CAC subcommittee on Congestion

18th Sep 2014

New Delhi

Decisions taken in meeting on 22nd Aug 2014

i. How much transmission capacity has been created and how much of it has become partly or completely redundant/ idle contributing to the gap. Reasons for same may be categorised under major heads like non-availability of state network, non-availability of expected generation, dynamic generation, etc.

ii. Short term solutions covering strategic shift in operation of generating units like backing down or two shifting of units, installation of hardware /software be suggested so that larger flows become permissible.

iii. Measures/ safeguards be suggested under following heads

1. Short term : less than 3 months
2. Medium term : 3-6 months
3. Long term : more than 6 months

iv. A mechanism like an audit to check working of the requisite systems as per requirements may be institutionalised.

v. APP to get data from Generators regarding issues in dispatch of power plants.

Decisions taken in meeting on 22nd Aug 2014

i. "How much transmission capacity has been created and how much of it has become partly or completely redundant/ idle contributing to the gap. Reasons for same may be categorised under major heads like non-availability of state network, non-availability of expected generation, dynamic generation, etc."

- State-wise maximum transfers vis-à-vis transmission capacity .....Exhibit-I
- Congestion due to delay in commissioning of generating units ..... Exhibit-II
- Congestion due to non-availability of intra-state network.....Exhibit-III

Decisions taken in meeting on 22nd Aug 2014

ii. "Short term solutions covering strategic shift in operation of generating units like backing down or two shifting of units, installation of hardware /software be suggested so that larger flows become permissible."

- 56 nos. System Protection Schemes (SPS) to take care of transmission delays (Exhibit-IV)
- Need to retire these schemes gradually through network augmentation
- Need to have Reliability Standards for SPS planning and design.

Decisions taken in meeting on 22nd Aug 2014

iii. "Measures/ safeguards be suggested under following heads
   1. Short term : less than 3 months
   2. Medium term : 3-6 months
   3. Long term : more than 6 months "

1. Short term
   1. System Protection Schemes (SPS) as per Exhibit-IV (done)
2. Medium term
   1. Exhibit-II and III systems to be expedited/commissioned.
3. Long term
   1. Exhibit-V systems to be closely monitored and commissioned
   2. Exhibit-VI on re-conductoring short line sections
   3. Exhibit-VII on shortening long transmission lines through LILO
   4. Mandating reserves and primary, secondary, tertiary control
   5. General Network Access (GNA)

Decisions taken in meeting on 22nd Aug 2014

iv. "A mechanism like an audit to check working of the requisite systems as per requirements may be institutionalised."

- Introduction of Reliability Standards modeled on NERC/other bodies. Exhibit-VIII
- Culture of compliance monitoring and stringent fines for non-compliance on the lines of FERC…….Exhibit-IX
- National Reliability Council for Electricity (NRCE)……framework
- Ministry of Power order dated 16th July 2014 for appointment of consultant for secure and reliable operation of the grid.

“i. How much transmission capacity has been created and how much of it has become partly or completely redundant/ idle contributing to the gap. Reasons for same may be categorised under major heads like non-availability of state network, non-availability of expected generation, dynamic generation, etc.”

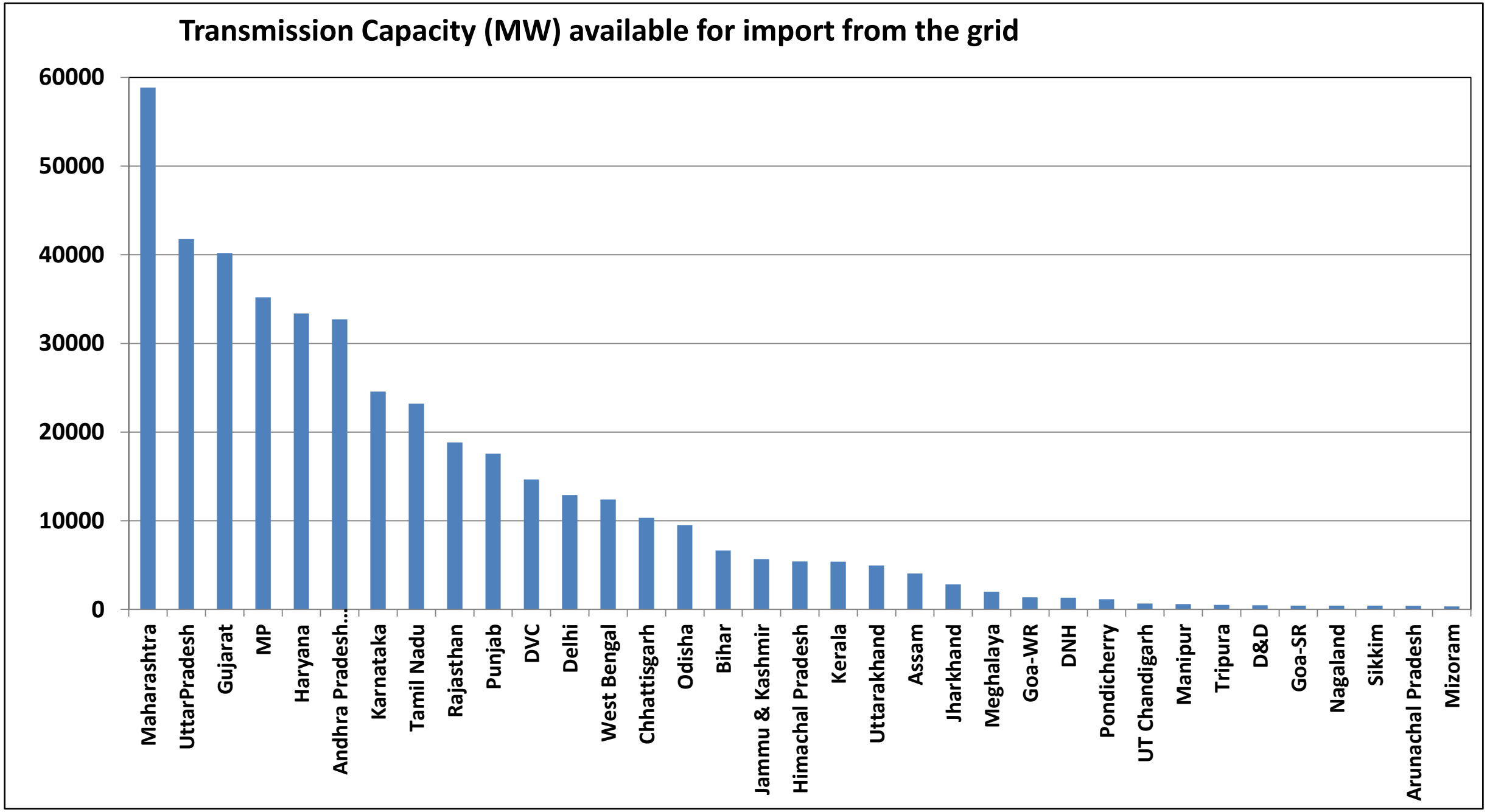
State-wise maximum power transfer vs transmission capacity

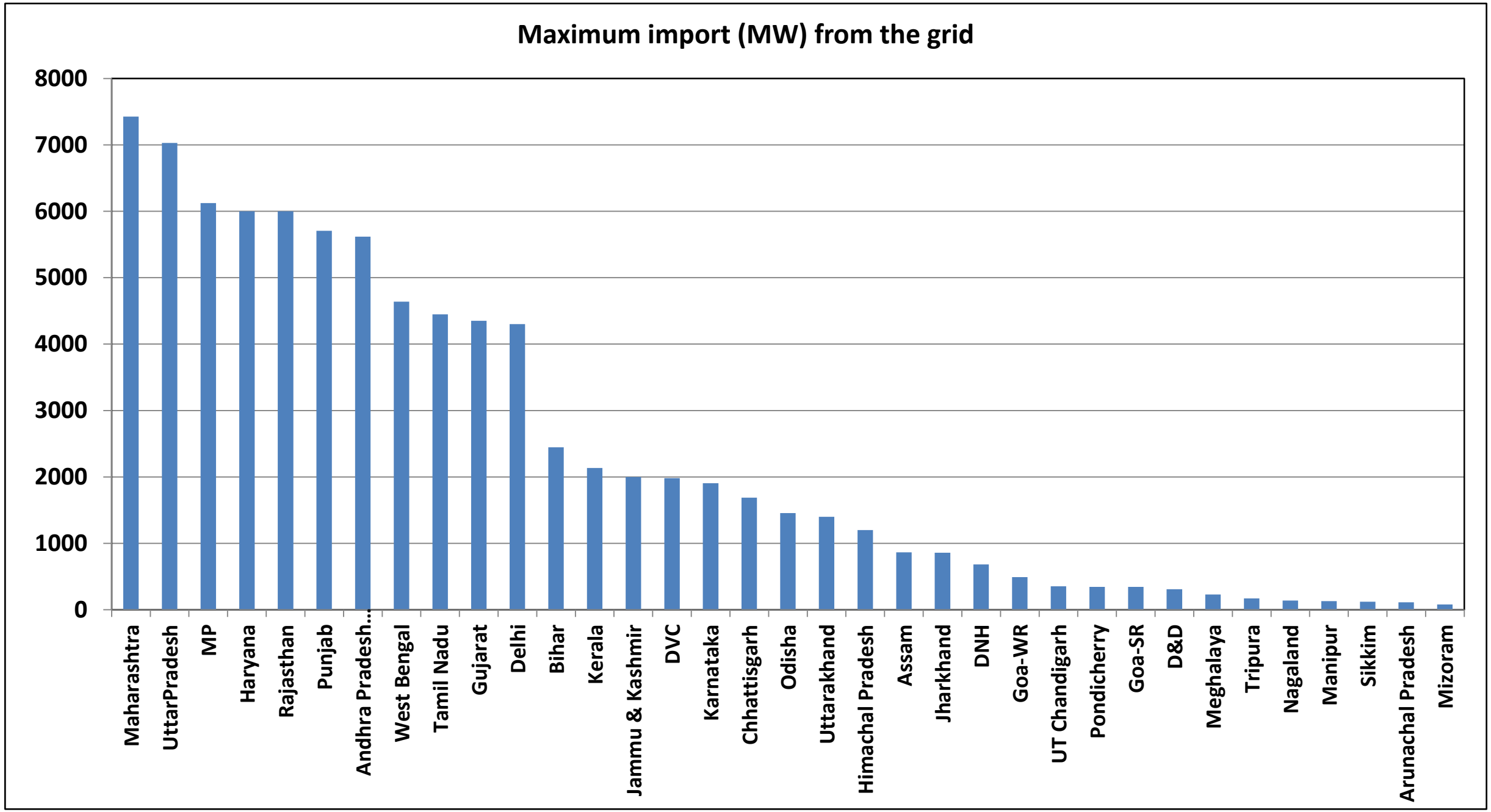
Exhibit-I

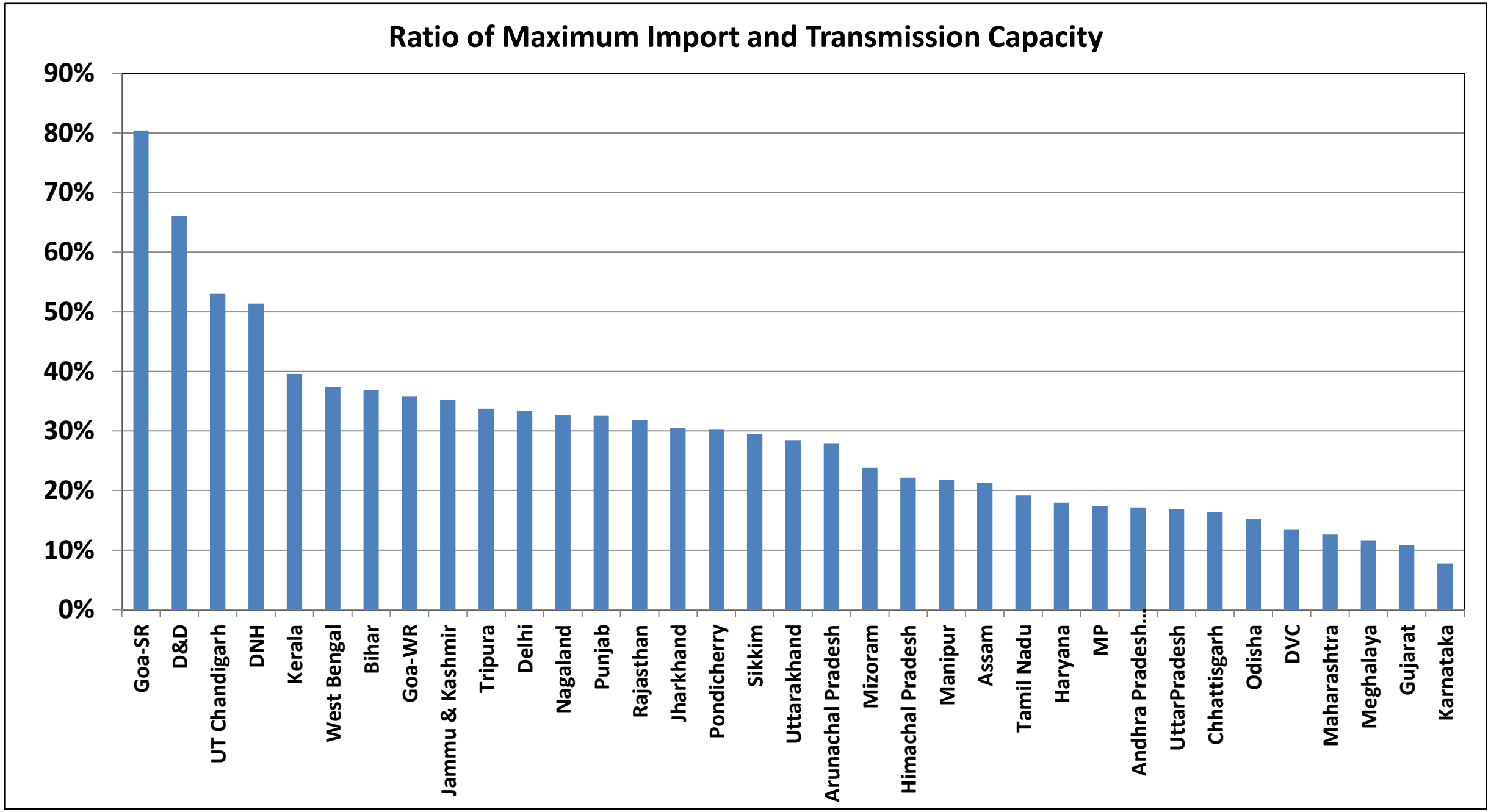
State-wise exercise

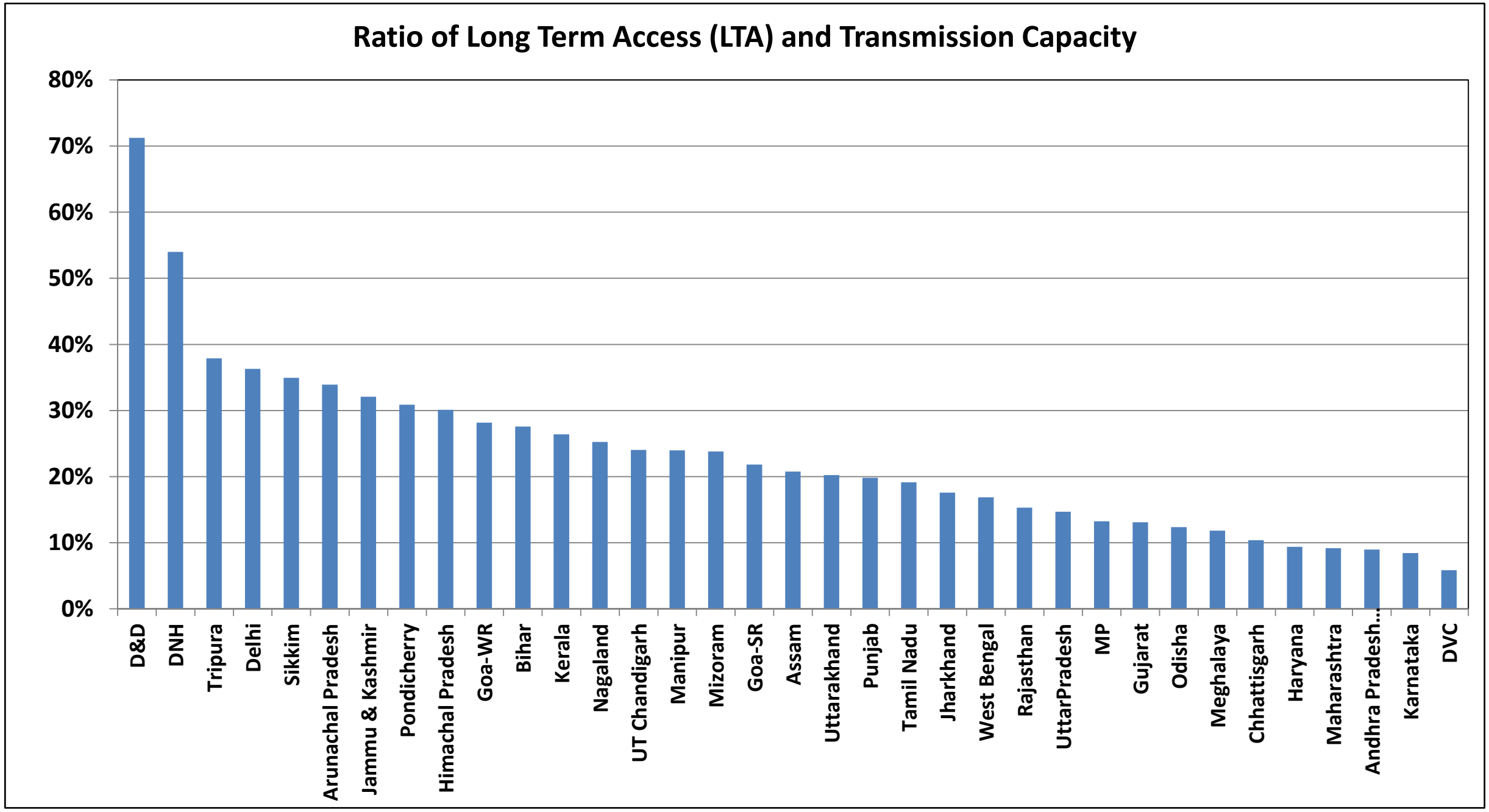
- The list of feeders/ICTs used for working out net drawal of each state was tabulated.
- Transmission capacity of the above was added up.
- Comparison with maximum power drawal by state
- Different ratios checked.
- Ratio of maximum power transfer to transmission capacity is typically of the order of 30% only
- Exercise would be a good starting point for GNA.

Details at Exhibit-I


Transmission Capacity (MW) available for import from the grid
60000
50000
40000
30000
20000
10000
0
Maharashtra
UttarPradesh
Gujarat
MP
Haryana
Andhra Pradesh...
Karnataka
Tamil Nadu
Rajasthan
Punjab
DVC
Delhi
West Bengal
Chhattisgarh
Odisha
Bihar
Jammu & Kashmir
Himachal Pradesh
Kerala
Uttarakhand
Assam
Jharkhand
Meghalaya
Goa-WR
DNH
Pondicherry
UT Chandigarh
Manipur
Tripura
D&D
Goa-SR
Nagaland
Sikkim
Arunachal Pradesh
Mizoram


Maximum import (MW) from the grid
8000
7000
6000
5000
4000
3000
2000
1000
0
Maharashtra
UttarPradesh
MP
Haryana
Rajasthan
Punjab
Andhra Pradesh...
West Bengal
Tamil Nadu
Gujarat
Delhi
Bihar
Kerala
Jammu & Kashmir
DVC
Karnataka
Chhattisgarh
Odisha
Uttarakhand
Himachal Pradesh
Assam
Jharkhand
DNH
Goa-WR
UT Chandigarh
Pondicherry
Goa-SR
D&D
Meghalaya
Tripura
Nagaland
Manipur
Sikkim
Arunachal Pradesh
Mizoram


Ratio of Maximum Import and Transmission Capacity
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Goa-SR
D&D
UT Chandigarh
DNH
Kerala
West Bengal
Bihar
Goa-WR
Jammu & Kashmir
Tripura
Delhi
Nagaland
Punjab
Rajasthan
Jharkhand
Pondicherry
Sikkim
Uttarakhand
Arunachal Pradesh
Mizoram
Himachal Pradesh
Manipur
Assam
Tamil Nadu
Haryana
MP
Andhra Pradesh...
UttarPradesh
Chhattisgarh
Odisha
DVC
Maharashtra
Meghalaya
Gujarat
Karnataka


Ratio of Long Term Access (LTA) and Transmission Capacity
80%
70%
60%
50%
40%
30%
20%
10%
0%
D&D
DNH
Tripura
Delhi
Sikkim
Arunachal Pradesh
Jammu & Kashmir
Pondicherry
Himachal Pradesh
Goa-WR
Bihar
Kerala
Nagaland
UT Chandigarh
Manipur
Mizoram
Goa-SR
Assam
Uttarakhand
Punjab
Tamil Nadu
Jharkhand
West Bengal
Rajasthan
UttarPradesh
MP
Gujarat
Odisha
Meghalaya
Chhattisgarh
Haryana
Maharashtra
Andhra Pradesh...
Karnataka
DVC

Congestion due to delay in generation

- Barh Stage-II: 2 x 660 MW (WR-NR)
- Palatana Module-II: 363 MW (ER-NER)
- Bongaigaon TPS: (3 x 250 MW) (ER-NER)
- Kudankulam APS: (2 x 1000 MW) (WR-SR & S1-S2)
- Neyveli-II Exp: (2 x 250 MW) (WR-SR & S1-S2)
- NLC TN Power : (2 x 500 MW) (WR-SR & S1-S2)

Details at Exhibit-II

Congestion due to non-availability of intra state network

- IEPL (2 x 270 MW)
- APML Tiroda (5 x 660 MW)
- APL Mundra (4620 MW)
- Vemagiri gas complex (1720 MW; constraint on gas avail.)
- North Chennai Exp (1200 MW)
- Mettur Stage-III (600 MW)
- Kawai (1320 MW)

Adverse effect on the Inter State Transmission System (ISTS)

Details at Exhibit-III

Decisions taken in meeting on 22nd Aug 2014

ii. "Short term solutions covering strategic shift in operation of generating units like backing down or two shifting of units, installation of hardware /software be suggested so that larger flows become permissible."

iii. "Measures/ safeguards be suggested under following heads

1. Short term : less than 3 months
2. Medium term : 3-6 months
3. Long term : more than 6 months "

System Protection Schemes (SPS)….short term

Sl. No.	Region	No. of Schemes In service	No. of Schemes approved (yet to be operationalized)	No. of schemes under discussion	Remarks
1	Northern	14	11		Inclusive of ER-NR and WR-NR corridors
2	Eastern	5	1	1	Inclusive of ER-SR corridor
3	Western	18	1		Inclusive of WR-NR and WR-SR corridor
4	Southern	18	1	1	Inclusive ER-SR and WR-SR corridor
5	North Eastern	1			
	TOTAL	56	14	2	72

Details at Exhibit-IV

Medium Term

- Expediting commissioning of new generating units at Exhibit-II
- Expediting commissioning of intra state systems at Exhibit-III

Long term----Expediting commissioning of new elements

- 67 elements being monitored by MOP (Exhibit-V)
- 8 elements commissioned recently
  - 765 kV Jharsuguda-Dharamjaygarh D/C
  - 765 kV Wardha-Aurangabad D/C
  - 400 kV Bhopal (MP)-Bhopal(BDTCL) D/C
  - 765 kV Raichur-Kurnool S/C
  - 765 kV Sholapur-Raichur S/C (RSTCL)
  - 400 kV Sholinganallur-Pugalur D/C
  - 220 kV BTPS-Agia 2nd ckt.
  - 400 kV Derang-Anugul D/C

Long term Re-conductoring short lines with HTLS

- Northern Region
  - 400kV Singrauli-Anpara S/C
  - 400kV Dadri-Muradnagar S/C
  - 400kV Meerut-Muzaffarnagar S/C
  - 400kV Muzaffarnagar-Roorkee S/C
  - 400kV Anpara-Obra S/C
  - 400kV Mohindergarh-Bhiwani D/C
  - 400kV Unnao-Panki S/C
  - 400 kV Bassi-Heerapura D/C
- Western Region
  - 400 kV Vapi-Boisar
- Eastern Region
  - 400kV Farakka-Malda D/C
  - 220kV Jeypore-Jayanagar D/C
  - 400 kV Maithon Power Limited-Maithon D/C
  - 220 kV Binaguri-Birpara D/C
  - 400 kV Behrampur-Behramara D/C
- Southern Region
  - 400kV Kolar-Hosur D/C
  - 400kV Hiriyur-Neelmangala D/C
  - 400kV Kaiga-Guttur D/C

Details at Exhibit-VI

Long term------Other measures to improve transfer capability

- 98 lines can be shortened through suitable LILO
- Possibility of making line reactor switchable
- Matter under discussion with CTU/CEA
- Details at Exhibit-VII
- Zone-3 resistive reach to be as per the recommendations of the V Ramakrishna Task Force

- Mandating reserves-----primary, secondary and tertiary control
- General Network Access (GNA) at planning stage.

Decisions taken in meeting on 22nd Aug 2014

iv. “A mechanism like an audit to check working of the requisite systems as per requirements may be institutionalised.”

Need for Reliability Standards to complement CEA/CERC Regulations

NERC Reliability Standards

S no	Area	No of standards
1	Resource and Demand Balancing (BAL)	14
2	Critical Infrastructure Protection (CIP)	22
3	Communications (COM)	6
4	Emergency Preparedness and Operations (EOP)	8
5	Facilities Design, Connections, and Maintenance (FAC)	11
6	Interchange scheduling and coordination (INT)	13
7	Interconnection Reliability Operations and Coordination (IRO)	19
8	Modelling, Data, and Analysis (MOD)	28
9	Nuclear (NUC)	2
10	Personnel Performance, Training, and Qualifications (PER)	5
11	Protection and Control (PRC)	32
12	Transmission Operations (TOP)	13
13	Transmission Planning (TPL)	5
14	Voltage and Reactive (VAR)	6
	Total	**184**

Exhibit VIII

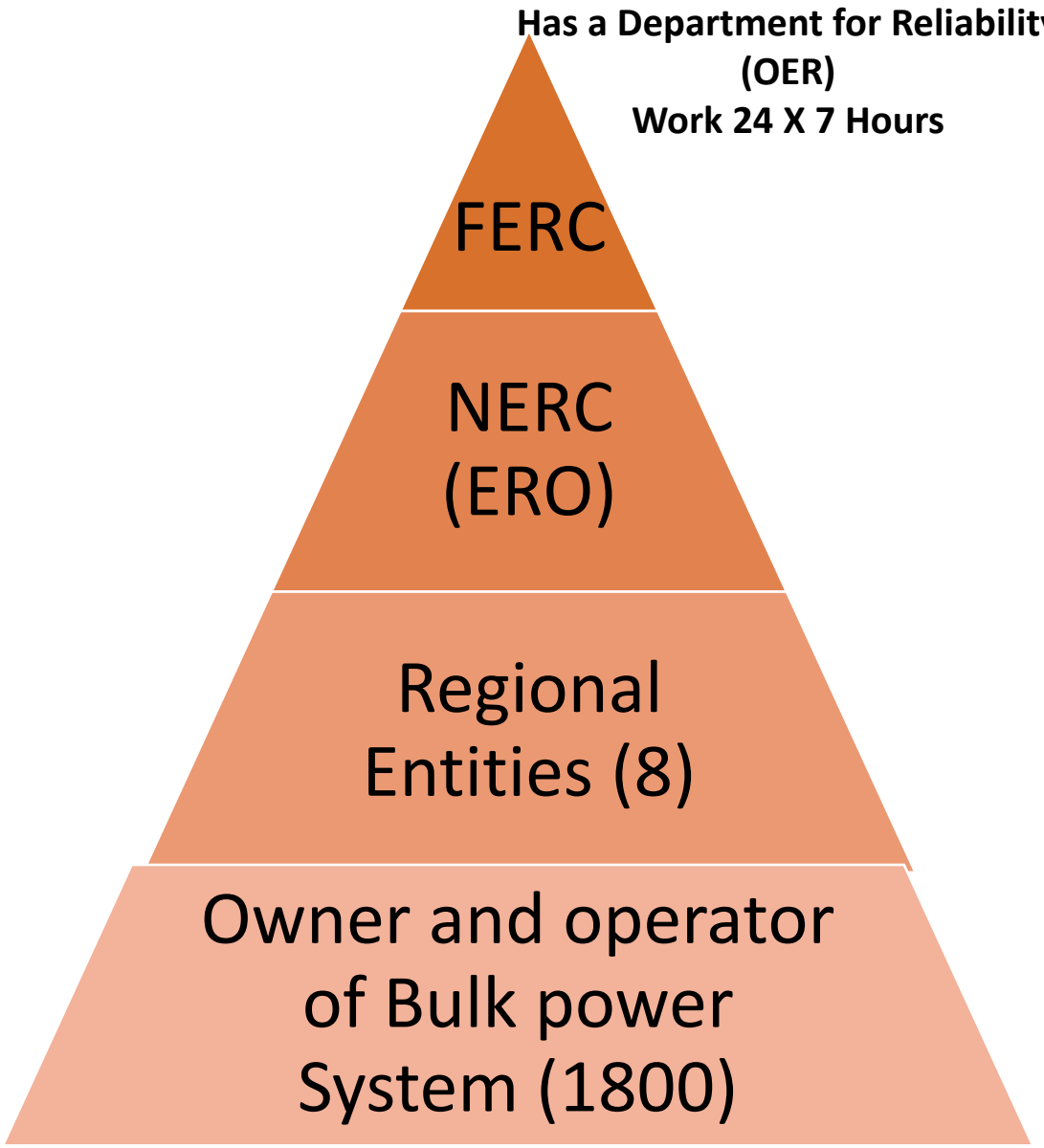
Culture of compliance monitoring

- Heavy penalties levied by FERC for non-compliance of Reliability Standards
- **Total Civil Penalties assessed for all years 2007 to present: $601,679,786**

Details at Exhibit-IX

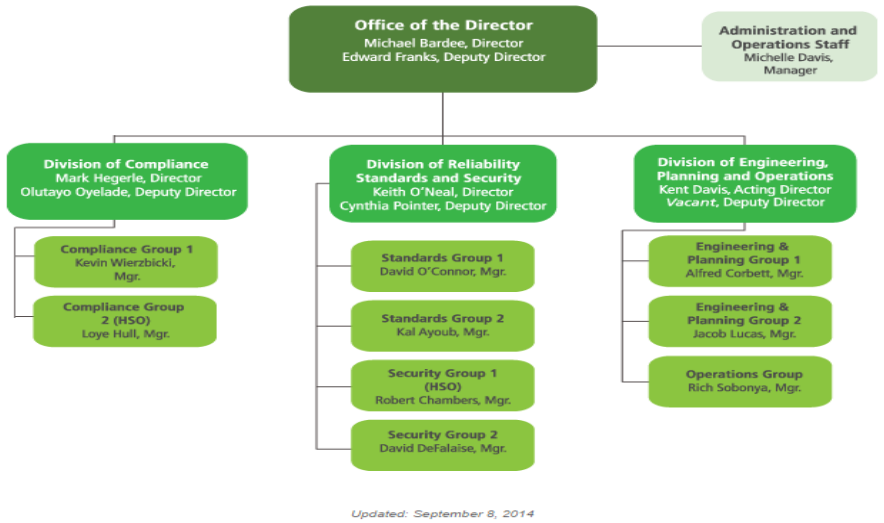
Reliability Compliance Monitoring and Enforcement in North America

- There are two agencies for the Electric Reliability Compliance Monitoring and its enforcement :
  - Office of Electric Reliability (OER) at FERC
  - North American Electric Reliability Corporation (NERC)
- **OER Oversees the :**
  - Development & review of mandatory reliability & security standards.
  - Ensures compliance with the approved mandatory standards by the users, owners, and operators of the bulk power system.
  - Coordinate with NERC for investigation
  - **Designate the Electric reliability Organization (ERO) which is NERC and direct him create a new standard or revise an existing standard.**
- **NERC is Responsible for :**
  - Preparation of Mandatory reliability and Security standard document which is approved by FERC.
  - Monitoring of the compliance status of standards by regional entities, RTO/TSO etc.
  - Submission of various reliability reports to FERC.
  - As ERO delegate enforcement responsibility to a regional entity.
  - Filing of Petition in view of Reliability compliance violation on behalf of itself and regional entities.

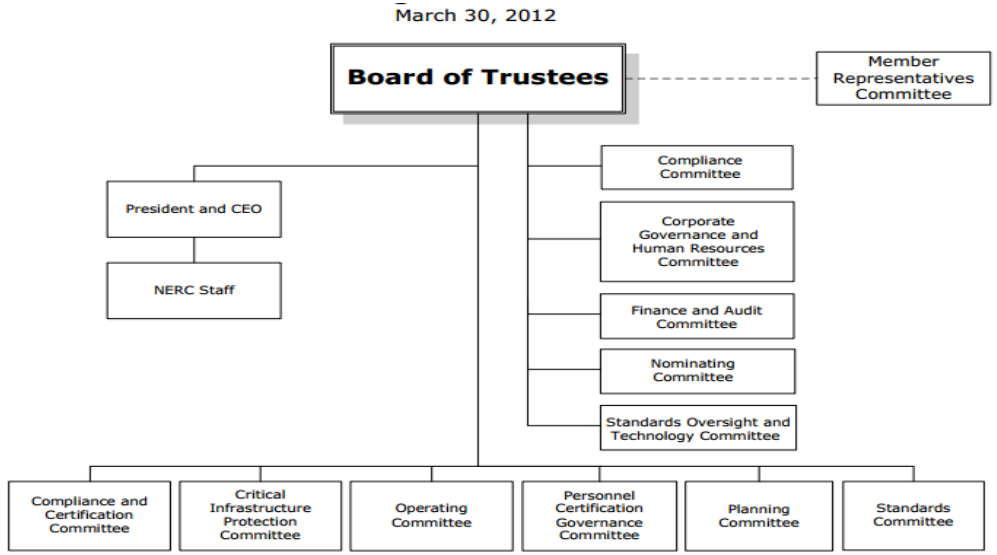


FERC's OER and NERC Organizational Structure

Office of Electrical Reliability (OER) at FERC



NERC Organizational Chart



- **FERC has 24 X 7 Emergency reporting system through Reliability Monitoring Centre (RMC).**
- **Number of FERC Staff : More than 100 Electrical Engineers (Devoted to Reliability), 50 Attorneys and 50 Auditors**
- **NERC is designated as the Electric Reliability Organization(ERO) by the FERC.**
- **Refers to NERC's role as the independent entity that develops and enforces mandatory standards for the Reliable Operation and planning of the Bulk-Power System throughout North America, as called for in the Energy Policy Act of 2005.**
- **Number of NERC Staff : More than 180**

Source : FERC and NERC

Enforcement of Reliability

- **NERC Prepares the Standards for Reliability categorized under 14 sections.**
- **Regional Entities/NERC monitors Compliance violations.**
- **FERC Audits Regional Entities/NERC for Compliance with the statute and regulations.**
- **If violations occurs , Regional entities assess the penalty and a Notice of Penalty is submitted through the NERC to Commission.**
- **Commission Uses penalty authority to encourage the company to inculcate the culture of compliance.**
- **Penalties up to $1 million per days in case of serious violation.**
- **Other Action apart from penalty is suspension or decertification.**
- **Action and Mitigation plan is also submitted by regional Entity/NERC for further enforcement of compliance.**

Key Facts

- **More than 6000 Violations Filed in FERC**
- **Maximum Penalty for reliability : $ 25 Millions, Florida Power and Light**
- **Second Highest for reliability : $ 12 Millions, IID**
- **Many Smaller Penalties**
- **Each Month More than 200 violations are being filed.**

Penalty are also imposed in Area of :

- **Market Manipulation**
- **Violation of Market regulation**
- **Violation in trading**
- **Violation of Safety rules at power station**
- **Release of Sensitive market data to traders etc.**

Source : Presentation by Sh. P.K. Agarwal http://www.slideshare.net/fullscreen/23734837/1

Few Penalties in the Area of Reliability Imposed by FERC

Violation Risk Factor	Violation Severity Level							
	Lower		Moderate		High		Severe	
	Range Limits		Range Limits		Range Limits		Range Limits	
	Low	High	Low	High	Low	High	Low	High
Lower	$1,000	$3,000	$2,000	$7,500	$3,000	$15,000	$5,000	$25,000
Medium	$2,000	$30,000	$4,000	$100,000	$6,000	$200,000	$10,000	$335,000
High	$4,000	$125,000	$8,000	$300,000	$12,000	$625,000	$20,000	$1,000,000

Year	Amount	Agency	Violation
2014	Civil Penalty : $12,000,000	IID	Possible violations of Reliability Standards associated with IID's operation of a portion of the Bulk Power System (BPS) and a blackout that occurred on September 8, 2011
2014	Civil Penalty : $3,250,000	APS	Possible violations of Reliability Standards associated with APS's operation of a portion of the Bulk Power System (BPS) and a blackout that occurred on September 8, 2011
2013	Civil Penalty : $975,000	Entergy	Possible violations of Reliability Standards associated with Entergy's operation of a portion of the Bulk Power System (BPS)
2012	Civil Penalty : $200,000	CAISO	Possible violations of the NERC Reliability Standards by CAISO surrounding a Disturbance in the San Diego area of the state of California on March 31-April 1, 2010
2011	Civil Penalty : $3,925,000	PacifiCorp	Possible violations of the NERC Reliability Standards by PacifiCorp related to its functions as a Balancing Authority and Transmission Operator surrounding a disturbance in the Western Interconnection that originated in the state of Utah on February 14, 2008
2010	Civil penalty of $350,000	FRCC	Possible violations of Reliability Standards associated with the Bulk Electric System (BES) load loss event in the State of Florida on February 26, 2008, more commonly referred to as the "Florida Blackout".
2008	Civil Penalty: $25,000,000	Florida Power and Light Company	Possible violations of Reliability Standards associated with the Bulk Electric System (BES) load loss event in the State of Florida on February 26, 2008, more commonly referred to as the "Florida Blackout."

Source : FERC and NERC Websites

Few Penalties in the Area of Market, Safety, Trading Imposed by FERC

Year	Amount	Agency	Violation
2014	Civil penalty : $4,000,000	Erie Boulevard Hydropower, L.P. (Erie)	Loss of Human Life due to non-operation of Alarm devices at Dam for releasing of water (Pertaining to the safety of the water power projects and power works)
2014	Civil Penalty : $32,500 Pay Disgorgement : $301,000	Indianapolis Power & Light Company (IPL)	Violation of the Open Access Transmission, Energy and Operating Reserve Markets Tariff (Tariff) of the Midcontinent Independent System Operator, Inc. (MISO)
2014	LDES : Civil Penalty: $4,072,257 and Disgorgement : $3,334,000 : Xu Cheng (Trader) : Civil Penalty : $310,000	Louis Dreyfus Energy Services L.P. (LDES)	Violation of Commission's Anti-Manipulation Rule, 18 C.F.R. § 1c.2 (2013), in connection with certain virtual trading within the Midcontinent Independent System Operator, Inc. (MISO) footprint from November 2009 through February 2010
2013	Barclays : Civil Penalty $435,000,000 , Disgorgement $34,900,000; Trader Scott Connelly Civil Penalty : $15,000,000; Traders Daniel Brin, Karen Levine, and Ryan Smith each : Civil penalty $1,000,000 each,	Barclays Bank PLC, Daniel Brin, Scott Connelly, Karen Levine, and Ryan Smith	Violation of the Anti-Manipulation Rule, 18 C.F.R. § 1c.2, for trading electricity in the western United States to affect the index price at which related financial instruments settled.
2012	Civil Penalty: $500,000;	Alliance Pipeline LP	The Commission approved a settlement resolving findings under the Standards of Conduct for Transmission Providers, 18 C.F.R. Part 385, and Alliance's transmission tariff for using its parent company to share non-public transmission information with an affiliate and for failure to make that information timely available to other customers.
2012	Civil Penalty: $2,500,000; Disgorgement : $910,553	Gila River Power, LLC	Violations under the Anti-Manipulation Rule, 18 C.F.R. § 1c.2, and under 18 C.F.R. § 35.41(b) that Gila River falsely labeled transactions submitted to the CAISO in order to artificially relieve congestion at interties and thereby improve profits on certain imports.

Source : FERC Websites

Thanks for the attention….