

Power that reflects in performance



A Maharatna Company



INVESTOR PRESENTATION 2016

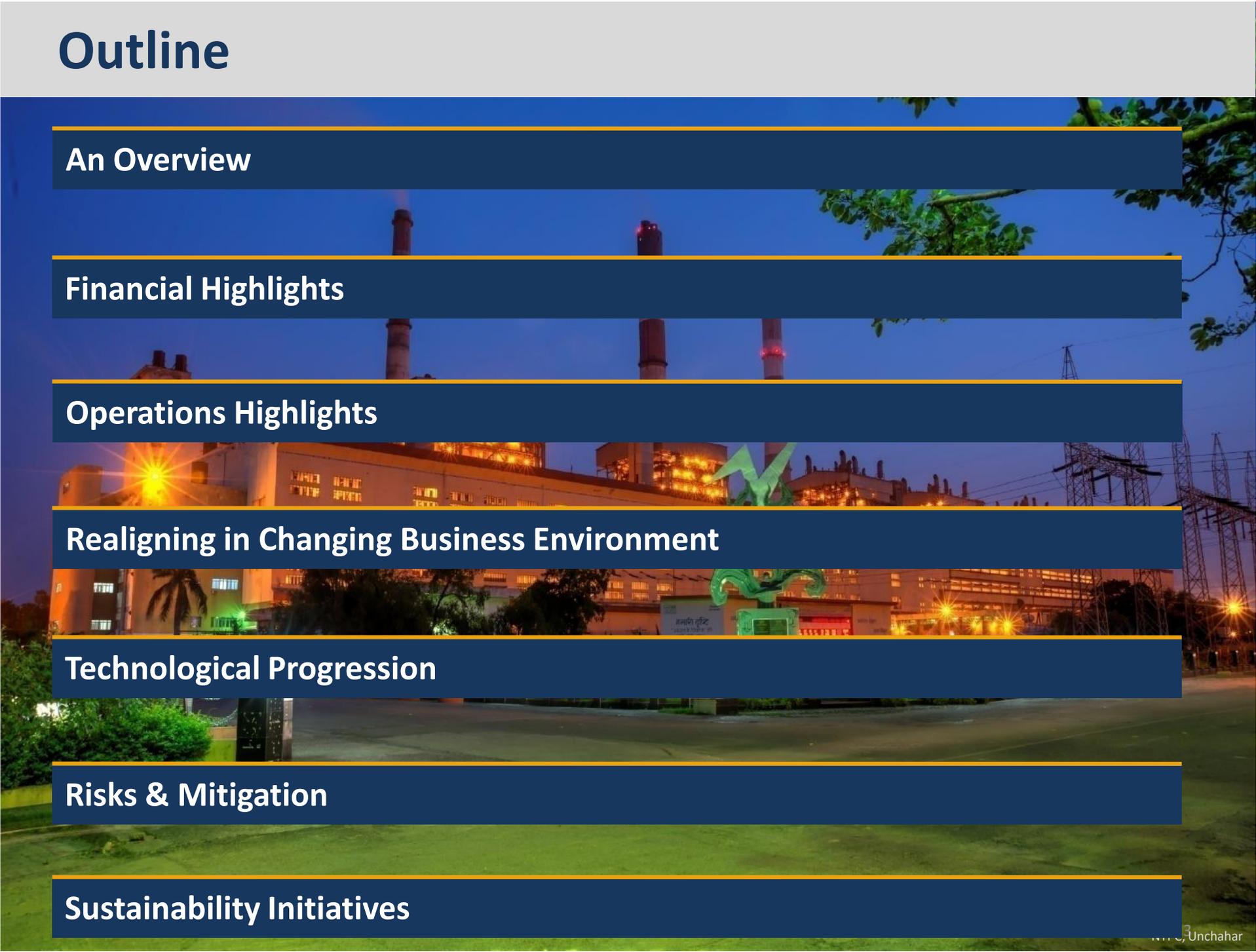
NTPC: Vision and Core Values

To be the world's largest and best power producer,
powering India's growth

Core Values



Outline



An Overview

Financial Highlights

Operations Highlights

Realigning in Changing Business Environment

Technological Progression

Risks & Mitigation

Sustainability Initiatives



NTPC- A Powerful Maharatna



Leading Generator for > 2 decades

- Total installed capacity of 47,228 MW (incl. 6,966 MW through group companies) + 24,009 MW under construction
- 1st Hydro project of 800 MW at Koldam declared commercial
- 360 MW Solar PV capacity commissioned, 510 MW under construction
- Committed to set up 10000 MW of Renewables over next 4-5 years.

Operational Excellence

- Highest ever gross generation of 241.98 BUs (standalone)-NTPC Group recorded Gross generation of 263.42 BUs FY 16
- Maintaining lead over All India PLF -Coal stations achieved PLF of 78.61% against All India PLF of 62.28%
- Top 3 coal stations in the country in terms of PLF belong to NTPC
- Achieved highest ever quarterly generation of 64.56 BUs during Q1 /FY17 - registering a growth of 10% QoQ.

Coal Mining

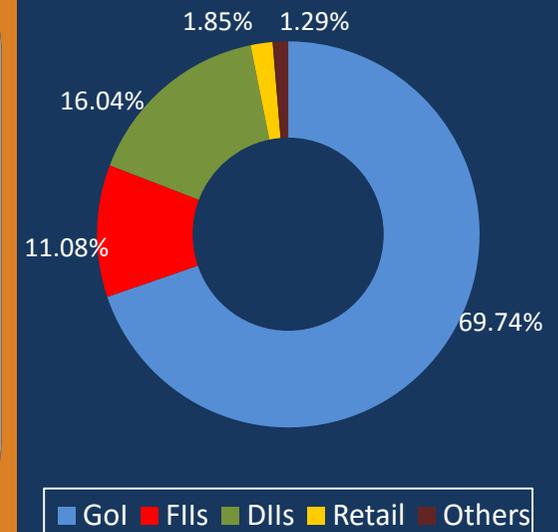
- 10 coal mining blocks allotted, with total Geological Reserves of around 7.3 BT
- Blocks have production potential of ~107 MTPA - can cater to the requirement of ~20000 MW of generation capacity
- Commenced Mining at Pakri Barwadih Coal Mining Block from western pit on 17.05.2016.
- Expect to produce 1MT of coal in the current fiscal.

Presence in Power Value Chain

- Subsidiary NVVN traded 12.7 BUs in FY16 as compared to 10.4 BUs in FY 15
- Also trades power with Bangladesh - nodal agency for trading power with Nepal & Bhutan
- Providing Consultancy in various areas of Power Generation in domestic and international market
- International presence- Setting up 2X250MW and 2X660MW coal based plants in Sri Lanka & Bangladesh

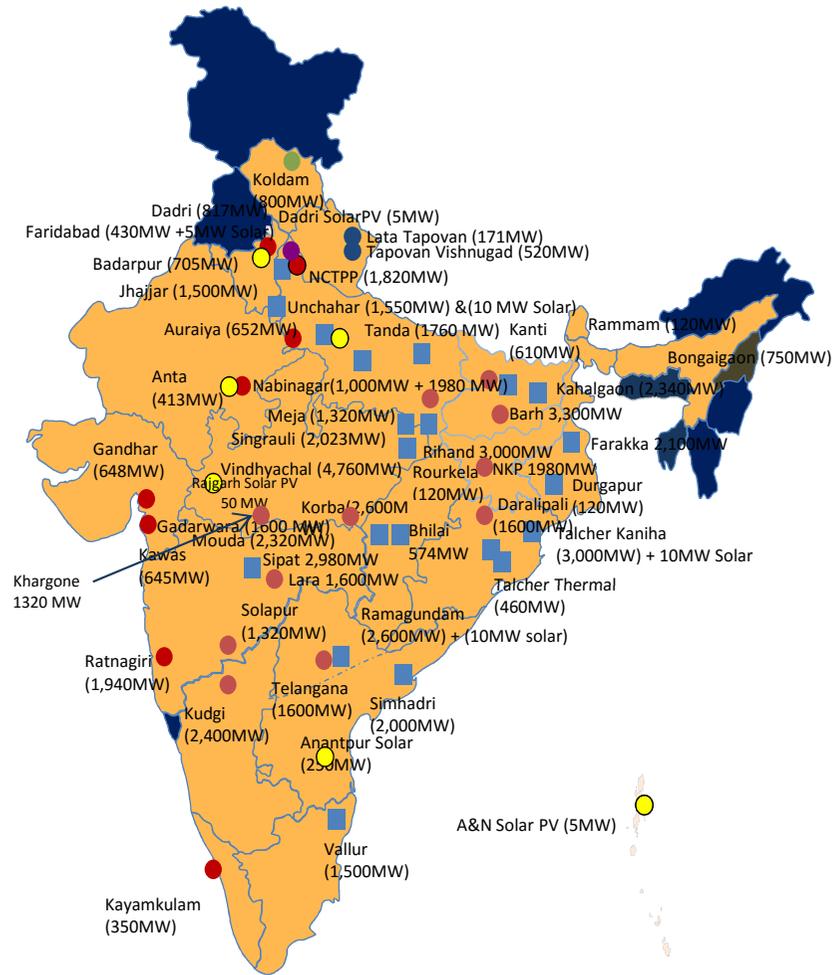
- With 15% of India's total installed capacity NTPC Group contributed 24% to All India generation during FY 16.
- NTPC is one of the 7 Maharatnas of Government of India
- Clocked the 4th highest profit amongst PSUs in FY 16
- Ranked 400th biggest company in the world in the Forbes Global 2000 list 2016
- Ranked No.2 IPP and Energy Trader Globally by Platts 2015

Shareholding Pattern
(as on 15.07.2016)

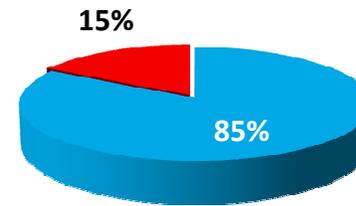


- NTPC is an Institution..... crucial for building capacity in India's surging power sector
- Capacity set to cross 50 GW this fiscal..... inching towards 24X7 Power for all

NTPC Group: Pan India Presence

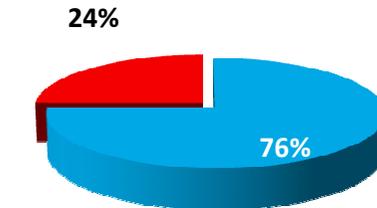


Share of Installed Capacity
(*as on June 30,2016)



*Rest of India 255940 MW
*NTPC (Group) 47178 MW

Share of Electricity Generated
(during Q1 FY17)



Rest of India 224.98 BUs
NTPC (Group) 71.50 BUs

NTPC group today is 47228 MW strong

Fuel Mix	No. of Plants	Capacity (MW)	% Share
NTPC Owned			
Coal	18	35,085	74.29%
Gas/Liquid Fuel	7	4,017	8.51%
Hydro	1	800	1.69%
Solar	9	360	0.76%
Sub-total	35	40,262	85.25%
Owned by JVs and Subsidiaries			
Coal	8	4,999	10.58%
Gas	1	1,967	4.17%
Sub-total	9	6,966	14.75%
Total	44	47,228	100.00%

Geographically well diversified presence..... Group presence across 20 Indian States

NTPC Group - Subsidiaries and Joint Ventures

NTPC has set up 5 Subsidiaries and 22 Joint Ventures to pursue its growth objectives on the foundation of Strong Financials



Out of the 27 group companies, 12 are operational and 6 of them registered an aggregate profit of ₹ 1,048.10 crore in FY 16.

JVs and Subsidiaries together paid a dividend of ₹ 134.40 crore during FY 16.

Investment in Group Companies as on 31.03.2016 is Rs.7,950 crore, Operational investments are Rs.4,355 crore.

Group companies to unlock their value and add to our earnings.



Strong Financials

FY 16

Rs. crore

Balance Sheet	Consol	Stand-alone
Total Debt	1,09,889	91,810
Cash & Bank	5,393	4,406
Net Debt	1,04,496	87,404
Net Worth	89,196	88,782

P&L	Consol	Stand-alone
Revenue	79,940	71,696
EBITDA	20,397	18,702
PAT	10,162	10,243

Note: Figures in brackets indicate holding of NTPC as on March 31, 2016.



What We Promised ... Is what we delivered in FY16

Actual Performance Against Commitments Made to Investors for FY16

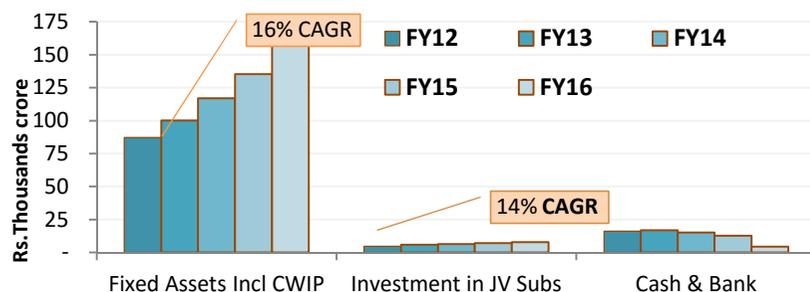
	Guidance	Performance
1	⚡ Target PAF (Coal)(FY16) : To achieve CERC norms	⚡ PAF (Coal) : All stations achieved CERC norms of PAF (DC) except Farakka & Badarpur
2	⚡ Commissioning of capacity	⚡ 2255 MW commissioned in FY16 as against MOU target of 2145 MW. ⚡ 575 MW has been added to company's capacity during FY17, till date.
3	⚡ Capex (standalone) Target of Rs.23,000 crore in FY16	⚡ Capex incurred Rs. 25,737 crore (112% of target)
4	⚡ New projects award- No explicit target given	⚡ Investment Approval of 2360 MW in FY 16 (Rs.15,482 crore): <ul style="list-style-type: none">⚡ 250 MW Ananthapuramu Solar(Rs.1,779 crore)⚡ 1600 MW Telangana-I STPP (Rs.10,599 crore)⚡ 260 MW Bhadla Solar(Rs.1,601 crore)⚡ 250 MW Mandsaur Solar (Rs.1,503 crore)
5	⚡ Start of mining	⚡ Pakri Barwadih Mine opened from western pit on 17.05.2016.
6	⚡ Cost Optimisation	⚡ Reduced ECR due to rationalization of linkages and reduced imported coal consumption.
7	⚡ Regulated Equity	⚡ Regulated Equity stands at Rs.41,420.42 crore as at 31.03.2016 as against projection of ~Rs.40,000 crore.

Awarded investment approval to projects worth Rs. 1,52,387 crore during FY12 to FY16

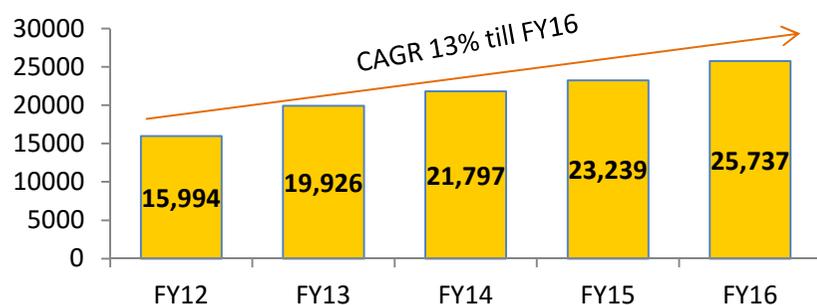
Financial Highlights

Financial Highlights ... 2015-16

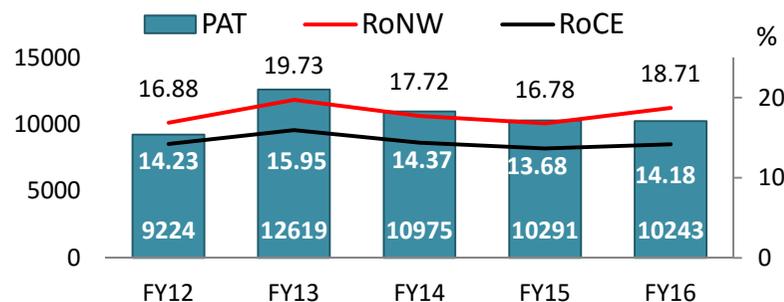
Assets Growth



Capex Growth



Margin Growth



All financial figures in Rs. Crore except where specified

RoNW- Return on Net Worth, RoCE- Return on Capital Employed

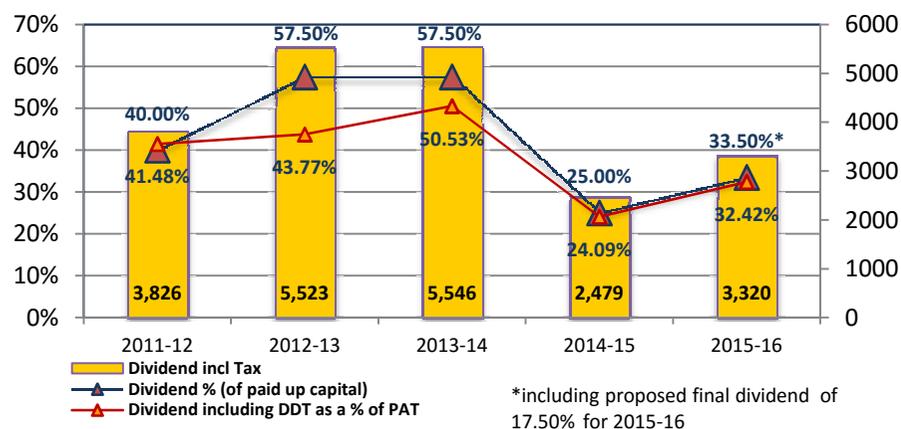
Year	FY16	FY15	%Change
Key P&L Highlights			
Total Revenue	71,696	75,337	-4.83%
Profit Before Tax	10,059	10,547	-4.63%
Profit After Tax	10,243	10,291	-0.47%
Key Balance Sheet Highlights			
Total Assets	214,619	197,135	8.87%
Capital WIP+ cap adv	73,617	64,214	14.64%
Investments (non-current)	7,950	7,154	11.12%
Year end Cash Balance	4,406	12,879	-65.79%
Net worth	88,782	81,657	8.73%
Total Debt	91,810	85,995	6.76%
Other Highlights			
Operating Cash Flows	14,504	14,235	1.89%
Book Value Per Share (Rs.)	107.67	99.03	8.72%
Dividend per Share (Rs.)	3.35	2.50	34.00%
EPS (Rs.)	12.42	12.48	-0.48%
Dividend yield at year end	2.60%	1.70%	+90bps
Price/Book at year end*	1.20	1.48	-19.14%
*Based on year end per share price of Rs.128.85 and Rs.146.85 as on 31.03.2016 and 31.03.2015 respectively			

Key 5 year Financial Highlights

Particulars	2015-16	2014-15	2013-14	2012-13	2011-12
	Rs. crore				
Operating Income	70,507	73,237	72,019	65,674	62,052
Other Income	1,189	2,100	2,689	3,102	2,778
Total Income	71,696	75,337	74,708	68,776	64,830
EBITDA	18,702	18,202	20,453	20,216	16,830
Profit before tax	10,046	10,547	13,905	16,579	12,326
Profit after tax	10,243	10,291	10,975	12,619	9,224
Dividend	2,762	2,061	4,741	4,741	3,298
Total Fixed Assets (Net block)	158,063	135,343	117,000	100,046	87,086
Investments (Non-current)	7,949	7,154	8,121	9,138	9,584
Net-worth	88,782	81,657	85,815	80,388	73,291
Total Debt	91,810	85,995	67,170	58,146	50,279
Value added	27,921	25,078	25,966	22,999	19,738
Debt to equity(times)	1.03	1.05	0.78	0.72	0.69

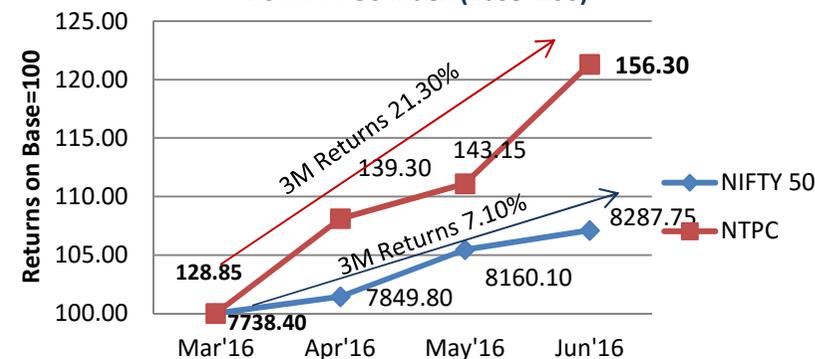
- Core Income grew by over 5% (YoY) after two years.
- Higher leverage leading to improved RoE
- Growth represented by increase in Net Fixed Assets
- Realignment of net-worth improved core RoE

High Dividend Payouts



NTPC Scrip Vs. NIFTY 50 during Q1/FY17

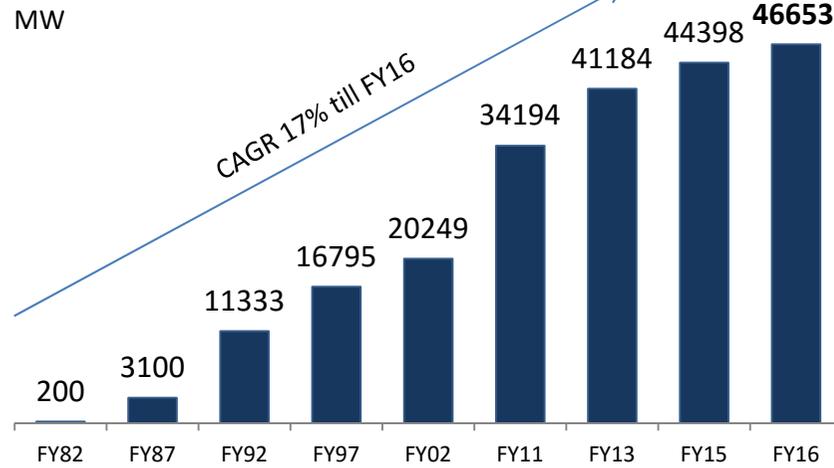
NTPC Scrip has given a three fold return in Q1/FY 17 vis a vis NIFTY 50 Index (Base=100)



Paying dividend for last 23 years.

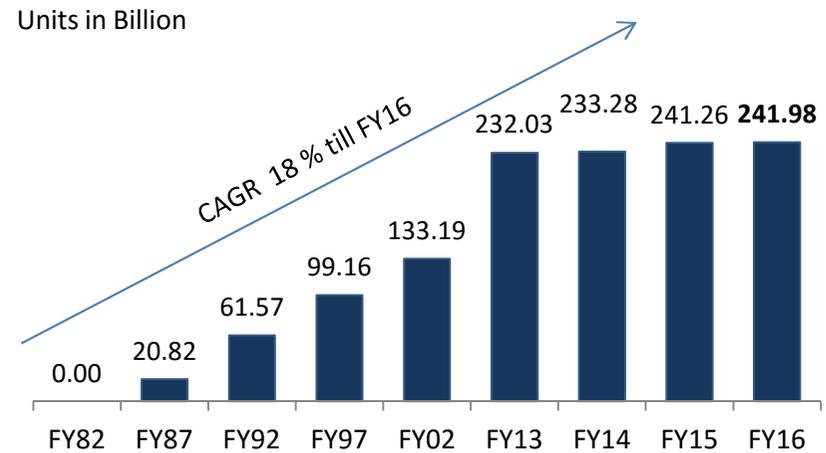
Robust Financials- Proven All round Track Record

Capacity (NTPC Group) *

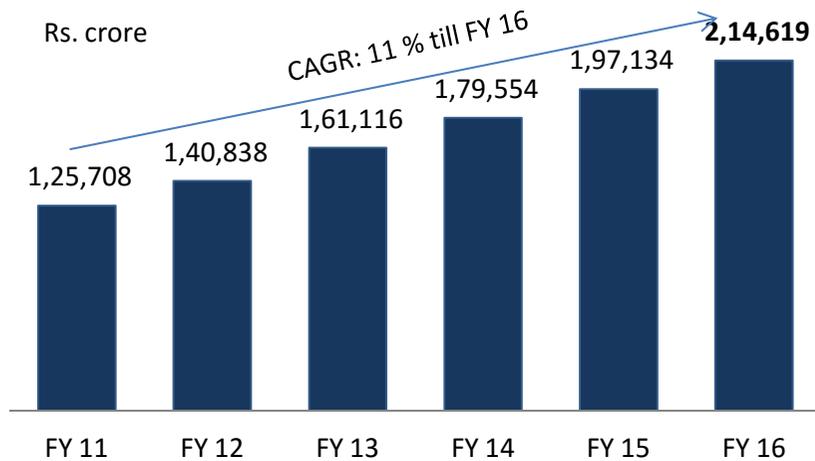


*including rating difference of 89 MW in case of gas stations

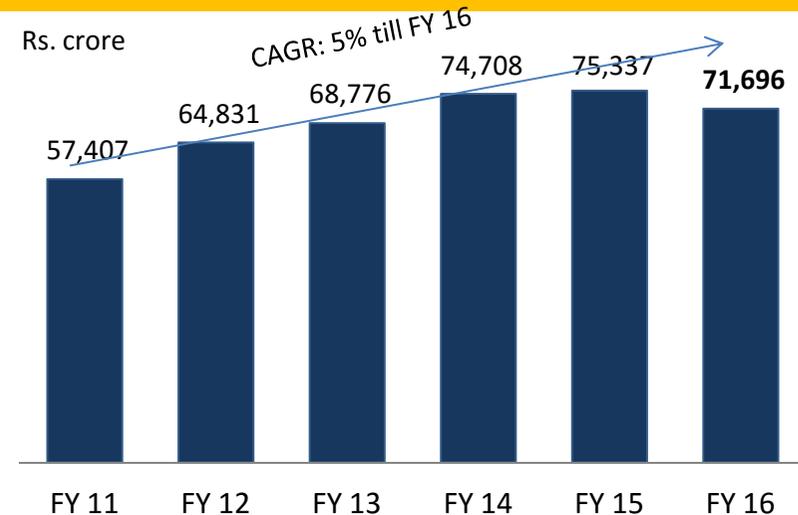
Generation (NTPC Standalone)



Total Assets¹



Total Revenue¹

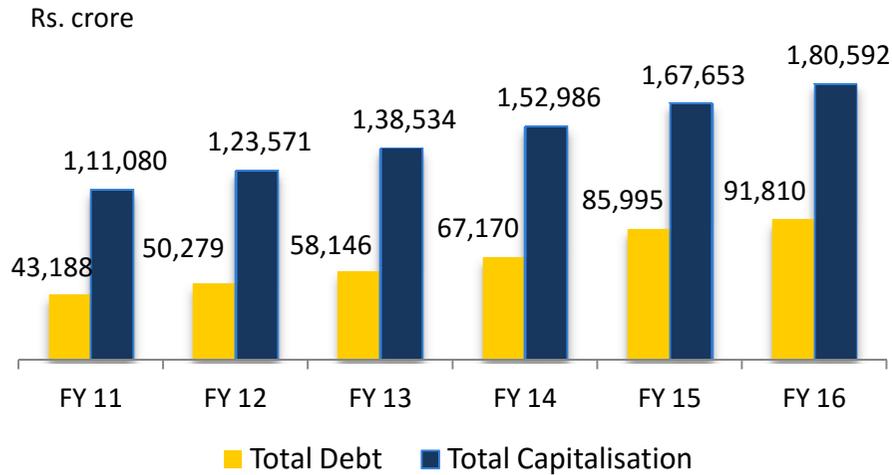


Note:.

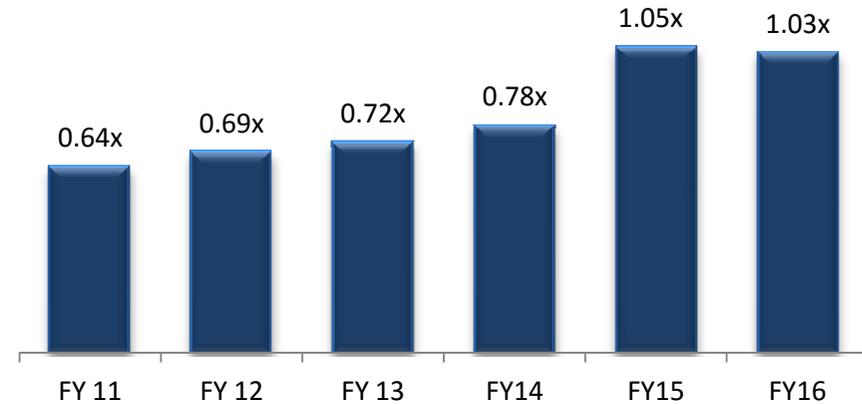
1. Based on stand-alone NTPC numbers.

Robust Financials- Proven All round Track Record

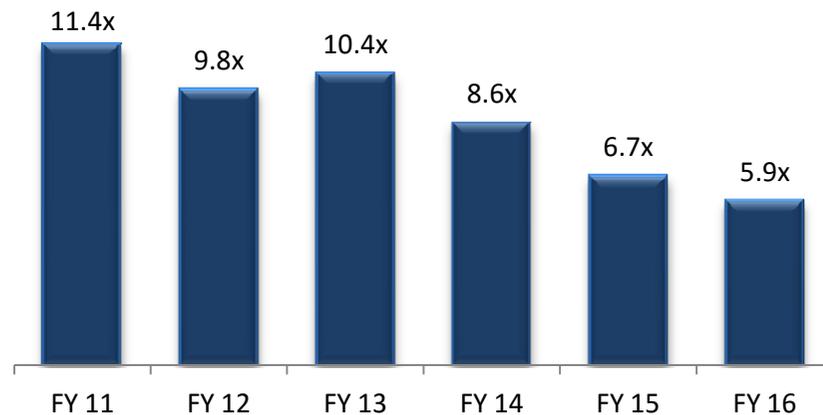
Total Debt and Capitalization¹



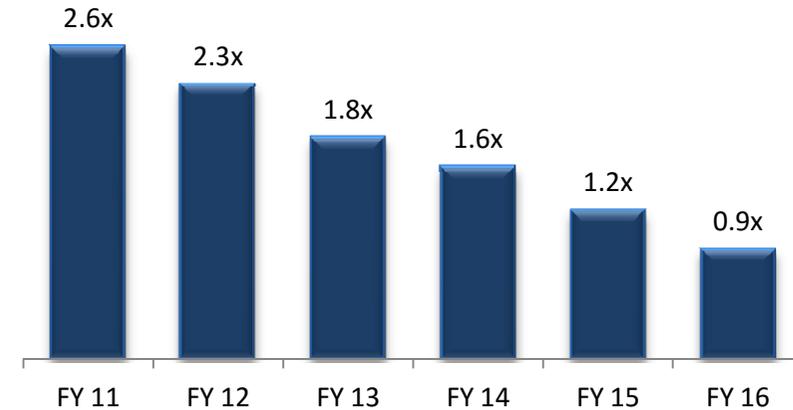
Debt/Equity¹



Interest Service Coverage Ratio¹



Current Ratio¹



Strong Credit Metrics Ensure Debt at Optimal Cost

1. Based on stand-alone NTPC numbers.



NTPC, Talcher Kaniha

Operations Highlights



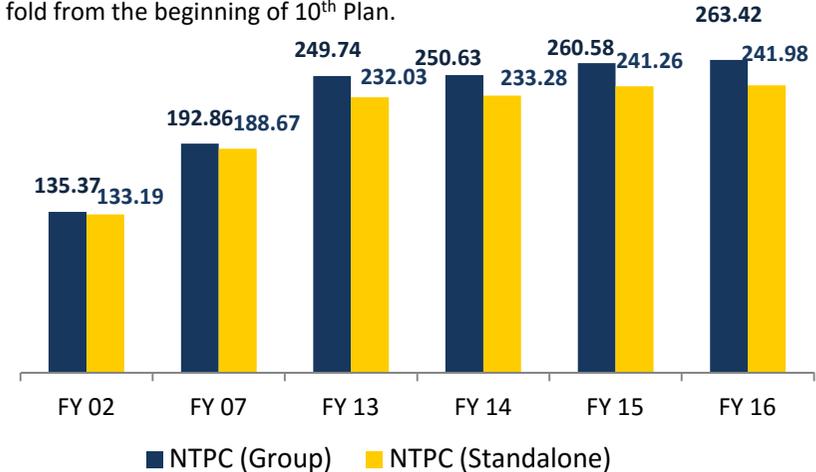
NTPC, Singrauli

Highly Efficient Plant Operations

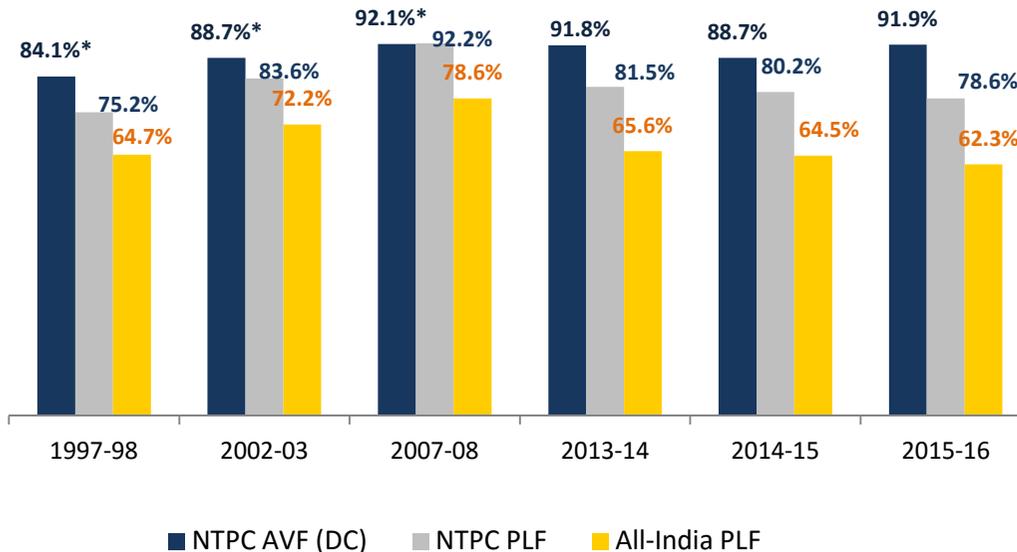
- Consistently maintaining spread of 15%-16% over the last 2 decades on All-India level.
- 6 NTPC coal stations amongst the top 10 stations of the country in terms of PLF - Talcher TPS (PLF 93.15%) is ranked 1st in FY 2015-16
- All stations recovered full Annual Fixed Charges under CERC regulations in FY 2015-16 except Farakka & BTPS
- Through in-depth engineering, renovation and management capabilities has turned around sick plants across India
- Operating and managing 177 units with varied fuel sources and technologies.

Standalone and Group Generation during last 2 decades (in BUs)

Contribution from Group Companies in total generation has increased 10 fold from the beginning of 10th Plan.



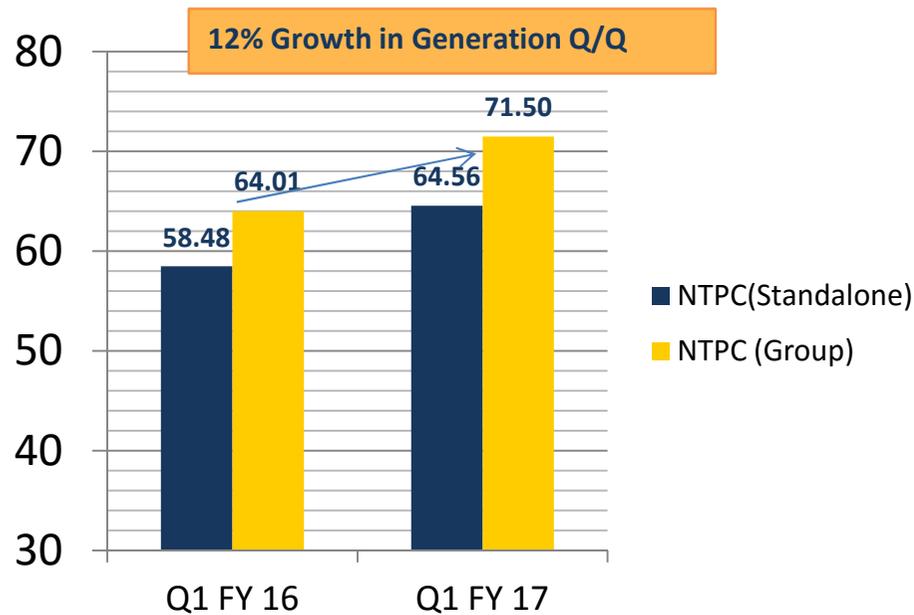
Proven Operational Excellence over last 2 decades



*AVF on bar

- Driven by strong systems guided by technical compliance documents.
- Maintenance practices and real-time monitoring system ensure high availability and efficient operations
- 100 percent analysis of boiler tube failures .
- Daily and Monthly review system(ORT-Operation Review team) system ensures high level of performance.
- Periodic structured Technical Audits are carried out for all the stations for identifying and correction of gaps .
- Fleet-wide monitoring by experts with online data system at Antariksh centre allows real time interventions.
- Best safety practices- Integral to NTPC's DNA.
- All stations are OHSAS-18001/IS-18001 certified

Creating New Records in Generation....Partnering SUs under UDAY

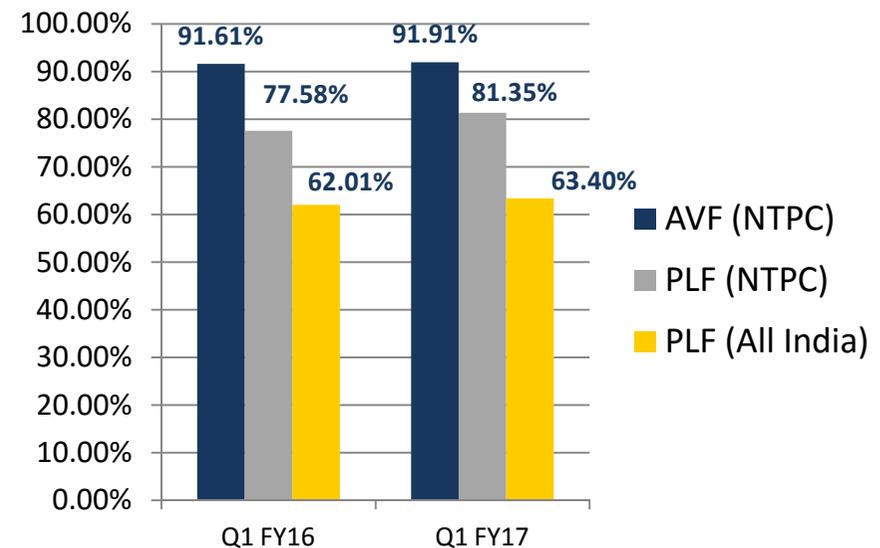


Achieved highest ever quarterly generation-Q1 /FY17

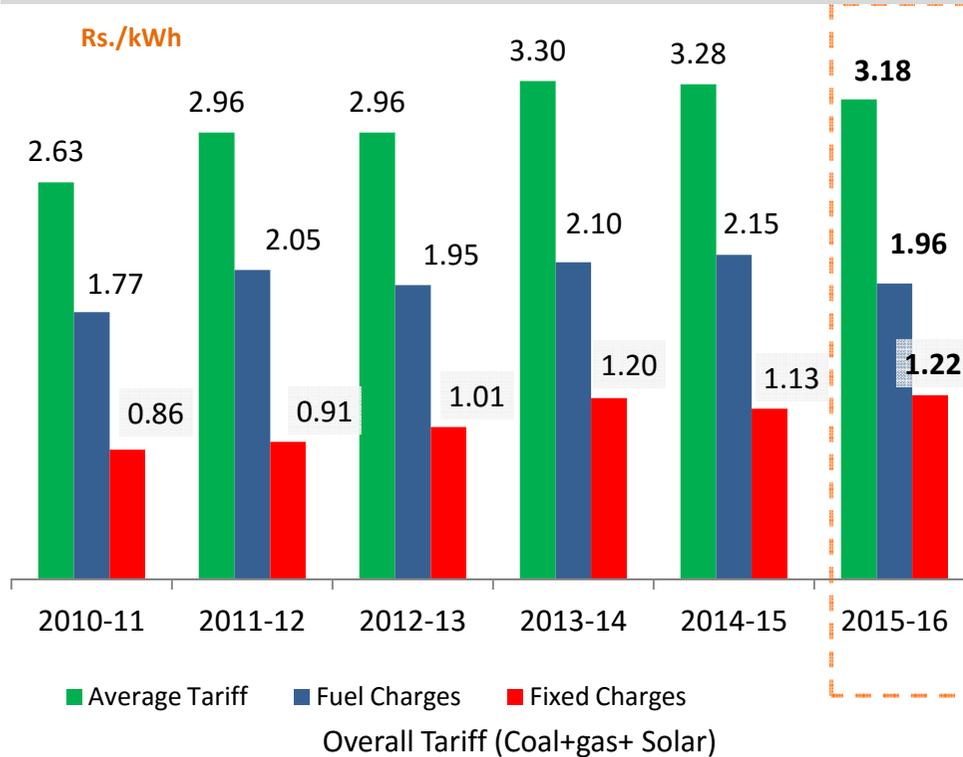
- NTPC has achieved highest ever quarterly generation of 64.56 BU during Q1 of FY17 surpassing previous highest of 63.16 BU achieved in Q1 of FY15.
- Group NTPC has achieved a generation of 71.50 BU in Q1 of FY17 registering a growth of 12% on QoQ basis.
- NTPC Coal achieved highest ever generation of 730.58 MU on 3rd June 2016, surpassing previous best of 724.29 MU on 2nd June 2016. NTPC (Coal + Gas + Hydro + Solar) achieved highest ever generation of 767.53 MU on 3rd June 2016, surpassing previous best 757.88 MU on 2nd June 2016.

Partnering State Utilities under UDAY

- Entrusted by Govt. of India to handhold State GENCOs for improvement of Operational efficiency under UDAY.
- An institutional setup has been created exclusively to enhance operational efficiency of State GENCOs under UDAY .
- Workshops conducted for State GENCOs in which best practices followed in NTPC power stations were shared with them which could be followed by them to improve their efficiency levels .
- NTPC reiterated its commitment to share its expertise with all State GENCOs to achieve overall efficiency in the power sector.



Sustaining its Status of Competitive Cost Power Producer



Average Coal Based Power Cost (Rs/kWh)						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Fixed Charges	0.85	0.89	0.98	1.14	1.09	1.18
Variable Charges	1.61	1.89	1.73	1.99	2.02	1.89
Avg. Coal tariff	2.46	2.78	2.71	3.13	3.11	3.07

- Tariffs based on Regulations notified by CERC. Regulatory mechanism assures Returns balancing Risk -reward Ratio.
- PPAs have been signed for all operating and under construction projects
- Policy of securing PPAs for all new plants before approval is given for investment
- Entire power output of NTPC power stations has been contracted under PPAs
- NTPC does not presently sell any power in the merchant market- revenues are immune to volatile merchant power prices

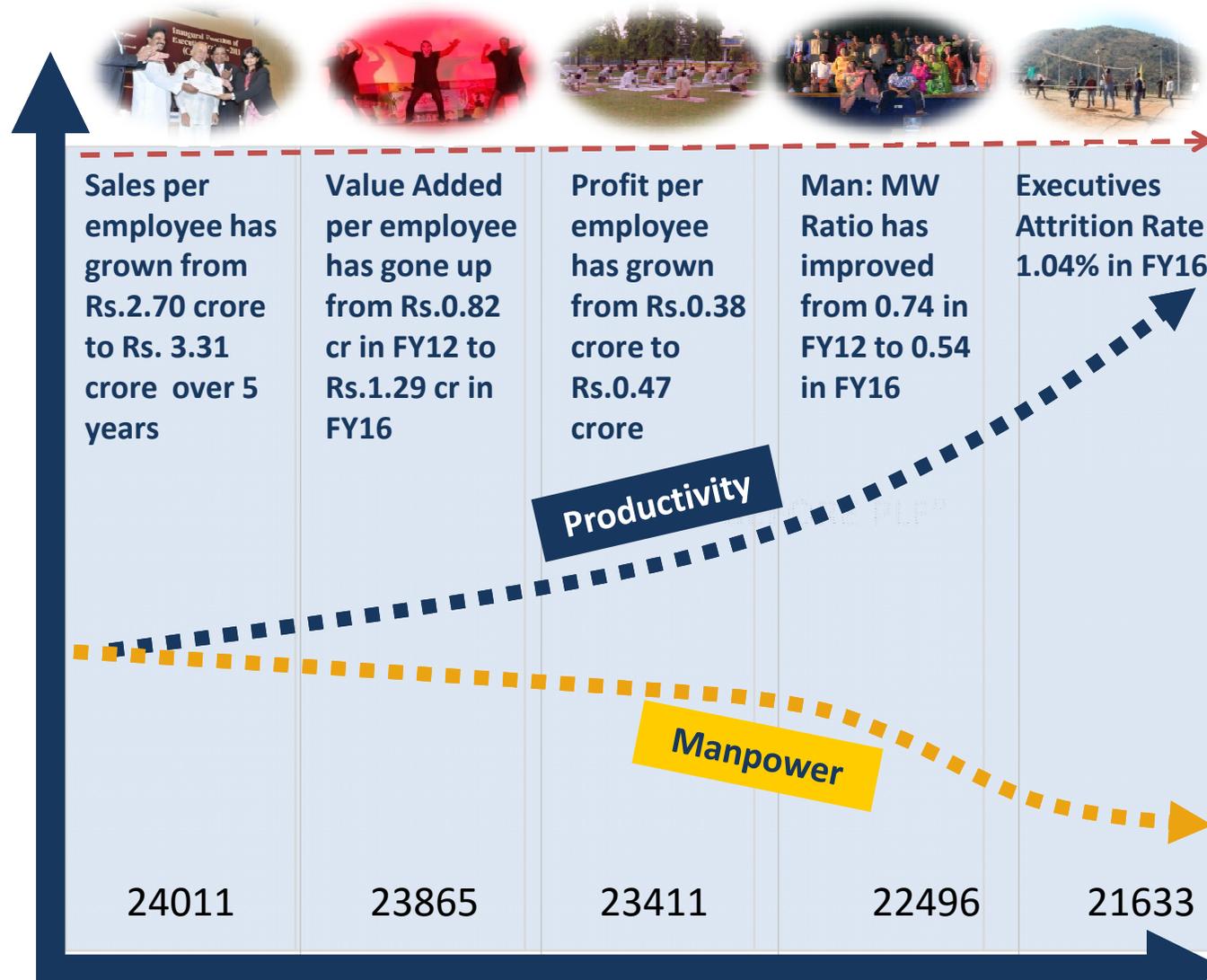


- 100% realization continuing in 13th year in succession
- Payment Security Mechanisms
 - LC coverage from SEBs adequate to cover monthly billing
 - Tripartite Agreements between Government, RBI and each state in terms of the Scheme for One Time Settlement of SEB dues valid till October 31, 2016.
 - Recourse to Reserve Bank of India (RBI) in case of default in making payment
 - Supplementary agreements signed with all discoms for first charge over State utilities' receivables after 2016.
 - 19 states have consented to extend the TPAs already-RBI has given its consent for extension.

Coal based plants close to pit head stations ensure competitive variable cost of generation

Based on NTPC stand-alone data.

“Can do it” culture drives excellence



OUR HR VISION
“To enable our people to be a family of committed world class professionals, making NTPC a learning organization”



FY12 **FY13** **FY14** **FY15** **FY16**
Awarded Best Company to work for under the Public Sector Category and Energy, Gas and Oil Sector at the India’s Best Companies to Work for 2016 by Economic Times

Realigning in Changing Business Environment



A Maharatna Company



Changing Power Sector Scenario

Growth Drivers for Sustained Growth

Growth Trajectory of NTPC

Why to Invest in NTPC

Moving towards Green Energy...

NTPC RE Plan in Sync with National Plan

Active Support of GoI ...Regulatory Interventions

Long-Term Fuel Security

Coal Mining

Changing Power Sector Scenario

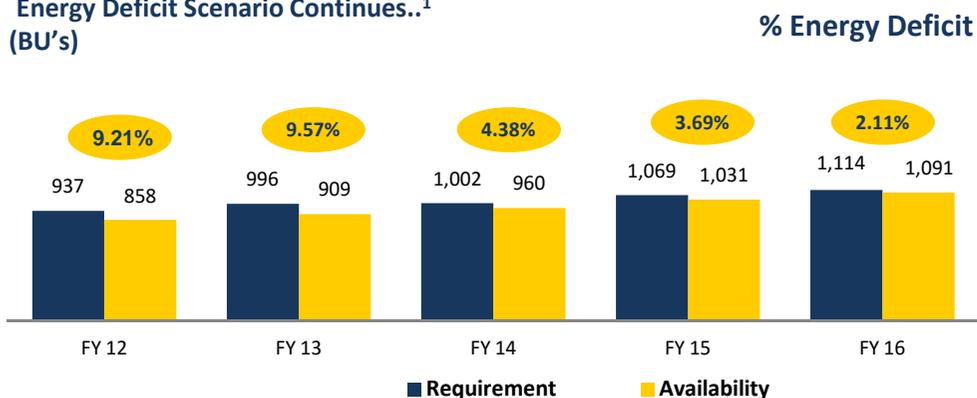
	Today		Target
Installed Capacity	~303 GW	➔	~ 401 GW by FY20
Generation (in BUs)	~1107 BUs	➔	~1582 BUs by FY20
Peak Load Demand	~153 GW	➔	~220 GW by FY20
Per capita consumption	~ 1075 kWh	➔	~ 3026 kWh (World average)
Renewable capacity	~43 GW	➔	175 GW by FY22
Coal production	~650 MT	➔	1.5 BT by FY20
Transmission Capacity (Inter Reg)	~60 GW	➔	~126 GW by FY22
AT & C Losses	~22.70%	➔	15% by FY19

Source: MOC, MOP, CEA, NTPC

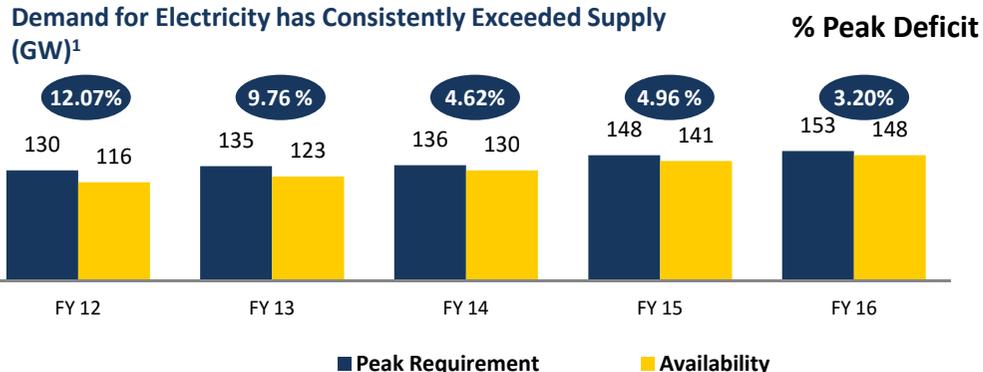
1. Government's focus on attaining affordable "24x7 Power for All" by 2019.
2. Energy Sector growing at a CAGR of ~7%-8%.
3. Big push to Renewable Energy- to grow from ~43 GW presently to 175 GW by 2022.

Growth Drivers for Sustained growth ...

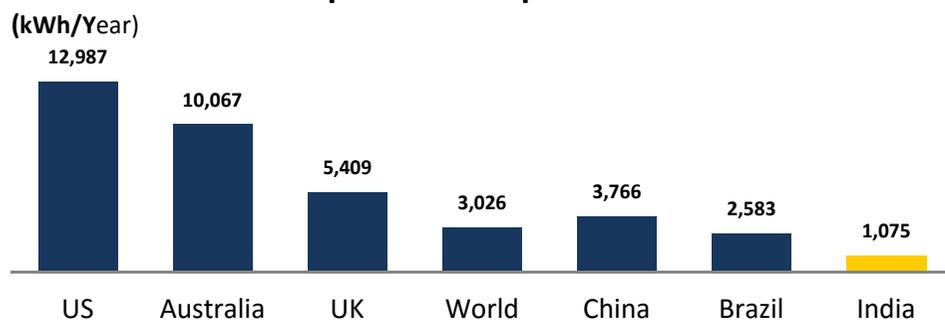
Energy Deficit Scenario Continues..¹
(BU's)



Demand for Electricity has Consistently Exceeded Supply (GW)¹



India has Low Per Capita Consumption²



Source:
1. LGBR Report,CEA.
2. Answers to PQ,MoP

GDP Growth to increase Per Capita Consumption

- Demand for energy grows in tandem with the growth of the economy.
- GDP of India is growing at faster pace as compared to other developing countries.
- Power deficit scenario has sustained despite capacity addition.
- **Although in FY16 peak and energy deficit numbers are lower but this is due to weak financial positions of discoms rather than reduction in demand.**
- Notwithstanding sustained demand, India continues to be among the lowest per capita consumers of Electricity globally, lagging Brazil & China by nearly 2.5x & 3.5x respectively
- Per capita consumption in India is ~36% of the world average.

Electrification drive can lead to 75% higher residential demand

- 75% jump in residential demand by Mar'20 if government achieves 100% electrification as targeted.
- On the country level ,4-5% annual incremental growth in power volumes can be supported by latent demand in rural areas.
- Residential power consumption is expected to grow to 460 BU by 2020 at a CAGR of 15.1% from current level of 262 BU if 100% electrification is achieved.



NTPC, Koldam

Growth Trajectory of NTPC...poised to be 128 GW company by 2032

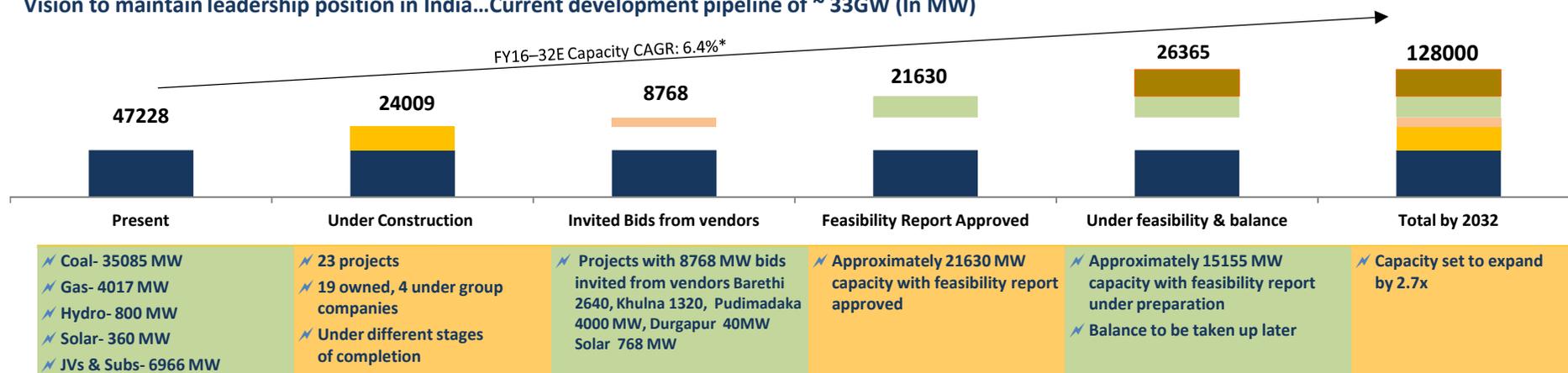


NTPC, Bongaigaon

Growth Trajectory.. slated to add ~36% of country's new coal capacity in FY17

NTPC takes the decision to proceed with a new project only once it is satisfied on the availability of land, water, fuel, off-take arrangements and environmental clearances.

Vision to maintain leadership position in India...Current development pipeline of ~ 33GW (In MW)



NTPC's Projects Under Construction

Projects	Fuel	Capacity (MW)	Technology	NTPC/JV
Barh I	Coal	1,980	Super-Critical	NTPC
Tapovan Vishnugad	Hydro	520	-	NTPC
Bongaigaon	Coal	500	Sub-Critical	NTPC
Singrauli Hydro	Hydro	8	-	NTPC
Solapur	Coal	1,320	Super-Critical	NTPC
Mouda II	Coal	660	Super-Critical	NTPC
Kudgi	Coal	2,400	Super-Critical	NTPC
Unchahar	Coal	500	Sub-Critical	NTPC
Lara	Coal	1,600	Super-Critical	NTPC
Gadarwara	Coal	1,600	Super-Critical	NTPC
Daralipali	Coal	1,600	Super-Critical	NTPC
North Karanpura	Coal	1,980	Super-Critical	NTPC
Tanda- II	Coal	1,320	Super-Critical	NTPC
Khargone	Coal	1,320	Ultra Sup-Critical	NTPC
Lata Tapovan	Hydro	171	-	NTPC
Rammam	Hydro	120	-	NTPC
Nabinagar (BRBCL)	Coal	750	Sub-Critical	Sub
Nabinagar (JV with BSEB)	Coal	1,980	Super-Critical	JV
Rourkela (JV with SAIL)	Coal	250	Sub-Critical	JV
Meja	Coal	1,320	Super-Critical	JV
Telangana-I	Coal	1,600	Ultra Sup-Critical	NTPC
Solar PVs (2 in Nos.)	Solar	510	Solar PV	NTPC
Total		24,009		

*NTPC Group YE FY12 capacity was 37,014MW, 41184 MW as at FY13 end, 43108 MW as at FY14 end ,44398 at FY 15 YE and 46653 at FY 16 YE

Capacity Addition .. Scheduled in 12th Plan (FY13 to FY17)

Commissioned		
Year	Project	Target MW
FY13	Sipat	660
	Indira Gandhi STPP JV	500
	Mouda – I, Unit - 1	500
	Vindhyachal – Unit 11	500
	Rihand – III	500
	Vindhyachal – Unit 12	500
	Mouda – I, Unit- 2	500
	Vallur – I JV	500
	Solar PV (A&N, Dadri)	10
	Total FY 13	4,170
FY14	Rihand – III	500
	Barh-II	660
	Solar PVs	65
	Vallur – I JV	500
	Kanti- Subsidiary	110*
Total FY 14	1,835	
FY15	Rajgarh (Solar PV)	20
	Singrauli (Solar PV)	15
	Barh-II (Unit#5)	660
	Koldam- Hydro (U#1 &2)	400
	Kanti – Subsidiary (Unit #3)	195
Total FY 15	1290	

Commissioned FY16 & Target FY17			
Year	Project	Target MW	
FY16	Bongaigaon (Unit#1)	250	
	Koldam (Unit #3 &4)	400	
	Vindhyachal -V (Unit #3)	500	
	Kanti – Subsidiary (Unit #4)	195	
	Nabinagar (BRBCL) (Unit#1)	250	
	Mouda –II (Unit#1)	660	
	Total FY 16	2255	
	FY 17	Lara (Unit#1)	800
		Bongaigaon (Unit #2)	250
		Nabinagar (BRBCL) (Unit# 2)	250
Kudgi (Unit#1 & 2)		1600	
Mouda –II (Unit#2)		660	
Solapur (Unit #1)		660	
Meja		660	
Total FY17		4880	
Capacity Commissioned in FY13 to FY16		9550	
Total Proj. Capacity Addition-12th Plan		14430	
Renewables			
Year	Projects	Target MW	
FY 17	Singrauli Mini Hydro	8	
FY 17	Ananatpur Solar (Commissioned)	250	
FY 17	Mandsaur Solar	250	
FY 17	Bhadla Solar	260	

As against ~12 GW target of CEA, NTPC is likely to achieve~15GW during 12th Plan

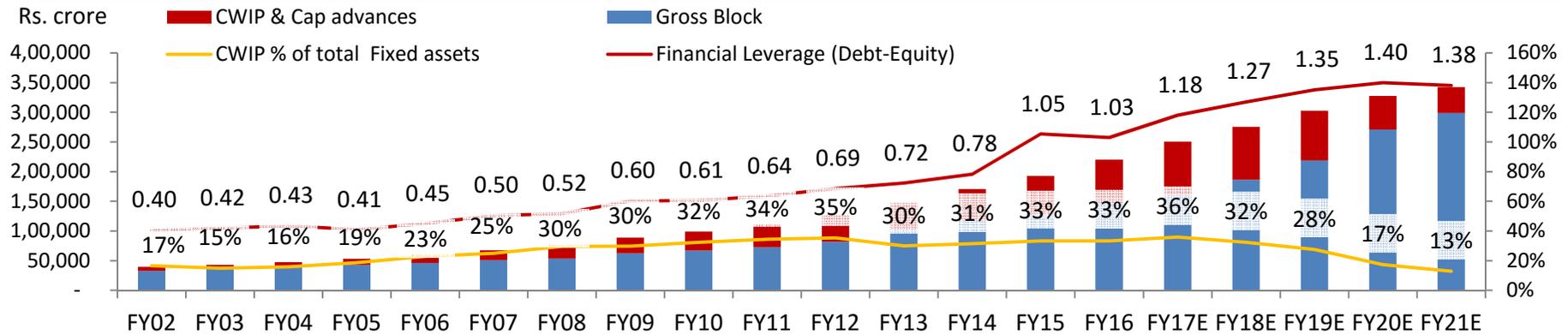
Tentative commissioning targets for FY18 and beyond

Projects already under construction and likely year of commissioning

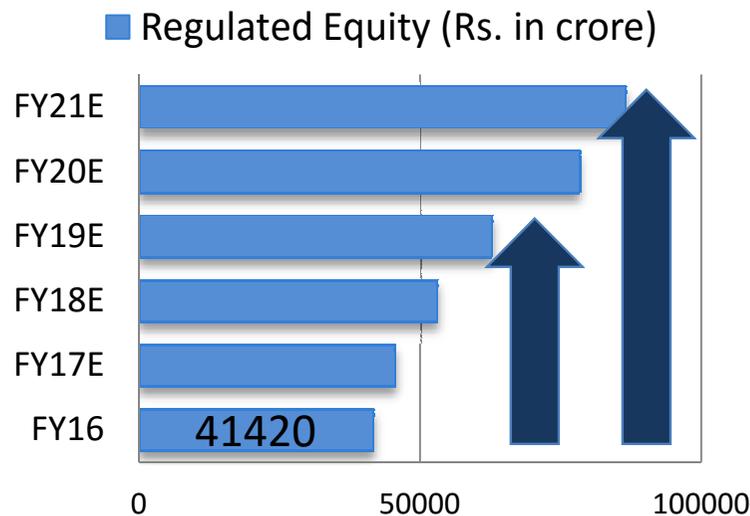
Year	Project	Target MW	NTPC	JV Projects	
FY18	Barh -I (Unit#1)	660	660		
	Kudgi (Unit#3)	800	800		
	Solapur (Unit#2)	660	660		
	Lara (Unit#2)	800	800		
	Gadarwara (Unit#1)	800	800		
	Unchahar- IV	500	500		
	Bongaigaon (Unit #3)	250	250		
	Nabingar (BRBCL JV) (Unit#3&4)	500		500	
	Meja (JV) (Unit#2)	660		660	
	Nabinagar (NPGCPL- JV) (Unit#1&2)	660		660	
	Total FY 18 E		6290	4470	1820
	FY19 & beyond	Barh-I (Unit#2&3)	1320	1320	
		Gadarwara (Unit#2)	800	800	
Darlipalli (Unit# 1&2)		1600	1600		
North Karanpura (Unit #1, 2 & 3)		1980	1980		
Tanda-II		1320	1320		
Nabinagar (NPGCPL- JV) (Unit#3)		1320		1320	
Rammam (Hydro)		120	120		
Lata Tapovan (Hydro)		171	171		
Tapovan Vishnugarh		520	520		
Khargone		1320	1320		
Telangana-I		1600	1600		
Rourkela (NSPCL JV)		250		250	
Total FY 19 & beyond			12321	10751	1570
Total capacity to be commissioned in 13th Plan		18611	15221	3390	

Why to Invest in NTPC

Growth in Gross Block, CWIP & Financial leverage



Expansion in Regulated Equity:



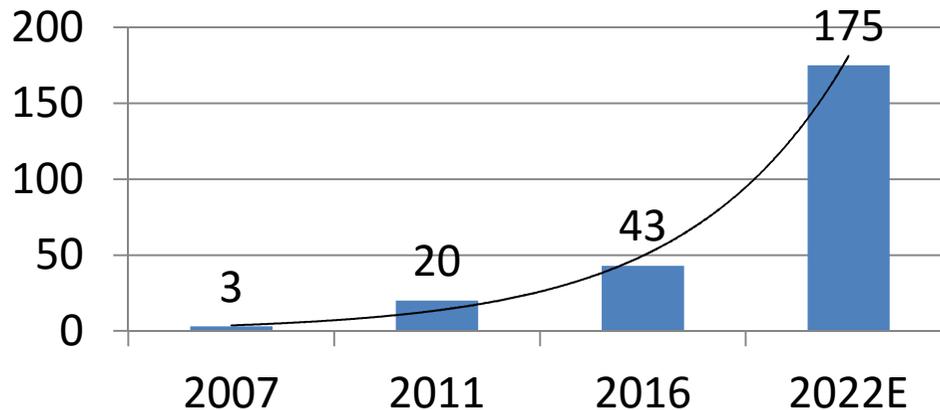
Investment Rationale- RoE expansion

- Gross block increased at a CAGR of 11% while CWIP grew at a CAGR of 19% FY 02 to FY16 .
- From FY02-FY07, CWIP to Total fixed assets (incl. CWIP) remained between 15%-25% and later ranged between 30% - 35%.
- Reversal in this ratio expected after FY 17 due to massive commissioning and CoD - entire capacity awarded in bulk tender will be on stream.
- Going forward, growth continues but the turnaround from CWIP to Gross block is quicker because of greater mix of solar capacity having a shorter gestation of 12-18 months.
- Fall in CWIP ratio leads to RoE expansion as the equity blocked in CWIP will start earning
- Benefit of financial leverage to result in higher RoE

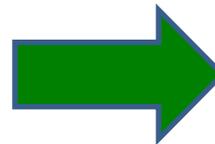
All financial figures on standalone basis

Moving towards Green Energy....increasing RE Landscape

Renewables (installed Capacity over the years in GW- Actual and Projected)



175 GW



**60 GW +
40 GW
(Rooftop)**

Solar

60 GW

Wind

5 GW

Small Hydro

10 GW

**Biomass &
Others**

Promoting Renewable Energy

- Initiative for creation of renewable energy capacity by mandating thermal power developers to establish capacity.
- Introduction of renewable energy generation obligation (RGO) for coal/lignite-based power-generating companies.
- Cross-subsidy not to be levied for open access based on renewable energy sources.
- Central government to formulate National Renewable Energy Policy.
- India has committed to reduce its emission intensity per unit of GDP by 33% to 35% below 2005 levels by 2030 under INDC (Intended Nationally Determined Contributions)

.....India to have 175 GW of Renewable Energy by 2022

NTPC Solar Plan in sync with National Plan

NTPC Solar Power Plan....Diversifying Fuel Mix....360 MW already commissioned

10,000 MW OWN CAPACITY ADDITION

15,000 MW UNDER NSM

Current Projects-3010 MW

- Under Execution- 510 MW
- Under Tendering-768 MW
- NIT Planned-1732 MW

Projects Identified for future implementation-7335 MW

Ananthapuramu (200 MW)

April 2015



April 2016



Transformation from barren land to 200 MW project in 1 year time

FIRST TRANCHE 3000 MW

Commissioned

- Ananthapuramu (AP) - 250 MW
- Rooftop in VSTPP – 0.452 MW

Under Execution

- Mandsaur (MP) - 250 MW
- Bhadla (Raj.) - 260 MW

NIT issued for 768 MW

- Ananthapuramu (AP) - 750 MW
- Chidiya Tapu (A&N)- 18 MW

NIT Planned for 1732 MW

- Pavagada (Karnataka)-1000 MW
- Banaskantha (Gujarat)-700 MW
- A&N Island-32 MW

*NIT published for 3000 MW
RA Completed for 2650 MW*

LOI issued for 2520 MW

PPA Signed for 1960 MW

Image of NTPC's 50 MW Rajgarh Solar PV in MP

85% capacity of NTPC's old plants to be bundled with solar capacity - creates certain & viable market

Active Support of GoI – Regulatory Interventions

Integrated approach towards making power affordable

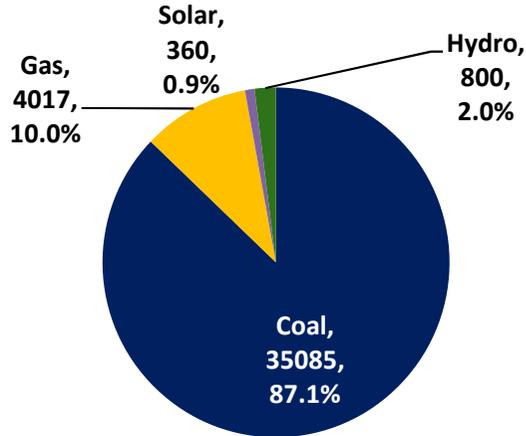
 Tariff Policy	 UDAY	 Coal Reforms
<ul style="list-style-type: none">▪ Focus on 4 Es: Electricity for all, Efficiency to ensure affordable tariffs, Environment for a sustainable future, Ease of doing business to attract investments and ensure financial viability.▪ Reduce power cost through expansion of existing power plants.▪ Sale of Un-Requisitioned Surplus (URS) power in the market. Profit sharing mechanism with original beneficiary surrendering URS identified.▪ Power from plants where PPAs have expired or Plant has completed useful life, may be bundled with power from renewable generating plants to be set up through the process of bidding.	<ul style="list-style-type: none">▪ A Scheme for the Financial Turnaround of Power Distribution Companies (DISCOMs).▪ Focuses on improving the operational and financial efficiency of the State-owned DISCOMs.▪ No direct relief by GoI instead financial relief is being extended by bringing down the cost of the debt by 300-400 bps.▪ UDAY mandates enabling of quarterly tariff revision and focuses on reducing the cost of power.▪ Stringent targets set for reduction in AT & C losses of DISCOMs.▪ Total 14 States have signed MOU with GOI for joining the UDAY-8 states have issued bonds.	<ul style="list-style-type: none">▪ Flexibility in utilization of domestic coal amongst Central Generating Stations, State Generating Stations and Power Plants of other State Power Utilities resulting in reduction of cost of electricity to the consumers.▪ Coal Swapping & Rationalization of Coal Linkages – Sourcing of coal from nearest mine leading to reduction in transportation costs.▪ Reverse auction of Coal Blocks▪ Increase in availability of Cheaper Domestic Coal through enhancement of Coal Production by CIL.▪ Bridge linkages provided to utilities which are in the process of commencing production from their captive mines.

UDAY is expected to improve financial health of SEBs resulting in better off-take of NTPC Power

Long-term Fuel Security

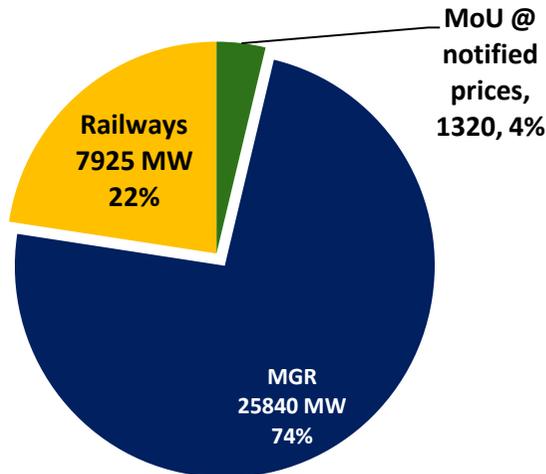
Current Capacity Break-up

Installed Capacity Break-up – Standalone (By Fuel)¹



Coal: Long-term Fuel Security

Coal Transportation
(Standalone Commissioned Capacity)¹



Coal Supply Agreements

- NTPC implements projects only upon establishing availability of fuel.
- NTPC's thermal Capacity of 32605 MW is covered by long term CSA. signed with CIL & SCCL. MoU for 1320 MW at Barh for supply of coal at notified prices.
- Additionally, CSA for 910 MW yet to be commissioned projects have been signed.
- Bridge linkage for 12200 MW of upcoming capacity
- 74% of coal capacity is linked by own merry go round rail system/belt conveyor system to coal mines representing 10 out of 18 coal plants.
- For group companies, CSAs for 4390 MW have been signed.

Coal Mining

- Allotted/under allocation coal mining coal blocks with estimated geological reserves of 7.3 BT .
- Estimated capacity of coal mines 107 MTPA .
- Mining commenced at PB block from western pit from 17.05.2016.
- Estimated Coal Mining capacity can cater to 20000 MW of generation.

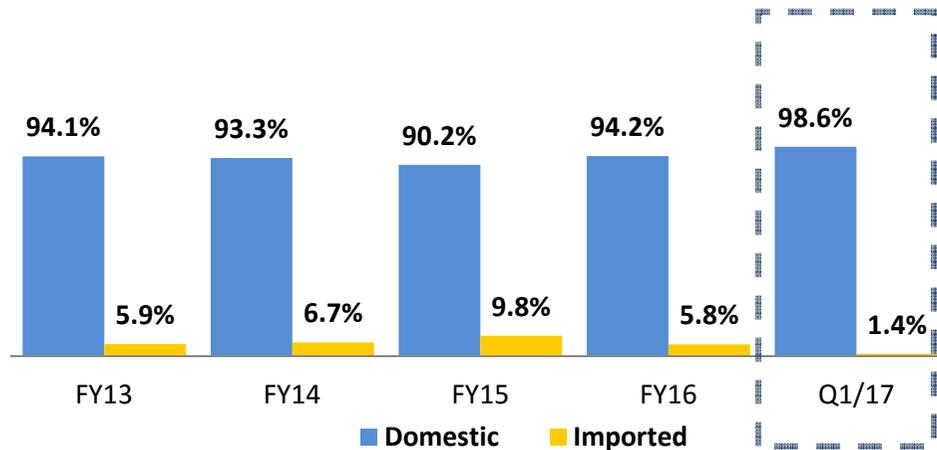
Gas Supply

- Long-term gas supply agreements with GAIL under APM for supply of gas to all directly-owned gas power stations at regulated pricing under Government orders.

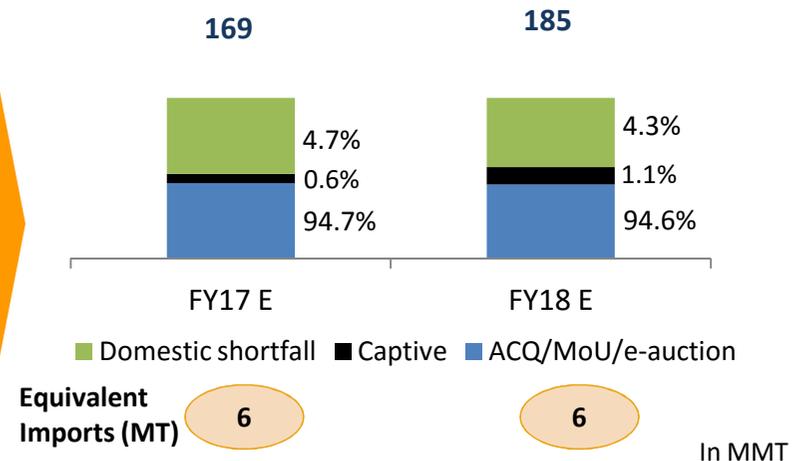
Commencement of third party (CIMFR) sampling of coal at all projects

Long-term Fuel Supply (Cont'd)

Coal Supply (For NTPC Own Plants)



Coal Requirements FY17E to FY18E (In MT)



(In MMT)	FY 2013	FY 2014	FY 2015	FY 2016	Q1 FY 2017
Domestic	145.9	149.8	151.0	152.4	40.2
Import	9.1	10.8	16.4	9.5	0.6
Total Supply	155.0	160.6	167.4	161.9	40.8

42% decrease in imported coal supply in FY16 vs. FY15

	FY 17 E	FY 18 E
Coal Requirement	169	185
Domestic (ACQ/LoA/MoU /E-auction)	160	175
Captive	1	2
Domestic shortfall	8	8
Import equivalent	~6	~6

- 91.18% materialization during 2015-16 as compared to 89% materialization in FY 14-15
- 97.88% materialization during Q1/17 vs 89.28% in Q1/16
- Reduction in imported coal supply by 86% in Q1 /17

NTPC Coal Mining Portfolio...10 Mines with ~7.3 BT GR

Status of Coal Mines

Coal block	GR (MMT)	Mining Capacity MMTPA	Status			
			EC	FC	Acq. Notice	MDO
Pakri Barwadih	1574	18	Yes	Yes	Yes	Appointed
Chatti Bariatu	548	7	Yes	Yes	Yes	Bids under Evaluation
Kerandari	285	6	Yes	St-I accorded	Yes	NIT to be issued
Talaipalli	1267	18	Yes	Yes	Yes	Bids under Evaluation
Dulanga	196	7	Yes	Yes	Yes	Bids under Evaluation

Pakri Barwadih Coal Mine opened from Western Pit on 17.05.2016 and company expects to produce 1 MMT this year.

Other Five Mines with GR of ~3.42 BT and Mining Capacity of ~51 MMTPA - under various phases of development.



Bandag-Hazaribagh Railway Siding is now operational for coal transportation from Pakri-Barwadih Coal Mine

Technology Progression

Technology Progression—Increased Efficiency and Greater Environmental Protection

Leader in introducing new technologies in the power sector.

Technologies Introduced

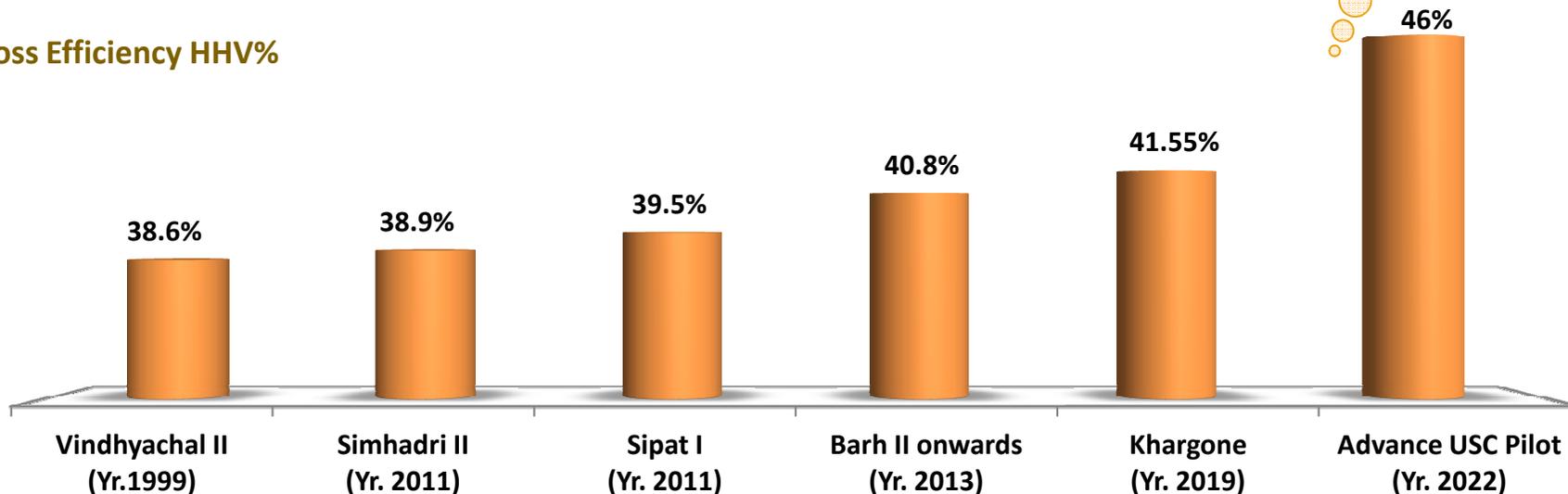
- Adoption of super critical parameters for higher efficiency
- Higher size units of 660 and 800MW
- Adoption of high reheat parameters for smaller units
- 765KV AC switchyard
- State of art automation technologies for C&I and Electrical systems
- Tunnel Boring machines
- Flue gas desulphurization
- High concentration slurry disposal system & Dry Ash extraction and disposal system

Technologies Under Development

- Development of IGCC suitable for Indian coal
- Development of Adv Ultra supercritical power plant along with IGCAR and BHEL for inlet steam temperature in the range of 700°C
- Use of advanced technologies in the renovation and modernization of aging power stations

Every 1% increase in efficiency yields 2.5% CO2 reduction

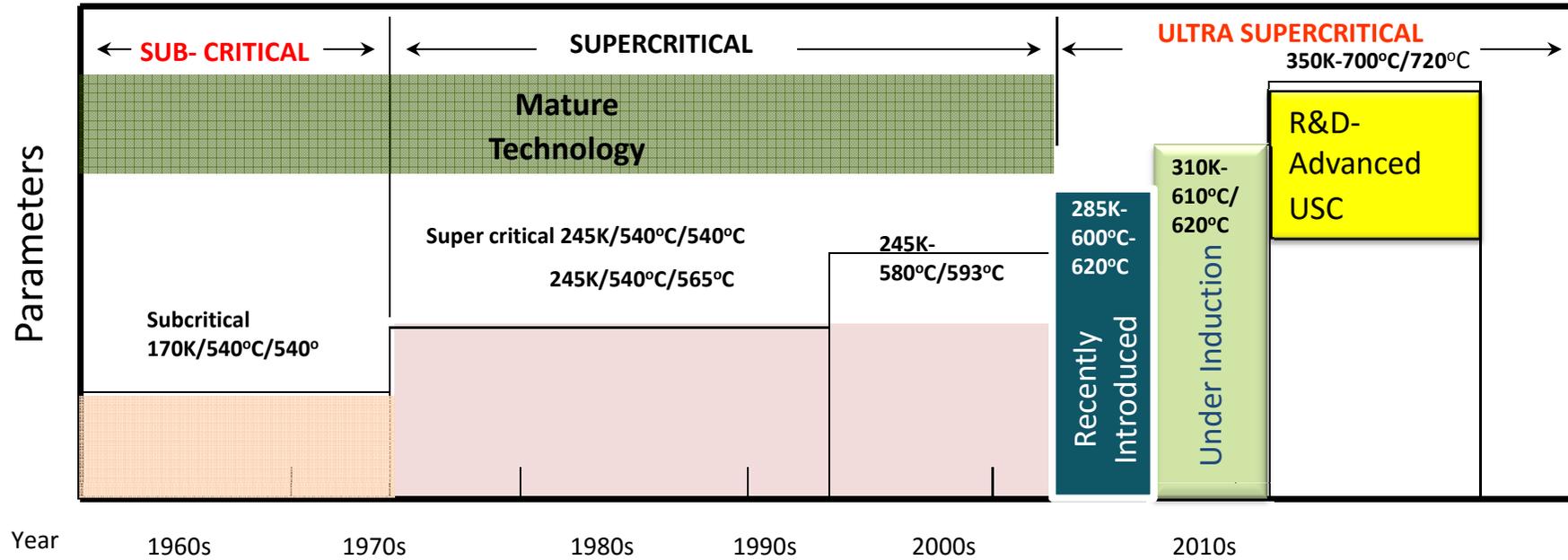
Gross Efficiency HHV%



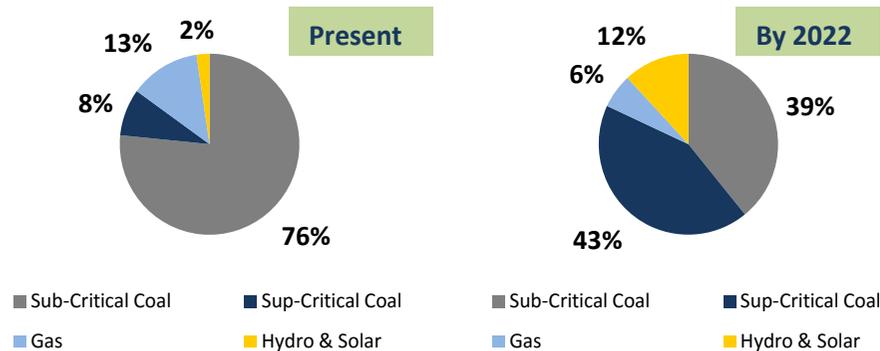
Constant endeavor to reduce CO2 emissions- steps to increase cycle efficiency

Paradigm shift in adopting Future Technology

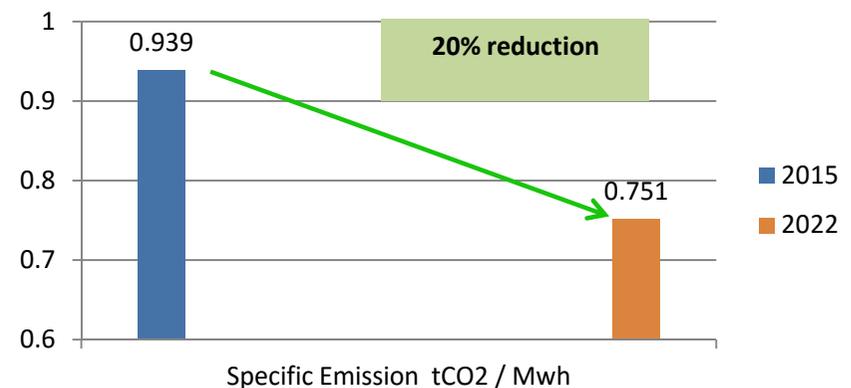
International Scenario



Capacity Mix-Present & by 2022



Target of 20% reduction in CO2 emissions by 2022



NTPC adopted Super critical technology in 2004

Adopted Ultra Super critical technology in 1320 MW Khargone TPP and 1600 MW Telangana-I TPP which may result in savings of 154kcal in SHR

All USC units now ordered are with temperature upto 600°C/ 600°C

Risks & Mitigation

Key Risks and Mitigation

Risk	Mitigation
Coal and Gas Supply Constraints	<ul style="list-style-type: none"> ▪ Long term Fuel Supply Agreements with CIL for a period of 20 years – ACQ for ~164.57 MMT. ▪ Bridge linkage allocated for 12.2 GW of upcoming capacity ▪ Govt approved flexibility in use of domestic coal to reduce the cost of power generation ▪ Captive coal blocks – to meet coal supply of 20 GW ▪ Long Term APM/PMT Gas Supply Agreement with GAIL for supply of 14.48 MMSCMD gas upto 2021/2019
SEB Financial Distress	<ul style="list-style-type: none"> ▪ Tripartite agreement likely to be extended for 15 years with recourse to RBI <ul style="list-style-type: none"> ▪ SEB's required to issue LCs covering 105% of the average monthly billing ▪ 'UDAY' scheme launched by GoI to address discoms financial distress. ▪ Supplementary agreements signed for first charge over state utilities' receivables after 2016
Supply may outstrip demand	<ul style="list-style-type: none"> ▪ Pick up in industrial activity leading to spurt in generation since India is the fastest growing economy ▪ Suppressed demand of SEBs due to high debt. Revival in demand expected after implementation of UDAY ▪ Amended tariff policy allows for sale of un-requisitioned power and sharing of benefits. ▪ Focus on Cost optimization-Reduced ECR ▪ Adoption of high efficiency units into the existing fleet
Land Acquisition Uncertainty	<ul style="list-style-type: none"> ▪ Progressive R&R Policy, focus on consultation and participation, negotiated settlement ▪ Institutional mechanisms like Village Development Advisory Committees and Public Information Centers ▪ Changing strategy to acquire land on "willing buyer and willing seller concept".
Accelerated Capacity Addition	<ul style="list-style-type: none"> ▪ Multi-pronged strategy developed and enhanced delegation of power for quick decision making ▪ Total 24,009 MW under construction.
Consistent RoE	<ul style="list-style-type: none"> ▪ Capex intensive model delivering consistent earnings and dividends ▪ Upside from PLF incentives ▪ Improving leverage to increase ROE ▪ Increasing Solar portfolio to earn quicker returns due to lower gestation period compared to coal stations
Competition from Private Players	<ul style="list-style-type: none"> ▪ Relatively robust business model with regulated returns ▪ GoI ownership ▪ Unparallel depth and Width of management expertise and high standards of corporate governance
Funding Requirements for New Projects	<ul style="list-style-type: none"> ▪ Strong balance sheet and healthy leverage ratios ▪ Easy access to domestic and overseas debt market; mobilized debt on most optimal rates from both domestic and international markets due to low gearing and healthy coverage ratios ▪ Targeting capex of Rs.30000 crore in FY17.
Environmental Laws and Regulations	<ul style="list-style-type: none"> ▪ Environmental clearances for all under construction projects received ▪ Targeting 10 GW solar capacity in next 5 years



Sustainability Initiatives



NETRA- PROVIDING THE TECHNOLOGY AND R&D EDGE

Spent Rs. 129.68 crore on R&D activities during the year 2015-16

Technology Development-*In house & Collaborative R&D for development of new processes, tools & systems.*

Efficiency & Availability Improvement

Process Intensification

- Flue Gas Sea Water Desalination
- Flue Gas Air conditioning
- Flue Gas Organic Rankine Cycle
- Flue Gas CT Blow down Recovery
- Back Pressure Micro Steam Turbine
- Multi Utility Heat Pump

Intelligent Systems

- Artificial Intelligence Plant Advisory
- CFD Applications - Flue gas duct, ESP, Rotary Equipment

New & Renewable Energy

- Solar Thermal Hybrid Plant
- Indigenous Concentrated Solar Thermal
- Indo-German R&D - Solar Thermal Lab
- Solar Thermal Air Conditioning
- Solar Thermal Cooking System
- Floating Solar PV System
- Robotic PV Cleaning
- Nono coating for PV panel
- PV integration with battery charger
- Indo-German R&D - Solar PV Lab
- Geo-thermal at Tattapani
- Ground Source Space Cooling
- Flexible operation of Fossil fired plant with increased renewable penetration

Climate Change & Environment

Ash Technologies

- Light Weight Aggregate from Fly Ash
- Geo-Polymer based Sand from Fly Ash
- Geo-Polymer based building block

Environmental Technologies

- Micro Algae based CO2 fixation
- Pressure Swing Adsorption CO2 capture
- Modified Amine CO2 capture



- Advanced Scientific Support through 11 NABL ISO 17025 accredited Labs ,5 Advance Process Labs and 3 more in Offing.
- Knowledge networking thereby leveraging best brains nationally & internationally and Institutional & Policy Support wide presence in apex bodies.

Inclusive Growth

Spent Rs. 491.80 crore on CSR activities during the year 2015-16.

NTPC's CSR initiatives have touched the lives of around 25 lakh people in one way or the other at remote locations.



Swachh Vidyalaya Abhiyan

- NTPC championed the cause of Swachh Bharat by successfully building 29,000 toilets in government schools for the benefit of students, especially girl children, covering 83 Districts in 17 States across the country.
- Project was aimed to improve health and hygiene among students, reduce girl child dropout and improve the overall health & hygiene of community by reducing open defecation.
- Availability of toilets ensured by NTPC will have direct positive impact on the lives of almost 20 lakh children.



Social Inclusiveness

- NTPC has always been sensitive to the needs of disadvantaged, vulnerable and marginalized stakeholders.
- NTPC has also taken up the activities for women empowerment, construction of SC/ST multipurpose halls & hostels, relief through distribution of various articles & support to orphanages & old age homes in the vicinity of its stations.



Skill Creation

- Inked two separate MoUs with Ministry of Skill Development & Entrepreneurship (NSDF-National Skill Development Fund) and National Skill Development Corporation (NSDC) for various employability linked skill development programs.
- Committed to contribute Rs.200 crore for setting up IIIT, Raipur. The institute commenced its academic session from 2015-16.
- Adopted 18 ITIs and associated with 8 ITIs.



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