completed by December 2017 (i.e. six months after power plant), the delays in HVDC transmission lines will cause power evacuation problems.

Comments of NTDC:

- i. Land acquisition of Matiari switching station is in progress.
- ii. Bids are under evaluation for construction of 500 kV Matiari to Port Qasim transmission line.
- iii. Expected completion date 2016-17.

2.9 Power Evacuation from 1320 MW Coal Power Plant at Jamshoro:

The first unit of 660 MW at Jamshoro is expected to be commissioned in December 2019. Power dispersal scheme for 1320 MW Coal Power plant at Jamshoro includes following:

Sr. No	Interconnection	Date of completion	Progress
1	500 kV Jamshoro-Moro-Dadu (202 km)	1.12.2016	45.53%
2	500 kV Moro-Goth Qazi Mahar transmission line	23.12.2016	63.33%
3	500 kV Goth Qazi Mahar – Rahim Yar Khan transmission line	3.8.2016	50.32%
4	500 kV switching station at Moro	9.5.2016	11%

52 % of work on construction of transmission line has been completed up to September 2015. The expected completion date of above mentioned interconnection scheme is December 2016.

Observations of NEPRA:

- i. 500 kV Jamshoro-Moro-Rahim Yar Khan S/C transmission line has been abnormally delayed for almost four years. In view of this fact and at existing pace of work the completion of line by December 2016 seems very difficult.

Comments of NTDC:

- i. Overall progress on the project is 17%.
- ii. Expected completion date is December 2016.

2.10 Power Evacuation from Patrind Hydro Power Project:

147 MW Patrind hydro power project is expected to achieve COD in April 2017. The interconnection arrangement for Patrind hydro power project includes construction and commissioning of 132 kV D/C transmission line (45 km) from power plant to 220 kV Mansehra new grid station and In/Out arrangement of 132 kV Patrind – Mansehra transmission line at Balakot and Muzafarabad-II grid station. The expected completion date for interconnection arrangement is June 2017.

The 220 kV Mansehra new grid station is a vital part for interconnection arrangement for Patrind HPP. The progress of work at 220 kV Mansehra new grid station up to October 2015 is 15 %. The expected completion date for 220 kV Mansehra new grid station is December 2016.

Observations of NEPRA:

- i. Delay in commissioning of 220 kV Mansehra grid station will not only cause serious power evacuation problems from Patrind HPP but also the low voltage problem will continue to persist in above mentioned areas.

Comments of NTDC:

- i. Procurement of material is in progress and survey work being finalized/re-checked.
- ii. Land acquisition for 132 kV Muzafarabad grid station is in process by AJK Govt.

3. DEVELOPMENT WORKS

NTDC's performance in respect of execution of developmental projects has been poor. Due to delay in completion of projects 'Commitment Charges' are being paid to donor agencies resulting loss of public exchequer.

NTDC must stop granting extensions in dates for completion of projects. The summary of ongoing developmental projects is as follows:

3.1 Grid Stations

Sr. No	Project Name	Progress (%) October 2015	Contractual Completion Date	New Target Date	Remarks of NEPRA as of Oct. 2015	Comments of NTDC as of Feb. 2016
1	220 kV Chishtian Grid Station	80%	8.9.2013	30.12.2015	Project would be completed in time.	All major equipment installed and wiring work in progress. Overall progress is 85%. Expected completion date is April 2016.
2	220 kV Vehari Grid station extension project	82 %	8.9.2013	30.12.2015	Project would be completed in time.	
3	220 kV Gujrat Grid Station.	60 %	21.03.2015	31.12.2015	Project would be delayed further	FAT of material completed and all material received at site. Overall progress is 75%. Expected completion date is June 2016.
4	500 kV New Lahore Grid Station	42%	17.11.2014	31.12.2015	Project would be delayed further	500/220 kV Auto T/Fs delivered at site. Overall progress is 52%. Expected completion date is December 2016.

5	500 kV Rahim Yar Khan Grid Station	85.33%	30.01.2012	31.12.2015	Project would be delayed further	Overall progress is 87%. Expected completion date is June 2016.
6	500 kV Shikarpur Grid Station	79.92%	2.8.2014	31.12.2015	Project would be delayed further	Overall progress is 85%. Expected Completion date is April 2016
7	220 kV Dera Murad Jamali Grid Station	73.17%	5.2.2014	30.06.2016	Project would be delayed further	Overall progress is 81%. Expected completion date is June 2016.
8	220 KV Mansehra Grid Station	15%	31.12.2016	--	Project would be delayed further.	Overall progress is 15%. Expected completion date is December 2016.
9	220 kV Ghazi Road Grid Station	12%	30.10.2016	--	Project would be delayed further.	Overall progress is 15%. Expected completion date is December 2016.
10	220 kV Chakdara Grid Station	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Bid evaluation report sent to ADB for concurrence. Expected completion date is December 2016.
11	220 kV DI Khan (New) Grid Station	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Bid evaluation report sent to ADB for concurrence. Expected completion date December 2016

12	220 kV Nowshera Grid Station	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Land acquisition for grid station is under progress. Expected completion date is December 2016.
13	Switching Station at Moro	11.15%	01.12.2016	--	Project would be delayed further.	Overall progress is 17%. Expected completion date is December 2016.

3.2 Transmission Lines

Sr. No	Project Name	Progress (%) October 2015	Contractual Completion Date	New Target Date	Remarks of NEPRA as of Oct. 2015	Comments of NTDC as of Feb. 2016
1	Associated T/Line for 220 kV Chishtian Grid Station	99%	21.8.2013	30.12.2015	Completed	Completed
2	Associated T/Line for 500 kV new Lahore Grid station & 220 kV Gujrat Grid Station	73 %	13.03.2015	31.12.2015	Project would be delayed further	Sever Right of Way Issues near New Lahore grid station. Expected completion date is March 2016. Overall progress is 75%.
3	Associated T/Line for 500 kV Rahim Yar Khan grid station	56.80%	24.11.2012	31.12.2015	Project world be delayed further	Contract with Gamarak Iran terminated. Bid evaluation report for new tender sent to JICA for concurrence. Expected completion date is June 2016.

4	Associated T/Line for 500 kV Shikarpur Grid Station	52.65%	26.6.2015.	31.3.2016	Project would be delayed further	Expected completion date is June 2016. Overall progress is 71%.
5	Associated T/Line for 220 kV Dera Murad Jamali Grid Station	73.17%	5.2.2014	30.06.2016	Project would be completed in time	Expected completion date is June 2016. Overall progress is 81%.
6	Jamshoro-Moro-Dadu to Rahim Yar Khan T/Line	Lot-I: 45.53% ; Lot-II: 63.33% ; Lot-III: 50.32%	1.12.2016	--	Project would be delayed further	Overall progress is 66%.
7	Associated Transmission Lines for 220 kV Chakdara S/S with	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Tenders opened, evaluated and sent to ADB for concurrence.
8	Associated Transmission line for 220 kV G/S DI Khan (New)	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Tenders opened, evaluated and under approval of award.
9	Associated Transmission line for 220 kV Nowshera grid station	Tenders opened, evaluated and under approval of award.	31.12.2016	--	Project would be delayed further.	Tenders opened, evaluated and under approval of award.
10	Associated T/Line for 220 KV Mansehra grid station	5%	31.12.2016	---	Project would be delayed further.	Overall progress is 15%.

3.3 Others

Sr. No	Project Name	Progress (%) October 2015	Contractual Completion Date	New Target Date	Remarks of NEPRA as of Oct. 2015	Comments of NTDC as of Feb. 2016
1	Installation of Static Var Compensators at 220 kV	76%	17.01.2014	31.12.2015	Project would be completed	Work held up due to litigation between

	New Kot Lakhpatri grid station				in time	main contractor M/sABB and Sub-contractor M/s Netracon. Expected completion date is March 2016.
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Observations:

- i. The projects mentioned at serial 1 to 7 in sections 3.1 and serial 1 to 5 in section 3.2 above, are all delayed from their contractual completion dates.
- ii. There is a tendency to extend the completion time of projects which is “harmful” for the system.
- iii. Total of 3.385 Million US dollars have been paid by NTDC in respect of commitment charges due to delay in execution of projects.

4. SYSTEM CONSTRAINTS

System constraints are posing serious threats to system reliability. Some of the most prominent transmission system constraints are as under:

4.1 Transformation constraints at 500 kV Guddu grid station in winter season.

In winter season the local demand of SEPCO and QESCO decreases prominently, due to which the unutilized power is routed through 220 kV transmission lines to 500 kV Guddu grid station so that it may be stepped up and dispersed on 500 kV network. The transformation capacity available at 500 kV Guddu grid station is 1350 MVA/ 1215 MW which prove in sufficient in winters. Establishment of 500 kV Shikarpur G/S along with transmission lines and utilization of allocated power by QESCO will solve this problem.

The existing progress of work regarding up gradation of 220 kV Shikarpur G/S into 500 kV is **79%** and target completion date is **December 2015**. Whereas, the target completion of interconnection of 500 kV Shikarpur G/S with Guddu and rest of 500 kV system is **March 2016**. Hopefully, this problem will be resolved by **March 2016** with commissioning of 500 kV Shikarpur grid station and allied transmission lines.

Due to transmission and transformation constraints especially in winter season, at times one or more plants from Uch-II Power (Pvt.) Limited, Engro Power Gen. Qadirpur, TNB Liberty and Foundation Power Company (Dharki) limited has to be shut down.

Observations:

- i.* Transformation constraints are likely to be experienced in this winter too. The 500 kV Shikarpur grid station is not expected to be commissioned before June 2016. It is delayed.
- ii.* The total financial loss incurred due to transmission and transformation constraints at Guddu during FY 2014-15 is **10.682 Billion Rupees**.

4.2 Absence of N-1 provision on 500 kV HUBCO - Jamshoro Transmission

Line:

N-1 contingency provision is not available on 500 kV HUBCO - Jamshoro (i.e. S/C x 2) transmission lines. Moreover, overloading of 500 kV HUBCO – NKI transmission line is expected in near future due to construction of Tawarki Steel Mill in Karachi.

The In/Out arrangement of 500 kV HUBCO-Jamshoro, 2nd circuit has been proposed by GSO to planning department of NTDC. The case is under study at the moment.

Further, 500 kV HUBCO - Jamshoro transmission line also experiences frequent tripping in winter season due to fog and humidity which affects system reliability in south. In this regard, GSO department has proposed for shifting of said lines away from coastal belt. The case is under evaluation at planning department. Moreover, EHV has been asked to make survey of area in view possible shifting of lines.

Observations:

- i. In case of outage of any circuit, there is chance of major break down in Hyderabad region of NTDC. The proposed solution is under evaluation which may take time to materialize. This issue has to be addressed on priority.
- ii. Each circuit of said transmission line has capacity to transfer almost 600 MW of power. Tripping of said line causes loss of 0.6 Million units of energy per hour. Monetary loss per hour is measured to be 6.0 Million rupees.
- iii. In case of tripping of said transmission line almost 190000 (i.e. 0.95%) of domestic consumers would be effected.

4.3 Absence of 2nd source at 220 kV Tando Muhammad Khan Road grid station and 220 kV Hala Road grid station.

220 kV Hala Road grid station and 220 kV Tando Muhammad Khan grid station are being energized from 500 kV Jamshoro. Provision of 2nd source at is missing at these grid stations. NTDC plans to construct and commission 220 kV D/C transmission (10 km) between Hala Road grid station and Tando Muhammad Khan Road grid station which will solve the problem. The expected date of commissioning of said transmission line is 2017-18, however the financing of the project is yet not arranged.

Observations:

- i. The reliability of system is likely to be affected in southern parts of Sindh in case of any fault or tripping of 220 kV D/C transmission line between Jamshoro- TM Khan and Jamshoro - Hala Road grid station.
- ii. In case of outage of any of above mentioned 220 kV grid stations at least 83000 domestic consumers get affected in Hyderabad region.

4.4 Power Evacuation Constraints from Nishat Power, Nishat Chunyan and Orient Power:

The total installed generation capacity of Nishat Power, Nishat Chunyan and Orient Power is 630 MW. Three 132 kV transmission lines between 132 kV Bhai Pheru grid station and 220 kV Sarfaraz Nagar grid station are used for power evacuation from above plants. These 3x132 kV transmission lines capacities are inadequate due to which they often experience overloading and hence power evacuation is restricted from Nishat Power, Nishat Chunyan and Orient power plants.

Observations:

- i.* NTDC must take the case with LESCO for rehabilitation of 132 kV lines. This is primarily the job of LESCO but it has to be pushed by NTDC as they face the generation problems.
- ii.* In event of overloading of transmission lines at least 200 MW of power has to be shed due to which almost 0.2 Million units of energy are lost per hour. This results a monetary loss of 2.0 Million Rupees in single hour of outage.

5. LOADING POSITION OF TRANSMISSION LINES

The 500 kV transmission lines are operating smoothly in normal conditions and all of the 500 kV transmission lines are operating below 80% of rated load.

The 220 kV transmission infrastructures is under stress at certain areas. Following is the list of brief of loading position of 220 kV transmission lines of NTDC for the month of August 2015:

Sr. No	Name of Transmission Line	Percent (%) Loading August 2015	Length (km)
1	220 kV Ghakar - Sialkot	> 100	36
2	220 kV Ravi - Sheikhpura		38
3	220 kV KAPCO - Multan		100
4	220 kV KAPCO - Muzafer Garh		49
5	220 kV KAPCO - Pak Gen		79
6	220 kV Gatti - Nishatabad Circuit I	> 90	2
7	220 kV Gatti - Nishatabad Circuit II		2
8	220 kV Gatti - Bandala Circuit I		31
9	220 kV Gatti - Bandala Circuit II		31
10	220 kV Jamshoro - Hala Road I		14
11	220 kV Jamshoro - Hala Road II		14
12	220 kV Guddu - Uch		168
13	220 kV Gatti - Jaranwala I	> 80	16
14	220 kV Gatti - Jaranwala II		16
15	220 kV Summadary Road - Nishatabad I		23
16	220 kV Summadary Road - Nishatabad II		23
17	220 kV Uch - Sibbi I		127
18	220 kV Uch - Sibbi II		108
19	220 kV Shikarpur - Uch		95
20	220 kV Multan - Toba Tek Singh I		65
21	220 kV Multan - Toba Tek Singh II		65

According to statistics of September 2015 following transmission lines are operating above 80%.

- i. **220 kV Ghakar – Sialkot**
- ii. **220 kV Gatti - Nishatabad Circuit I**
- iii. **220 kV Gatti - Nishatabad Circuit II**
- iv. **220 kV Guddu – Uch**
- v. **220 kV Shikarpur - Uch**

Observations:

- i. 220 kV Ghakar – Sialkot, 220 kV Gatti - Nishatabad Circuit I&II, 220 kV Guddu – Uch and 220 kV Shikarpur- Uch seems to be permanently over loaded.
- ii. The overloaded transmission lines indicate either lack of proper planning by NTDC or delay in executing the job for its addressal.

6. LOADING POSITION OF GRID STATIONS

The summary of loading position of transformers at NTDC's 500 kV and 220 kV grid stations for the months of June, July, August and September 2015 is given below.

Transformer Voltage Level	June. 2015		July. 2015		August. 2015		September. 2015	
	Total	Loaded above 80%	Total	Loaded above 80%	Total	Loaded above 80%	Total	Loaded above 80%
500/220 kV	33	8	33	3	33	6	33	8
220/132 kV	130	93	130	43	130	52	130	49

Observation: Most of power transformers at 220 kV grid stations are loaded above 80%

7. SYSTEM EXPANSION PLANS

The system expansion plans of NTDC for next five years (i.e. up to FY 2019-20) are categorized as:

- i. Short term plans: Ongoing development projects of NTDC (**Annex-A**)
- ii. Medium term plans: Projects which are ready for implementation (**Annex-B**)
- iii. Long term plans: Projects whose financing is as yet not arranged (**Annex-C**)

The summary of investment required to carry out above mentioned plans, as intimated by NTDC, is as follows:

Description	Completion Year	No. of Projects	Estimated Cost (Million Rs. / Million US\$)	Financing Arranged / Admitted (Million Rs. / Million US\$)	Financing Required (Million Rs. / Million US\$)
Short Term Plan	2015-16	22	94,249 / 1174	89,419 / 1127	4,830 / 47
Medium Term Plan	2016-17	21	106,017 / 1153	46,373 / 557	58,644 / 596
Long Term Plan	2019-20	21	141,882 / 1391	51,000 / 500 *	90,882 / 891
Total		64	342,148 / 3718	187,792 / 2,184	154,356 / 1,534

* 30 Million US\$ committed by JICA for 500 kV Faisalabad; 350 Million US\$ committed by WB for Dasu T/Line Project
120 Million US\$ committed by WB for CASA 1000 Project

The NTDC's network after the successful execution above mentioned system expansion plans will be as under:

Description	No. of 500 kV Grid Stations (MVA Capacity)	No. of 220 kV Grid Stations (MVA Capacity)	Length of 500 kV Transmission Lines (km)	Length of 220 kV Transmission Lines
Existing NTDC's System (June 2015)	13 18,624 MVA / 16,762 MW	39 24,063 MVA / 21,656 MW	5,197	9,814
Proposed Expansion	7 11,100 MVA / 9990 MW	20 16,380 MVA / 14742 MW	3,286	1,656
NTDC's Network After Five Year (2019-20)	20 29,724 MVA / 26,752 MW	59 40,443 MVA / 36,399 MW	8,483	11,470

In next five years almost 23000 MW is expected into national the national grid, if the power generation projects are not delayed. The year wise comparison of available transformation capacity and total generation on 500 and 220 kV network only is given as follows:

Year	Total installed generation capacity (MW) *	Maximum generation available at 500 & 220 kV network (MW)	Transformation Capacity of NTDC's System (MW)	
			500/220 kV	220/132 kV
June 2015	22885	13586	16762	21656
2015-16	23575	13586	21082	27912
2016-17	31191	16170	22702	30999
2017-18	40179	21099	25402	33699
2018-19	41458	23807	25402	33699
2019-20	46038	25982	26752	36399

* This includes generation on 132 kV voltage level.

Observation: Though over all transformation capacity of system seems adequate but if the proposed grid stations are delayed then system may face transformation constraints in certain areas.

8. NPCC UPGRADATION PROJECT

The up-gradation of National Power Control Center (NPCC), Islamabad includes the establishment of fully functional Supervisory Control and Data Acquisition (SCADA) system. The total cost of the project as approved by ECNEC was Rs.2895 million. The expenditure incurred on the project is 33 % higher than the approved cost.

The SCADA project at the moment is short of at least 41 to 51 Remote Terminal Units (RTUs). The contractor is demanding a price Rs. 12 million for installation of each additional RTU. These RTUs were not part of the original contract.

It is relevant to mention here that SCADA system with existing number of RTUs may not be sufficient to “fully” equip NPCC with the provision of real time information of national grid.

The contract for NPCC up gradation was signed on 31.3.2010 between NTDC and Alstom. In this project following latest tools and software applications were included but till date these tools and applications are not operative despite issuance of Take Over Certificate (TOC) on 9.9.2014. The objective of this upgraded project can not be fully achieved without functioning of below mentioned operational applications.

1. Network Application Software
 - a. Optimum Power Flow
 - b. Contingency Analysis

- c. Outage scheduler
- 2. Energy Management Software
 - a. Load Forecast
 - b. Generation Scheduling – unit commitment
- 3. Real Time Dispatching Function
 - a. Reserve monitoring
 - b. Economic Despatch
 - c. Automatic Generation Control

Observation: A very important project for the overall system has been neglected and ignored by NTDC.

9. SECURED METERING SYSTEM AT COMMON DELIVERY POINTS:

Common delivery points are the points between two or more than two companies on which energy transaction takes place. Energy transaction means either energy can be exported or imported from one company to another.

In order to ensure correct meter reading PC-I was approved back in 2004 by NTDC for procuring current transformers and potential transformers exclusively for the energy meters of common delivery points which can be termed as their cash box. These equipment were in total, procured.

The main objective of the project was to install accurate and secured metering system at CDPs with dedicated current transformers and potential transformers of 0.2 accuracy class in separate temperature controlled rooms with provision for remote meter reading/data collection through the public switched network (PSTN) or SCADA. This was planned to ensure that accurate reading is recorded as the “shared” C.T or P.T used for more than one “purpose” can generate error in energy meter reading. It is relevant to mention here that slightest of error in reading caused due to “shared” C.T or P.T can bring a huge variance in the energy recording.

The equipment procured under the said PC-I were used elsewhere, the result being that 225 number of CDPs out of total 446 number of CDPs are without independent C.Ts and P.Ts. the energy meters without independent C.T and P.T cannot be called “secured” and its reading cannot be relied on. This may be one of the reasons of increase in technical losses.

The physical and financial achievement on the project is shown below:

FINANCIAL PROGRESS

Name of the Scheme	PC-I Cost	Expenditure up to FY 2015-15	Expected date of Completion
Secured metering system at delivery points	1009	887	June 2015

PHYSICAL PROGRESS

DISCO	Total number of CDPs	Number of CDPs without having independent C.T and P.T.	% age of CDPs without independent C.T and P.T	Accuracy class of installed meters
SEPCO	27	19	70 %	0.2
HESCO	45	16	35 %	0.2
MEPCO	97	50	51 %	0.2
QESCO	13	7	53 %	0.2
FESCO	64	32	50 %	0.2
LESCO	73	43	59 %	0.2
GEPCO	35	15	43 %	0.2
IESCO	63	19	30 %	0.2
PESCO	49	24	49 %	0.2
TOTAL	466	225	48%	--

Absence of independent C.Ts and P.Ts on 48% of CDPs is not only the violation of PC-I but it is also resulting in metering discrepancies towards which NTDC is oblivious.

Observation:

- i. Absence of Secured Metering System at 48 % of Common Delivery Points.

10. FUNCTIONALITY OF EVENT RECORDER AND FAULT RECORDERS AT GRID STATIONS

Each and every 220 kV and 500 kV grid station must compulsorily have an event and fault recorder. These vital instruments generate very useful and correct information which is of great value and help in assessing cause of any major/minor happening in the grid station or on the system. Most of the event recorders and fault recorders are non-functional at NTDC's grid stations. The detail regarding functionality of fault recorders at various grid stations of NTDC is as follows:

Sr. No	Name of Grid Station	Number of "Fault Recorders" Required	Number of "Fault Recorders" Installed	Number of Faulty "Fault Recorders"
1	500 kV Rawat	4	4	4
2	500 kV Shaikh Muhammadi	5	Nil	-
3	500 kV Gatti	4	4	4
4	500 kV Shekhupura	2	2	2
5	500 kV Multan	10	10	10
6	500 kV Muzafargarh	1	2	1
7	500 kV Yousafwala	11	11	11
8	500 kV DG Khan	2	2	Not commissioned
9	500 kV Dadu	6	6	6
10	500 kV Guddu	3	2	2
11	500 kV NKI	1	1	1
12	500 kV Jamshoro	13	13	13
13	220 kV Burhan	-	Nil	-
14	220 kV Bannu	1	2	1
15	220 kV Daud Khel	2	2	1
16	220 kV Mardan	4	Nil	Nil
17	220 kV Sangjani	4	1	-
18	220 kV Shahi Bagh	-	1	1
19	220 kV University	3	1	-
20	220 kV Nokhar	1	3	0
21	220 kV NKLP LHR	-	Nil	-
22	220 kV Ravi LHR	1	2	2
23	220 kV Sarfaraz Nagar	1	1	1
24	220 kV Sialkot	1	1	1
25	220 kV Kala Shah kaku	1	Nil	-
26	220 kV Bund Road	1	1	1
27	220 kV Ghakar	1	1	1
28	220 kV Wapda town	1	1	0
29	220 kV Shalamar	-	1	0

30	220 kV Ghazi Road	0	Nil	-
31	220 kV Jaranwala	1	Nil	-
32	220 kV Nishat Abad	-	Nil	-
33	220 kV T.T Singh	-	2	Not commissioned
34	220 kV Ludewala	-	2	Not commissioned
35	220 kV Sammundri Road	-	Nil	-
36	220 kV Bandala	-	1	0
37	220 kV Bahawalpur	-	1	1
38	220 kV Vehari	2	Nil	-
39	220 kV Muzafargarh	2	Nil	-
40	220 kV Okara	1	Nil	-
41	220 kV Kassowal	-	Nil	-
42	220 kV Hala Road	4	2	2
43	220 kV Quetta Industrial	2	1	1
44	220 kV Sibbi	1	1	1
45	220 kV Shikarpur	1	1	Not commissioned
46	220 kV Tando Muhammad Khan Road	2	2	2
47	220 kV Dharki	2	Nil	-
48	220 kV Rohri	1	1	Not commissioned
49	220 kV Khuzdar	2	1	Not commissioned
50	220 kV Loaralai	-	1	Not commissioned

Event recorder and fault recorders installed at NTDC's grid stations having developed faults are deliberately not being replaced by NTDC as with the same being in service, nothing can be concealed particularly when a probe or investigation has to be made in a major/minor breakdown or "blackout"

Observation:

- i. It seems that fault recorders are deliberately left un-attended at NTDC's grid stations.

11. Annexure:

11.1 Annexure-A

SHORT TERM PLANS					
Sr. #	Name of Project	MVA Capacity	Addition in T/Line (km)	Expected Completion Date	Donor Agency
1	220 kV Khuzdar G/S along with allied T/Line	2x160	270	Commissioned	JICA
2	220 kV Kassowal G/S along with Allied T/Lines	2x160	60	Commissioned	WB
3	220 kV Okara G/S along with Allied T/Line	3x250	10	One T/F commissioned & 2 nd will be commissioned by Aug. 2015	ADB Tranche II
4	220 kV Toba Tek Sing G/S along with allied T/Line	3x250	2	2x250 (Commissioned) 1x250 (30.11.2015)	ADB Tranche II
5	500 kV DG Khan G/S along with allied T/Line	2x600 + 2x250	40	Commissioned	ADB Tranche II
6	500 kV RYK G/S along with allied T/Line	2x600 + 2x250	60	December 2015	JICA
7	220 kV Gujrat G/S along with allied T/Line	3x250	8	December 2015	JICA
8	220 kV GIS Ghazi RD G/S along with allied T/Line	3x160	30	December 2015 (1x160 MVA T/F temporarily energized)	--
9	SVC at New Kot Lakhpat G/S	450 MVAR	-	December 2015	ADB Tranche II
10	220 kV DM Jamali G/S along with allied T/Line	2x160	5	June 2016	NTDC own Resources
11	500 kV Lahore New G/S along with allied T/Line	2x750	130 (500 kV) 104 (220 kV)	December 2015	JICA
12	500 kV Shikarpur G/S along with allied T/line	2x600	84 (500 kV) 50 (220 kV)	December 2015	JICA
13	220 kV Chistian G/S along with allied T/Line	2x250	65	December 2015	JICA

14	Power Dispersal from Neelum Jhelum HPP	--	275	June 2016	NTDC own Resources
15	220 kV Mansehra G/S along with allied T/Line	2x250	1	December 2016	ADB Tranche III
16	220 kV D/C T/Line from Uch-II to Sibbi	-	125	April 2016	ADB Tranche III
17	Power Dispersal from C3 & C4 (220 kV C3 C4 – Bannu T/line)	-	129	October 2015	NTDC own Resources
18	Power Evacuation from 1000 MW Quai-e-Azam Solar Park at Lal-Suhanra	3x250	40	2015-16 (Linked with Solar COD by Govt. of Punjab)	NTDC own Resources
19	220 kV Jhimpir G/S along with allied T/Line	3x250	70 (220 kV) 172 (132 kV)	December 2016	NTDC own Resources
20	Land Acquisition for convertor stations & grounding station at both ends of ± 600 kV HVDC T/Line from Matiari to Lahore	-	-	2015-16	Not arranged yet
21	Land Acquisition for convertor stations & grounding station at both ends of ± 600 kV HVDC T/Line from Port Qasim to Faisalabad	-	-	2015-16	Not arranged yet
22. Augmentation of Existing G/S					
i	500 kV Sheikh Muhammadi	4x160 to 4x250	-	1x250 MVA T/F commissioned	Iranian Loan & ADB Tranche IV
ii	220 kV Mardan	2x160 to 2x250		December 2015	
iii	220 kV Burhan	4x160 to 4x250		1x250 MVA T/F commissioned	
iv	220 kV Bund Road	4x160 to 4x250		Commissioned	
v	220 kV Bahawalpur	2x160 to 2x250		Commissioned	
vi	220 kV Quetta Industrial	2x160 to 2x250		December 2015	
vii	500 kV Rewat	1x450 to 1x750		December 2015	

11.2 Annexure-B

MEDIUM TERM PLANS					
Sr. #	Name of Project	MVA Capacity	Addition in T/Line (km)	Expected Completion Date	Donor Agency
1	3 RD 500 kV circuit from Jamshoro to Rahim Yar Khan.	-	590	December 2016	ADB Tranche – III
2	Power Dispersal from 747 MW CCPP (500 kV Guddu – Muzafar Garh T/Line)	-	276	December 2016	ADB Tranche – IV
3	220 kV Nowshera G/S along with allied T/Line	3x250	10	December 2016	
4	220 kV Lalian new G/S along with allied T/Line	3x250	8	December 2016	
5	220 kV DI Khan G/S along with allied T/Line	2x250	100	December 2016	
6	220 kV Chakdara G/S along with allied T/Line	2x250	85	2016-17	
7	Installation of SVC at Quetta industrial G/S	-	-	2016-17	US AID
8	Evacuation of Power from 147 MW Patrind HPP	-	70 (132 kV)	2016-17	
9	220 kV Gharo G/S along with allied T/Line and extension at 500 kV Jamshoro G/S and 220 kV T/Line for NBT WPPs	2x250 Gharo + 1x450 Jamshoro	85 (220 kV) 20 (132 kV)	2016-17	-
10	Evacuation of power from 1320 MW Imported coal based power plant at Sahiwal	1x600	0.5	2016-17	-
11	Rehabilitation of NTDC system in south area for improvement in system reliability to avoid the frequent tripping	-	-	2016-17	-
12	Evacuation of Power from 1200 MW LNG based power project at Bhikki	-	3	2016-17	-
13	Evacuation of Power from 1200 MW LNG based power project at Balloki	750	40	2016-17	-
14	Evacuation of Power from 1200 MW LNG based power project at Jhang (Haveli Bahadur Shah)	-	28	2016-17	-
15	Power dispersal from 1200 MW Thar coal power plant (500 kV Thar – Matiari T/Line & Matiari 500 kV S/Station)	-	270	2016-17	-
16	Evacuation of power from 1320 MW Bin Qasim Project	-	180	2016-17	-
17	Evacuation of power from 1320 MW HUB power company limited	-	220	2016-17	-

18	500 kV HVAC T/Line for interconnection of HVDC convertor station at Lahore with existing HVAC system	-	30	2016-17	-
19	Evacuation of power from 300 MW coal fired power plant at salt range	-	80 (132 kV)	2016-17	-
20	Extension/Augmentation of 220/132 kV Rewat S/S (2x160 to 2x 250 + 1x250)	430	-	2016-17	-
21					
i	Replacement of existing 220 kV Tarbella – Burhan D/C T/Line (35 km)	-	138	2016-17	-
ii	Replacement of existing 220 kV Tarbella – Burhan – ISPR D/C T/Line (62.5 km)				
iii	In / Out of one circuit of 220 kV Mansehra – ISPR D/C T/Line at Islamabad University G/S (40 km)				

11.3 Annexure-C

LONG TERM PLANS					
Sr. #	Name of Project	MVA Capacity	Addition in T/Line (km)	Expected Completion Date	Donor Agency
1	500 kV Faisalabad West G/S along with allied T/Line *	3x250 + 2x750	125 (220 kV) 32 (500 kV)	2017-18	Financing Yet Not Arranged
2	500 kV Islamabad West G/S along with allied T/Line	3x250 + 2x750	35 (220 kV) 27 (500 kV)	2017-18	
3	Implementation of Integrated solution to improve productivity and control in NTDC by enterprise resource planning system	-	-	2017-18	
4	220 kV Mirpur Khas G/S along with allied T/Line	2x250	70	2017-18	
5	500 kV Chakwal G/S along with allied T/Line	2x250	20	2017-18	
6	220 kV Mastung G/S along with allied T/Line	2x250	120	2017-18	
7	Evacuation of power from Tarbella 5 th extension	-	77	2017-18	
8	TM khan to Hala RD 220 kV D/C T/Line	-	10	2017-18	
9	Evacuation of power from Karot & Azad Patan HPPs	-	10	2018-19	
10	Evacuation of power from 350 MW siddiqsons Limited	-	32	2018-19	
11	Evacuation of power 660 MW Lucky Electric Power Company Limited	-	32	2018-19	
12	Evacuation of power from 2160 MW Dasu Hydro Power Project (Phase-I)**	-	615	2019-20	
13	Evacuation of Power from 840 MW Suki Kinari HPP (500 kV Switching Station at Allot along with T/lines)	-	200	2019-20	
14	220 kV Kohat G/S along with allied T/Lines	2x250	50	2019-20	
15	220 kV Jamrud G/S along with allied T/lines	2x250	10	2019-20	
16	220 kV Kamra G/S along with allied T/Lines	2x250	5	2019-20	
17	220 kV Shadman G/S along with allied T/lines	2x250	15	2019-20	
18	220 kV Jauhrabad G/S along with allied T/Lines	2x250	10	2019-20	
19	220 kV H.Faqiran G/S along with allied T/Lines	2x250	58	2019-20	

* 30 Million US\$ are committed by JICA for Phase-I

** 350 Million US\$ are committed by World Bank

Sr. #	Name of Project	MVA Capacity	Addition in T/Line (km)	Expected Completion Date	Donor Agency
20	Evacuation of Power from K2/K3 Nuclear Power plant near Karachi (In/Out of 500 kV Port Qasim to Matiari S/C and 500 kV Hub to Matiari S/C at K2/K3)	-	50	2019-20	Financing Yet Not Arranged
21	Interconnection arrangement for CASA-1000 (HVDC Part)*	-	100 (HVDC)	2019-20	
	500 kV Peshawar new G/S along with allied T/Lines (HVAC part of CASA-1000)	2x750	15 (500 kV) 24 (220 kV)	2019-20	

* 120 Million US\$ committed by World Bank