CONFERENCE ON TRANSMISSION & DISTRIBUTON

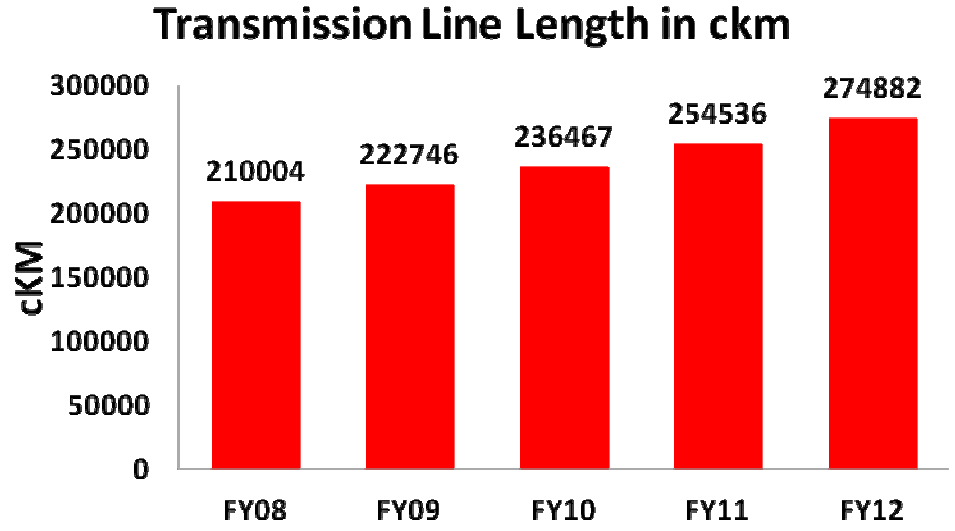
MR N C VENUGOPAL

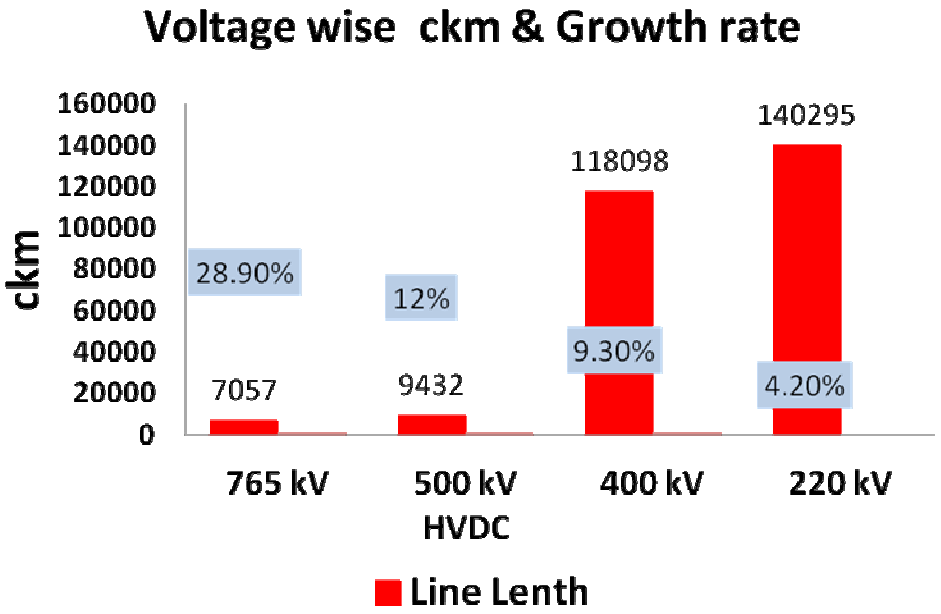
TRANSMISSION SECTOR GROWTH & CHALLENGES.

DATE – 2ND NOVEMBER 2012

TRANSMISSION SECTOR GROWTH HIGHLIGHTS

GAMMON



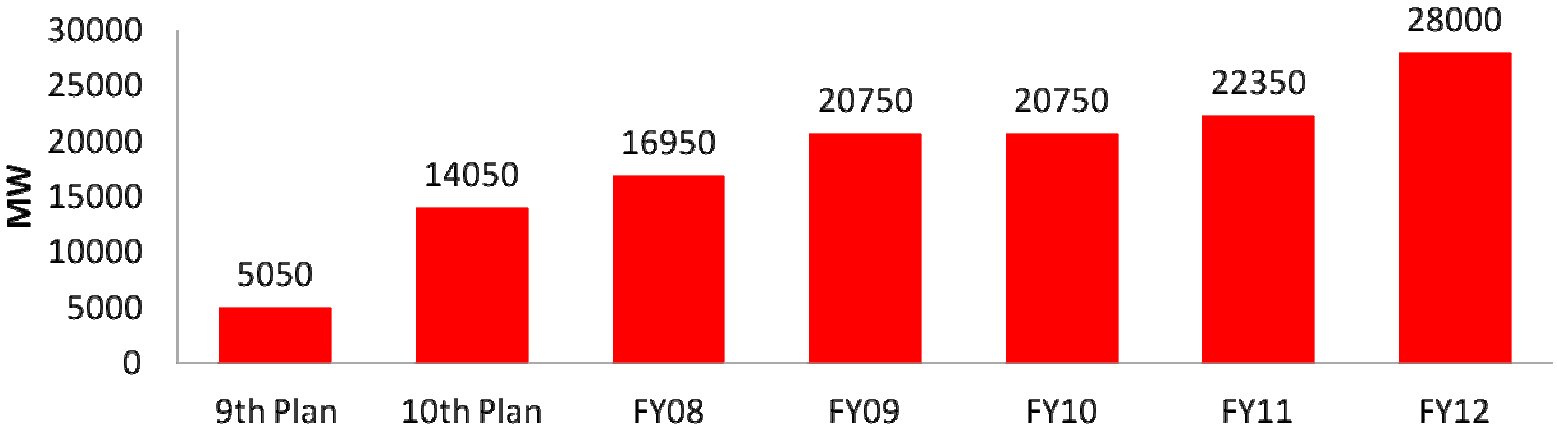


Source - POWERLINE

- Transmission line length has grown at a CAGR of 7% between FY08 and FY12.
  - Growth driven by 400 kV lines
  - 765 kV line length has doubled between FY10 and FY12.
- Interstate Transmission lines has grown at a CAGR of 11% and intrastate has grown at 5% only.
- Transmission Network is dominated by 220 kV lines, followed by 400 kV
- Trend has been a gradual movement towards a higher voltage level
  - 765 kV has grown at a CAGR of 29% between FY08 and FY12.
  - 1200 kV Transmission system under development.

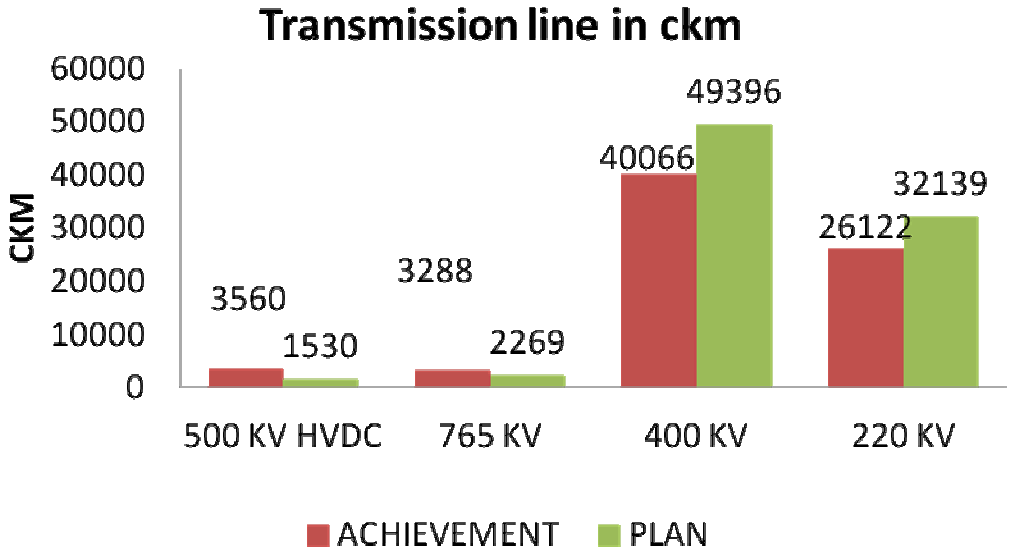
TRANSMISSION SECTOR GROWTH HIGHLIGHTS

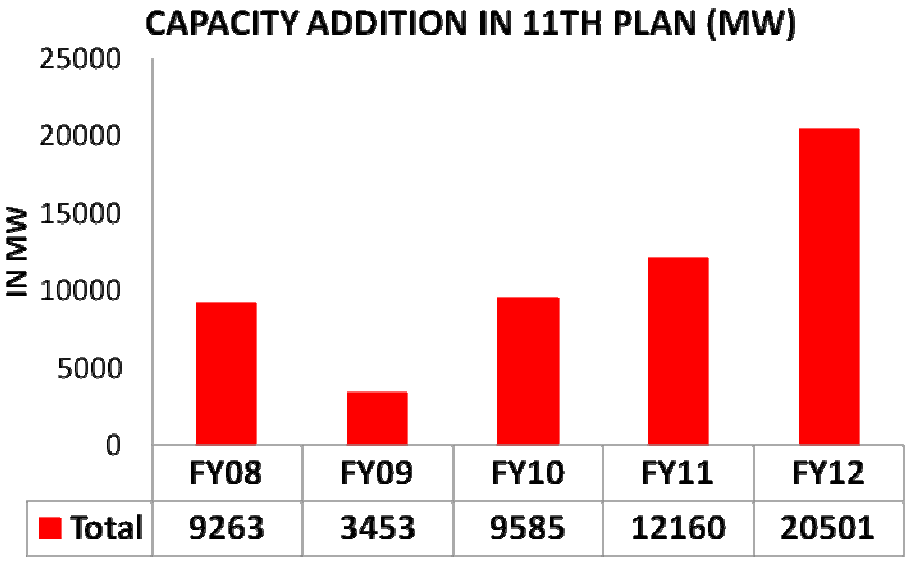
INTERREGIONAL TRANSMISSION CAPACITY ADDITION



- **The inter-regional transmission capacity stood at 28,000 MW at the end of 11th Plan (March 2012)**
- Inter-regional power transmission capacity of 5,600 MW was added during FY12 which was highest in any single year.
- Considering a capacity addition of 76,000 MW by the end of 12th plan, the interregional capacity addition is targeted at 38,000 MW capacity in this plan period.

ELEVENTH PLAN TARGETS AND ACHIEVEMENTS





- Total 54,963 MW generation capacity has been added in 11th plan against the mid term appraisal target of 62,374 MW.
- More than 69,000 CKM line length has been added implying 82% achievement.
- Private sector has contributed approx 5% of the total CKM.
- 765 kV and HVDC levels has seen good growth during the period.

POWERGRID PARTICIPATION

Works	Target to achieve	Achievement	Percentage
Foundation (Nos)	15000	15448	103%
Tower Erection (Nos)	14500	14502	100%
Stringing (in ckms)	9500	8610	91%
Transmission Lines ready for commissioning (in GW ckms)	6450	7927	123%
Inter regional power transmission capacity (MW) addition/ready for commissioning	4200	5600	133%

Source – POWERGRID ANNUAL REPORT

- **Added 10,600 ckm and was able to achieve its capex and capacity addition targets.**
- **PGCIL envisaged development of high capacity ultra high voltage transmission system to optimize the eco-sensitive RoW and cater the need of bulk power transfer.**
- **Focus on creating high power intensity transmission corridors.**
- **Development innovative design in transmission line towers like multi circuit, narrow based tower, usage of technologically advance conductor configuration (HTLS).**
- **Focus on development and strengthening of Communication Network.**

PRIVATE SECTOR PARTICIPATION

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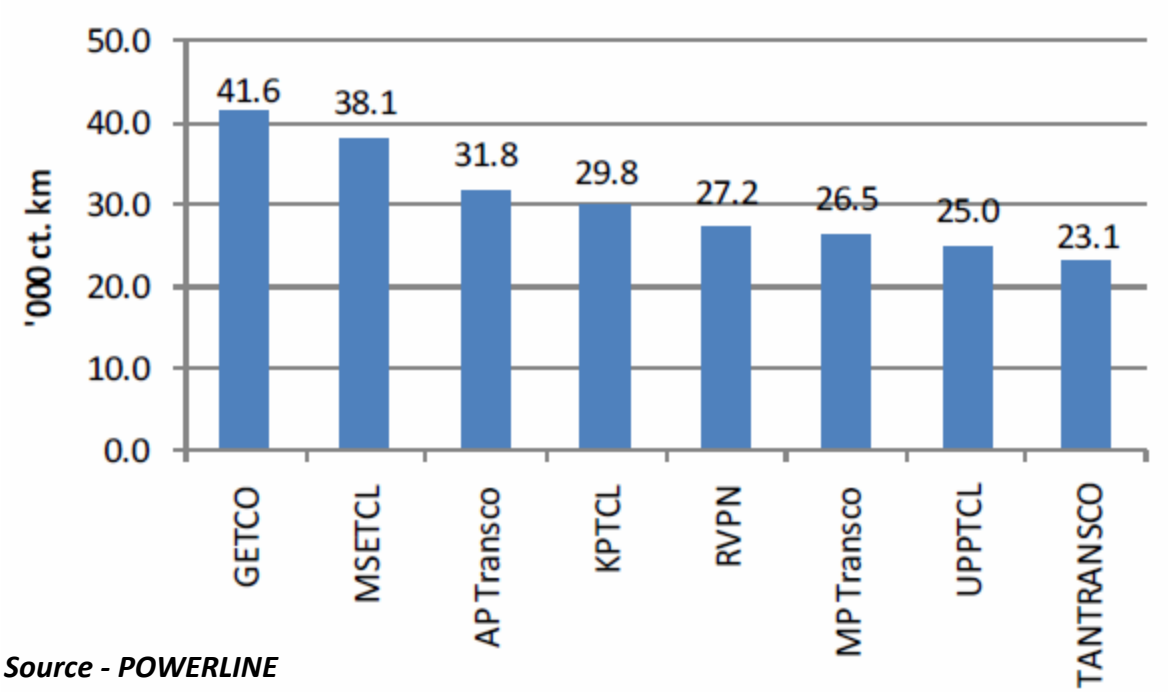
- Nine interstate transmission system awarded under competitive bidding,
- PGCIL has also won last 2 project under competitive bidding.
- Other projects are being executed by Reliance, Sterlite and Simplex BS Transcom JV.
- Almost a dozen transmission system associated with private generation project being developed by private players either independently or in JV with CTU or STUs
- Maharashtra, Haryana, Rajasthan and Uttar Pradesh have implemented PPP in state level transmission projects involving over 4300 km of lines at investment of over Rs 25 billion.
- Other state like Tamil Naidu and Madhya Pradesh are planning implementation under PPP route.

STATE SECTOR PARTICIPATION



Source - POWERLINE

- STUs accounted for 323,641 ct. km of transmission lines and over 483,234 MVA of transmission capacity as of March 2012
- Gujarat, Maharashtra, AP, Karnataka and Rajasthan account for around half of the total intra-state line length
- While intra-state transmission capacity grew at a CAGR of 7.3%, line length grew at 4.7% (2007-08 to 2011-12)
- Mahatransco incurred the highest capital expenditure at Rs 29.4 billion during 2010-11 followed by RRVPNL at Rs 20 bilion, and Tantransco and KPTCL at Rs 17 billion

TWELFTH PLAN TARGETS

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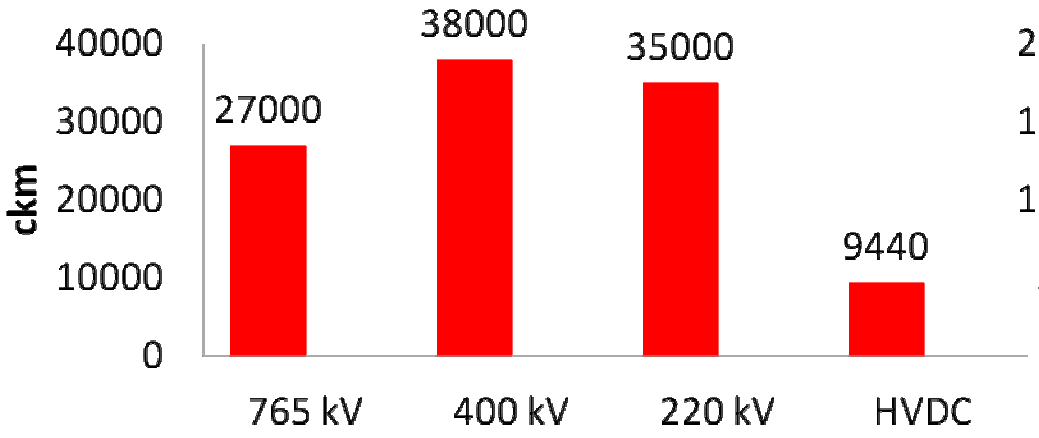
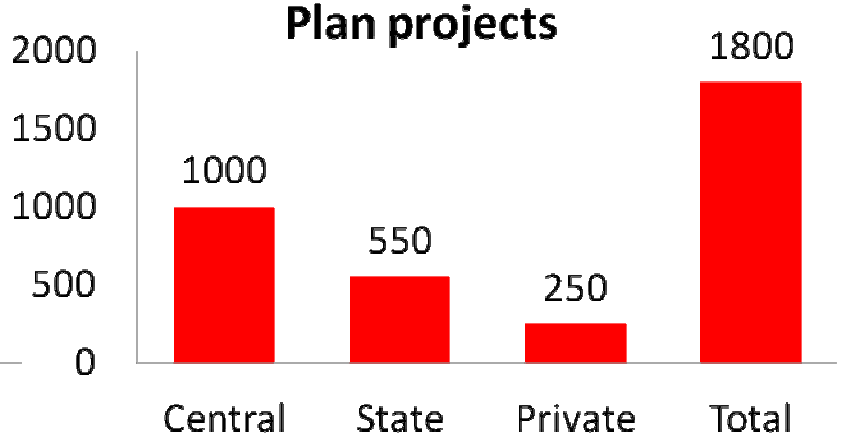
Transmission Capacity Addition Target



Source – Power line

Fund Requirement for 12th Plan projects



Source – Working Group report

- Capacity addition requirement during the XII Plan is 75,785 MW as per Working group.
- Transmission line length addition of approx 1,10,00 ckm, with major growth seen in 765 kV voltage level .
- Around 38,000 MW of interregional capacity is expected to be added in 12th plan.
- Transmission Segment see spend target of approx Rs 1800 billion, with approx 46% growth. The spend on T&D has increased to 56% of total power sector outlay to improve infrastructure.

TWELFTH PLAN TARGETS

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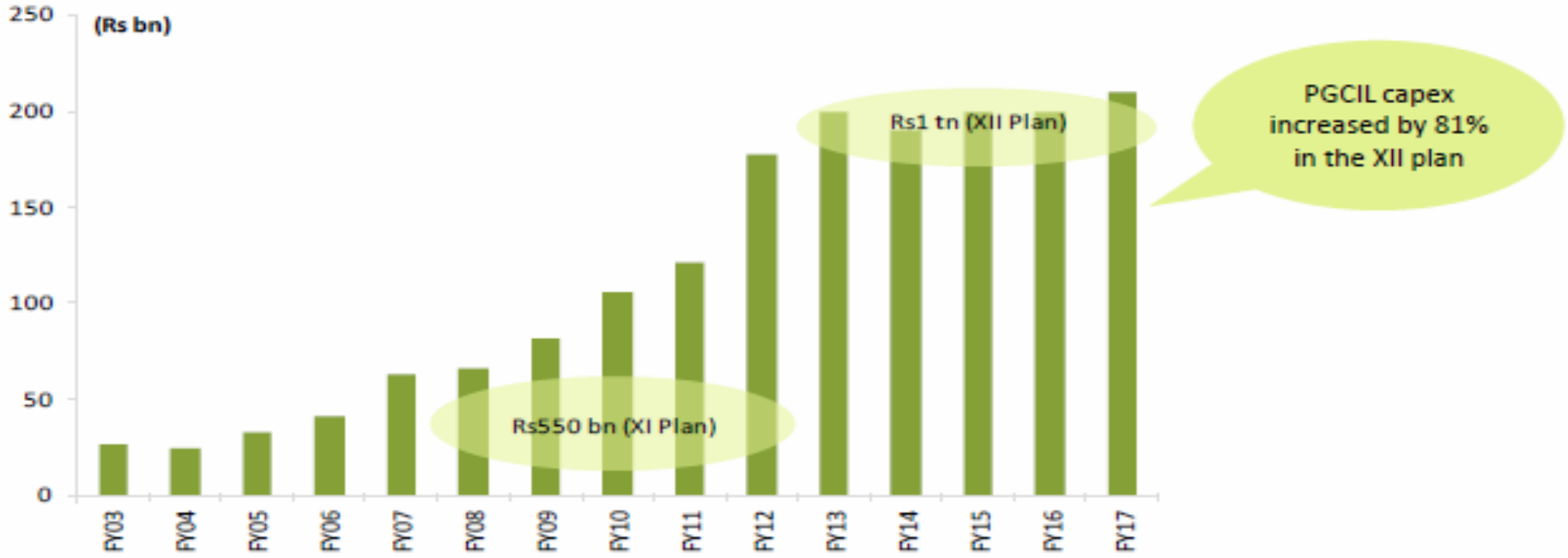
PGCIL capex increases by 81% in XII Plan; XI Plan target has been achieved



Source: PGCIL, quant Global Research

- PGCIL share in total plan spend is rising from 39% in 11th plan to 57% in the 12th plan.
- Out of PGCIL's planned capex of Rs 1000 billion, focused on developing high capacity transmission corridors, Ultra transmission system for 6 UMPPs, Transmission system for DVC generation projects.
- PGCIL has consistently been able to meet their capex spending and 12th plan target more than the highest achievement of 11th plan in each year.

Supply Quantity Requirements for Line in 12th Plan

Item	Unit	Annual Quantity	Total Quantity
Conductor	KM	1,28,000-1,52,000	6,40,000-7,62,000
Tower Steel	MT	5,22,000-6,18,000	2,608,00-3,091,000
Hardware	SETS	1,77,000-2,10,000	8,84,000-10,52,000
Insulators	DISC	157,19,000-186,38,000	785,94,000-931,88,000

Source – PGCIL presentation

- Transmission Segment has sufficient capacity available to meet the requirement of 12^{th} Plan.
- Sector has seen number of new player entering and the established players are expanding their capacity to meet the growth target
- Transmission Tower major player like Kalpataru, KEC, L&T, Gammon and others are building additional capacity.
- Hardware Supplier are also expanding their facility like EMI, TAG and have seen number of new globally est player entering Indian market like Sicame, Mosdorfer
- Other component suppliers have also shown interest. Foreign players and new players are also setting their network in country.

Emerging challenges and opportunities

- Delays in land acquisition, obtaining right of way (ROW), environmental and related statutory clearances
- Transmission development in a phased manner –commensurate with generation / load growth
- Transmission Project should be planned in holistic manner with generation projects.
- Uncertainty in the upcoming generation projects impacting the future transmission project planning.
- Usage and adoption of advanced Project Management skills
- Availability of Experience Manpower
- Lack of level playing field for private players and limited avenues for investment.
- Inadequate project under private sector participation with concern of payment security, generations, policy change matter, licenses, sector funding and other transmission line risk.

Emerging challenges and opportunities

- Adoption of advanced construction technologies which are not being used due to local issues and cost implication.
- Quality of contractors need to be improved.
- New vendor or source approval is time consuming, to be more structured and time bound.
- Poor creditworthiness of state utilities leads to lack of payment security for contractor and private players.
- Fast resolution of Contractual Issues and timely closure of contract.
- Non availability of skilled Man power
- Need for setting up training centers.
- Focus on safety and usage of safety equipment's.

BENCHMARKING

Best Practices in Transmission

- Identify Technologies leading to greater efficiency in the Bulk Power System
- Increase in System Utilization
- Reduction in System losses

On Comparison with other Developing Countries

HVAC

India – 765 kV | China – 1000 kV | South Africa - 765 kV | Brazil – 765 kV

HVDC

India – 500 kV and 800 kV | China – 800 kV | South Africa – 533 kV | Brazil – 600 kV

Substation Automation

India – Yes | China – Yes | South Africa – Yes | Brazil – Yes

In India we have been moving in right direction we need to continuously enable our systems through

1.Policy Changes

2.New Construction Technology

3.Adoption of new advanced products like conductors, poles and long rod insulators

4.Safeguarding domestic industry and improvising on internal strength

5.Better Project Management Practices

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THANK YOU