TRANSMISSION
OPPORTUNITIES, CHALLENGES & WAY FORWARD

Confederation of Indian Industry
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Power Sector : Demand Drivers

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Demand far outstrips supply

- **Low demand base:** Per capita consumption at 704kwhr, less than 30% of the global average.
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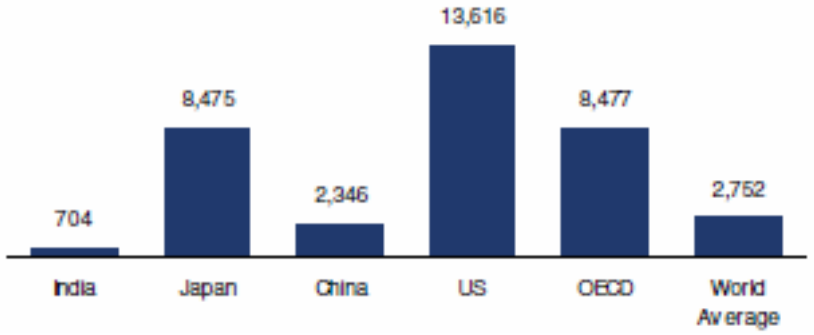
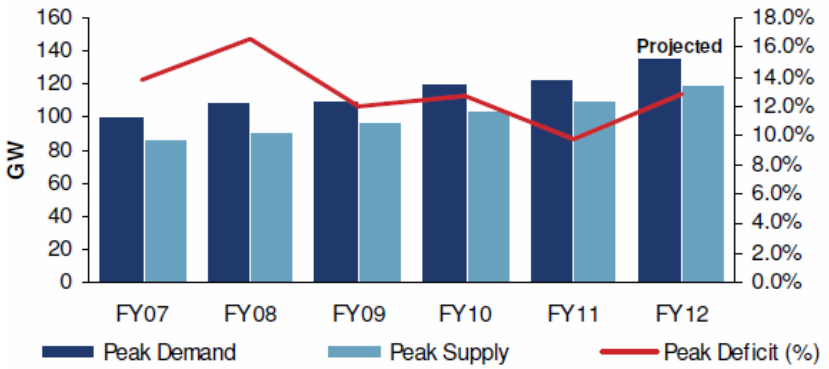
- **High deficits:** Peak deficits have remained high between 10% and 14% over the last five years.
- **Economic growth to boost demand:** To sustain a GDP growth trajectory of 8-9% power sector needs to grow at least 8.1% per annum .
- ***Supply side:*** The planned capacity addition of 76 GW in 12th Plan i.e. 1.5 times of the capacity addition during 11th plan.

Per Capita Consumption in India Remains Low (kWh)[1]



Significant Supply is Needed to Bridge the Imbalance



Source – PGCIL, India

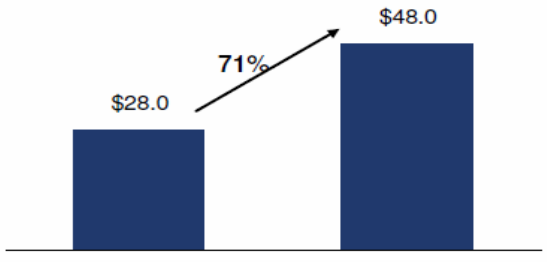
Transmission Sector: 12TH Plan

- New Transmission Schemes Planned for 12th Plan Period - 119,000 – 126,000 ckm
- Increase in Transmission Sector investment by 71% during the 12th plan with an increase in the share of Power Sector investment from 13% to 21%.
- Huge Investment projection in 12th plan - Rs 1,80,000 Cr

  Central - Rs 1,00,000 Cr, State - Rs. 55,000 Cr & Private - Rs. 25,000 Cr.

  Inter-State (incl. Pvt) □ 125,000 crore & Intra-State □ 55,000 crore
- Inter-Regional Transmission Capacity Programme up to 12th Plan of 75GW and country wide synchronous Grid by 2014.
- Thrust on 765kV and HVDC Transmission System in the12th Plan / 13th Plan Period. Approx 27% of new line addition at these voltage level as against of 10% in 11th plan.
- Development of 1200kV transmission system

Driving Investment in Transmission Sector (US$ bn)



%investment in Transmission to Total investment in Power Sector

XI Plan 13% **XII Plan 21%**

Source – PGCIL, India

Transmission lines additions (in circuit KMs)		
Type	11th actual	12th plan
HVDC Lines	3,560	4000-6000
765 kV	3,546	25000-30000
400 kV	37,645	50,000
220 kV	25,535	40,000
Total	70,286	119000-126000

Source : CEA Monthly Report, India

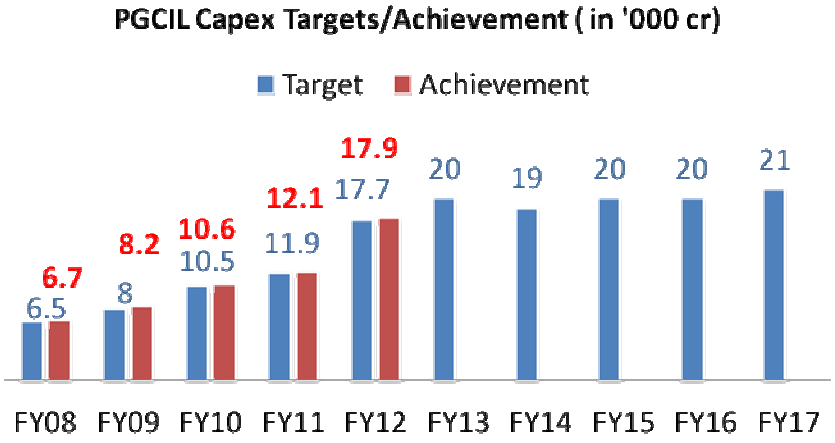
PGCIL : 12TH Plan

- PGCIL 12th plan capex outlay of Rs. 100,000 crs with share of 57% in total Transmission spend as against 39% in the 11th plan.
- Investment Approvals received for Schemes worth Rs.84,000 cr. , Contracts awarded for Rs.70,000 cr.
- Funds tied up for 22,000 cr debt requirement out of total projected 70,000 cr debt.
- Discussion underway with State Govts. to develop Intra State Transmission for Bihar, Odisha, Chhattisgarh, Manipur, UP, MP, Tamil Nadu, Karantaka
- PGCIL appointed Implementation & Supervision consultant for 6 states of NER with project cost 8400 Crs.
- High Focus on projects under TBCB projects, Successfully secured two projects floated after National Tariff regulation.

PGCIL Capex Plan - 12th plan

Project/ Schemes	Capex (Rs Cr.)	($ bn)
Central Sector Generation	20,000	3.9
UMPP	14,000	2.8
IPP	55,000	10.8
Grid Strengthening	11,000	19.7
Total	100,000	37.2

Source : PGCIL, India



Transmission: Upcoming Opportunities

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Upcoming Business opportunity

•Green Energy Corridors - Grid Integration of Renewable Energy

42,000 cr investment in transmission for 40 GW

Planning intra state/ inter state transmission requirement and mechanism for forecasting generation & Demand side management .

- •Intra State TS Strengthening – 20000 cr
- •Inter State TS strengthening - 22000 ct

•**Transnational Interconnections – Towards SAARC GRID**

Development of cross border interconnection with Neighboring countries.

Steps have been initiated to establish New transmission links with Bangladesh, Nepal , Bhutan & Indo –Sri Lanka under sea link

•**Private Investment**

Investment Planned during 12th Plan Rs 25,000 cr. through IPTC route as against Rs 20,000 crs in 11th plan mostly through JV and partly through IPTC.

•Major intra state grid strengthening and capacity enhancement expected from various states through BOO and EPC route.

Sector Capacities & capabilities

- **Contractors –** Globally 6 out of the leading 10 EPC contractors are from India with global presence and capability to work at 765 KV and above level.
- **Tower Manufacturing capacity** – Existing capacity of more than 2mn MT and capacity enhancement underway by many players to meet future demand.
- **Design Capability –** Extensive experience of designing the system at 765 kV D/C & 1200 kV S/C, PGCIL providing consultancy to various utilities globally.
- **Tower Testing Capability -** Testing facilities available at more than 10 locations capable of Testing tower up to 1200 kV level and is recognized world over and covers max. operating voltage level available globally.
- **Project execution experience** – proven capabilities of executing project in diverse terrain both within and outside India using advance construction technologies. Advanced project management practices being adopted globally for planning and execution.

Challenges & Way Forward

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- Right of Way has become perennial problem across states leading to inordinate delays in Project Implementation. Requires policy reform under applicable Indian Telegraph Act, 1885.
- Forest clearances: Project being cross country forest is unavoidable. However being least/ no impact work regulation needs be relaxed and norms regarding tower heights and design can be considered for faster clearances.
- Encourage use of Modern Construction Technologies, with emphasis on greater mechanization to reduce time and cost for construction.
- Skilled Manpower : Efficient inflow of right skills and manpower. Greater industry participation required in opening/Adopting ITI and training institutes.
- Encourage use of Modern project management tools followed by timely monitoring and corrective actions to avoid delays and consequential losses.

Challenges: Private Developers

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- Delay in finalisation of New Schemes due to changes in tariff regulations, bidding norms and generation project delay impacting sector attractiveness and low visibility of project pipeline.
- Large number of clearances, no integrated processing leading to delays, reduction in revenue earning period, and cost uncertainty.
  - BPC role needs to be redefined and mechanism needs to established for providing single window clearances inclusive of License, tariff adoption, Section 164 clearance and land acquisition for sub-station.

- Reducing the bid cycle time and associated cost overrun due to delays which are beyond bidder's control .

- Encourage adoption of innovation, cost efficient latest technologies available globally .

- Allow certain risk such as commodity, currency to be pass through thereby eliminate speculation and encourage sustainable & fair Tariff.

- Improve project bankability and create funding opportunities.

Challenges : EPC Contracts

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- Complexity and magnitude of work needs to define project completion period.
- Non standard and outdated specifications being followed by many State utilities.
- No Mechanism to address the contractual issues arising during the currency of the contract and often handled in arbitrary and high handed manner.
- Adopt Modern Project management practices in planning and monitoring for smooth project Execution.
- Route shall be finalized before award through dedicated office and timely applying for various environmental and forest clearances to curtail project Delays.
- Completion of Engineering and design before award of project .
- No time frame for commercial closure of contracts after the project is commissioned, leading to huge cost to the contractors.

EPC Contracts: Suggestions

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- Revision of bidding framework/evaluation criteria on capability and performance
- Develop Specifications to encourage :
  - Technology usage
  - Incentive for faster execution
  - Safety compliance
  - Mechanization
  - Contract Conditions to be relooked to address Contractual risk sharing framework on fair and equitable basis as in case of most International contracts.
  - Just & Fair Compensation for Delays by the owner.
  - Easier and quicker contract closure, should be a contract milestone.
  - Delayed payment compensation especially in case of State utilities.
  - Dispute Resolution mechanism to be more robust and fair.

Key Recommendation of Working Group on Power : 12th Plan (2012-17)

- **Private Sector Participation** – All new transmission schemes in future would be implemented through **competitive bidding process** as far as possible.

- **Right of Way –**
  - To **reserve transmission corridor** in High density populated area like metros and other upcoming urban areas, to meet future demand.
  - **Town planning** for new sub urban area and industrial centres to have provision for laying transmission line should be kept in mind.
  - **Land compensation** for the land occupied by Transmission tower at prevailing market rate. Central Government may issue notification on consultation.

- **Forest Clearance**
  - Exemption/relaxation for obtaining consent of Gram Sabhas,
  - Delegated of powers of Regional MOEF for approval to be enhanced,
  - Expediting Stage II approval after Stage I approval.

Key Recommendation of Working Group on Power : 12th Plan (2012-17)

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- Measures to meet Challenges in the Sector
  - **Increase in transmission voltage,**
  - **Up gradation of transmission line,**
  - **High capacity 400 kV multi circuit/ bundle conductor lines,**
  - **Compact towers,**
  - **Increase in current through HTLS conductor**

- Funding through grant for setting up TL for **evacuation of power from Renewable Energy Source (RES)**, to encourage RES rich states.

- **Training infrastructure** has been identified as paramount importance and argued to utilities to invest 0.25% of profit annually for meeting training expenses.

Technology trends

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Move to higher voltage

- High Intensity (MW/m) transmission corridor by increasing
- 800 kV HVDC and 765 kV DC high capacity corridors under execution
- Development of 1200 kV transmission system for future demand

Increase in Current Carrying Capacity

- Multi Conductor Bundle Line
  - 400 kV, 765 kV, 800 kV, 1200 kV
- High Temperature Low Sag (HTLS) Conductors
  - ACSS, ACAR, INVAR, GAP
  - Re-conducting existing line, New lines
  - Enhanced capacity, high corrosion resistance, low loss

Design Improvement

- Compact/ Narrow base towers, Tall towers
- Pole type towers
- Multi circuit towers

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|THANK YOU |