



A Maharatna Company

# Power Sector :

## NTPC's initiatives to meet INDCs



**A Presentation by:**  
**A K GUPTA ED (ENGG), NTPC Limited**



A Maharatna Company

# Presentation Outline

- COP-21 overview
- INDC- INTENDED NATIONALLY DETERMINED CONTRIBUTION
- INDIA'S POWER SECTOR INDC
- NTPC INITIATIVES

# Presentation Outline

- COP-21 overview
- INDC - INTENDED NATIONALLY DETERMINED CONTRIBUTION
- INDIA'S POWER SECTOR INDC
- NTPC INITIATIVES

# Paris Agreement (COP21)

- 195 countries adopted the legally binding global climate deal.
- Limiting global warming to well below 2 degree C.
- The agreement is due to enter into force in 2020.
- New Mechanism with completely replace CDM after 2020.
- Each country is to declare INDC's every 5th year .
- Developed countries pledged \$100 billion annually for climate finance.
- Countries agreed to establish Technology Framework.



A Maharatna Company

# Presentation Outline

- COP-21 overview
- INDC - INTENDED NATIONALLY DETERMINED CONTRIBUTION
- INDIA'S POWER SECTOR INDC
- NTPC INITIATIVES



A Maharatna Company

# India's INDC

- To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.
- To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030
- To create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.



A Maharatna Company

# Presentation Outline

- COP-21 overview
- INDC - INTENDED NATIONALLY DETERMINED CONTRIBUTION
- INDIA'S POWER SECTOR INDC
- NTPC INITIATIVES



# India's Power Sector INDC

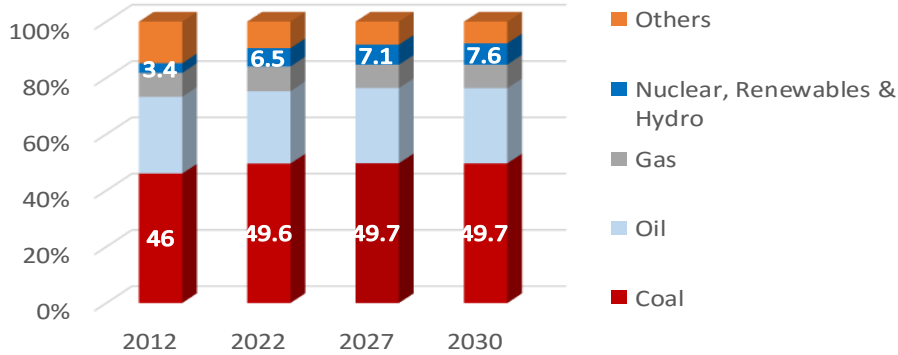
A Maharatna Company

- **Shifting from sub-critical to super-critical technology**
- **Renovation, modernization and life extension**
- **National Mission for Enhanced Energy Efficiency (NMEEE)**
  - Perform, Achieve and Trade (PAT)
  - Market Transformation for Energy Efficiency (MTEE)
  - Energy Efficiency Financing Platform (EEFP)
  - Framework for Energy Efficient Economic Development (FEEED)
- **Up scaling Solar energy**
  - Jawaharlal Nehru National Solar Mission (JNNSM)
  - Ultra Mega Solar Power Projects
  - Solar pumps
  - Solarisation of petrol pumps
  - Surya Mitra Scheme
- **Up scaling Wind Energy**
  - National off shore Wind Energy Policy
  - Wind Atlas, 2015
  - Restoration of Accelerated Depreciation (AD) Benefits for Wind Power Projects
  - National Wind Energy Mission (Proposed)
- **National Smart Grid Mission**
- **Integrated Power Development Scheme (IPDS)**



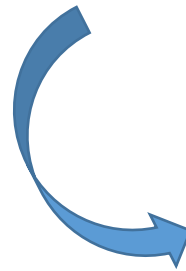
# Coal to remain integral to India's energy security

Primary Energy Mix



Source: IESS, 2047, NITI Aayog

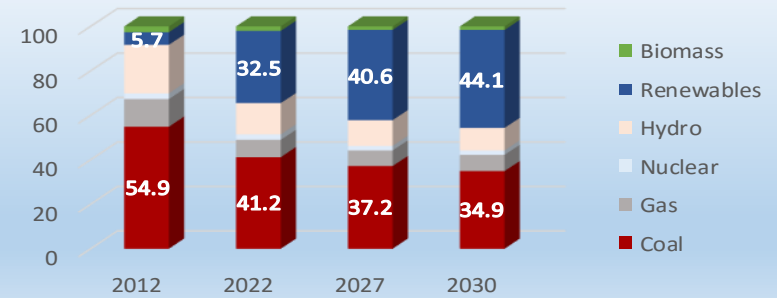
- Coal will remain one of the major contributors to electrical capacity for a few decades
- Non Solar capacity need to have margins equal to solar capacity to provide balancing power during non sunny periods, till storage technologies become economically viable



## Growth Drivers for Coal Based TPS

- India has 4<sup>th</sup> largest coal reserves & 3<sup>rd</sup> largest producer on the globe. Coal prices are less volatile- **Affordability**
- Conventional coal based power generation technology is quite mature. We now manufacture power plants which can work for almost 100% of the time- **Maturity/reliability**
- Limited availability / technological constraints of other energy sources

Electricity Mix



Source: IESS, 2047, NITI Aayog

The predicted energy use and targeted emissions reduction calls for dramatically improving efficiency of coal fired power plants.



A Maharatna Company

# Presentation Outline

- COP-21 overview
- INDC - INTENDED NATIONALLY DETERMINED CONTRIBUTION
- INDIA'S POWER SECTOR INDC
- NTPC INITIATIVES



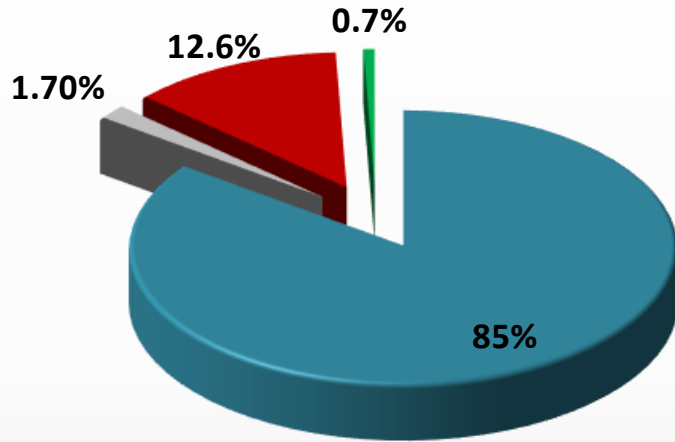
A Maharatna Company

# NTPC Initiatives & INDC

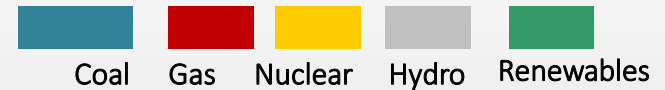
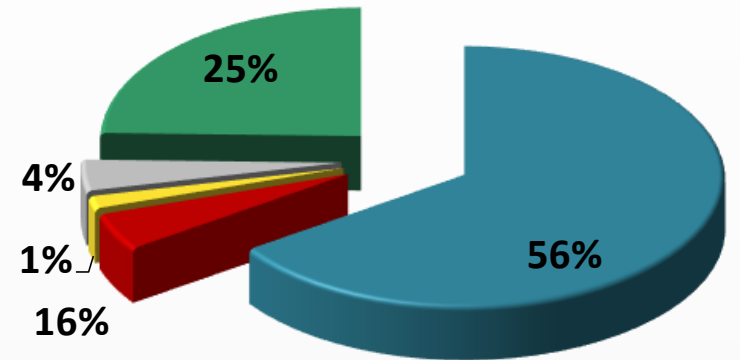
- Portfolio mix ( Increase share of renewable)
- Adoption of highly efficient, low emission, environment friendly state of art technology
- Extensive R&M of existing units
- Massive afforestation
- Collaborative research & development

# Planning for Accelerated Growth

Today - 47.18 GW



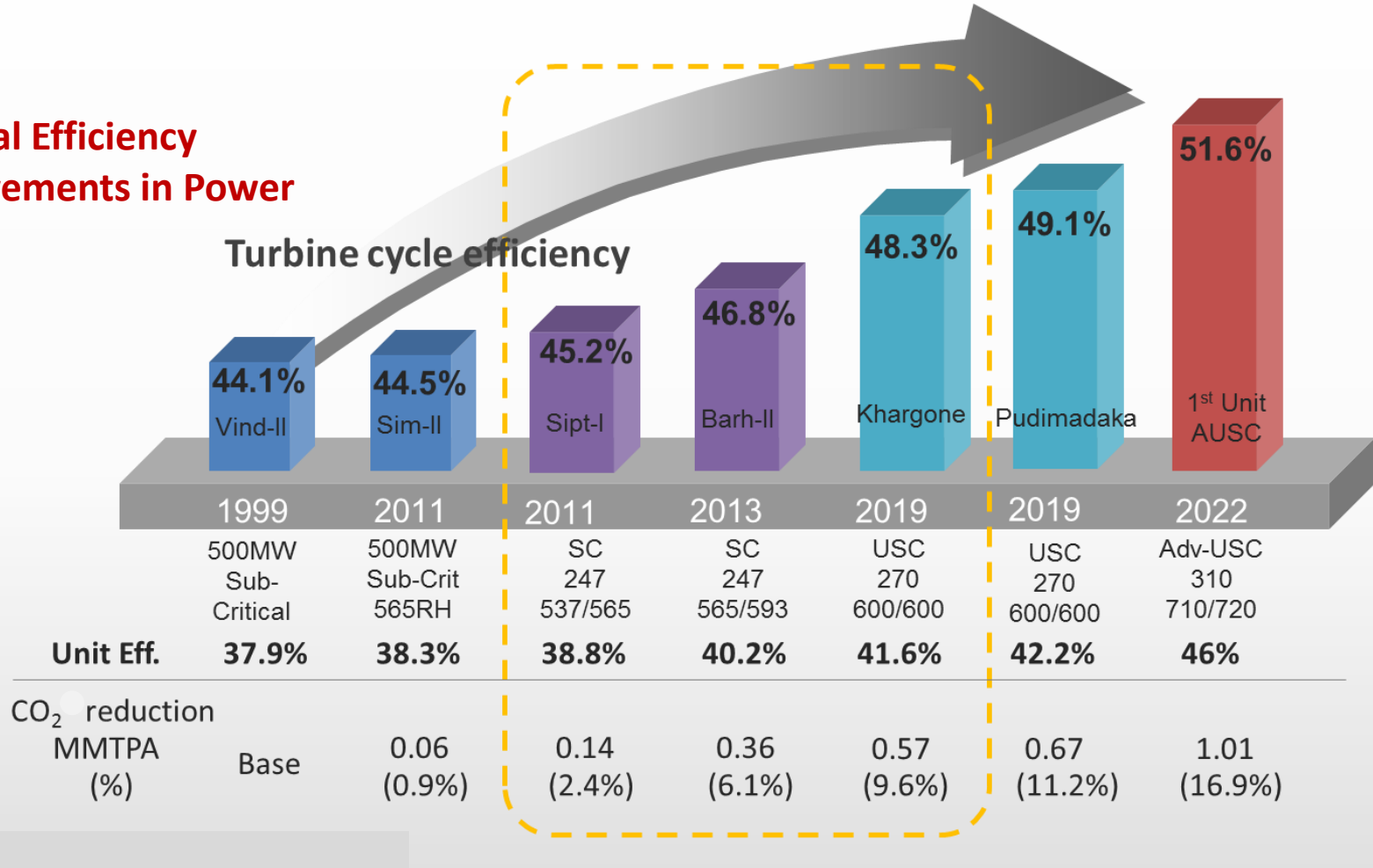
Year 2032 - 130 GW



- Improved energy mix -On path to meet INDC
- More than 24 GW under construction; Nearly 20 GW in pipeline.
- Have given Green Energy Commitment for 10 GW solar in 5 years. This generation would save around 10 MMT of CO<sub>2</sub> emissions annually.

# Clean Use of Coal - High Efficiency Trajectory

**Thermal Efficiency improvements in Power Plants**



Ultra supercritical technology with steam temperatures upto 600°C is being specified for new 600/800 units. 24 GW of generation capacity currently under construction is based on SC/USC technology

# Renewables - NTPC going big on Solar

## Renewable Bouquet

- Solar
- Solar thermal
- Solar ACs
- Wind
- Wind-offshore
- Small Hydro
- Geo-Thermal

0.7% to 25%  
by 2032

## Solar PV Capacity

• Installed – 310 MW

|                |                                    |
|----------------|------------------------------------|
| Solar Planning | 10000 MW by 2022<br>(own capacity) |
|                | 15000 MW by 2019<br>(Under NSM)    |

## Project Being Developed

|                      |  |
|----------------------|--|
| <b>Geo-Thermal</b>   | MoU with Chhattisgarh                                      |
| <b>Wind-offshore</b> | 100 MW in Planning<br>1000 MW by 2022 (NTPC revising Plan) |

Lack of capacity & capability in CSi PV cell manufacturing chain

## Solar Capacity Approach

Two Pronged Approach

1. Add MW
2. Building Institutional capacity

## R&D in Solar

- 50 TR Solar AC Operational
- Solar Thermal Lab
- Development of indigenous floater for floating PV System
- Solar Thermal based cooking at Dadri
- Solar thermal hybrid with existing thermal plant
- Robotic Cleaning system for Solar Plant at Dadri
- Tie-up of NTPC - NETRA with
  - ✓ DLR, Germany
  - ✓ ISE, Fraunhofer Institute Germany

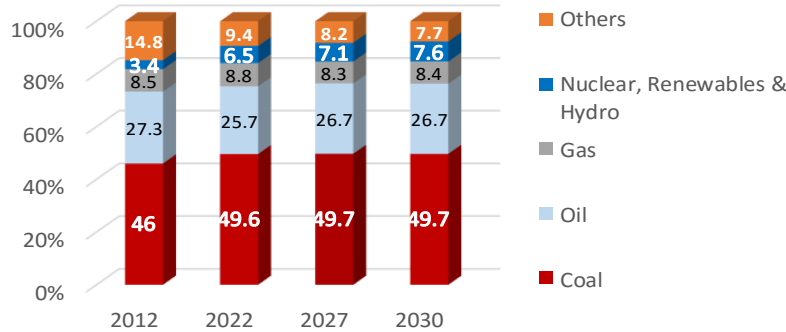


A Maharatna Company

THANK  
YOU

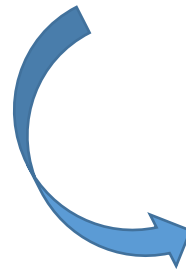
# Coal to remain integral to India's energy security

Primary Energy Mix



Source: IESS, 2047, NITI Aayog

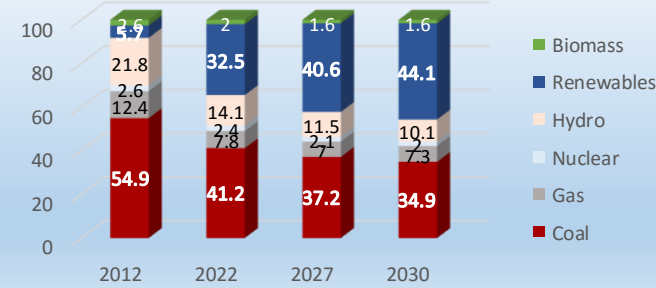
- Coal will remain one of the major contributors to electrical capacity for a few decades
- Non Solar capacity need to have margins equal to solar capacity to provide balancing power during non sunny periods, till storage technologies become economically viable



## Growth Drivers for Coal Based TPS

- India has 4<sup>th</sup> largest coal reserves & 3<sup>rd</sup> largest producer on the globe. Coal prices are less volatile- **Affordability**
- Conventional coal based power generation technology is quite mature. We now manufacture power plants which can work for almost 100% of the time- **Maturity/reliability**
- Limited availability / technological constraints of other energy sources

Electricity Mix



Source: IESS, 2047, NITI Aayog

The predicted energy use and targeted emissions reduction calls for dramatically improving efficiency of coal fired power plants.