

# ***Challenges for Indian Power Market***

## **- What J-POWER will do for the future**

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**September 13, 2010**

**“Opportunities for Global Partnership  
between India and Japan**

**Infrastructure, the Environment, and Finance”**

**Seigou MIZUNUMA**

**Executive Director**

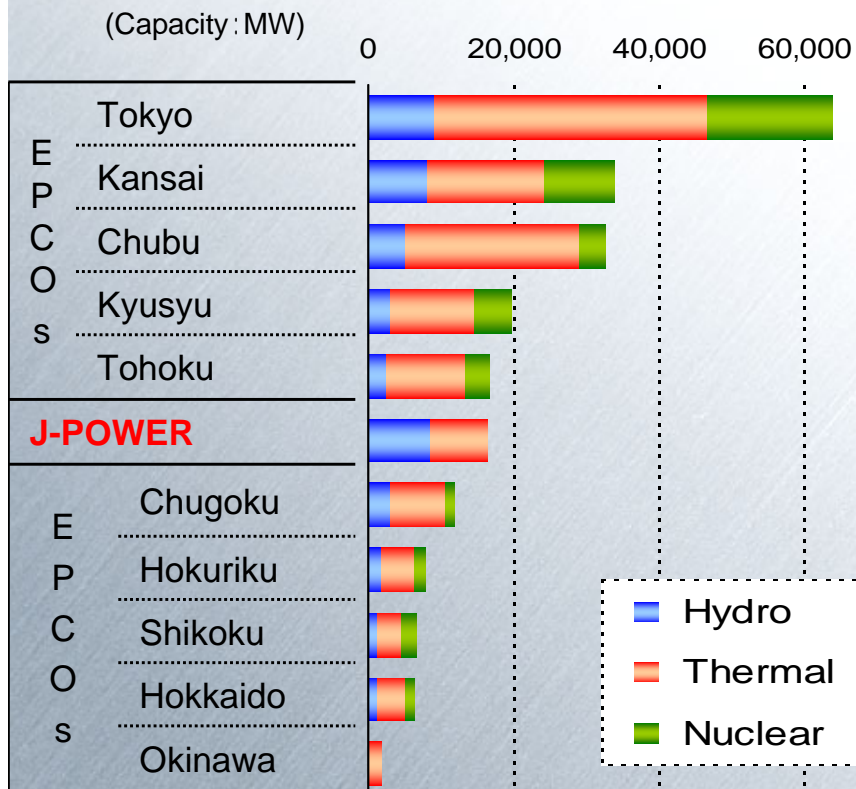
**J-POWER**

# 1. Profile of J-Power (in Japan)

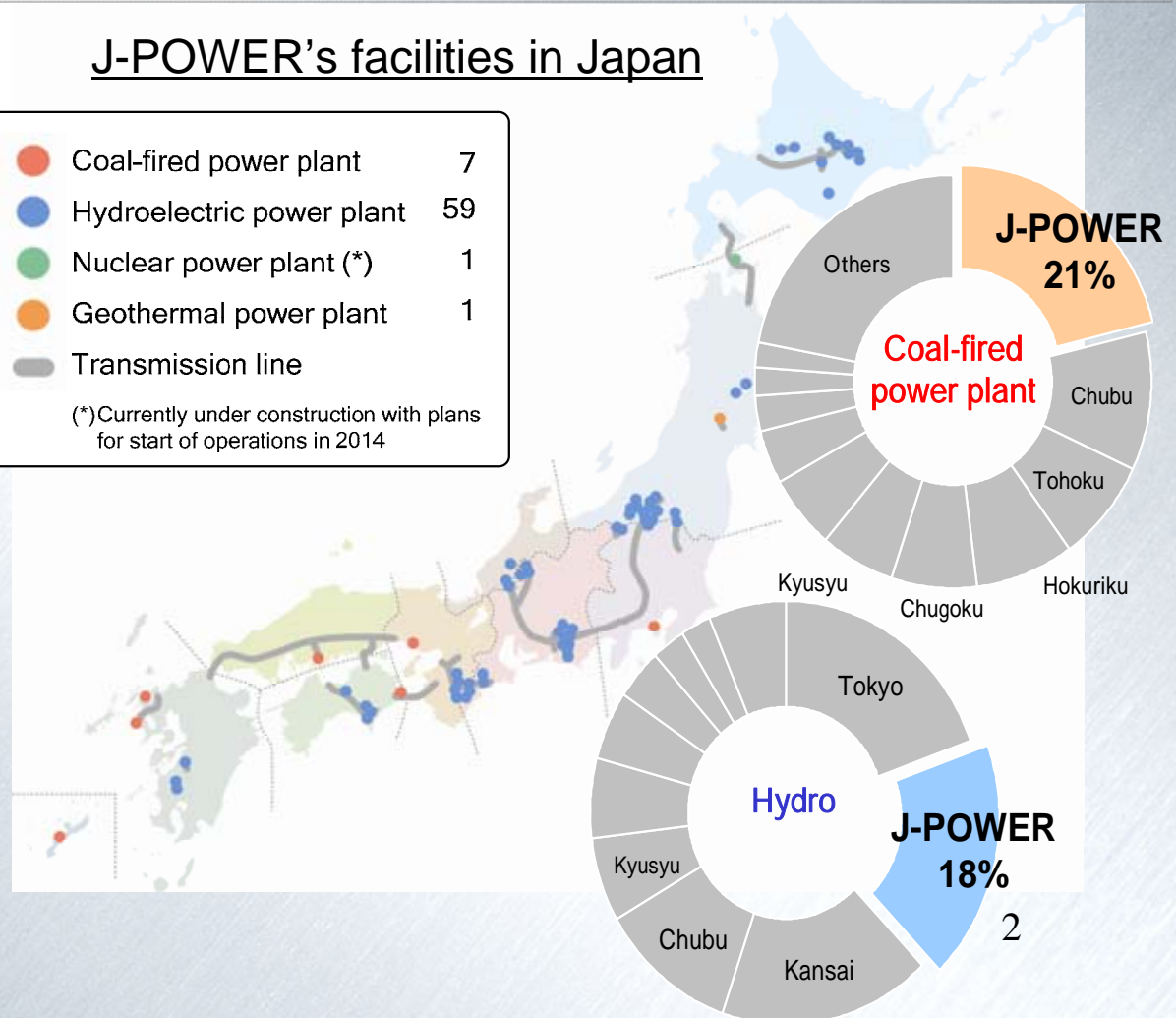
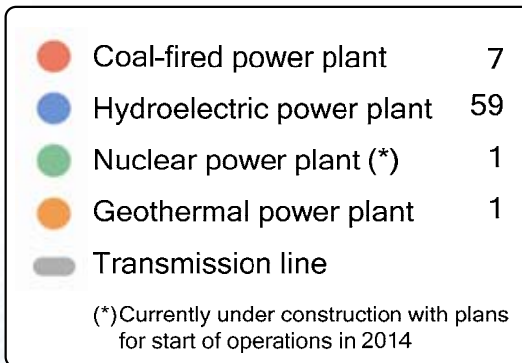


- ▶ Only one large-scale electric wholesaler– 6th largest in generation capacity (17GW)
- ▶ Established as SOE in 1952, but 100% privatized through IPO in 2004.
- ▶ In terms of generation capacity, largest for coal-fired (8.4GW), 2nd largest for hydro (8.6GW) and wind (269MW).
- ▶ Owner of transmission trunk lines 2,400 km that link Japanese electric power networks

## Major electric power companies in Japan



## J-POWER's facilities in Japan



Note: As of March 31, 2009

# 1. Profile of J-POWER (in Japan)



## Location of Coal-fired power plant in Japan

**Takehara**  
1# 250MW(1967)  
2# 350MW(1995)  
3# 700MW(1983)



**Takasago**  
1# 250MW(1968)  
2# 250MW(1969)

**Ishikawa**  
1# 156MW(1986)  
2# 156MW(1987)



**Matsuura**  
1# 1,000MW(1990)  
2# 1,000MW(1997)



**Matsushima**  
1# 500MW(1981)  
2# 500MW(1981)



**Isogo**  
New 1# 600MW(2002)  
New 2# 600MW(2009)



**Tachibanawan**  
1# 1,050MW(2000)  
2# 1,050MW(2000)

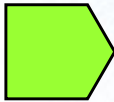
# Cf. Isogo Power Plant (Typical Project applying latest USC technology)



**Isogo Coal-Fired Power Plant**  
commissioned in 1967



**New Isogo Coal-Fired Power Plant**  
**Unit #1** in 2002 and **Unit#2** in 2009



- 3 objectives**
- ◆ Repowering
  - ◆ Cleaner Environment
  - ◆ Efficiency Improvement

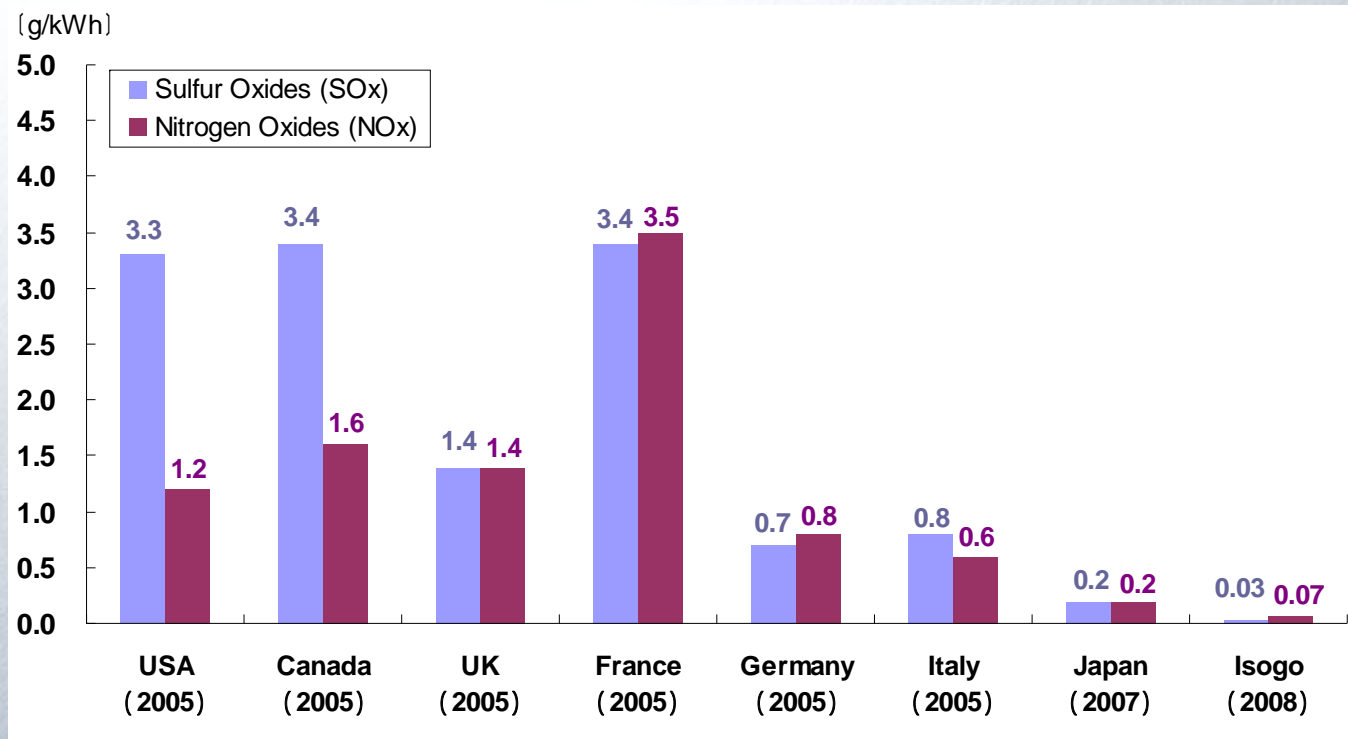
Generation Capacity	530MW (264MW × 2 units)	➔	1200MW (600MW × 2 units)
SOx	60ppm	➔	10ppm (20)
NOx	159ppm	➔	13ppm (10)
PM	50mg/m <sup>3</sup> N	➔	5mg/m <sup>3</sup> N (10)
Steam Condition	<b>Sub Critical</b>	➔	<b>Ultra Super Critical</b>
Efficiency (gross %LHV)	40%	➔	45%
CO2 emission intensity (Net)	<b>100</b> (base)	➔	<b>83</b>

Numbers in ( ) are for Unit #1

## 1. Environment protection measures

SOx and NOx are also important to improve the air quality in India.

The emissions levels in Japan are much lower than other developed countries.



Source : Federation of Electric Power Companies, Japan (and actual data for Isogo)

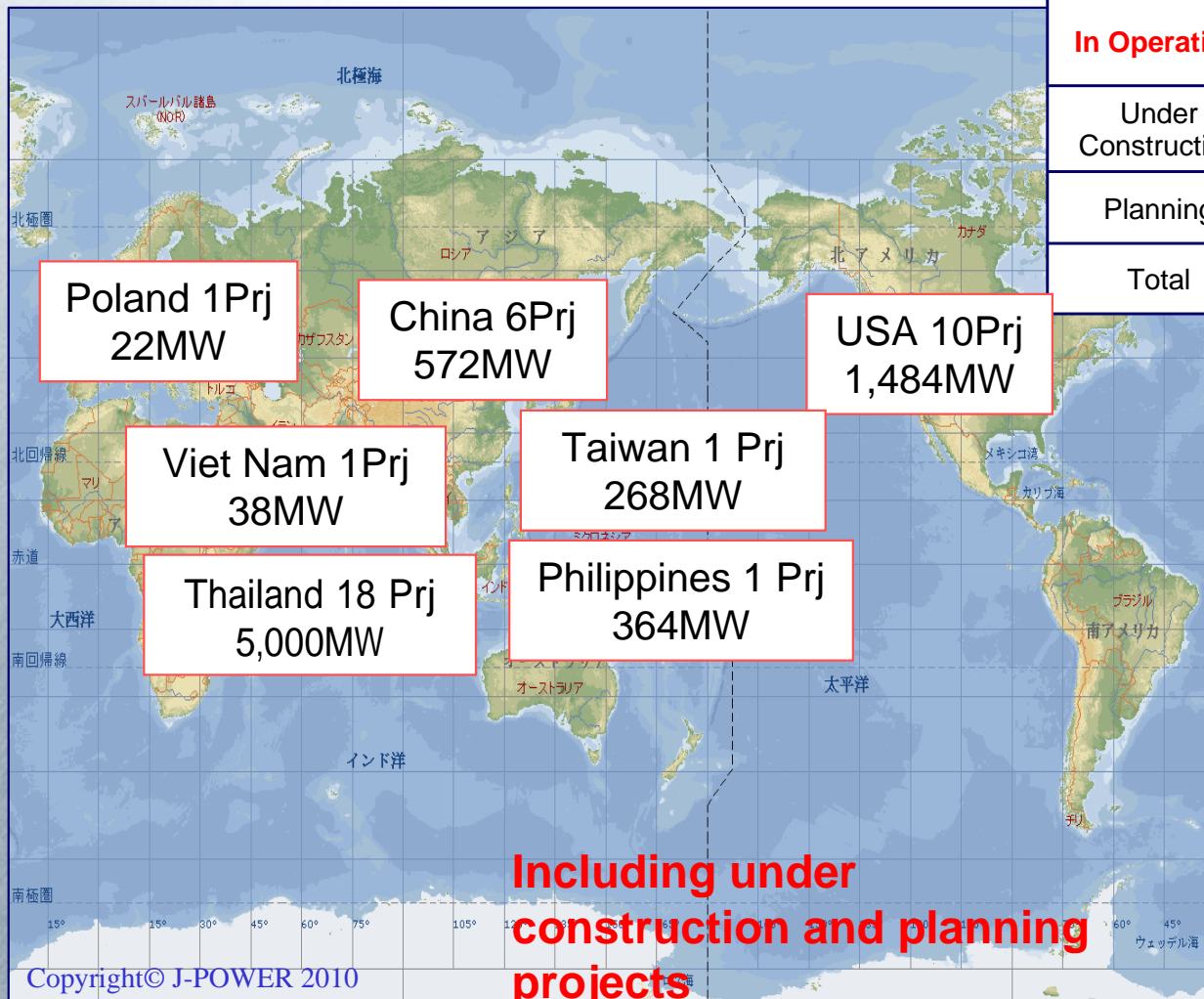
The following equipments can mitigate SOx and NOx emissions;

- Wet type desulfurization equipment
- Dry type desulfurization equipment (**J-POWER En Tech Inc.**)
- Ammonia selective catalytic reduction process

# 1 Profile of J-POWER (Overseas)

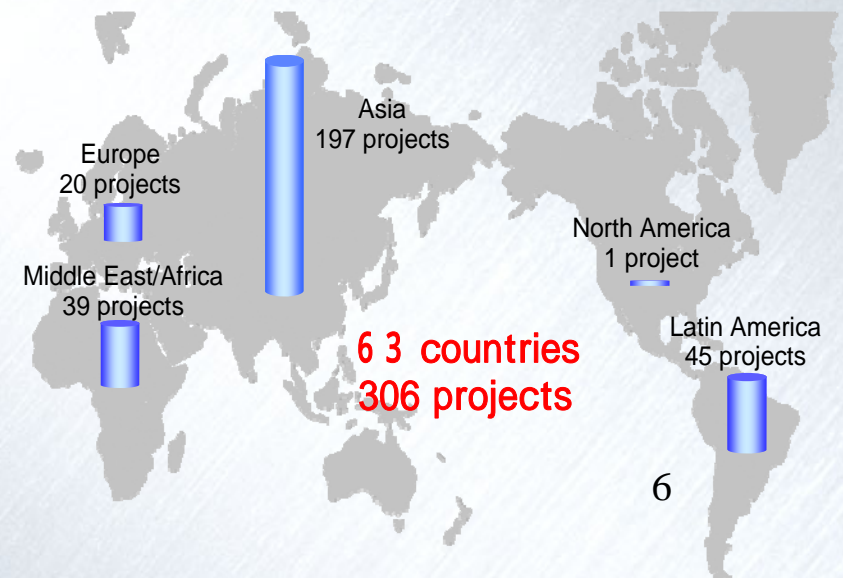
- ▶ Since 1960s, J-POWER has provided consulting services for 306 projects in 63 countries.
- ▶ J-POWER is aggressively promoting overseas power generation business (IPP) in the key markets of Asia and USA (6 countries, 25 projects, 3.5GW in operation)

## Power Generation Business (IPP)

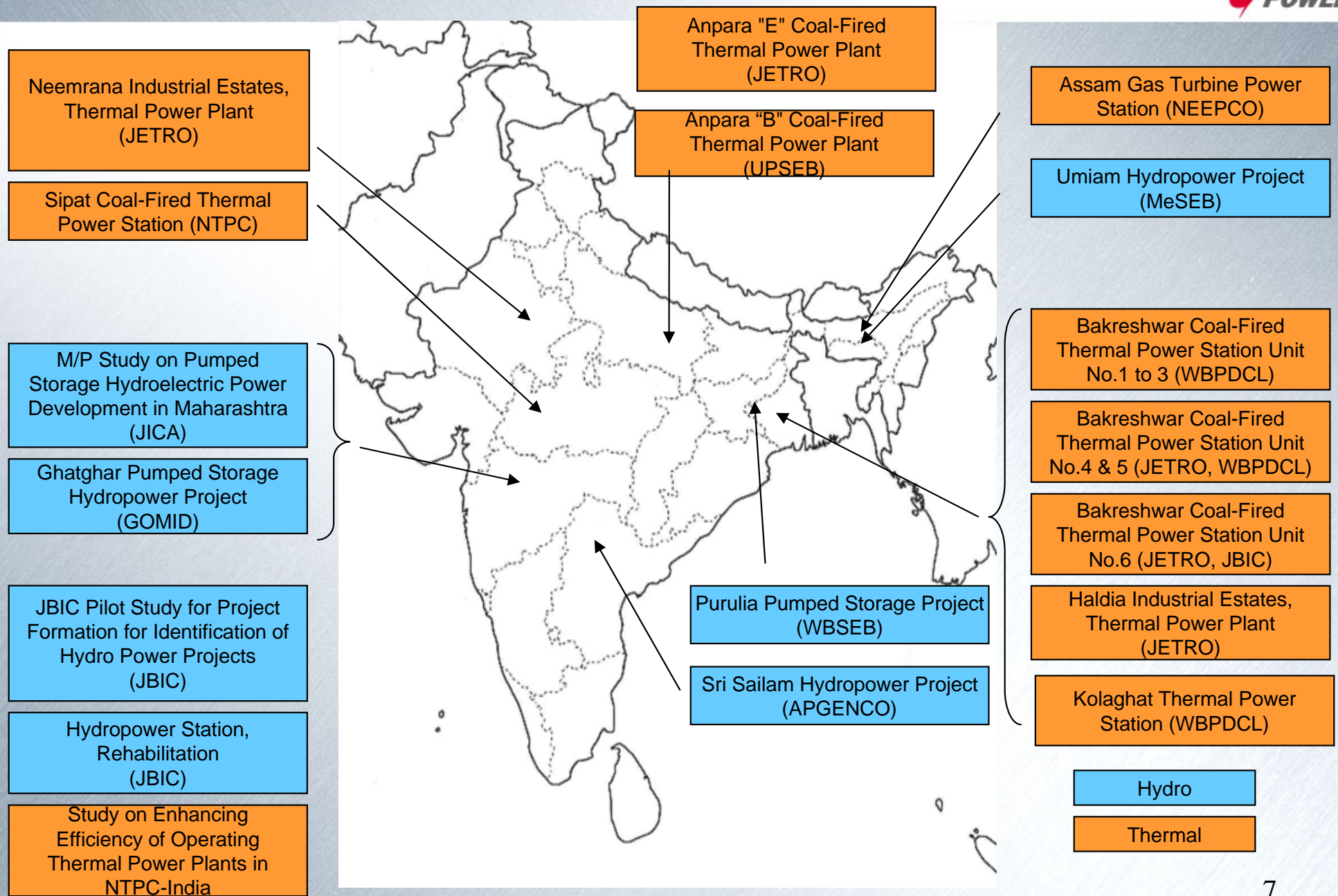


Status	IPP Project No.	Electricity Output	Owned Capacity
In Operation	6countries 25 Projects	13,870MW	3,493MW
Under Construction	3countries 4 Projects	1,775MW	271MW
Planning	1 country 9 Projects	3,980MW	3,980MW
Total	7countries 36 Projects	19,625MW	7,744MW

## Engineering Consulting Business



# 1 Profile of J-POWER (In India) Track Record of Consulting Business



# 1 Profile of J-POWER (In India)



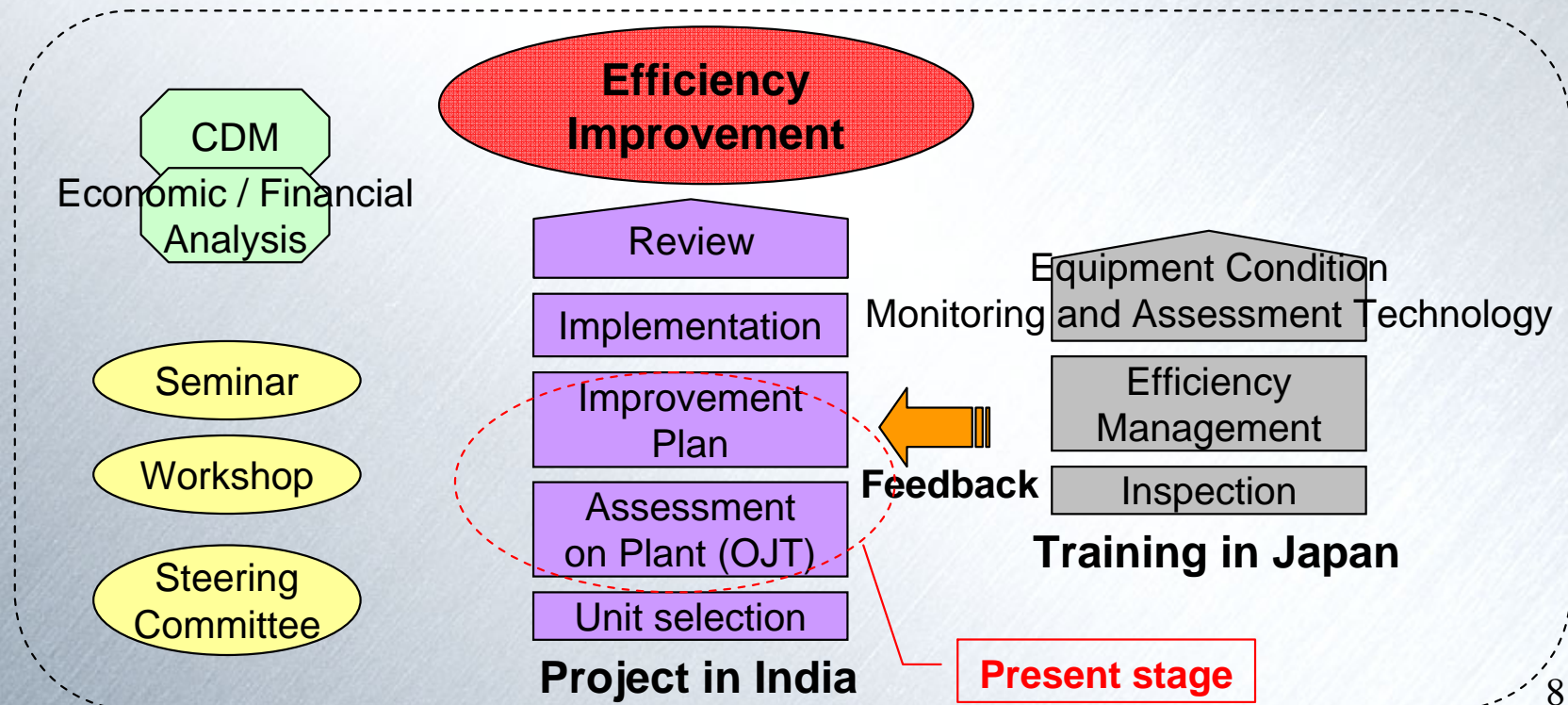
**Selected 5 Units**  
Korba #6 (Chatisgar)  
Singrauli #4, #6 (UP)  
Rihand #2, #3 (UP)  
Vindhyachal #7 (MP)  
Unchahar #3 (UP)

## Recent Activities in India

### 1) Study on Enhancing Efficiency of NTPC Coal-fired Power Plants

- a) Scheme : JICA Technical Cooperation  
[**J-POWER (Leader)**, KYUSHU\*1, CHUGOKU\*2]
- b) Period : Dec/2008-Oct/2010
- c) Counter Part : Ministry of Power, NTPC
- d) Project overview

\*1 KYUSHU :  
(Kyushu Electric Power Co., Inc)  
\*2 CHUGOKU :  
(The Chugoku Electric Power Co., Inc)





# ***1 Profile of J-POWER (In India)***



## **Recent Activities in India (continued)**

### **2) Consulting for Bakreswar Coal-fired Power Plant (West Bengal State)**

**a) Client : WBPDC (West Bengal Power Development Corporation)**

**5x210MW Coal-fired Power Plant**

**b) Scope : FS, BD (Basic Design), DD (Definite Design), SV**

**c) Period : 1995- 2009**

### **3) Consulting for Puluria Hydro Pumped Storage Power Plant (West Bengal State)**

**a) Client : WBSEB (West Bengal State Electricity Board)**

**4x225MW Hydro pumped Storage Power Plant**

**b) Scope : FS, BD, DD, SV**

**c) Period : 1990-92, 1995-2008**

### **4) Consulting of Sipat Coal-fired Power Plant (MP state)**

**a) Client : NTPC, 3x660MW Coal-fired Power Plant**

**(1st Supercritical Power Plant in India)**

**b) Scope : FS, BD**

**c) Period : 1998-2003**

***Active in India for more than 20 years***

## 2. Investing in Indian Power Sector (No.1)



### [Opportunities]

#### 1.Chronic Shortage of Electric Power

#### 2.High Growth Potential for Electric Power Sector in a longer perspective

Item	India	China	Japan
Capacity (GW)	159 (March,2010)	793 (2008)	263 (2008)
GDP per capita (PPP)	2,762US\$	5,962US\$	34,115US\$
Population (2008)	1.2 billion	1.35 billion	0.13 billion

- Growth of Power Demand: **6.4%** (past 10 year average) Source : IEA World Energy Outlook 2009,etc.
- 11th Five-Year-Plan(2007-2011): **62.4GW** planned to be developed (about 1/4 of Japan)

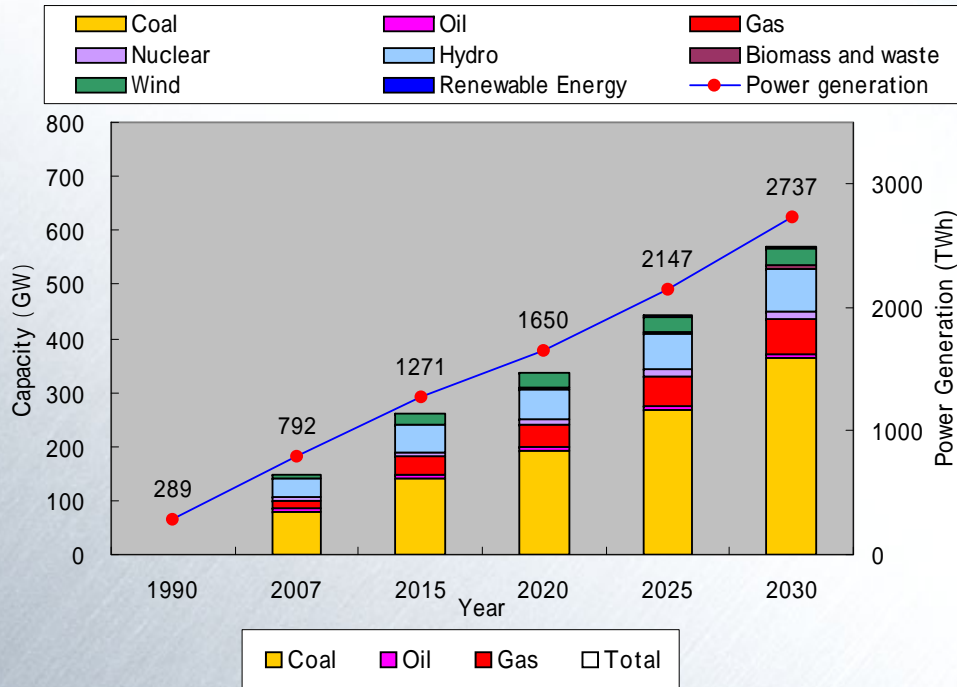
#### 3 . Dominance of Coal-fired Generation (**68%** of total amount of electricity generated)

- Market trend of Coal-fired P/P : leaning to technologies of higher efficiency and clean coal firing.

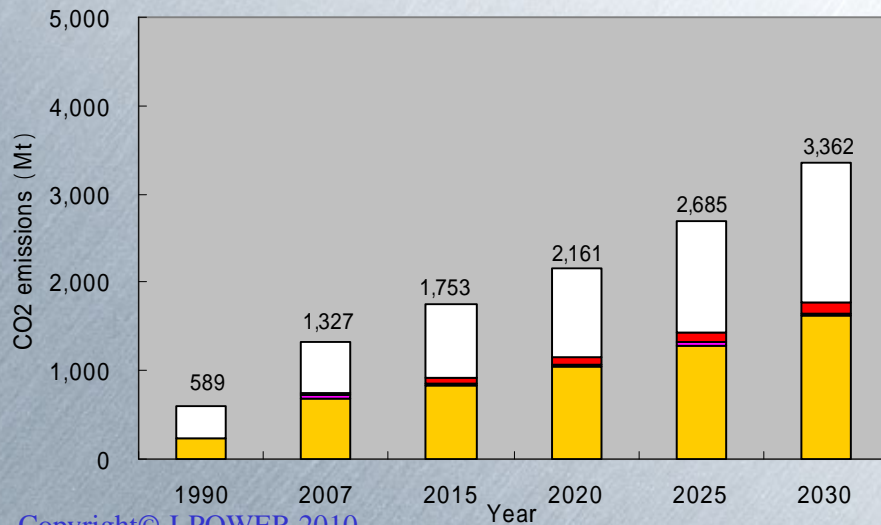
**“Large-scale Electric Power Development Plan” and “Bulk Order for Super-Critical Units”**

# Cf. Coal for Power Generation in India

## Future prospects



- India will continue to depend on coal to meet strong growth of power demand.
- Capacity of coal-fired plants will grow drastically from **78GW** in 2007 to **364GW** in 2030. **(4.7 times)**
- Accordingly, CO2 emission from coal-fired plants is increasing from **0.7 billion ton** in 2007 to **1.6 billion ton** in 2030. **(2.3 times)**



- Coal-fired plants are still a major source of CO2 emission  
 Govt is committed to a CO2 reduction target (i.e., 20-25% reduction per unit of GDP by 2020 over 2005)

*high efficiency coal-fired plants need to be installed.*

## 2. Investing in Indian Power Sector (No. 2)



### 4 . Participation of Japanese Heavy Electric Machinery Manufactures in Indian equipment supply market (JV with local partners)

Acceleration of local sourcing of reliable and affordable equipments for high-efficient Coal-fired P/P.

*India offers unique opportunities for J-POWER to take advantage of its experience and expertise accumulated over long time and world-wide, especially in the field of Clean Coal and Clean Air technologies.*

*Pursuing them is just in line with the Japanese Government's New Growth strategy.*

## 2. Investing in Indian Power Sector (No.3)



### [Challenges]

#### 1. Very limited foreign investment in Indian power sector

- More than 80% of generation capacity is owned by national or state companies.
- IPPs account for only 15% and dominated by Indian capital.  
(e.g. Tata and Reliance successfully won 4000MW-class Ultra Mega Power Project bids)

#### 2. Weak financial strength of off takers

- Inappropriate cost-benefit sharing of electricity tariff (Cross subsidies among customers, setting low-price for agricultural users)
- Transmission and distribution loss (Aggregate Technical and Commercial Losses) is still almost **30% !**
- After enactment of the Indian Electricity Act 2003, financial standing of Discoms in some states has improved owing to unbundling of electricity authorities, introduction of Multi-Year-Tariff approval system, e.t.c.

## 2. Investing in Indian Power Sector (No.4)



### 3 . Land Acquisition and local environmental issues

**Local partner's role is important !**

### 4 . **Complicated systems** (Power trading, domestic coal procuring, etc.)

**Power Market system is too much complicated and increases risk profile for foreign investors.**

**e.g., Intra and Inter state power supply, short term, middle term and long term power supply, Multiple or Bilateral power supply, power transaction in Merchant Power Market, Automatic Settlement Mechanism for the gap of power Supply and Demand, etc**

### 5. Complicated legal systems(wide-range operation of general rules and guideline,etc)

***Unique features of Indian market: Important to accumulate experiences and knowledge***

## 2. Investing in Indian Power Sector (No.5)



### **[Going Forward]**

***Indian power sector has developed and is developing rapidly, but still dominated by Indian players, and failed to attract foreign capital and finance as it should have.***

***There still remains a gap between Indian policy makers and foreign investors and financial institutions on the perception of Indian power market and its business environment.***

***Indian power market is simply too huge to be invested and financed by Indian players alone. At the same time, India is a core market for the Japanese government's New Growth Strategy.***

***Indian side should not stick to the recent success stories alone and listen to foreign parties as well. Policy discussions between Indian policy makers and Japanese counterpart is necessary. I welcome JBIC to play a leading role in them.***



**Thank you**

**End**

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