

# पायर ग्रिड कोर्पोरशन ऑफ इंडिया लिमिटेड Power Grid Corporation of India Limited सूचना का अधिकार अभिनियम 2005 के अंतर्गत केन्द्रीय लोक सूचना अधिकारी Central Public Information Officer under the RTI Act, 2005 केन्द्रीय कार्यालय, 'सौदामिनी', प्लाट नं.2, सैक्टर-29, गुडगांव, हरियाणा-122007 Corporate Centre, 'Saudamini', Plot No. 2, Sector-29, Gurgaon, Haryana-122007



CP/RTI/2017/209

Date: 28th September, 2017

Shri Deepak Patel, Express Building, B-1/b, Sector-10, Noida, Uttar Pradesh – 231301

Sub: Information under Right to Information Act, 2005.

Dear Sir.

This has reference to your online RTI request dated 8<sup>th</sup> September, 2017 received in the POWERGRID on 28<sup>th</sup> September, 2017 seeking information under RTI Act, 2005.

Available information is attached at Annexure-I.

First Appeal, if any, against the reply of CPIO may be made to the first appellate Authority within 30 days of the receipt of the reply of CPIO. Details of Appellate Authority at Corporate Centre, Gurgaon, under RTI Act, 2005 is as below:

Shri Sanjeev Singh,
Executive Director (CMG) & Appellate Authority
Corporate Centre, Power Grid Corporation of India Limited
"Saudamini", Plot No. 2, Sector-29, Gurgaon – 122007, Haryana.
Email ID: <a href="mailto:sanjeev@powergridindia.com">sanjeev@powergridindia.com</a>
Phone No. 0124-2571962

Thanking you,

भवदीय,

(अजय होलानी)

अपर महाप्रबंधक (के.आ.) एवं के.लो.सू.अधिकारी

Email ID: cpio.cc@powergrid.co.in

Copt to:

Sh.Sanjeev Jain
 Under Secretary (PG Desk)
 Ministry of Power, Govt of India
 Shram Shakti Bhawan
 Rafi Marg, New Delhi-110001

#### POWER GRID CORPORATION OF INDIA LTD.

(Fastest Growing Electric Utility in Asia since 2014)\*





**New Delhi** 

**September 07, 2017** 

ONE Ration Grid Frequency

As per Plotts Top250 Energy Cos. (2014, 2015, 2016)

#### Index



#### **Transmission – An Introduction**

- Indian Power System Framework
- National Grid Development
- Transmission Planning & Growth

#### **About POWERGRID**

- POWERGRID Overview
- Performance
- Major Projects Under Implementation





## **Transmission – An Introduction**

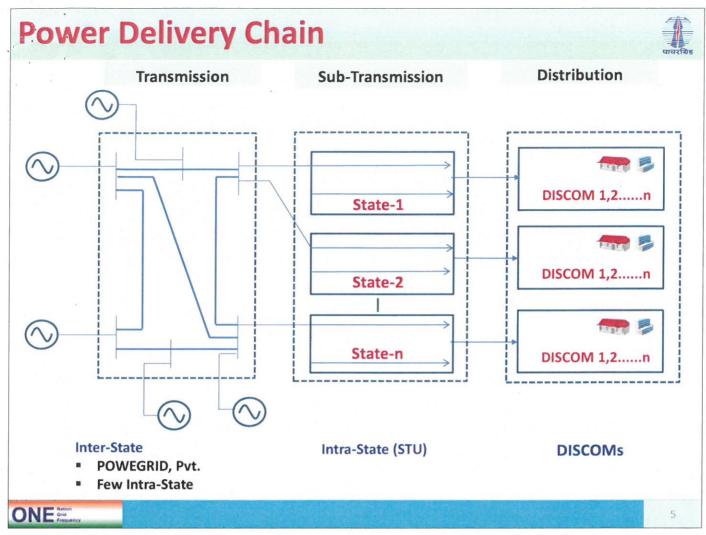


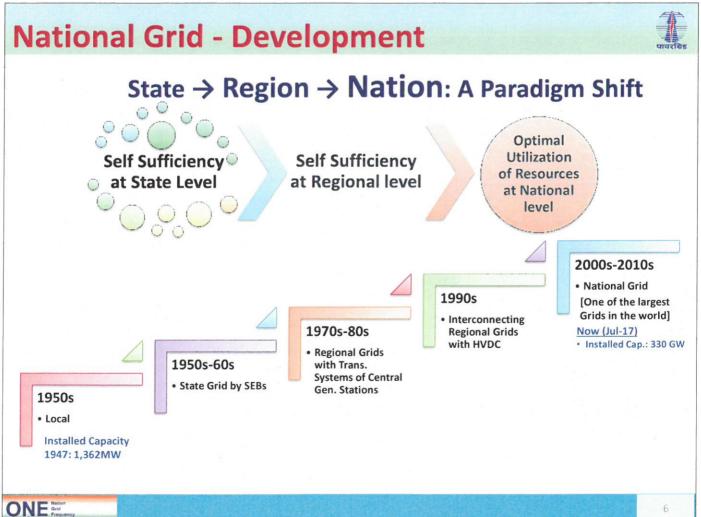
## **Indian Power System Framework**



#### **Electricity - A Concurrent Subject**

#### **Central Level** State Level **Central Electricity Authority** Perspective Planning & System National Electricity Plan Operator Generators Generators POSOCO State Public Sector · Central Public Sector Private Sector/IPP · Private Sector/IPP Power Intra-State Transmission Exchange · State Tr. Utility (STU) Inter-State Transmission · Pvt. Tr. Licensee · CTU/ POWERGRID Traders Distribution · Private Tr. Licensee · State DISCOMs · Pvt. Dist. Licensee Consumers Industries, Household, Agriculture





#### **Development of Synchronous National Grid Existing I-R** Capacity 75,050MW One of the largest Electricity August 2006 North synchronized Grids operating at single One Nation with Central Grid frequency in the world One Grid One Frequency **One Price** March 2003 West synchronized With East & North-East **NEW\*** Grid October 1991 East & North-East synchronized Dec'2013 South 5 Grids synchronized with **NEW Grid** ONE

## **Planning - A Consultative Process**



#### **Inputs for ISTS Planning**

- Open Access applications (Generation linked)
- Operational feedback (System Strengthening)

[Ref: National Electricity Plan of CEA; Demand projection (EPS) of CEA and Capacity addition programs] Extensive System Studies & Component Modelling for evolution of Transmission System

Evaluation of techno-economic alternatives & assessment
(as per Transmission Planning Criteria of CEA)

Standing Committee on Power System Planning
(Technical Approval of Transmission Scheme by Constituents)

Regional Power Committee (Discussions between stakeholders)

#### Empowered Committee on Transmission (ECT)

(To recommend to GoI whether project is to be implemented under TBCB or under regulatory mechanism by POWERGRID/ CTU)

- Govt. allocates project to POWERGRID
- POWERGRID/ CTU seeks Regulatory Approval, if no beneficiaries

Regional Power Co

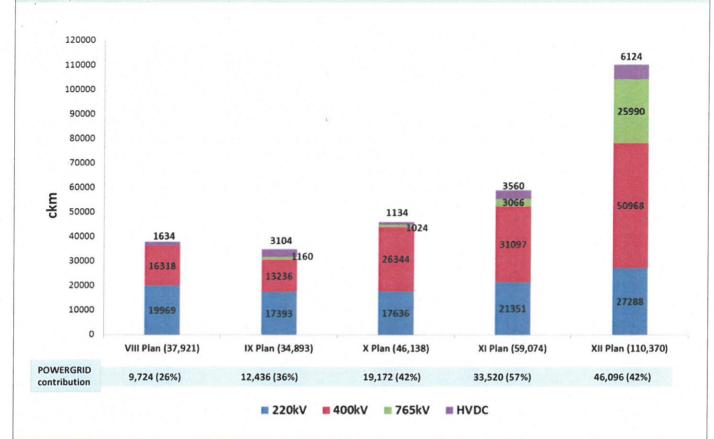
#### **TBCB Project**

- Govt. allocates project to TBCB
- Bid Process Coordinator allocated by ECT takes up related activities



## **Transmission Growth - Planwise**





ONE Grid Frequency

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## **Statutory Reforms since 2014**



## Forest Clearance

Enhancement in delegation of powers of Regional Offices of MoEFCC (Oct'14)

Permission to start work after Stage-I (Inprinciple approval) (Aug'14)

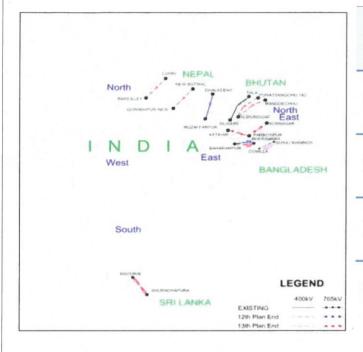
FRA Compliance need to be completed at the time of Stage-II

RoW Compensation

Guidelines issued by MoP for payment of additional compensation for Land Use (Oct.'15)

#### **SAARC Interconnections**





**Present Power Transfer:** 

India - Bhutan: 1350 MW

India - Bangladesh: 660 MW

India - Nepal: 490 MW

India - Myanmar: 3 MW



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## **About POWERGRID**



#### **POWERGRID- An Overview**



- A 'Navratna' CPSE Designated as 'Central Transmission Utility' of the country since 1998.
- Started Commercial Operation since 1992-93.
- Listed on BSE & NSE IPO in Sep.'07; FPOs in 2010 & 2013
  - Present Shareholding: Gol-57.90%; Public: 42.10%
- ❖ ~ 85% ISTS Transmission Network owned by POWERGRID
- Paying Dividend since 1993-94
- Market Value ₹ 1,13,316 crore#

#- Based on BSE Closing Price of ₹ 216.60 per share as on 01.09.2017

ONE Site

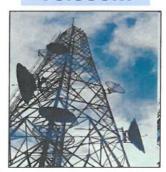
## **Areas of Operation**



#### **Transmission**



#### Telecom



#### Consultancy



- Establishment and O&M of:
  - ISTS
  - Transnational links
- Provides
  - **Services**
  - Point to Point Leased Lines, MPLS, Internet leased lines
- & Owns operates ~42,000km of Telecom network
- Telecom Provides Consultancy Services:
  - Domestic State Utilities, Pvt./Govt. Cos.
  - International Footprints in 20 countries

**POWERGRID: 11 Subsidiaries & 13 Joint Venture Companies** 

#### **POWERGRID - At Present**



~ 141,912 ckm >1100 nos. of lines

• Transmission Lines

224 Nos.

• EHVAC, UHVAC and HVDC Substations

~2,95,673 MVA

• Transformation Capacity

₹ 1,53,272 crore

• Gross Fixed Assets (as on 30.06.2017)

₹ 26,581 crore

• Turnover (FY 2016-17)

₹ 7,520 crore

• Net Profit (FY 2016-17)

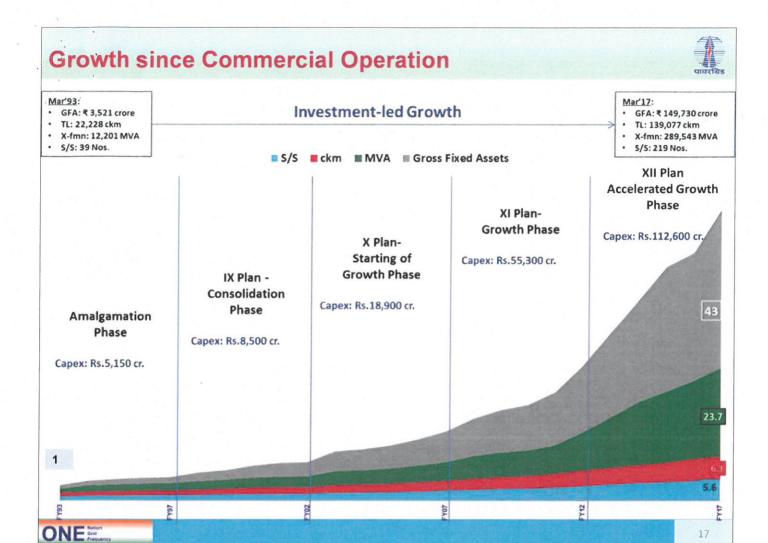
Physical Data as on 31.07.2017

ONE Greet

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## Performance



#### **Transmission: Enabling Seamless Power Movement ATC Enhancement I-R Power Transfer Power Markets- STOA** (MW) (BU) (Txns. & BU) ■ Mar'12 ■ Mar'17 ■ FY12 ■ FY17 FY12 FY17 8550 138 100 6500 67 59 2000 1960 WR-NR **NEW-SR** Energy, BU Inter-Regional 328% 299% 134% 50% Increase (%)

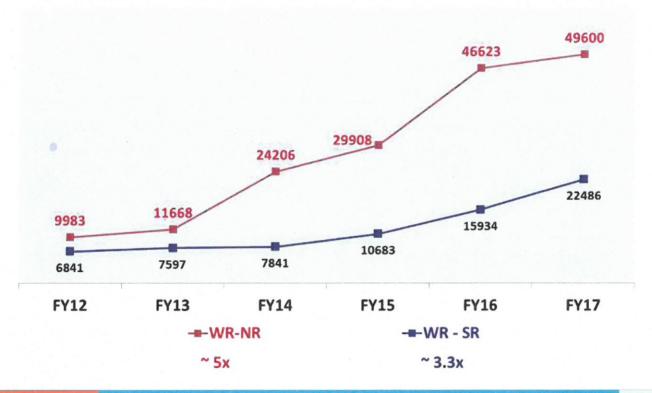
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## **Transmission- Congestion Management**



I-R Power flow from WR to NR & WR to SR (MUs)



ONE Nation Grid Frequency

urce: POSOCO

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Major Projects Under Implementation

## **Major Lines Targeted for FY 2017-18**



## **Major Lines**

- 1) 765kV D/C Nizamabad Hyderabad (Maheswaram)
- 2) ±800kV Champa-Kurukshetra Pole-II (1500MW)
- 3) ±800kV Alipurduar-Agra Bipole (3000MW)
- 4) 400kV D/C Aurangabad- Boisar
- 5) 765kV D/C Jabalpur- Orai -Aligarh
- 6) 765kV D/C Aurangabad Padghe (along with 400kV D/C Padghe-Kudus & Kala-Kudus)
- 7) 400kV D/C Wardha Aurangabad (1200kV tower)
- 8) 765kV S/C Salem Madhugiri
- 9) Lines associated with GEC and Solar Power Parks

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## Major Lines Targeted for FY 2017-18 (contd.)



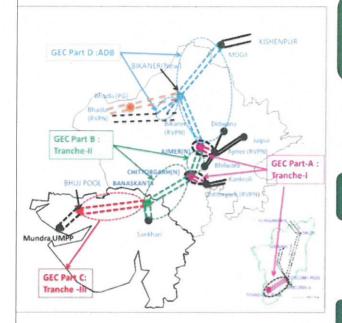
## **Other Important Lines/ Generation Linked Lines**

- 1) 400kV D/C Nabinagar Gaya
- 2) 220kV D/C Kishenganga Amargarh
- 3) 400kV D/C Dulhasti Kishenpur
- 4) 400kV D/C Sasaram-Daltonganj
- 5) 132kV S/C Pasighat Roing Tezu Namsai (bal. last link)
- 6) 400kV D/C Dehradun-Abdullapur
- 7) 400kV D/C Kameng Balipara
- 8) 400kV D/C (charged at 132kV) Silchar Melriat



## **Green Energy Corridors-I**





#### **Transmission Strengthening:**

Interconnection of RE for evacuation & extending boundary for balancing resources

- Estimated Cost (ISTS): ₹ 11,369 Cr
- Debt Funding: KfW & ADB
- · Commissioning progressively from Dec'17

#### **Dynamic Compensation:**

To maintain grid parameters due to variability

- 16 nos. SVC/STATCOM
  - 2 nos. SVC commissioned (Ludhiana, Kankroli)
  - STATCOM NP Kunta commissioned

#### **REMC: Forecasting & scheduling**

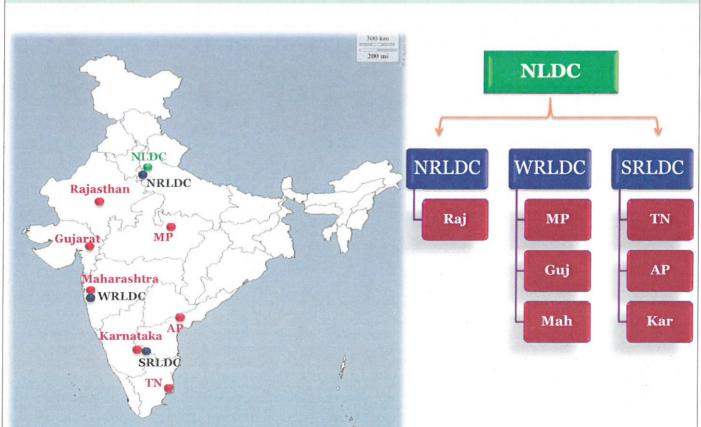
 11 nos. REMCs in 7 RE rich states; 3 RLDCs & 1 NLDC



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## **REMC Locations**





## **Dynamic Compensation**





- Facilitating Renewable Integration
- Maintaining Grid Parameters
- 14 No. of Hybrid STATCOMs
- 4 No. of SVCs

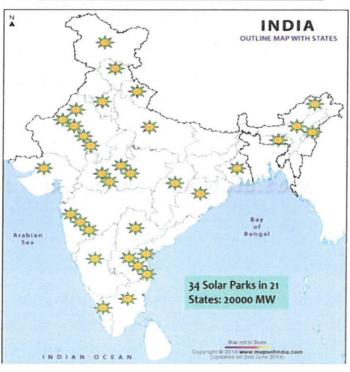
ONE Grid
Frequency

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## Renewable Integration- Green Energy Corridors -II



#### **Locations of Ultra Mega Solar Parks**



## 34 Solar Parks 20,000 MW

- ✓ POWERGRID assigned 8 Solar Parks in 5 States
  - AP (NP Kunta), MP (Rewa),
     Karnataka (Tumkur), Rajasthan
     (Bhadla, Essel), Gujarat
     (Banaskantha)
- ✓ TS for 7 Nos. Solar Parks under implementation
- ✓ Additional 20,000 MW Solar parks envisaged

## **Technologies Being Adopted**



- Higher Voltages
  - 765kV EHVAC, ±800kV HVDC
  - Future 1200kV UHVAC Highest Voltage in the World
- GIS Substations
- Remote Operation of Sub stations
  - 150 nos. already being operated remotely from State of the Art Control centre (NTAMC) at Manesar & RTAMCs.
- Increase in capacity of transmission corridor through
  - HTLS Conductor, Series Capacitor
- **❖** Voltage Source Converter (VSC) based HVDC
- Substation Automation: Process Bus Architecture

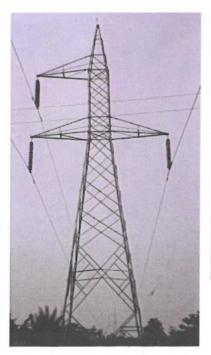


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#### **Conservation of RoW**



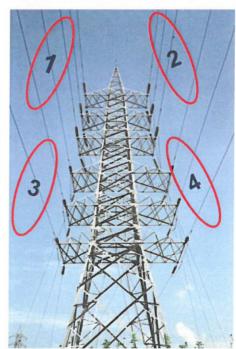
#### **Single Circuit Tower**





Multi Circuit Tower
Erection Using Existing
Corridor in Jaldapara
Sanctuary

#### **Multi Circuit Tower**





#### **Conservation of RoW**



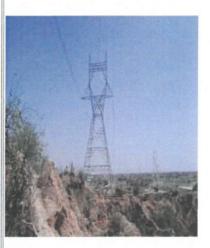
765 kV Normal Tower





400kV Compact Single Pole Tower

765 kV Compact Tower



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## **Use of New Technologies in Transmission**





Use of Unmanned Aerial Vehicles (Drones)



**Use of Helicopters** 



**Hot Line Maintenance** 



**Emergency Restoration System** 



**GIS Mapping of TLs** 





## Implementation of Important Gol Schemes



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## **Important Gol Schemes**



Power System Improvement Project in NER

Transmission Assignments Comprehensive Scheme for Strengthening of Transmission & Distribution System for Arunachal Pradesh and Sikkim

Connectivity to Leh-Kargil Area with NR Grid at 220kV level

Rural Electrification

**Electrification in 15 districts of Odisha** 

**IPDS** 

In Old Kashi area, conversion of existing overhead distribution network to new underground system.

