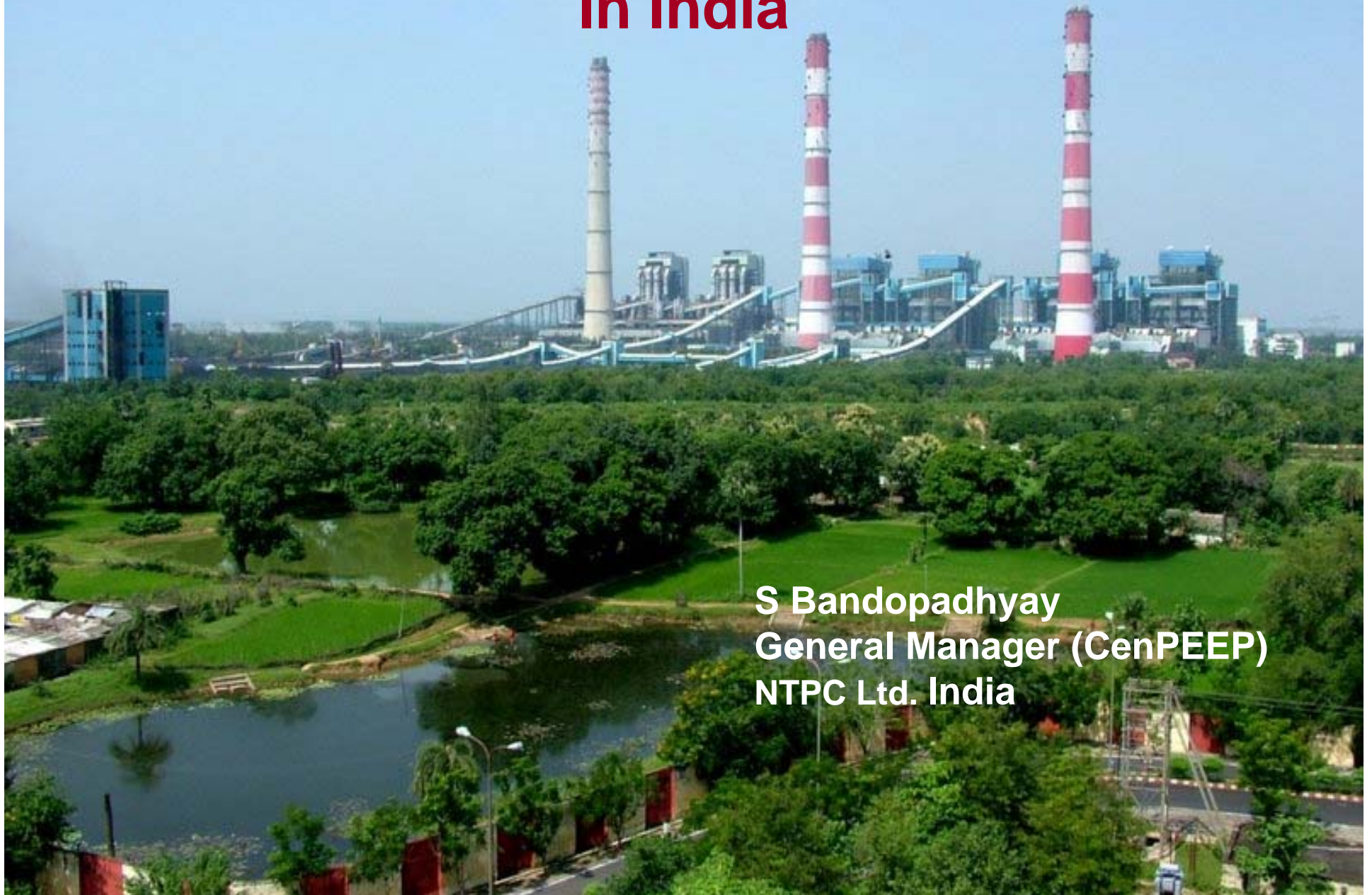
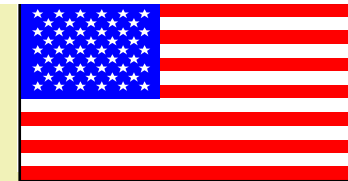


# Initiatives for Low Carbon Power Generation In India



**S Bandopadhyay**  
**General Manager (CenPEEP)**  
**NTPC Ltd. India**



# Indo-US Power Sector Initiative

## ***Centre for Power Efficiency & Environmental Protection***

- NTPC
- PSEB
- WBPDC
- TNEB
- Guj. GenCo
- Maha GenCo
- AP GenCo
- UPRVUN
- MPGENCO
- IPGCL

***CenPEEP***

*To implement  
Greenhouse Gas  
Pollution  
Prevention (GEP)  
Project*

- USDOE
- NETL
- USEA
- EPRI
- TVA
- General Physics
- Storm Tech
- Structural Int. (SI)
- Domain Experts

**Guided by**

**Advisory Board & Executive Committee**

Consisting of NTPC, USAID, and representatives from Govt. of India, State & private power utilities, industry associations, research institutes, etc.



## Methodology Adopted

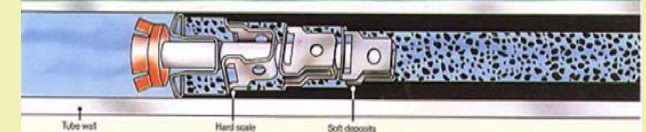
**Selection of Low-Cost & High-Benefit  
technology**

**Technology  
Selection &  
Acquisition**

**Technology  
Transfer**

**Technology  
Demonstration**

**Training &  
Technology  
Dissemination**



# Driving Excellence in Performance

## GHG Reduction Initiative

### TECHNOLOGY DEMONSTRATIONS

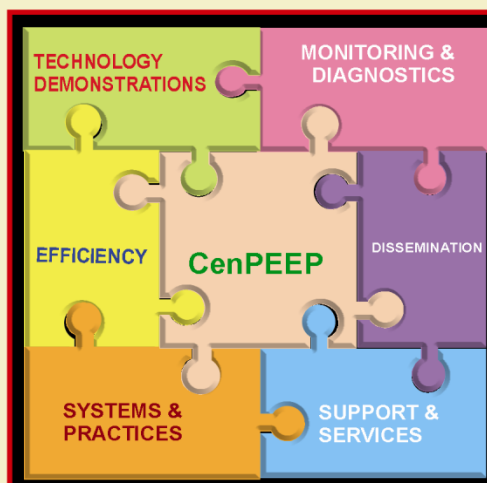
- Condenser Water Powered Tube Cleaners
- Helium Leak Detector for Condenser Air- in-leak
- Dirty Pitot & Rotary Probe for Mill
- Boiler Performance Assessment & Optimisation
- IRT, Acoustics & Videoscope for Diagnostics
- Thermodynamic Modeling for Performance Analysis
- UT for FW Flow Measurement

### MONITORING & DIAGNOSTICS

- Predictive Maintenance (PdM)
- Reliability Centred Maintenance (RCM)
- Risk Evaluation and Prioritization (REAP)
- Financial Risk Optimisation (FRO)

### EFFICIENCY

- Accurate Test Instruments
- Simplified Subsystem Performance Test
- User Friendly System - Portable DAS, Computational Software, Tapping Location etc.
- Periodic Gap Assessment & Action Plan



### DISSEMINATION

- Workshops-Efficiency and M&D
- Guidelines on Technology
- Performance Optimizers, CenPEEP Times, Portal on Intranet
- Best Practices on Overhaul

- Energy & Efficiency Management System (EEMS)
- Overhaul Preparedness Index (OPI)
- Knowledge Based Maintenance

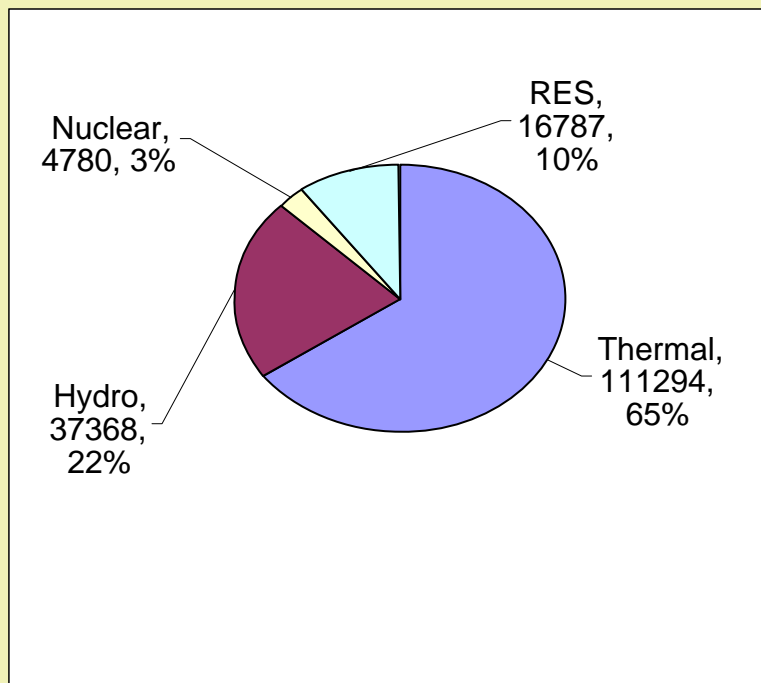
### SYSTEMS & PRACTICES

### SUPPORT & SERVICES

- Customized Training Programs
- Support to State Utilities
- Consultancy Assignments
- Capability & Skill Building-Hands on Training & Demonstrations

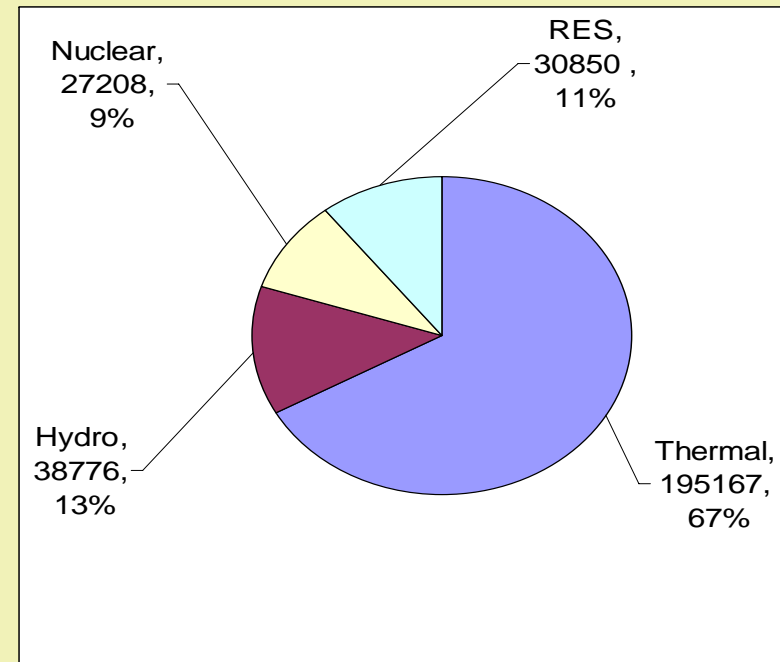
## Indian Power Sector: An Overview

### Present Total Installed Capacity Mix: 170,229 MW



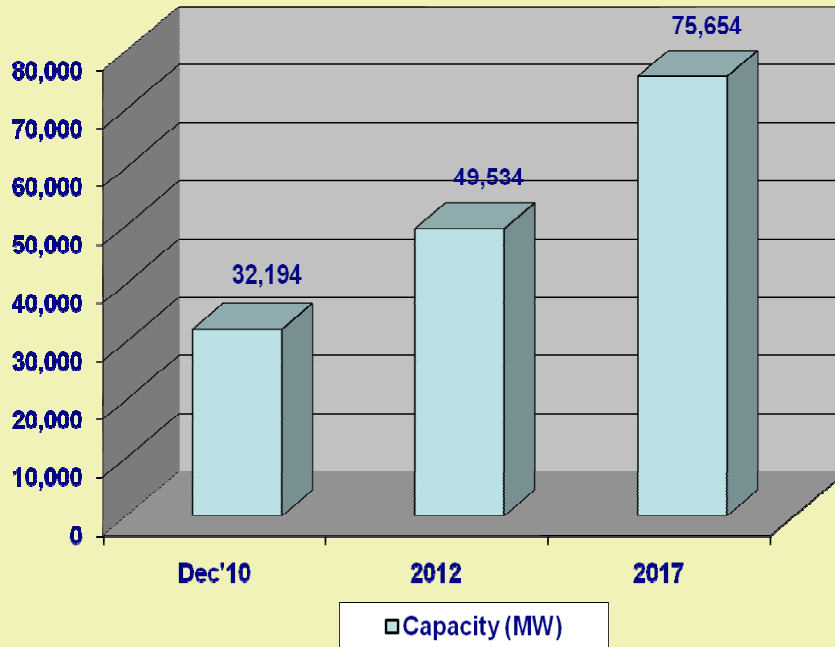
**Source: CEA, Power Sector at a Glance  
(31-01-2011)**

### Projected Total Installed Capacity Mix: 292,000 MW



**Source: India Vision 2020, Planning  
Commission**

# NTPC's Capacity Addition Plan



*Super critical & Ultra super critical units*

## PROJECTS UNDER CONSTRUCTION

- 3 x 660 MW Sipat STPP Stage-I
- 3 x 660 MW Barh STPP Stage-I
- 2 x 660 MW Barh STPP Stage –II

## PROJECTS UNDER BULK TENDER

- ❖ Meja, Uttar Pradesh – 2x660 MW
- ❖ Solapur, Maharashtra – 2x660 MW
- ❖ Mouda-II, Maharashtra – 2x660MW
- ❖ New Nabinagar, Bihar – 3x660 MW

## PLANNED PROJECTS

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| ❑ Kudgi I, Karnataka – 3x800 MW   | ❑ Katwa, West Bengal – 2X800 MW    |
| ❑ Darlipali I, Orissa – 2x800 MW  | ❑ Khargone, M.P. - 2X 660 MW       |
| ❑ Gajmara I, Orissa – 2x800 MW    | ❑ Dhuvaran I, Gujarat – 2X 660 MW  |
| ❑ Lara I, Chhattisgarh – 2x800 MW | ❑ Bilhaur, Kanpur U.P. – 2X 660 MW |
| ❑ Tanda-II, U.P. – 2x660 MW       | ❑ Adra (Railways JV) – 2X660 MW    |
| ❑ Gidderbaha, Punjab – 4x660 MW   | ❑ Gadarwara I, M.P. – 2 X 660 MW   |
| ❑ Barethi, M.P. – 6x660 MW        |                                    |

## NTPC target - 128 GW with 28% from non-fossil sources by 2032

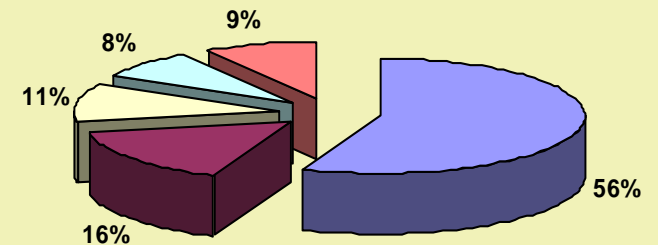
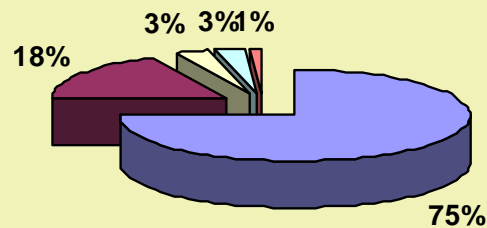
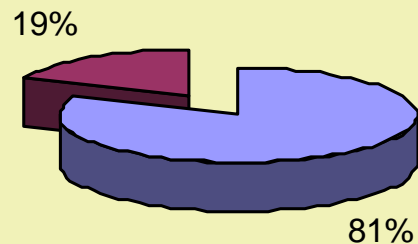
**2010**  
~ 33 GW



**2017**  
~ 75 GW



**2032**  
~ 128 GW



Coal



Gas



Nuclear



Hydro



Renewables

## Energy Efficiency

### Policy Interventions

- Upto 10% improvement in LMZ machines - Targeting large no. of 210 MW Units which are completing their normal life
- Energy Efficient R&M for Efficiency Improvement of Existing Units
- Supercritical units – New units of 660/800 MW of higher efficiency
- National Mission for Enhanced Energy Efficiency - A part of National Action Plan on Climate Change (NAPCC)

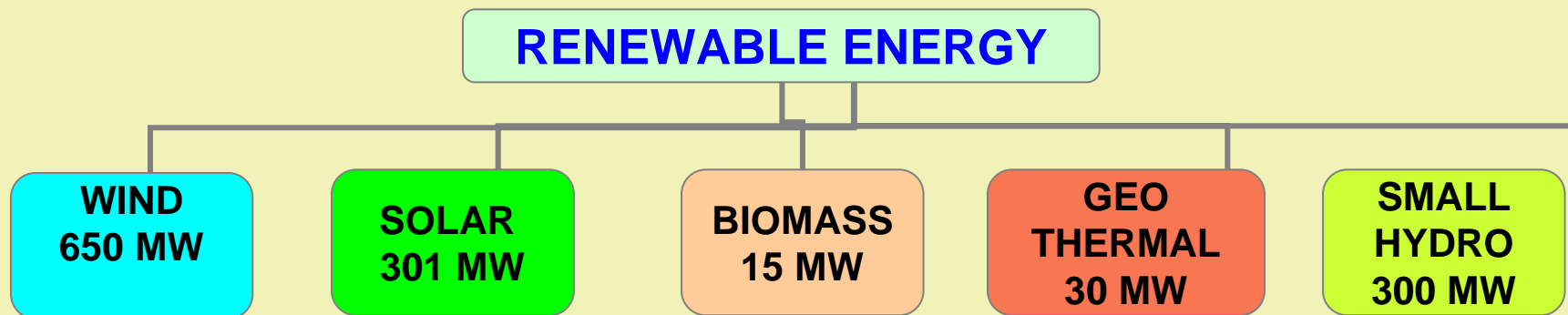
*(Includes the initiative of 'Perform, Achieve and Trade Scheme' (PAT), a market based mechanism to enhance energy efficiency & provide incentives)*

### NTPC Initiatives for efficiency improvements & GHG reduction

- Adoption of advanced cleaner and greener technologies
- Establishment of CenPEEP
- Suitable realignment of fuel mix
- Systems to monitor & enhance plant efficiency



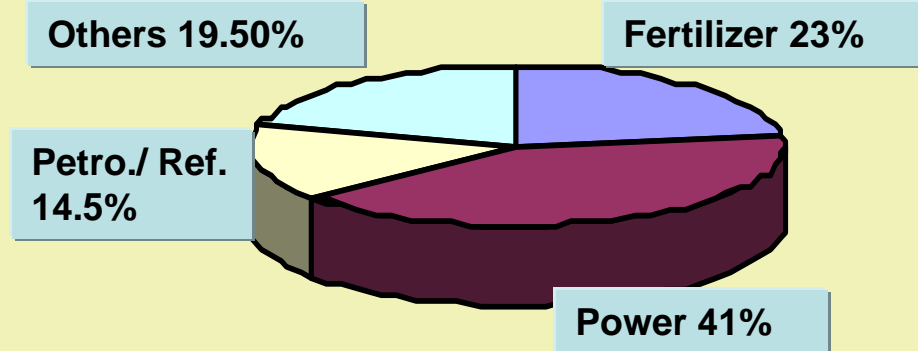
## Capacity Addition Portfolio of Renewable Energy



- *300MW Solar projects by 2014*
- *1000MW capacity RE projects by 2017*
- *20000 MW by 2022 as per Jawahar Lal Nehru National Solar Mission*

## INDIA: GAS AVAILABILITY

### Sector wise Gas Consumption (2010)



- **Gas Generation capacity: 17456 MW (31.01.2011)**
- **Additional 10,000 MW gas based capacity in 2011**
- **CEA has proposed new gas based capacity of ~ 25,000 MW during 2012-2017**

### ***Integrated Gasification Combined Cycle Plant (IGCC)***

- ***Indian Coal have high ash, high fusion temperature, high reactivity and low sulfur content***
- ***NTPC is making concerted efforts for induction of IGCC***

## Nuclear Power in India

- Current installed capacity ~ 4780 MW
- Projected capacity upto 2020 ~ 21780 MW & 2030 ~ 63000 MW
- NPCIL has commenced construction of two plants (Rawatbhata and Kakrapar) - 2 x 700 MW each using indigenous technology
- Plans for setting up 5 nuclear parks of 6 X 1000 MW power plants with foreign collaborations
- NTPC has formed a Joint Venture Company with NPCIL for setting up Nuclear power plants.
- NTPC plans to add 2000 MW of nuclear capacity by 2017 and 15000 MW of nuclear capacity by 2030

# Thanks