



The Energy and Resources Institute

Supply Side Energy Efficiency: Scope, Needs & Constraints in India

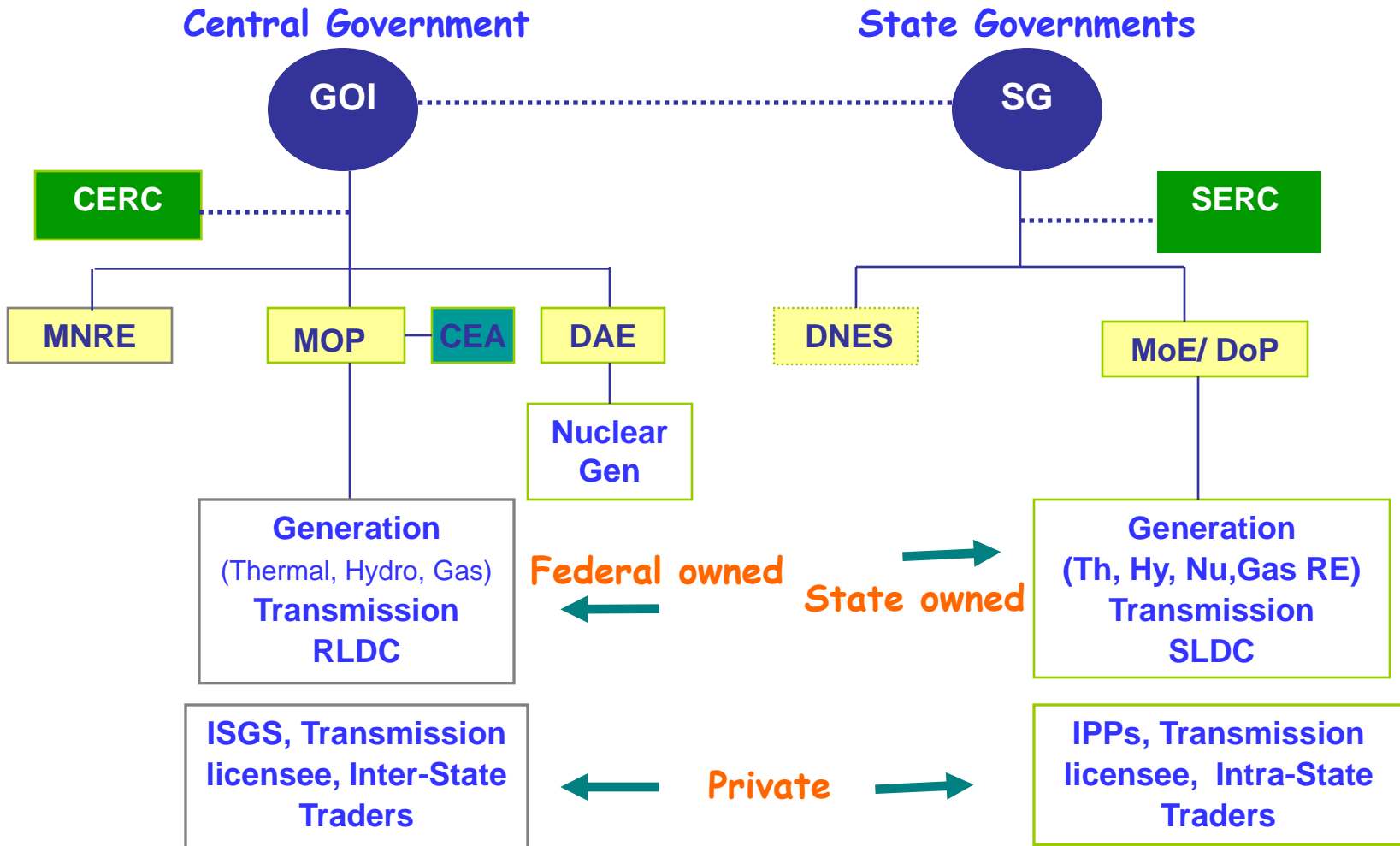
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**Match making event between CDM project developers & EU
stakeholders in the field of EE & EST**

15-16 March 2010 at Hotel Le Meridien, New Delhi

Organizational Structure



➤ Other energy related sectors like coal, oil & gas, etc are under different ministries. Electricity a concurrent subject as per Constitution of India

Indian Power Sector – An Overview

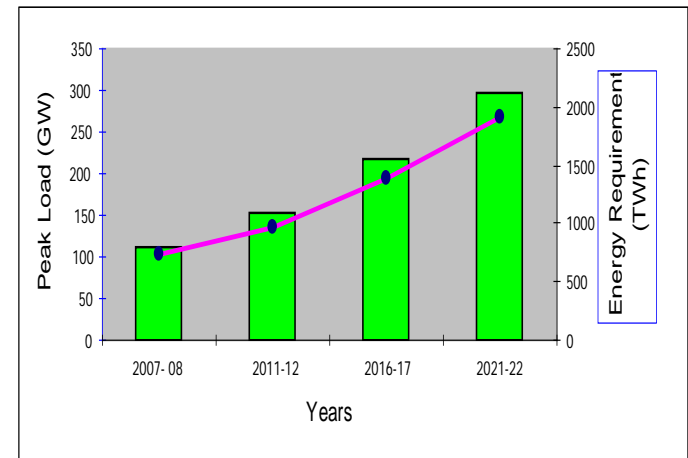
The Indian power supply industry is over 110 years old

Some salient features (2008-09)

- ★ Installed generating capacity 148 GW
Th 65%, Nu 2.5%, RE 8.5%, Hydro 24%
- ★ Electricity generation 724 BU
- ★ National Power Grid
- ★ Interconnections with Bhutan & Nepal
Planned with Sri Lanka & Bangladesh
- ★ Per-capita consumption 704 kWh
- ★ Power supply position (*shortages*)
Energy: 11%, Peak deficit: 12%
- ★ Access 44%
- ★ Captive (above 1 MW) > 22 GW
- ★ Evolving power market

Looking ahead

Demand rising @ 8-10% per annum



Vision 2012

- Reliable & quality power for all
- Per-capita consumption to go up to 1000 kWh
- Minimum lifeline consumption: one kWh/ household/day as a merit good

Challenges to Sustainable Development

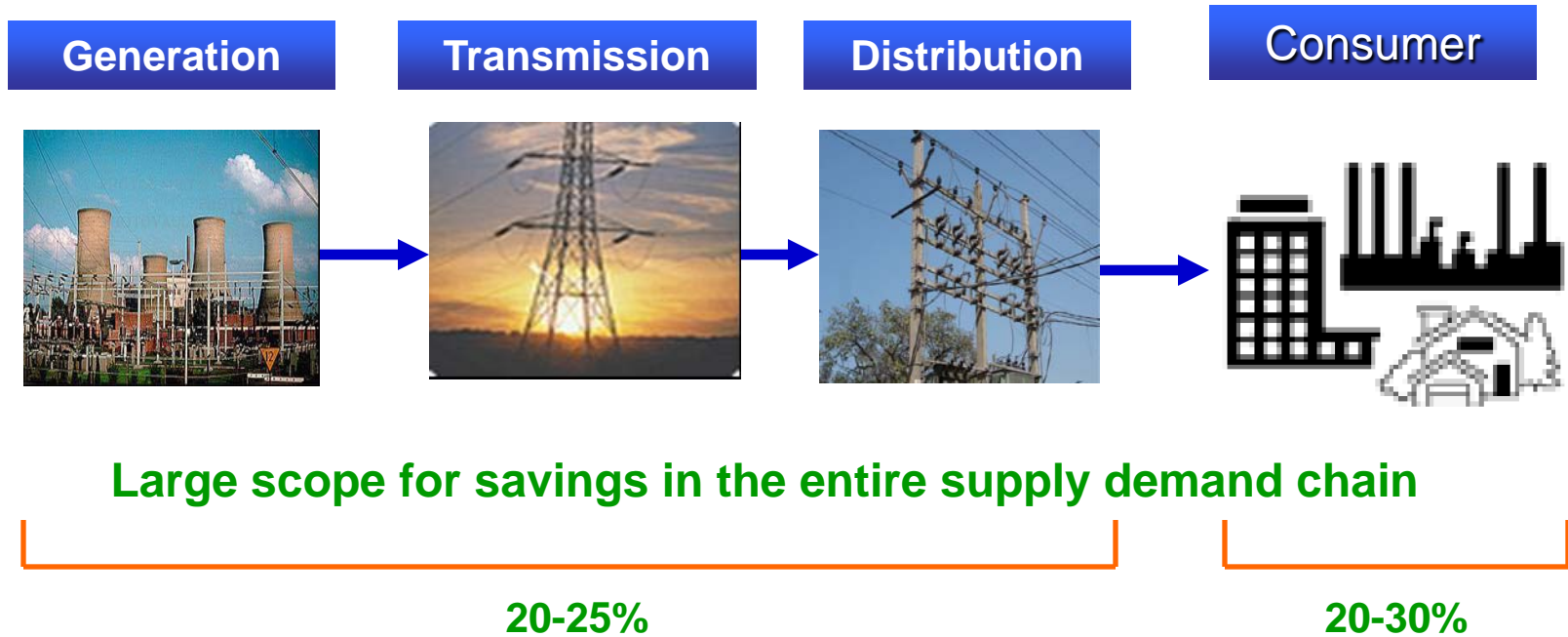
- ✦ Steep growth in demand & continuing power shortages
- ✦ Past track record of generating capacity additions
- ✦ Environmental & social issues
- ✦ GHG emissions from fossil fuel generation
- ✦ Inefficiencies in the entire demand-supply chain
- ✦ Issues relating fuel availability, energy security
- ✦ Pricing of power
- ✦ Limited private sector participation & lack of competition

Various policy & regulatory measures have been initiated in recent years to address these concerns.



Improving energy efficiencies key for sustainable development of the sector

Scope for Improving Efficiencies



Main areas of concern in the supply chain:

- ✱ Generation (especially thermal power generation)
- ✱ T&D (especially sub-transmission & distribution)

Efficiency Concerns: Generation

- ✱ Conversion efficiencies (SHR)
- ✱ Plant age
- ✱ Technology (almost all sub-critical)
- ✱ Quality and availability of fuel
- ✱ Plant utilization

- ✱ Reservoir silting
- ✱ Non-optimal operation

- ✱ Fuel availability
- ✱ Plant load factor

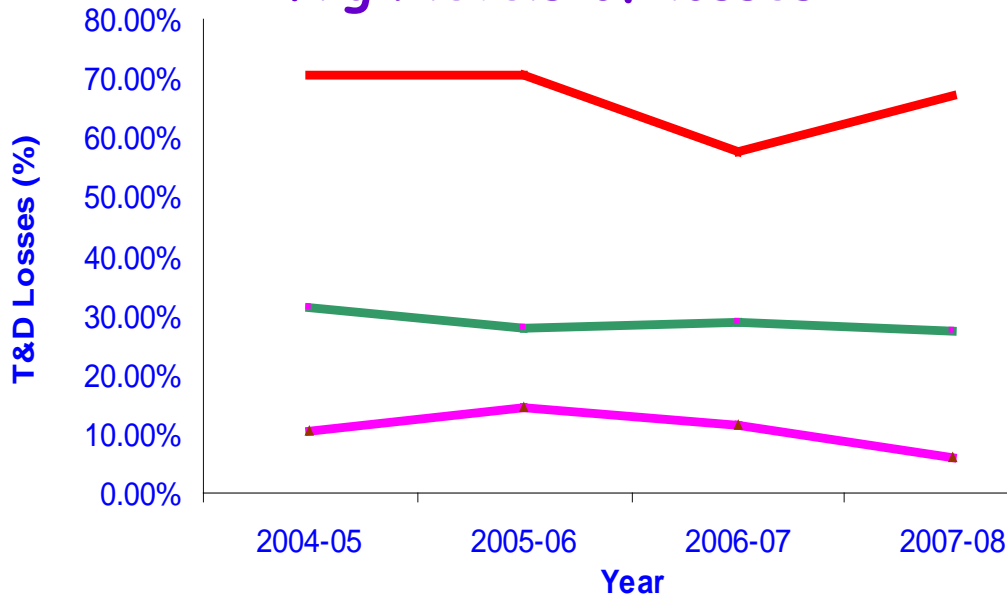
Coal based plants

Hydropower plants

Gas & Nuclear plants

Efficiency Concerns: T & D

High levels of losses



Source: CEA

Maximum All India Minimum



Some typical scenes!

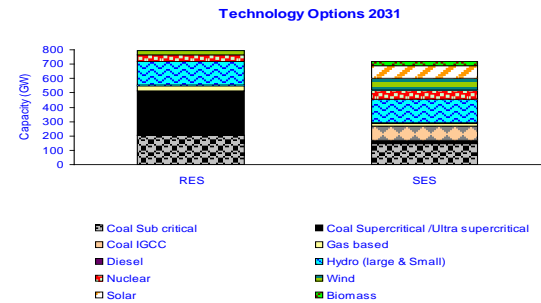
Major area of concern: Distribution system

Causative factors: Haphazard growth, poor HT-LT ratio, inadequacies in MB&C, pilferages, poor QOSS, governance issues, etc

Technological Interventions: Generation

- ☀ Choice of generation technology & fuel options
- ☀ Cogeneration & waste heat recovery systems
- ☀ Hybrid use of renewable energy technologies
- ☀ Decentralized Distributed Generation (DDG)

Over 10% reduction in IC



Source: TERI

Special focus on thermal power generation

- ☀ Adoption of super critical steam parameters & other advanced cycles based on pressurized fluidized bed combustion & gasification
- ☀ Combustion optimization of existing plants
- ☀ R&M of old plants

Technological Interventions: T&D Systems

Sub-transmission & distribution systems (Main focus)

- ✱ HVDS & Network reconfiguration to reduce LT lines
- ✱ Energy efficient transformers
- ✱ Reactive power correction near load centers
- ✱ Metering technologies
(for proper energy audits, control of non-technical losses, etc)
- ✱ Smart grids

Transmission systems (energy losses generally not high)

- ✱ Development of National Power Grid
- ✱ Better reactive power management
- ✱ Power electronics for efficient use of the facilities

Policy & Regulatory Interventions

- ✱ **Mandating efficient technology in specifications**
- ✱ **Encouraging indigenous manufacture of supercritical units**
- ✱ **Incorporating efficiency parameters in bid selection**
- ✱ **IRP in long term planning**
- ✱ **Opening up of market & removing transmission congestions**
- ✱ **Mandatory energy audits (guidelines by CEA)**
- ✱ **Notifying SOP Regulations and performance based regulation**
- ✱ **Promotion of co-generation, RE technologies & smart grids**
- ✱ **R-APDRP program (with focus on base line data & loss reduction)**
- ✱ **DSM initiatives (with focus on load research & use of IT)**
- ✱ **National Mission on Enhanced Energy Efficiency (NMEEE)**

Thank you

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