Power

NOVEMBER 2011

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- ❖ Advantage India
- ❖ Market overview and trends
- ❖ Growth drivers
- ❖ Success stories: NTPC, Tata Power
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Advantage India

Growing demand

- Expansion in industrial activity to boost demand for electricity
- Growing population, and increasing penetration and per-capita usage to provide further impetus

Opportunities

- Large capacity additions (100 GW) targeted in the 12th and 13th Five-Year Plans
- Ambitious projects, increasing investments across the value chain

FY22

Total demand (TWh): 1915.0

Advantage India

Increasing investments

- One of the key sectors attracting FDI inflows into India; inflows recorded a CAGR of 70 per cent during FY06-FY11
- Major investments earmarked by public as well as private companies across the value chain

Policy support

- Elimination of licensing for various segments; removal of entry barriers
- Cost reduction, rationalisation of tariffs
- Development of Ultra Mega Power Projects (UMPP)

FY07

Total demand (TWh): 690.0

Source: FY22 estimates as per IEA forecasts, Aranca Research
Notes: FDI – Foreign Direct Investment, E- estimates, CAGR- Compound Annual Growth Rate, TWh- terawatt-hour

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Evolution of the Indian Power sector

Before 1956

Introductory stage

- Electricity (Supply) Act 1948
- Establishment of semi-autonomous State Electricity Boards (SEBs)

1956-1991

Nationalisation Stage

- Industrial Policy Resolution (1956)
- Generation and distribution of power under state ownership
- Power losses, subsidies, infrastructure bottlenecks, and resource constraints

1991- 2003

Liberalisation Era

- Legislative and policy initiatives (1991)
- Private sector participation in generation
- Fast track clearing mechanism of private investment proposals
- Electricity Regulatory Commissions Act (1998) for establishing Central and State Electricity Regulatory Commissions and rationalisation of tariffs

2003 onwards

Growth Era

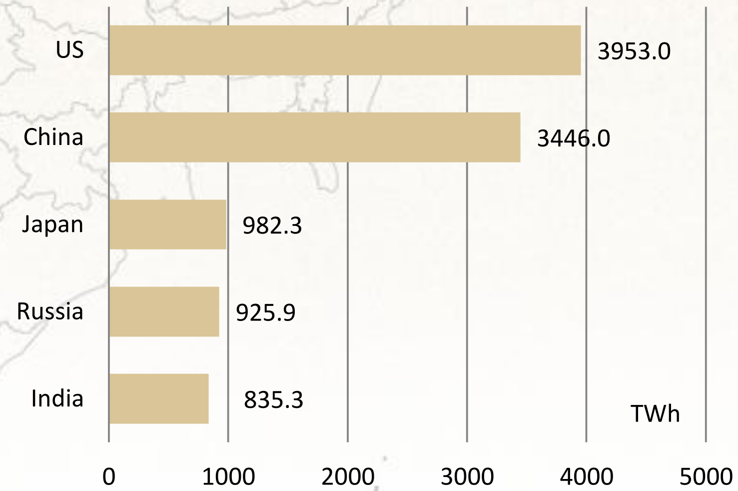
- Electricity Act (2003)
- National Tariff Policy (2006)
- Elimination of licensing for generation projects
- Increased competition through international competitive bidding
- Adequate return on investment for the companies engaged in power generation, transmission and distribution
- Further rationalisation of tariffs
- Launch of Ultra Mega Power Project (UMPP) scheme

Source: KPMG, Corporate Catalyst India, IFLR, Aranca Research

Power generation has been growing rapidly … (1/2)

- India is the fifth largest producer and consumer of electricity in the world after US, China, Japan and Russia
- Electricity production in India (excluding captive generation) stood at 811.1 TWh in FY11

World's leading electricity producers (2009)



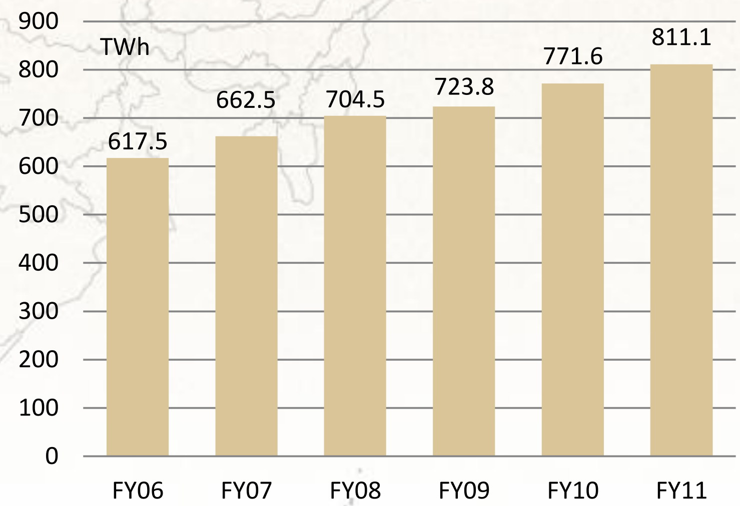
Source: CIA World Factbook, Aranca Research

Power generation has been growing rapidly … (2/2)

- In past five years, electricity production has expanded at a CAGR of 5.6 per cent
- Power generation has increased over 100 fold since independence

Note: CAGR- Compound Annual Growth Rate

Electricity production in India



Source: Central Electricity Authority (CEA), Aranca Research

Notes: FY – Indian financial year (April-March), TWh – Terra Watt hour

Sources of power with shares in total installed capacity

Thermal – 65%

- **Coal** – 55%: India has large reserves of coal; estimates for FY09 put the figure at about 267.2 billion tonnes
- **Gas** – 10%: India's proven natural gas reserves measure about 1,074 billion cubic meters

Hydro – 22%: With a large swathe of rivers and water bodies, India has enormous potential for hydro power; estimates put the figure at about 84,000 MW of which only 25 per cent has been harnessed till date

Renewable – 10%: Growing environmental concerns, geographical advantages, and rising hydrocarbons costs have favoured the pitch for renewable energy, primarily wind energy, solar photovoltaic energy, biomass power, and mini-hydro plants

Nuclear – 3%: Nuclear energy is a critical component of India's future power policy. In 2010, the country had 20 operational nuclear power plants with five others under construction. India also has one of the world's largest reserves of thorium

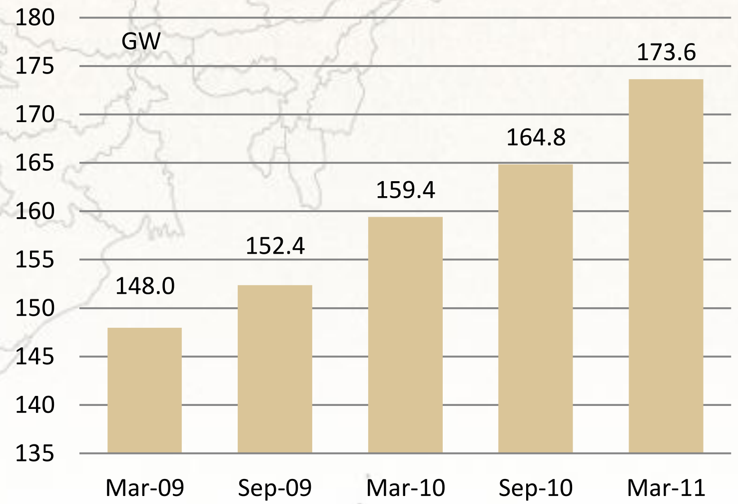
Source: Ministry of Coal, NHPC, The Hindu, Corporate Catalyst India, Aranca Research
Notes: MW- megawatt

Generation capacity has been increasing at a healthy pace … (1/2)

- India's installed power generation capacity was 173.6 GW at the end of FY11
- Installed capacity increased at a CAGR of 8 per cent over the past two financial years

Notes: FY – Indian financial year (April-March),
GW- gigawatt
CAGR- Compound Annual Growth Rate

Installed electricity generation capacity



Source: Central Electricity Authority (CEA), Aranca Research

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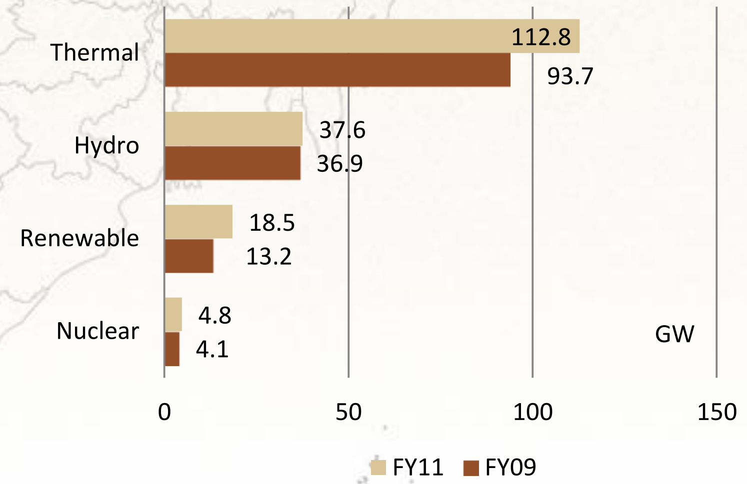
Generation capacity has been increasing at a healthy pace … (2/2)

- Among the different sources, installed capacity over FY09-FY11 expanded at a CAGR of--
  - 9.7 per cent for thermal power
  - 18.3 per cent for renewable energy, the fastest among all the sources

Notes: FY – Indian financial year (April-March),
GW- gigawatt
CAGR- Compound Annual Growth Rate

Comparison of installed capacity (FY09 and FY11)



Source: Central Electricity Authority (CEA), Aranca Research

Key players in the power sector … (1/2)

Company	Business description
एनटीपीसी NTPC	• NTPC is India's largest power producer and the sixth-largest thermal power producer in the world • It has also diversified into hydro-power, coal mining, power equipment manufacturing, oil and gas exploration, power trading, and distribution
TATA POWER	• Tata Power, India's largest private power company, pioneered power generation in India nine decades ago • It has a presence in all the segments across the value chain
RELIANCE Power	• The company has a portfolio of over 35,000 MW of power generation capacity, both operational as well as under development
CESC Limited	• CESC Limited is a vertically integrated player engaged in coal mining, and generation and distribution of power
एनएचपीसी NHPC	• NHPC is the largest hydro power utility in India with an installed capacity of 5295MW and has drawn up a massive capacity expansion plan of adding 6697 MW up to the year 2017

*This list is indicative.

Source: Company websites, News articles, Aranca Research

Key players in the power sector … (2/2)

Company	Business description
PFC	• Power Finance Corporation Limited (PFC) is an NBFC engaged in financing and development activities within the Indian power sector • Major products and services include project term loans, lease financing, direct discounting of bills, short-term loans and consultancy services
ADANI	• Adani Power is the largest private thermal power producer in India with total generation capacity of 2640 MW • It has a presence in power generation, power transmission, and solar power
पावरग्रिड	• Power Grid Corporation of India Limited (PGCIL) is the single largest transmission utility in India and is responsible for planning, co-ordination, supervision and control over inter-state transmission systems
DVC	• Damodar Valley Corporation is engaged in power generation, distribution and transmission of electric power, irrigation, and flood control
एसजेवीएन SJVN	• SJVN Limited is the second largest hydro power company in India • The company plans to diversify into wind power projects soon

*This list is indicative.

Source: Company websites, News articles, Aranca Research
Notes: NBFC: Non-banking financial company

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Strong demand and policy support driving investments

Growing demand

- Increase in industrial activity
- Increasing penetration, per-capita consumption
- Growing consumer base

Inviting →

Policy support

- Electricity Act (2003)- highly liberal framework for generation
- R-APDRP- aimed at reducing T&D losses
- Development of Ultra Mega Power Projects (UMPPs)

Resulting in →

Increasing investments

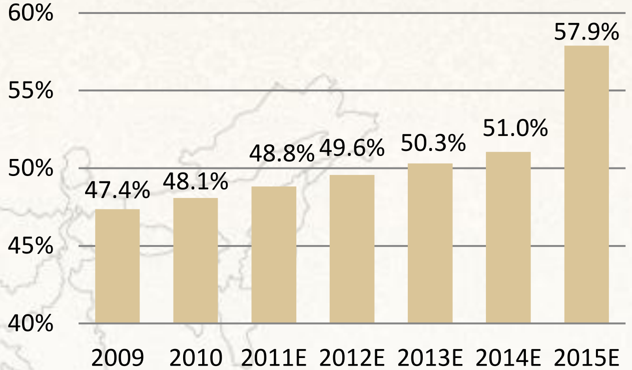
- Increasing FDI inflows
- Growing M&A activity
- Large investments in equipment manufacture and power generation

Source: Corporate Catalyst India, Ministry of Power, Aranca Research
Notes: FDI- Foreign Direct Investment, M&A- Merger and Acquisition, R-APDRP- Restructured Accelerated Power Development and Reform Programme, T&D – Transmission and Distribution

Industrial expansion and strong GDP growth to boost power demand

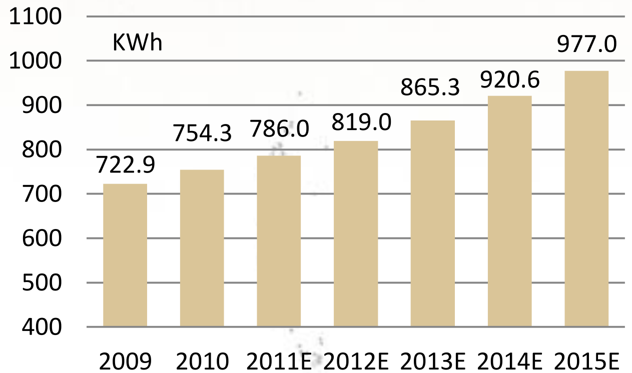
- Multiple drivers (industrial expansion, growing per-capita incomes) are leading to growth in power demand; this is set to continue over the coming years as well –
  - During FY10-FY15, GDP growth is likely to average 8.0-8.5 percent
  - India is set to become a global manufacturing hub with investments across the value chain
- 82GW worth of generation capacity is set to be added during FY11-FY15; future investments will benefit from strong demand fundamentals, policy support, and increasing government focus on infrastructure

Share of industry in electricity consumption



Source: Estimates as per BMI India power report Q3 2011, Aranca Research

Per-capita electricity consumption



Source: Estimates as per BMI India power report Q3 2011, Aranca Research

Policy support aiding growth in the sector

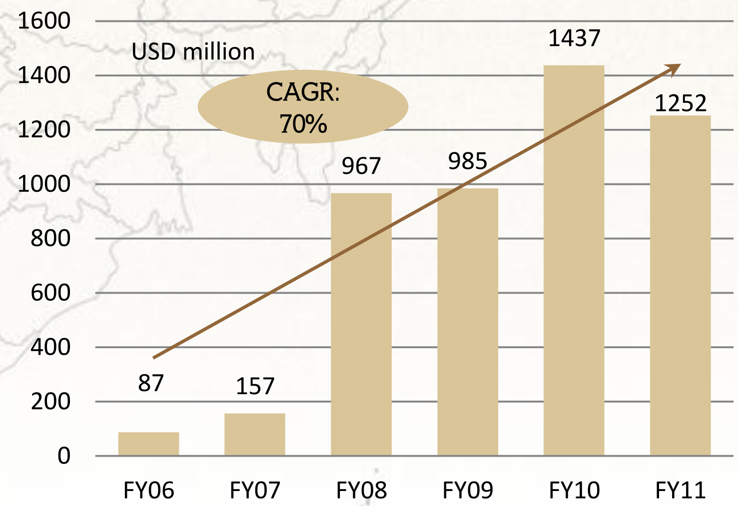
Electricity Act, 2003	• Elimination of licensing for electricity generation projects • Increased competition through international competitive bidding • Demarcation of transmission as a separate activity • Greater participation of the private sector
National Tariff Policy, 2006	• Adequate return on investment to the companies engaged in power generation, transmission and distribution • Uniform guidelines to SERCs for fixing tariffs • Assured electricity to consumers at reasonable and competitive rates
Ultra Mega Power Projects (UMPP)	• Launch of Ultra Mega Power Project (UMPP) scheme through tariff based competitive bidding • Ease of land possession, provision of fuel, water and necessary clearances for enhancing investor confidence
R-APDRP	• Restructured Accelerated Power Development and Reform Programme • Linking disbursement of central government funds (to states) with actual reduction in transmission and distribution losses

Source: KPMG, CRISIL, Ministry of Power, Aranca Research
Notes: R- APDRP- Restructured Accelerated Power Development and Reform Programme, SERC- State Electricity Regulatory Commission

Increasing investments: FDI inflows and key deals … (1/2)

- Power is one of the key sectors attracting FDI inflows into India
- During FY06-FY11, FDI inflows into the sector increased from USD87 million to USD1,252 million

FDI inflows into the power sector



Source: : Department of Industrial Policy and Promotion, Aranca Research

Increasing investments: FDI inflows and key deals … (2/2)

- The sector has witnessed a total of 35 M&A deals since 2010
- Morgan Stanley Infrastructure Fund's investment in Asian Genco Pvt Ltd was the largest PE transaction in the Indian power sector

Notes: FDI - Foreign Direct Investment, PE- Private Equity

Mergers and Acquisitions (M&A)			
Acquirer	Target	Deal date	Deal value (USD million)
Athena Capital Partners LLP	SPS Ispat and Power Ltd	08th Jul 2011	67.6
India Infrastructure Fund	Caparo Energy (India) Ltd	17th Jun 2011	78.5
Warburg Pincus India Pvt Ltd	Diligent Power Pvt Ltd	11th May 2011	150.0
Blackstone Group LP	Moser Baer Projects Pvt Ltd	18th Aug 2010	300.0
Morgan Stanley Infrastructure	Asian Genco Pvt Ltd	18th Mar 2010	425.0

Source: Thomson One Banker, Economic Times, Aranca Research

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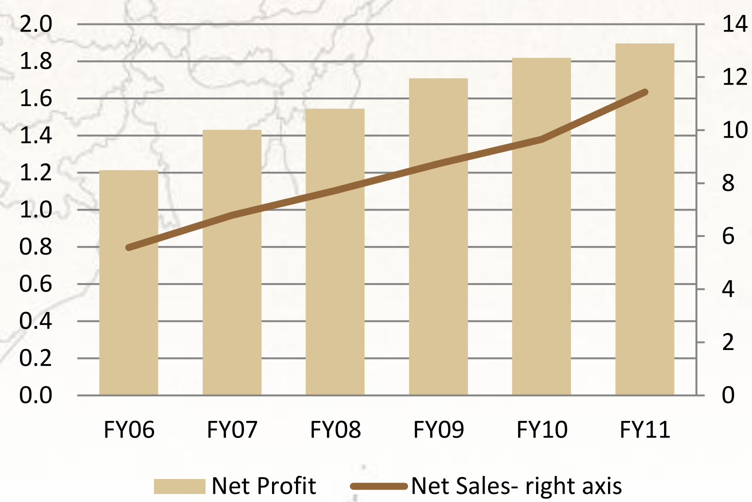
NTPC: A public sector success … (1/2)

- During FY06–11, NTPC's revenues increased at a CAGR of 15 per cent; CAGR in profits was 9 per cent
- NTPC accounts for 17.8 per cent of total capacity, but contributes 27.4 per cent of total power generation
- The company has an installed capacity of 34,854 MW; projects worth more than 14,000 MW are underway

Notes: NTPC – National Thermal Power Corporation, Aranca Research

Top line and bottom line (USD billion)



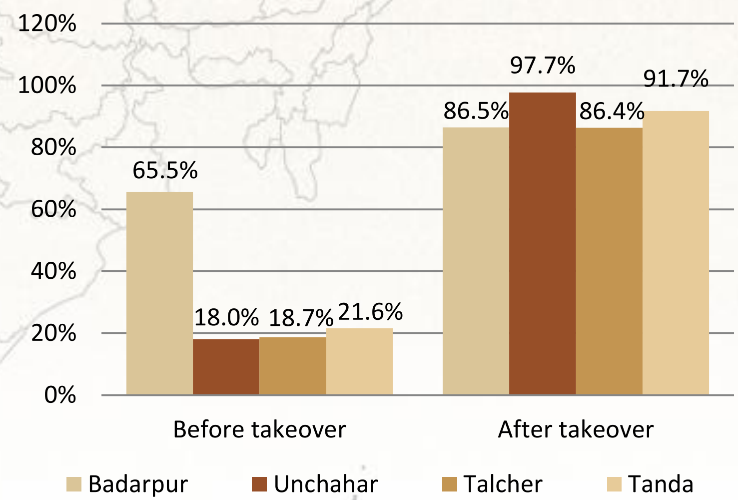
Source: NTPC website, annual reports, Economic Times, Aranca Research

NTPC: A public sector success … (2/2)

- NTPC has taken over and successfully turned around a number of sub-optimally performing stations
- High operational efficiency (indicated by plant load factor and availability factor) is NTPC's trademark
- It is a pioneer in high-efficiency supercritical and ultra supercritical coal-based power plants in India

Notes: NTPC – National Thermal Power Corporation, Aranca Research
PLF - Plant load factor, After Takeover- figures for FY08

Impact of NTPC takeover of sub-optimal plants (PLF)

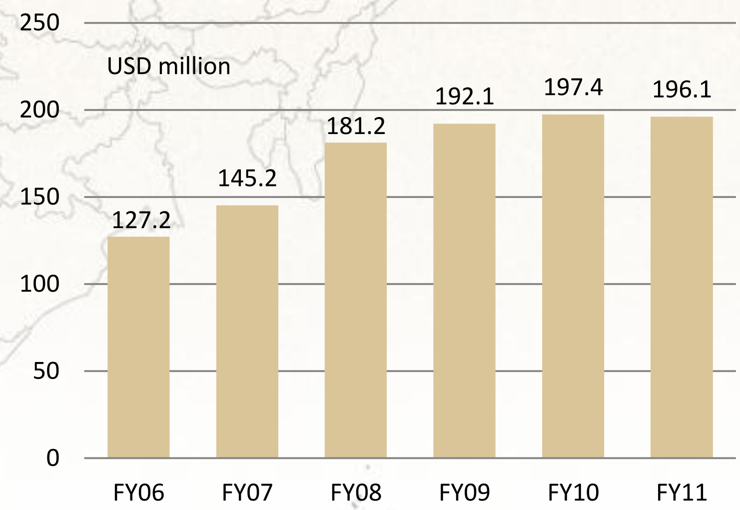


Source: NTPC website, Annual Reports, Economic Times, Aranca Research

Tata Power: Forging ahead in the private sector … (1/2)

- During FY06-FY11, Tata Power's profits increased at a CAGR of 9 per cent
- The company is developing the first 4000 MW Ultra Mega Power Project at Mundra (Gujarat) based on super-critical technology
- It has the largest installed capacity for wind power

Growth in net income

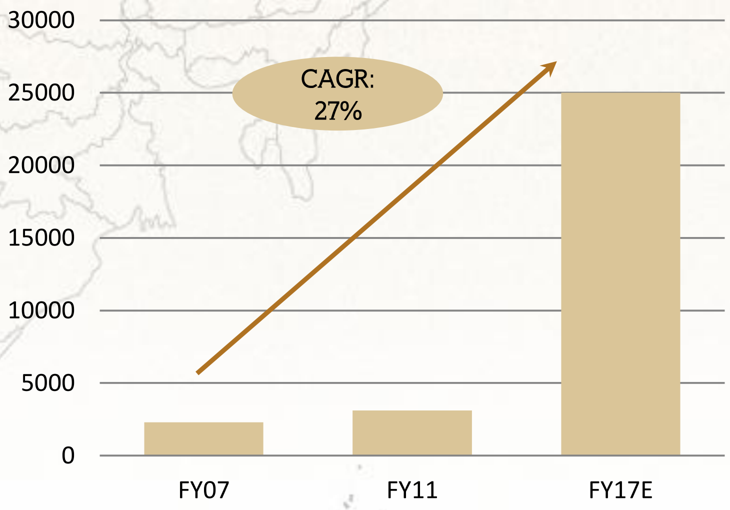


Source: Company website, annual reports, Economic Times, Aranca Research

Tata Power: Forging ahead in the private sector … (2/2)

- The company estimates its installed capacity to grow eight-fold in the next six years (CAGR of 27 per cent from FY07 and 41 per cent from FY11)
- Recognising the enormous potential in renewable energy, the company intends to increase the share of renewable sources to 25 per cent of its total generating capacity

Installed capacity in mega watts (MW)



Source: Company website, FY17 estimate as per press release, 15th July 2011

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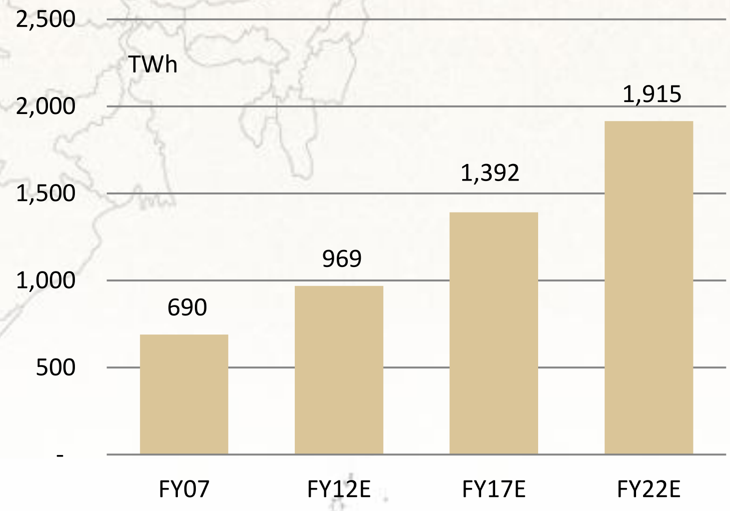
Power generation: Overall fundamentals will remain strong … (1/2)

- Demand for electricity is expected to grow at a CAGR of 7 per cent over FY07-FY22 to 1,915 TWh
- Current production levels are not enough to meet demand; annual demand outstrips supply by 7-12 per cent

Electricity demand forecast



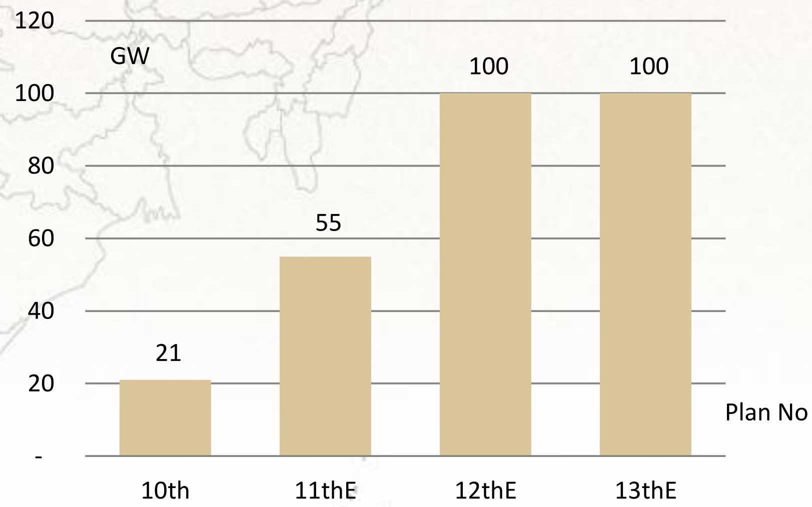
Source: International Energy Agency (IEA), demand estimates based on IEA forecasts, Aranca Research

Power generation: Overall fundamentals will remain strong … (2/2)

- The government has targeted capacity addition of 100,000 MW each in the 12th Plan (2012-17) and 13th Plan (2017-22)
- The focus is on promotion of hydro, renewable and gas-based projects, and adoption of clean coal technology

Notes: FY – Indian financial year (April-March), GW- gigawatt CAGR- Compound Annual Growth Rate, TWh- terawatt-hour, E- estimates

Addition to generation capacity under Five Year Plans



Source: Business Standard, capacity addition estimates by Central Electricity Authority (CEA), Aranca Research

Current trends point to opportunities across the value chain

Investments across the value chain

Generation

- **Adante Power** → Plans to invest USD17.7 billion in power generation by 2014
- **Germac Energy and Sepco III (JV)** → Coal-fired plant in Tamil Nadu; investment of USD1.3 billion
- **Tata Power** → Nuclear power ambition; studying entry strategy with minimum investment of USD3.0 billion
- **Reliance Power** → USD2.5 billion investment in hydro-power in Arunachal Pradesh with combined generating capacity of 2.5 GW

T&D

Power Grid Corporation of India Ltd (PGCIL)

- Loan from ADB of USD600 million for development of high- voltage transmission system
- Developing an integrated national grid, including strengthening of five regional grids; project investment is worth about USD16 billion
- Joint development of an India-Sri Lanka undersea transmission link with the Ceylon Electricity Board at an estimated cost of USD573 million

Source: BMI India power report Q3 2011, Aranca Research
Notes: JV – Joint venture, T&D – Transmission and distribution, GW- gigawatt

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Industry Associations … (1/2)

Council of Power Utilities
A-2/158, Janakpuri, New Delhi-110058, India
Tel : 91 11 25618472, 45652708
Fax : 25611622
E-mail : cvjvarma@gmail.com, cvjv1933@yahoo.com
Web site: www.indiapower.org

Hydro Power Association (India)
Flat no 6, Green Park Apartment, Shriram Society, Warje, Pune - 411058, Maharashtra, India
Tel: 91 20 25233338
E-mail: hypaindia@gmail.com, president@hpaindia.org, secretary@hpaindia.org
Website: http://hpaindia.org/

Bureau of Energy Efficiency (BEE)
Ministry of Power, 4th Floor, SEWA Bhawan, R. K.Puram, New Delhi – 110066, India
Tel: 91 11 26179699
Fax: 91 11 26178352
E-mail: webmanager-bee@nic.in
Website: http://www.beeindia.in/

Industry Associations … (2/2)

Indian Wind Energy Association (INWEA)
PHD House, 3rd Floor, Opp. Asian Games Village, August Kranti Marg, New Delhi-110016, India
Tel : 91 11 26523042
E-mail : manish@inwea.org
Web site: http://www.inwea.org/

Glossary … (1/2)

- **CAGR:** Compound Annual Growth Rate
- **FDI:** Foreign Direct Investment
- **FY:** Indian Financial Year (April to March)
  - So FY10 implies April 2009 to March 2010
- **GW:** gigawatt
- **M&A:** Merger and Acquisition
- **MW:** Megawatt
- **NBFC:** Non-Banking Financial Company
- **PE:** Private Equity
- **PLF:** Plant Load Factor
- **R&D:** Research and Development

Glossary … (2/2)

- **R-APDRP:** Restructured Accelerated Power Development and Reform Programme
- **T&D:** Transmission and Distribution
- **TWh:** terawatt-hour
- **USD:** US Dollar
  - Conversion rate used: USD1= INR48
- Wherever applicable, numbers have been rounded off to the nearest whole number

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