

JM Morgan Stanley Securities  
Private Limited+

**Parag Gupta**

Parag.Gupta@morganstanley.com  
+91 22 2209 7915

**Nehal Shah**

Nehal.Shah@morganstanley.com  
+91 22 2209 7926

April 23, 2007

Industry View  
In-Line

## India Utilities

### Thrust on Generation

**Significant industry potential:** India faces an electricity shortfall of 14 GW at peak levels, due largely to a lack of adequate generation capacity, inefficiencies in generation plants and high AT&C losses in the distribution system. The per capita consumption of electricity in India is among the lowest in the world, and we believe electricity requirements will increase with the rapid pace of economic growth.

**Generation will be in the spotlight:** The Ministry of Power projects that India's electricity demand will rise 9% a year during F2007-12. To meet this burgeoning demand, it envisages a total capacity addition of 69 GW during this period. Furthermore, the ultra mega power projects seem to be a step in the right direction as they will increase competition and promote efficiencies. With generation in the spotlight, we believe players with aggressive plans to increase generation capacity will be the winners.

**Privatization in transmission and distribution seem some time away:** While the Ministry of Power and various state governments seem willing to increase private participation in these segments, we have yet to see seriousness in execution of these plans. Delays in privatization of various transmission and distribution projects due to administrative issues have dampened our interest in these two segments for the moment.

**Initiating coverage on NTPC (EW), Reliance Energy (OW), Tata Power (OW) and Lanco (EW-V).**

#### Ratings and Target Prices

Company	Rating	Target Price (Rs)
Lanco (LAIN.BO, Rs146)	Equal-weight-V	152
NTPC (NTPC.BO, Rs160)	Equal-weight	146
Reliance Energy (RLEN.BO, Rs511)	Overweight	609
Tata Power (TTPW.BO, Rs546)	Overweight	643

Source: Morgan Stanley Research

#### Relative Performance of the Stocks



Source: Morgan Stanley Research

Note: We have not included Lanco since the company was listed in November 2006

Morgan Stanley does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

**For analyst certification and other important disclosures, refer to the Disclosure Section.**

+ = Analysts employed by non-U.S. affiliates are not registered pursuant to NASD/NYSE rules.

Initiation

## Investment Case

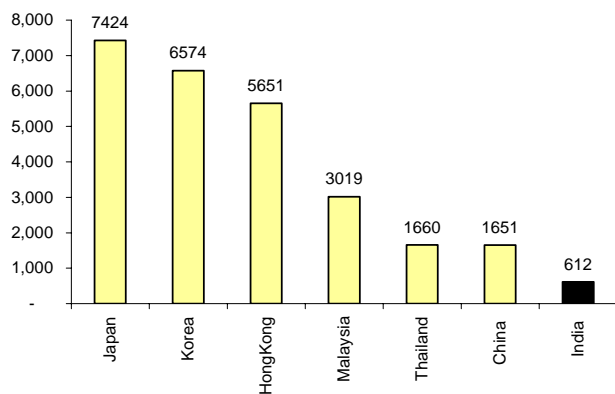
### The Indian Utility Sector: A Brief

The Indian utility sector can be segmented into generation, transmission and distribution. It is highly regulated, and the central and state governments are the largest players in all segments of the industry. While NTPC is the largest government-owned power generator, the State Electricity Boards are the primary transmission and distribution vehicles in the country.

According to the Planning Commission of India, 56% of rural households are not electrified. Furthermore, the per capita consumption of electricity in India is amongst the lowest in the world and about a third of China's (Exhibit 1). India has always been a power-deficit country. Although installed capacity has increased at an average annual rate of 4% from 1991 to date, power requirements have risen at an average rate of about 6%, leading to a demand-supply mismatch (Exhibits 2 and 4). In our view, demand for electricity will increase significantly going forward, given the fast pace at which the economy is growing, which will boost per capita consumption of electricity.

Exhibit 1

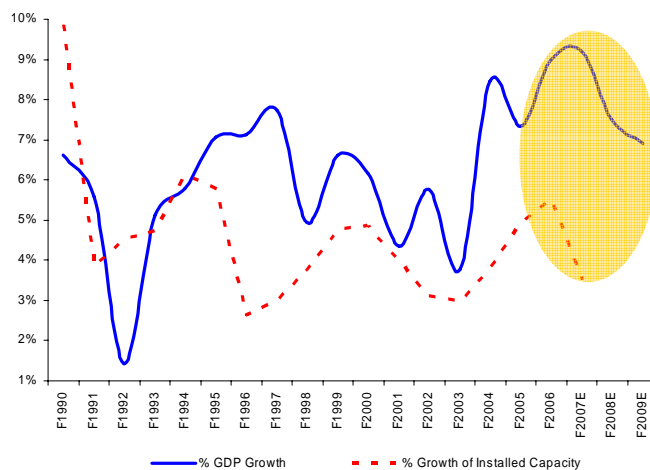
### Global Per Capita Consumption of Electricity in 2006



Source: MoP, CIA World Fact book, Morgan Stanley Research

Exhibit 2

### India's Installed Capacity Growth Lagging GDP Growth



Source: CSO, CEIC, MoP, Morgan Stanley Research;  
 E = Morgan Stanley Research Estimates

### Regulation and Structure of the Industry

The utility industry in India is primarily a government-regulated sector with the *Ministry of Power* being the apex government body responsible for planning, policy formulations and monitoring its performance. The *Central Electricity Authority (CEA)* is the main technical advisor to the government and is responsible for advising the central government on matters relating to electricity policy and short-term plans for the development of the electricity system. The CEA also sets up technical and safety requirements for construction, operation and maintenance of electrical plants and transmission lines. Every five years, CEA releases a National Electricity Plan, which is based on the National Electricity Policy. The *Central Electricity Regulatory Commission (CERC)* is responsible for setting guidelines for arriving at the electricity tariff and interstate transmission tariff and is the key advisor to the government for formulation of the National Electricity Policy and the National Tariff Policy. While the above-mentioned bodies are at the central government level, each state has its own electricity board, which regulates the sector within that state.

Exhibit 3

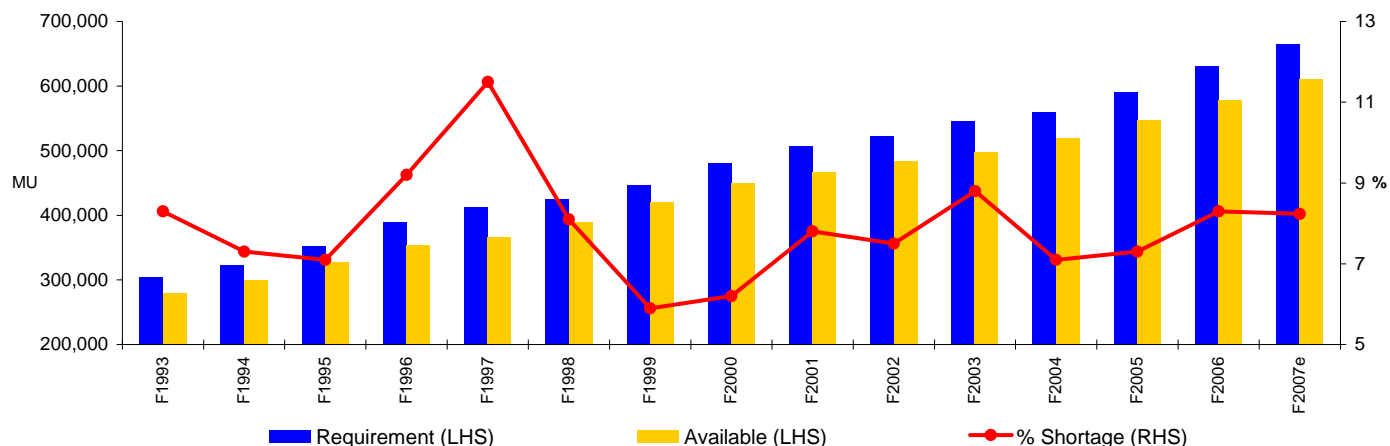
**Landmark Events in the Development of the Indian Power Sector**

1948	Electricity (Supply) Act that provided for establishment of the Central Electricity Authority (CEA) and the State Electricity Boards
1950-60	Growth of State Grid Systems
1964	Constitution of Regional Electricity Boards
1965-73	Interconnecting State Grids to form Regional Grid Systems
1974	Independent Ministry for Power Sector
1975	CEA becomes full-fledged organization
1975	Central PSUs to supplement the efforts of states in generation. The CPSUs also established transmission systems for evacuation of power
1980-88	Growth of Regional Grid Systems
1989	Formation of Power Grid Corporation of India (POWERGRID)
1991	Generation of electricity opened for private sector
1998	Electricity Regulatory Commission Act
2000	Central initiative through Accelerated Power Development Programme (APDRP)
2003	Electricity Act 2003
2005	National Electricity Policy

Source: Infraline, Morgan Stanley Research

Exhibit 4

**India's Power Shortage**



Source: Company data, Morgan Stanley Research

**Key Government Players**

**National Thermal Power Corporation (NTPC)**

NTPC is the largest power generator in India with a total installed capacity of 26,350 MW. The Indian Government has an 89.5% equity holding in NTPC. The corporation has been granted a *Navratna* status, which accords it various benefits in the form of greater autonomy.

**National Hydroelectric Power Corporation (NHPC)**

NHPC has grown to be the largest player in the hydro segment with over 30 years of experience and a total installed capacity of 4,145 MW. The company has the capability to undertake all activities from conceptualization to commissioning, including

operation and maintenance of hydropower projects. NHPC has diversified to include other sources of energy such as geothermal, tidal and wind. It is wholly owned by the Government of India.

**Nuclear Power Corporation of India Limited (NPCIL)**

NPCIL is entirely owned by the Government of India and falls under the administrative control of the Department of Atomic Energy (DAE), Government of India. The company operates the atomic power stations for generation of electricity under the provisions of the Atomic Energy Act, 1962.

**Power Finance Corporation (PFC)**

PFC was set up in July 1986 to finance power projects and foster the development of the sector. Recently, PFC was appointed as the nodal agency along with the Ministry of Power and the CEA to facilitate the development of nine Ultra Mega Power Projects (UMPPs), which will have a total installed capacity of 36 GW.

**Power Trading Corporation (PTC)**

PTC was incorporated in April 1999 to support private sector mega power projects (projects with an installed capacity greater than 1,000 MW). PTC enters into long-term power

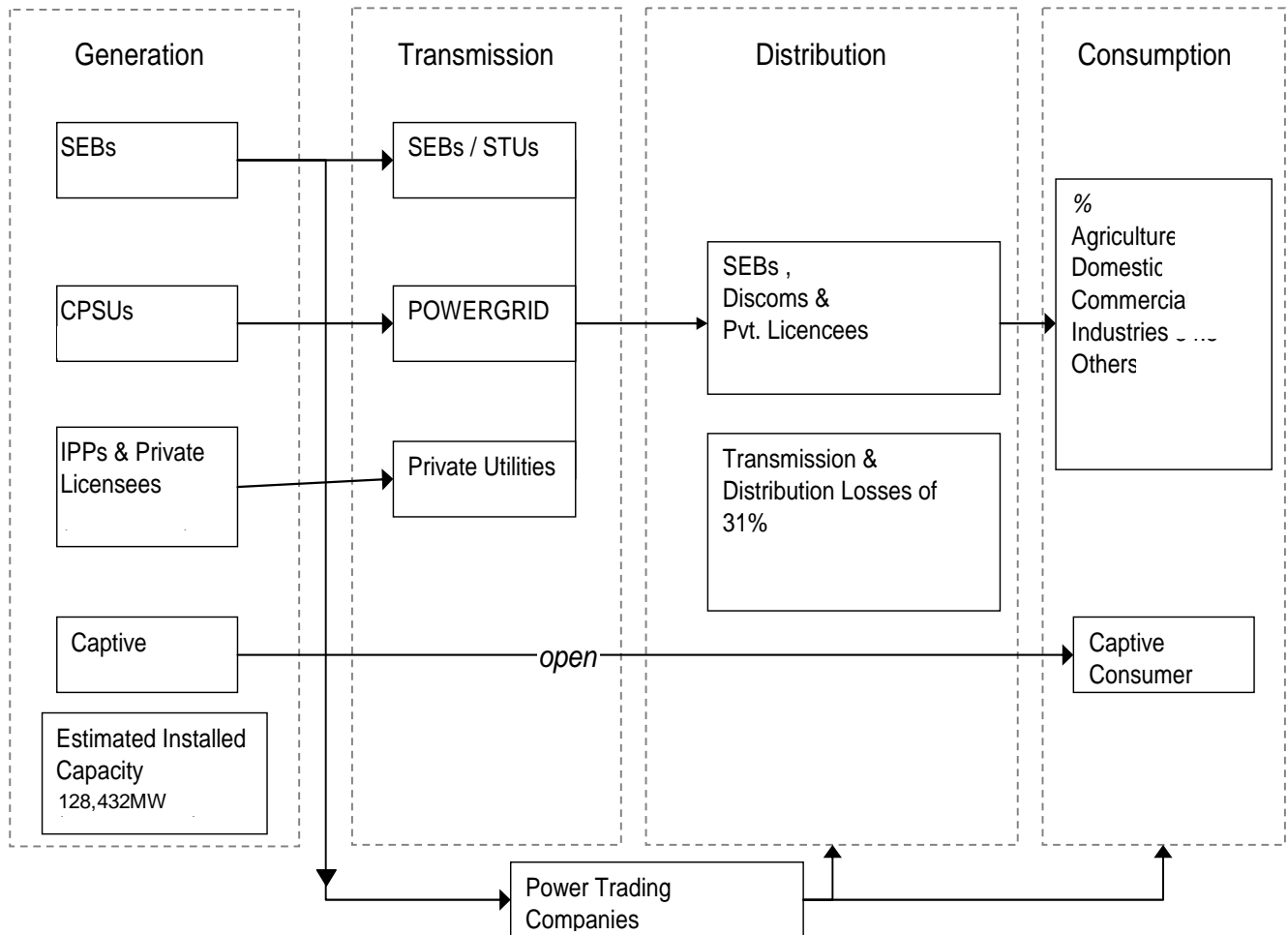
purchase agreements (PPAs) with independent power producers (IPPs) and with consumers/state electricity boards (SEBs) to insulate IPPs from political and receivable risk.

**Power Grid Corporation of India Ltd (PGCIL)**

PGCIL is the central transmission utility and is wholly owned by the Government of India. PGCIL is responsible for providing transmission systems for evacuating power and for operating the regional and national grids to transfer power within and across regions. PGCIL has a total installed capacity of 16,450 MW.

Exhibit 5

**Organisation of the Indian Power Sector**



Source: Lanco prospectus, Morgan Stanley Research

## Generation

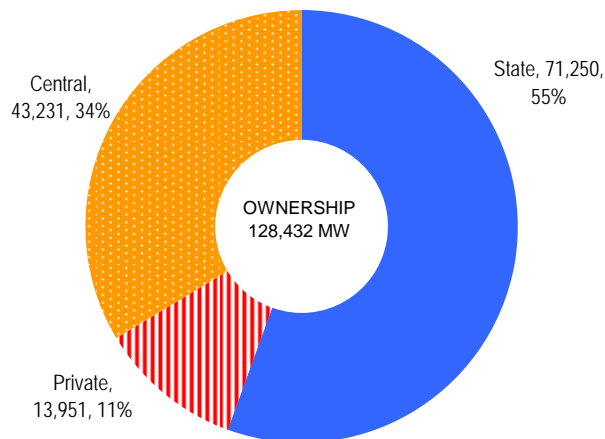
India's total installed generation capacity at the end of February 2007 was 128 GW, with a peak shortfall of about 14 GW. The central government owns 34% of the installed capacity through companies like NTPC and NHPC, while the SEBs own 55% of this capacity (Exhibit 6). The share of Private IPPs is small now, but we believe this scenario will change as the government increases the role of the private sector to promote competition, increase efficiency and reduce tariffs.

The bulk of the installed capacity is thermal (coal and gas) (84,300 MW) followed by hydro (33,492 MW). Nuclear (3,900 MW) and renewable sources (6,191 MW) form a very small portion of the installed capacity as of now (Exhibit 7). We believe coal is the primary fuel used in generation plants across the world due to the large reserves of coal relative to gas and oil. India has 96 billion tonnes of proven coal reserves, which are adequate to meet 200-250 years of requirement. While gas supply is currently falling short, we believe there will be a spurt in production in the near future, although even that may not be adequate to meet demand. We do not think nuclear energy will become significant within the next 10 years due to the complexities and high costs involved. Renewable sources such as hydro, wind and biomass have great potential, and their share in total generation capacity will gradually increase over a period of time.

Installed capacity has been rising by approximately 4% per annum over the past decade (Exhibit 9), led mainly by investments by the public/state sector. While the government has been setting ambitious capacity addition plans, the achievement has been far from satisfactory. Historically, only 50-60% of the targets have been achieved due to lack of funds, inefficiency, shortfall in equipment supply, lack of fuel linkages and political intervention (Exhibit 8). The Xth Five-year Plan (March 2002-07) targeted the addition of 41 GW of additional capacity. However, we believe only about 23 GW has been added to date. Furthermore, the XIth Five-year Plan (March 2007-12) has set a target of 69 GW, which will be over and above the capacity that has slipped from the Xth plan into the XIth plan. We believe these targets are bold, and their achievement looks difficult given the past record and the preparedness of power generation companies.

Exhibit 6

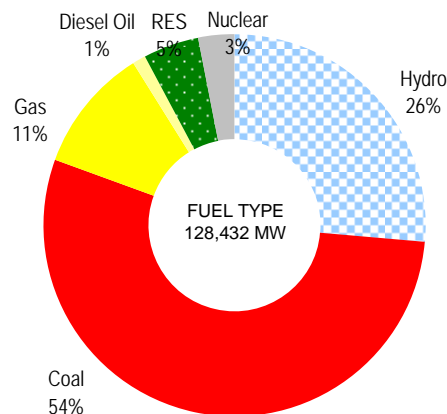
### Ownership of India's Installed Generation Capacity



Source: Ministry of Power, Morgan Stanley Research

Exhibit 7

### India's Installed Capacity by Fuel Type



Source: Ministry of Power, Morgan Stanley Research

Exhibit 8

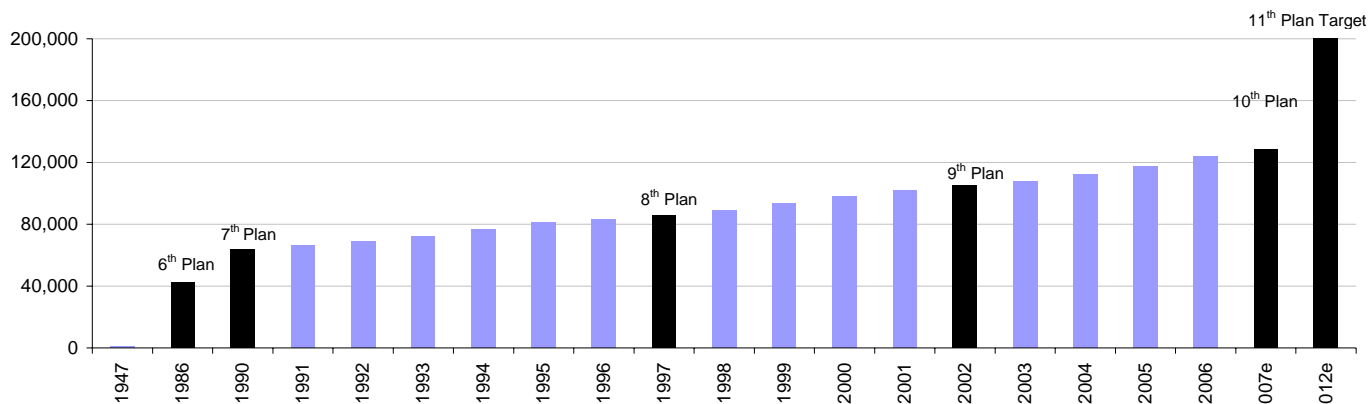
**Record of Achievement of India's Generation Capacity Targets over Plan Period**

Plan	Target (MW)	Achievement (MW)	% Achieved
1st (51-56)	1,300	1,100	84.6
2nd (56-61)	3,500	2,250	64.3
3rd (61-66)	7,040	4,520	64.2
4th (69-74)	9,264	4,579	49.4
5th (74-79)	12,499	10,202	81.6
6th (80-85)	19,666	14,226	72.3
7th (85-90)	22,245	21,401	96.2
8th (92-97)	30,538	16,423	53.8
9th (97-02)	40,245	19,015	47.2
10th* (02-07)	41,110	23,245	56.5

\*To date  
 Source: Ministry of Power, Morgan Stanley Research

Exhibit 9

**Evolution of Installed Capacity in India over the Plan Period (MW)**



Source: Ministry of Power, Morgan Stanley Research

**Ultra Mega Power Projects**

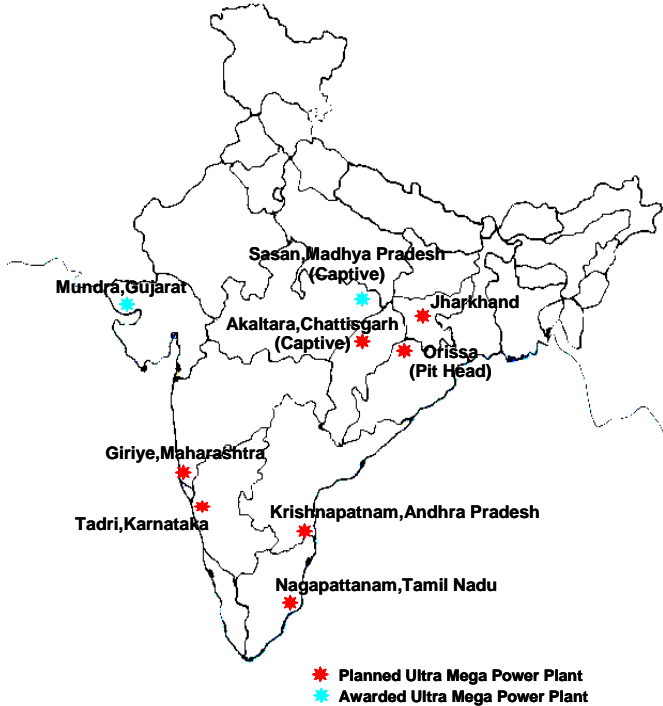
According to the Ministry of Power, the country's generation capacity needs to grow by at least 9% annually to support GDP growth of 9%. Currently, India has a peak power deficit of 14 GW (14% deficit) and the government has set a target of "Power for All" by 2012. Given the power deficit and the increasing demand, the government is looking to promote competition by moving towards a competitive bidding scheme rather than the current regulated tariff system. Ultra Mega Power Projects (UMPPs) are the first step in that direction. The government has identified nine sites for those projects, with each project having an installed capacity of 4,000 MW using supercritical technology (Exhibit 10). The government will ensure land and environmental clearances, fuel linkage, offtake agreements and a payment security mechanism to ensure smooth implementation. Each UMPP will entail an investment of US\$3.5-4 billion, and wither the projects will use

imported coal (for coastal-based plants) or the government will ensure fuel linkage by allocating captive mines or pit-head mines. As of now, the government has awarded the Sasan UMPP to the Lanco-led consortium (see Exhibit 12) and the Mundra UMPP to Tata Power (see Exhibit 13). The government intends to finalize two more UMPPs by mid-2007.

We believe that UMPPs will help in driving economies of scale and will improve efficiency, thereby resulting in lower tariffs. However, implementation will be key, and it will be critical to see how the government manages to execute its plan.

Exhibit 10

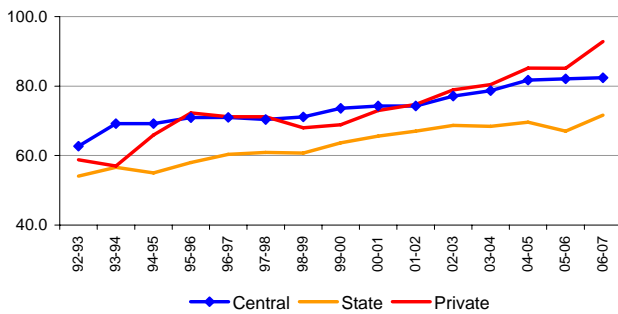
India Power: Sites Identified for UMPPs



Source: Morgan Stanley Research

Exhibit 11

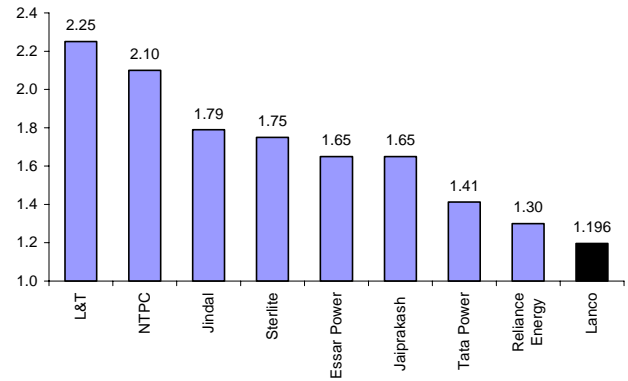
Plant Load Factor: India's Private IPPs More Efficient than Government



Source: Infraline, Morgan Stanley Research

Exhibit 12

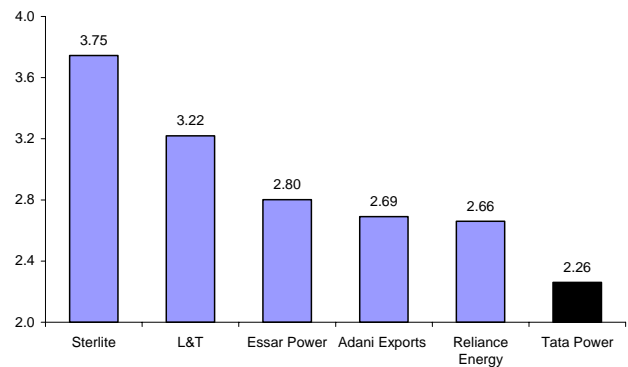
Sasan UMPP Bids (Rs/Kwh)



Source: Infraline, Morgan Stanley Research

Exhibit 13

Mundra UMPP Bids (Rs/Kwh)



Source: Infraline, Morgan Stanley Research

Merchant Power Plants (MPP)

MPPs generate electricity for sale in the open wholesale power market. MoP has been contemplating the set-up of MPPs, which will generate power and wheel it to a grid, thereby ensuring a regular supply of electricity. To ensure this, the government would either assure coal linkage or allocate captive coal blocks. The MoP, in consultation with the Ministry of Coal, has identified 15 coal blocks with estimated reserves of 3.6 billion tonnes for allocation to MPPs.

Coal: Captive or Imports

Coal plants account for 53% of the total generation capacity in India, highlighting its significance in the generation industry. India has 96 billion tonnes of proven coal reserves (10% of total world coal reserves), which are adequate to meet demand for the next 200-250 years (Exhibit 15). Coal India Limited, a government company, is the key coal mining company (85% of

coal generation output). However, the high ash content and low calorific value of Indian coal combined with the inefficiencies of Coal India Limited result in a higher cost of power generation.

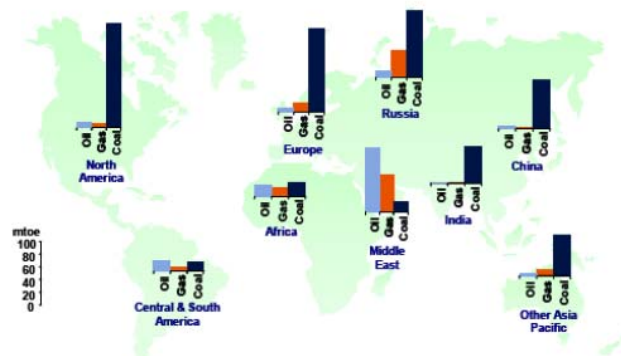
To mitigate these risks, power companies are now looking to acquire captive coal mine blocks in India/overseas or have been importing coal from Indonesia, Australia, China and South Africa.

Captive coal mining would involve significant capex and management bandwidth. However, it would ensure a regular supply of coal, thereby maintaining a high plant load factor (PLF). We believe a capex of Rs4 billion will be required to develop a mining capacity of 1 million tonnes per annum. The Coal Ministry has identified 15 coal blocks for the power sector and will give priority to projects that have a capacity in excess of 500 MW.

The share of imported coal relative to domestic coal will increase over time, in our view, as demand outpaces domestic production, and the cost of imported coal may be lower than that of domestic coal owing to its high calorific value. India imports 10-15 million tonnes of coal for the power sector, which will increase substantially to meet the coal shortfall caused by the massive additional planned generation capacity (Exhibit 16) and some of the new ultra mega power projects that will use imported coal as fuel.

Exhibit 14

**World: Proven Coal Reserves**



Source: BP (2004), Morgan Stanley Research

Exhibit 15

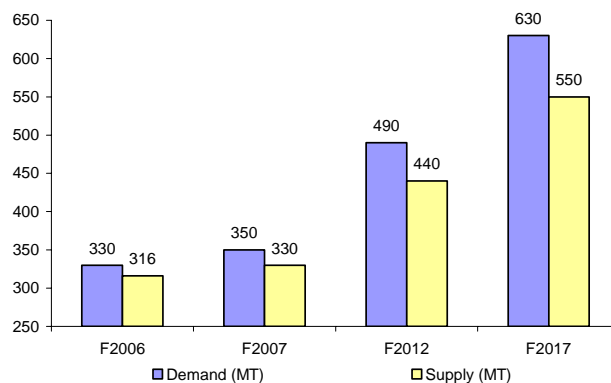
**India: Coal Reserves (billion tonnes)**

	Total Reserves	Proven Reserves
Coking Coal	32.1	16.5
Non-Coking Coal	221.2	79.3
<b>Total</b>	<b>253.3</b>	<b>95.8</b>

Source: GSI, Morgan Stanley Research

Exhibit 16

**Coal Shortfall in India for the Power Sector**



Source: MMTC, Morgan Stanley Research



## Transmission

PGCIL is the largest player in the transmission business in India, followed by the SEBs. PGCIL manages the national and regional grids, while the SEBs manage the state grids and distribution networks. To facilitate the transfer of power among neighboring states, state grids are interconnected to form regional grids. There are five regional grids – Northern region grid, Eastern region grid, Western region grid, Southern region grid and North-Eastern region grid (Exhibit 18). PGCIL's total installed capacity is 16,450 MW, and the government intends to take this up to 37,150 MW by the end of 2012. With the increase in generation capacity, the transmission network will have to be augmented to evacuate more power. The XIth Five-Year Plan focuses on the creation of a national grid that will add over 60,000 ckm (circuit kilometers) of transmission network during this period. The integrated grid will evacuate an additional 100 GW of power and carry 60% of the power generated in the country.

To increase the transmission capacity, the government is also inviting private sector participation. The CEA has identified 14 such transmission projects for development through private sector/competitive bidding (Exhibit 17). The Tala transmission line was the first privatized transmission project, which was executed by a Tata Power and PGCIL joint venture. The 1,200-km transmission line was to evacuate power from Tala (Bhutan) and supply it to the northern parts of India. The other privatized project is the Western Region System Strengthening (WRSS) scheme, which will be executed by Reliance Energy. The government is also in the process of inviting private

players to set up transmission lines to evacuate power from the UMPPs. These transmission projects will be awarded in the same way as the UMPPs.

While there are significant opportunities in the transmission business, we are unsure of the government's and PGCIL's willingness to increase private sector participation. It will be important to watch the speed with which the government increases the privatization process in this business.

---

Exhibit 17

### **India's Transmission Projects for Development through Private Sector/Competitive Bidding**

---

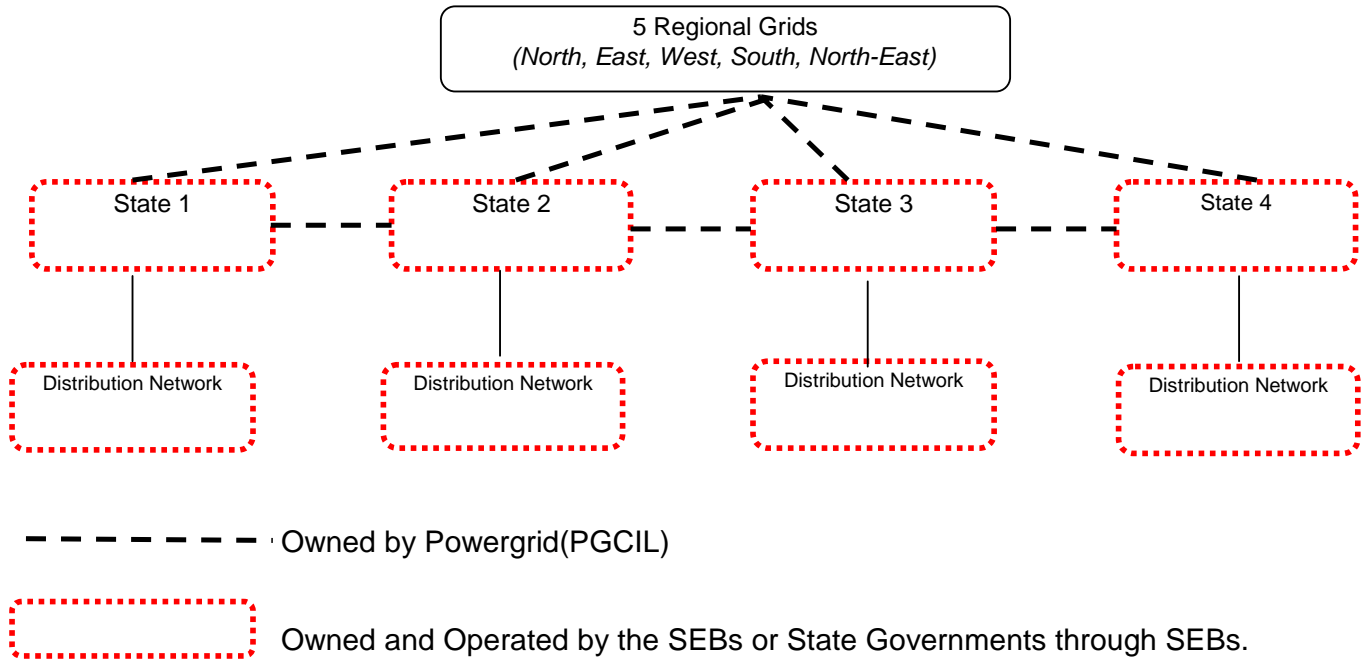
- 1 Evacuation System for North Karanpura (1980 MW)
- 2 Talcher Augmentation System
- 3 Evacuation System for Maithon RB (1000 MW)
- 4 Schemed for enabling import of NER/ER surplus by NR
- 5 SR-WR Synchronous Inter-Connector
- 6 Kavas-Navsari 400 kV D/C
- 7 Navsari-Mumbai New location 400 kV D/C
- 8 Evacuation System for Barh-II (1320 MW)
- 9 Evacuation System for Nabinagar (100 MW)
- 10 Evacuation System for Daripally Integrated Project 3200 MW, 800 MW in 11th Plan
- 11 Evacuation System for Koderma 500 MW
- 12 Evacuation System for Mejia ext. 1000 MW
- 13 Evacuation System for Lara Integrated Project 4000 MW in 11th Plan
- 14 Evacuation System for Simhadri Ext. (1000 MW)

---

Source: CEA, Morgan Stanley Research

Exhibit 18

Organisation of India's Power Grid System



Source: CEA, Morgan Stanley Research

## Distribution

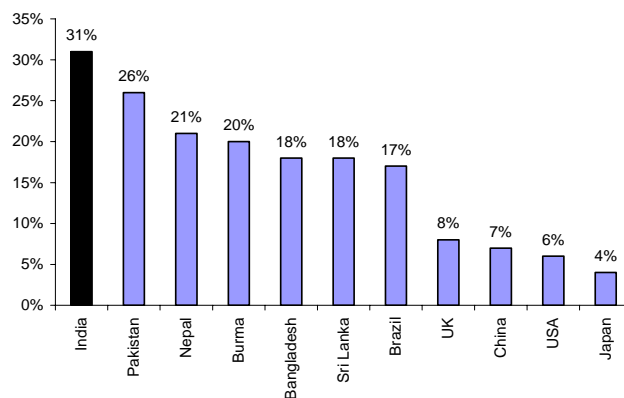
The distribution segment is a 'state level' subject in the Indian context and is extremely vulnerable to state politics. Some of the key issues in the distribution business are as follows:

- **Cross-subsidization of power:** Free or subsidized power is provided to the poor/agricultural sector, with costs either recovered from the industrial/commercial consumer or borne by the SEB.
- **High AT&C (Aggregate Technical & Commercial) losses:** Inefficient distribution assets, lack of metering and inadequate investment have led to high transmission and receivable losses and significant power theft.
- **Political instability:** the privatization process is heavily dependent on the seriousness shown by the state governments. However, lack of political stability has not helped this process. For example, the Karnataka Government was ready to privatize the distribution business within the state by early 2005, but, a change in the state government rendered the entire process useless.
- **High SEB losses:** Due to high AT&C losses, the SEBs had cumulative losses aggregating Rs2 trillion (without subsidies) as at 2005. We believe these losses constrained the SEBs from making adequate investments in the business.
- **Political intervention:** Given the importance of power for winning elections, state governments have intervened in the reform process. For example, the Delhi government rolled back tariff increases in Delhi even though the distribution circle was managed by private players.

Given the high level of AT&C losses in the country, we believe privatization of the distribution business could attract a lot of interest from private players. Not only is there significant scope to generate returns (given the high AT&C loss level), but also, distribution provides last-mile ownership and thus greater control over revenue realization.

Exhibit 19

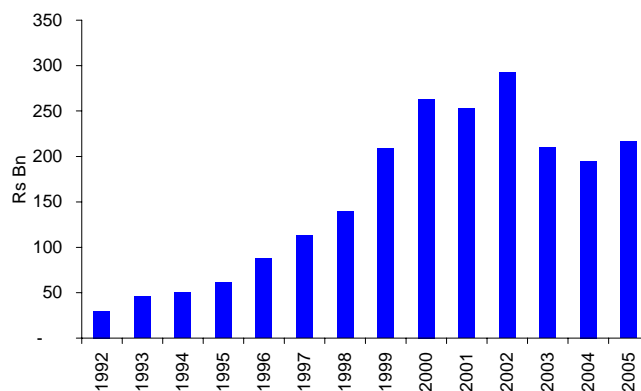
### Comparison of Power Transmission & Distribution Losses in India



Source: Infraline, Morgan Stanley Research

Exhibit 20

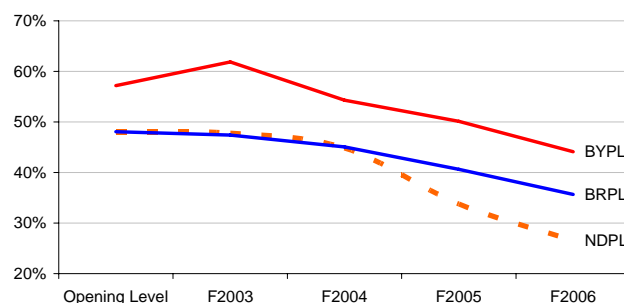
### India Power: SEB Losses (without Subsidy) (Rs bn)



Source: Planning Commission, PFC, Morgan Stanley Research

Exhibit 21

### Reduction of AT&C Losses in Delhi Distribution



Source: GNCTD, Morgan Stanley Research

## Appendix 1: Clearances Required for Power Projects

Clearance	Agency	Remarks
<b>Statutory Clearances</b>		
1 Cost Estimates  Any power project involving capital expenditure exceeding the limit fixed by government must be scrutinized by CEA for examination of salient features and benefits that may accrue there from	CEA	Required under Section 29 of Electricity (Supply) Act, 1948 (E/S) Act, 1948.
2 Techno-economic clearance / concurrence of CEA after examination of:  i. River works/dams to be put up for hydro and for water availability for thermal plants. ii. Greatest possible economic output of electric power. iii. Transmission lines and systems. iv. Reasonableness of the scheme v. Site location for optimum utilisation of fuel resources, distance from load centres, transportation facilities, water availability and environmental considerations.	CEA	Under Section 30 of Electricity (Supply) Act, 1948 SEBs/ state govts. Concerned Ministries of Coal, Petroleum & Natural Gas, Railways Surface Transport.
3 Publication  Schemes to be published in the Official Gazette/ local newspapers as the generating company may consider necessary along with a notice for at least two months and modification if any consequent to public representation.	State Govts	Section 29 clause (2),(3),(4) and (6) ES Act, 1948 state govts.
4 Water Availability	State Govt. CWC	Interaction between state govt depts & CWC required. Relevant Irrigation Act of the State & Central / Water Commission
5 SEB Clearance	SEB State Govt.	Sec 44 ES Act, 1948
6 Pollution Clearance Water and Air	SPCB	Water Prevention & Control Pollution Act 1974 Air/Prevention & Control of Pollution Act 1981
7 Forest Clearance	State Govt, Min. of E&F	Coordination with State Forest Dept. Min. of Environment & Forest (regarding Forest Conservation Act 1980)
8 Environment & Forest Clearance	- do -	As per item 6, 7 & Govt. Policy in force
9 Civil Aviation Clearance for Chimney Light	National Airport Authority	
10 Registration of Company	Registrar of Companies	Under Indian Companies Act, 1956
11 Rehabilitation & resettlement of families displaced by land acquisition	MoEF/State Govt.	
12 Hydro Project (Mini-Micro)	Ministry of Water Resources	Under Relevant Acts.
13 Equipment Procurement	DGTD/ CCI&E*	Import & Export Acts.
<b>Non Statutory Clearances</b>		
14 Land availability	State Govt.	
15 Fuel linkage	Dept. of Coal, Dept. of Petroleum & Natural Gas	
16 Financing	CEA, Dept. of Power, Dept. of Eco. Affairs, Financial Institutions	
17 Transportation of fuel	Dept of Coal, Min. of Petroleum & Natural Gas, Ministry of Railways, Shipping & Surface Transport	

Source: Infraline, Morgan Stanley Research

## Appendix 2: Supercritical Technology

Supercritical technology represents generation units having a capacity of 660 MW or 800 MW. The current generation units used in India are primarily 250 MW and 500 MW. Super critical technology has proven a success in developed nations such as Japan and Europe. In India, however, the technology has yet to gain ground. While the MoP is looking at increasing the use of supercritical units in India, we believe, the pace of introduction of these units may be slow. The UMPP process will be the first big step towards the introduction of both the 660 MW and 800 MW units in India.

### Advantages of Supercritical Technology

- **Higher efficiency:** With 800 MW supercritical units, it would be possible to achieve 4% more efficiency than with 500MW units.
- **Savings in fuel and emissions:** An 800 MW supercritical unit requires less fuel and hence the emission levels also come down.
- **Faster capacity addition:** The time required to set up such units is less – e.g., a 1,600 MW (2x800 MW) will take 42 to 45 months to set up as against 52 months and 51 months in case of 250 MW and 500 MW units, respectively, which are at present available in the country.
- **Cost savings due to economies of scale:** Economy of scale is obtained automatically, due to larger size of the units. Typically, to set up 4,000 MW unit capacity, eight units of 500 MW units currently have to be installed, whereas same capacity can be achieved by setting up five units of 800 MW each.
- **Greater operating flexibility:** 500 MW units are currently operating at constant pressure even during part-load

operation, which is resorted to during-off peak remote condition, especially during night time. Supercritical units have the capability to operate at lower pressure during part-load conditions, which results in fuel saving.

- **Faster start time:** From a cold start, it takes approximately 210 minutes for a sub-critical unit to reach synchronization from first firing, whereas with supercritical units the same can be achieved in approximately 100 minutes.

### Equipment Suppliers in India

BHEL, a public sector undertaking, is the primary equipment supplier in India for 250 MW and 500 MW units (in 1980s a Technology Transfer Agreement was signed with Siemens for turbo generators and combustion engineering for steam generators). Since the company does not have expertise in the supercritical segment, it has initiated a process of tying up with the following companies for technology transfer pertaining to the 800 MW unit:

- Siemens (Germany) for steam generators;
- Alstom (France) for boilers.

However, we believe that, going forward, power generation companies will not be under any compulsion to source equipment from BHEL since they will be allowed to call for competitive bids from global suppliers in an effort to achieve cost competitiveness. In some of the recent contracts for 660 MW units, BHEL lost out to Korean and Russian suppliers due to higher equipment costs, which stemmed from high import cost, high cost of technology and incremental cost of meeting guarantees.

**Appendix 3: Gas Supply Position in India**

mmscmd	F2005	F2006	F2007E	F2008E	F2009E	F2010E	F2011E	F2012E
Domestic Gas + LNG	88.8	104.2	106.7	117.2	135.1	223.3	304.7	322.5
Assumed GAIL's volume	71.56	78.87	79.72	84.87	87.87	107.87	107.9	107.9
% of total	80.5%	75.7%	74.7%	72.4%	65.0%	48.3%	35.4%	33.5%
Overall Domestic Gas	79.9	86.4	88.8	91.0	99.3	169.5	219.4	232.7
ONGC Domestic Gas	62.9	61.9	60.5	56.4	56.4	56.4	54.1	52.0
Joint Venture Gas	12.0	13.1	14.7	19.3	18.5	18.1	17.7	17.4
Panna/Mukta	3.8	3.8	3.6	3.4	3.2	3.0	2.8	2.6
Tapti	5.9	7.0	7.0	12.0	12.0	12.0	12.0	12.0
Ravva			1.9	1.7	1.1	0.9	0.7	0.7
Cairn - Lakshmi		1.4	1.4	1.1	0.9	0.5	-	
Cairn - Gauri		1.2	1.4	1.3	1.2	1.1	1.1	0.8
Niko - Hazira		3.5	3.5	3.5	3.5	3.5	3.5	
Niko - Bhira		0.4	0.4	0.4	0.4	0.4	0.4	
Reliance - KG Basin					4.9	40.0	80.0	95.0
Reliance - Orissa						1.2	4.6	9.4
Reliance CBM Blocks					0.5	3.2	13.0	13.0
OIL - North East	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
LNG Terminal gas mmscmd available	8.9	17.8	17.8	26.3	35.8	53.8	85.3	89.8
LNG Terminals gas mmscmd possible	8.9	25.0	25.0	34.0	53.8	65.1	85.3	89.8
LNG Terminals mntpa	2.5	7.0	7.0	9.5	15.0	18.1	23.7	25.0
Dahej (PLL)	2.5	5.0	5.0	5.0	5.0	7.5	10.0	10.0
Shell (Hazira)	-	2.0	2.0	2.5	5.0	5.0	5.0	5.0
Dabhol (GAIL)				2.0	5.0	5.0	5.0	5.0
Ennore (IOC)								
Mangalore (ONGC)								
Kochi (PLL)	-	-	-	-	-	0.6	3.8	5.0

Source: Company data, Morgan Stanley Research  
E= Morgan Stanley Estimates

## Disclosure Section

The information and opinions in this report were prepared or are disseminated by Morgan Stanley Dean Witter Asia Limited (which accepts the responsibility for its contents) and/or Morgan Stanley Dean Witter Asia (Singapore) Pte. (Registration number 199206298Z, regulated by the Monetary Authority of Singapore, which accepts the responsibility for its contents), and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H, regulated by the Monetary Authority of Singapore, which accepts the responsibility for its contents), and/or Morgan Stanley Taiwan Limited and/or Morgan Stanley & Co International Limited, Seoul Branch, and/or Morgan Stanley Dean Witter Australia Limited (A.B.N. 67 003 734 576, holder of Australian financial services license No. 233742, which accepts responsibility for its contents), and/or JM Morgan Stanley Securities Private Limited and their affiliates (collectively, "Morgan Stanley").

### Analyst Certification

The following analysts hereby certify that their views about the companies and their securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: Parag Gupta.

Unless otherwise stated, the individuals listed on the cover page of this report are research analysts.

### Global Research Conflict Management Policy

This research has been published in accordance with our conflict management policy, which is available at [www.morganstanley.com/institutional/research/conflictolicies](http://www.morganstanley.com/institutional/research/conflictolicies).

### Important US Regulatory Disclosures on Subject Companies

As of March 30, 2007, Morgan Stanley beneficially owned 1% or more of a class of common equity securities of the following companies covered in this report: Reliance Energy, Tata Power Co.

As of March 30, 2007, Morgan Stanley held a net long or short position of US\$1 million or more of the debt securities of the following issuers covered in this report (including where guarantor of the securities): Reliance Energy.

Within the last 12 months, Morgan Stanley managed or co-managed a public offering of securities of LANCO Infratech Ltd.

In the next 3 months, Morgan Stanley expects to receive or intends to seek compensation for investment banking services from Reliance Energy, Tata Power Co.

Within the last 12 months, Morgan Stanley & Co. Incorporated has received compensation for products and services other than investment banking services from Tata Power Co.

Within the last 12 months, Morgan Stanley has provided or is providing investment banking services to, or has an investment banking client relationship with, the following companies covered in this report: Reliance Energy, Tata Power Co.

Within the last 12 months, Morgan Stanley has either provided or is providing non-investment banking, securities-related services to and/or in the past has entered into an agreement to provide services or has a client relationship with the following companies covered in this report: Tata Power Co.

The research analysts, strategists, or research associates principally responsible for the preparation of this research report have received compensation based upon various factors, including quality of research, investor client feedback, stock picking, competitive factors, firm revenues and overall investment banking revenues.

Certain disclosures listed above are also for compliance with applicable regulations in non-US jurisdictions.

### STOCK RATINGS

Different securities firms use a variety of rating terms as well as different rating systems to describe their recommendations. For example, Morgan Stanley uses a relative rating system including terms such as Overweight, Equal-weight or Underweight (see definitions below). A rating system using terms such as buy, hold and sell is not equivalent to our rating system. Investors should carefully read the definitions of all ratings used in each research report. In addition, since the research report contains more complete information concerning the analyst's views, investors should carefully read the entire research report and not infer its contents from the rating alone. In any case, ratings (or research) should not be used or relied upon as investment advice. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations.

### Global Stock Ratings Distribution

*(as of March 31, 2007)*

For disclosure purposes only (in accordance with NASD and NYSE requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below). To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Underweight to hold and sell recommendations, respectively.

Stock Rating Category	Coverage Universe		Investment Banking Clients (IBC)		
	Count	% of Total	Count	% of Total IBC	% of Rating Category
<b>Overweight/Buy</b>	<b>843</b>	<b>38%</b>	<b>292</b>	<b>44%</b>	<b>35%</b>
<b>Equal-weight/Hold</b>	<b>991</b>	<b>45%</b>	<b>284</b>	<b>42%</b>	<b>28%</b>
<b>Underweight/Sell</b>	<b>364</b>	<b>17%</b>	<b>95</b>	<b>14%</b>	<b>26%</b>
<b>Total</b>	<b>2,198</b>		<b>671</b>		

Data include common stock and ADRs currently assigned ratings. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations. Investment Banking Clients are companies from whom Morgan Stanley or an affiliate received investment banking compensation in the last 12 months.

### Analyst Stock Ratings

Overweight (O or Over) - The stock's total return is expected to exceed the total return of the relevant country MSCI Index, on a risk-adjusted basis over the next 12-18 months.

Equal-weight (E or Equal) - The stock's total return is expected to be in line with the total return of the relevant country MSCI Index, on a risk-adjusted basis over the next 12-18 months.

Underweight (U or Under) - The stock's total return is expected to be below the total return of the relevant country MSCI Index, on a risk-adjusted basis, over the next 12-18 months.

More volatile (V) - We estimate that this stock has more than a 25% chance of a price move (up or down) of more than 25% in a month, based on a quantitative assessment of historical data, or in the analyst's view, it is likely to become materially more volatile over the next 1-12 months compared with the past three years. Stocks with less than one year of trading history are automatically rated as more volatile (unless otherwise noted). We note that securities that we do not currently consider "more volatile" can still perform in that manner.

Unless otherwise specified, the time frame for price targets included in this report is 12 to 18 months.

### Analyst Industry Views

Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index.

*Stock price charts and rating histories for companies discussed in this report are available at [www.morganstanley.com/companycharts](http://www.morganstanley.com/companycharts) or from your local investment representative. You may also request this information by writing to Morgan Stanley at 1585 Broadway, (Attention: Equity Research Management), New York, NY, 10036 USA.*

### Other Important Disclosures

For a discussion, if applicable, of the valuation methods used to determine the price targets included in this summary and the risks related to achieving these targets, please refer to the latest relevant published research on these stocks. Research is available through your sales representative or on Client Link at [www.morganstanley.com](http://www.morganstanley.com) and other electronic systems.

This report does not provide individually tailored investment advice. It has been prepared without regard to the individual financial circumstances and objectives of persons who receive it. The securities discussed in this report may not be suitable for all investors. Morgan Stanley recommends that investors independently evaluate particular investments and strategies, and encourages investors to seek the advice of a financial adviser. The appropriateness of a particular investment or strategy will depend on an investor's individual circumstances and objectives. The securities, instruments, or strategies discussed in this report may not be suitable for all investors, and certain investors may not be eligible to purchase or participate in some or all of them.

This report is not an offer to buy or sell or the solicitation of an offer to buy or sell any security or to participate in any particular trading strategy. The "Important US Regulatory Disclosures on Subject Companies" section lists all companies mentioned in this report where Morgan Stanley owns 1% or more of a class of common securities of the companies. For all other companies mentioned in this report, Morgan Stanley may have an investment of less than 1% in securities or derivatives of securities of companies mentioned in this report, and may trade them in ways different from those discussed in this report. Employees of Morgan Stanley not involved in the preparation of this report may have investments in securities or derivatives of securities of companies mentioned in this report, and may trade them in ways different from those discussed in this report. Derivatives may be issued by Morgan Stanley or associated persons.

Morgan Stanley and its affiliate companies do business that relates to companies covered in its research reports, including market making and specialized trading, risk arbitrage and other proprietary trading, fund management, commercial banking, extension of credit, investment services and investment banking. Morgan Stanley sells to and buys from customers the securities/instruments of companies covered in its research reports on a principal basis.



With the exception of information regarding Morgan Stanley, reports prepared by Morgan Stanley research personnel are based on public information. Morgan Stanley makes every effort to use reliable, comprehensive information, but we make no representation that it is accurate or complete. We have no obligation to tell you when opinions or information in this report change apart from when we intend to discontinue research coverage of a subject company. Facts and views presented in this report have not been reviewed by, and may not reflect information known to, professionals in other Morgan Stanley business areas, including investment banking personnel.

Morgan Stanley research personnel conduct site visits from time to time but are prohibited from accepting payment or reimbursement by the company of travel expenses for such visits.

The value of and income from your investments may vary because of changes in interest rates or foreign exchange rates, securities prices or market indexes, operational or financial conditions of companies or other factors. There may be time limitations on the exercise of options or other rights in your securities transactions. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. Unless otherwise stated, the cover page provides the closing price on the primary exchange for the subject company's securities.

To our readers in Taiwan: Information on securities that trade in Taiwan is distributed by Morgan Stanley Taiwan Limited ("MSTL"). Such information is for your reference only. The reader should independently evaluate the investment risks and is solely responsible for their investment decisions. This publication may not be distributed to the public media or quoted or used by the public media without the express written consent of Morgan Stanley. Information on securities that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities. MSTL may not execute transactions for clients in these securities.

To our readers in Hong Kong: Information is distributed in Hong Kong by and on behalf of, and is attributable to, Morgan Stanley Dean Witter Asia Limited as part of its regulated activities in Hong Kong. If you have any queries concerning this publication, please contact our Hong Kong sales representatives.

Certain information in this report was sourced by employees of the Shanghai Representative Office of Morgan Stanley Dean Witter Asia Limited for the use of Morgan Stanley Dean Witter Asia Limited.

This publication is disseminated in Japan by Morgan Stanley Japan Securities Co., Ltd.; in Hong Kong by Morgan Stanley Dean Witter Asia Limited (which accepts responsibility for its contents); in Singapore by Morgan Stanley Dean Witter Asia (Singapore) Pte. (Registration number 199206298Z) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H), regulated by the Monetary Authority of Singapore, which accepts responsibility for its contents; in Australia by Morgan Stanley Dean Witter Australia Limited A.B.N. 67 003 734 576, holder of Australian financial services licence No. 233742, which accepts responsibility for its contents; in Korea by Morgan Stanley & Co International Limited, Seoul Branch; in India by JM Morgan Stanley Securities Private Limited; in Canada by Morgan Stanley Canada Limited, which has approved of, and has agreed to take responsibility for, the contents of this publication in Canada; in Germany by Morgan Stanley Bank AG, Frankfurt am Main, regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin); in Spain by Morgan Stanley, S.V., S.A., a Morgan Stanley group company, which is supervised by the Spanish Securities Markets Commission (CNMV) and states that this document has been written and distributed in accordance with the rules of conduct applicable to financial research as established under Spanish regulations; in the United States by Morgan Stanley & Co. Incorporated, which accepts responsibility for its contents. Morgan Stanley & Co. International plc, authorized and regulated by Financial Services Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. Private U.K. investors should obtain the advice of their Morgan Stanley & Co. International plc representative about the investments concerned. In Australia, this report, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act.

The trademarks and service marks contained herein are the property of their respective owners. Third-party data providers make no warranties or representations of any kind relating to the accuracy, completeness, or timeliness of the data they provide and shall not have liability for any damages of any kind relating to such data. The Global Industry Classification Standard ("GICS") was developed by and is the exclusive property of MSCI and S&P.

Morgan Stanley has based its projections, opinions, forecasts and trading strategies regarding the MSCI Country Index Series solely on publicly available information. MSCI has not reviewed, approved or endorsed the projections, opinions, forecasts and trading strategies contained herein. Morgan Stanley has no influence on or control over MSCI's index compilation decisions.

This report or any portion hereof may not be reprinted, sold or redistributed without the written consent of Morgan Stanley.

Morgan Stanley research is disseminated and available primarily electronically, and, in some cases, in printed form.

**Additional information on recommended securities is available on request.**

**The Americas**

1585 Broadway  
New York, NY 10036-8293  
**United States**  
Tel: +1 (1) 212 761 4000

**Europe**

25 Cabot Square, Canary Wharf  
London E14 4QA  
**United Kingdom**  
Tel: +44 (0) 20 7 425 8000

**Japan**

4-20-3 Ebisu, Shibuya-ku  
Tokyo 150-6008  
**Japan**  
Tel: +81 (0) 3 5424 5000

**Asia/Pacific**

Three Exchange Square  
Central  
**Hong Kong**  
Tel: +852 2848 5200

**Industry Coverage:India Utilities**

<b>Company (Ticker)</b>	<b>Rating (as of)</b>	<b>Price (04/20/2007)</b>
<b>Parag Gupta</b>		
LANCO Infratech Ltd (LAIN.BO)	E-V (04/23/2007)	Rs145.70
NTPC (NTPC.BO)	E (04/23/2007)	Rs160
Reliance Energy (RLEN.BO)	O (04/23/2007)	Rs511.05
Tata Power Co (TTPW.BO)	O (04/23/2007)	Rs546.3

Stock Ratings are subject to change. Please see latest research for each company.