

# Energy and Power Investment Opportunities in Asia

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# 2008 – The Year In Review

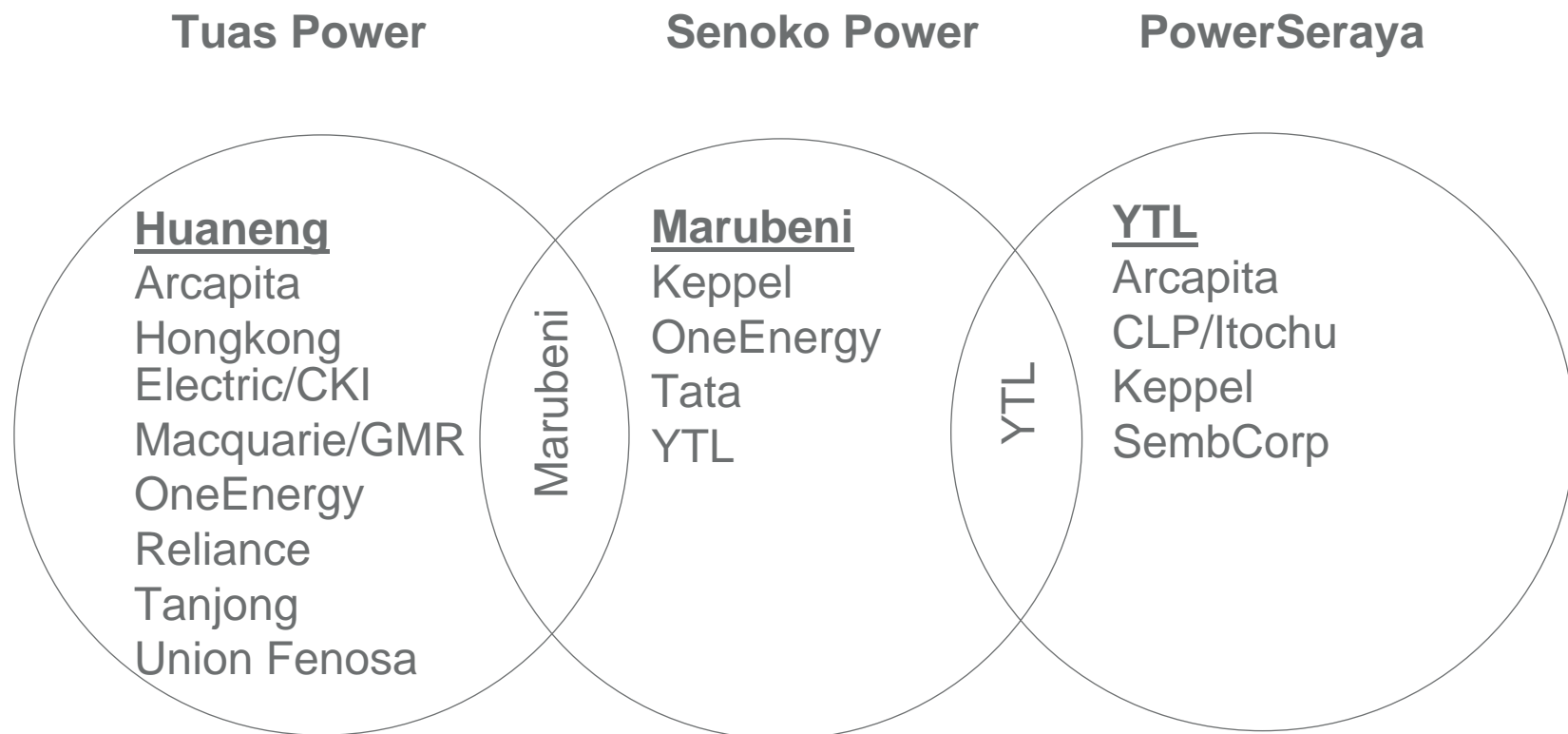


2008 was a banner year in Asia for the divestment – and privatization – of power assets in Asia. In just Singapore alone, no fewer than 17 power companies examined the Singapore gencos, three of which produced more than \$8 billion in proceeds for Temasek:

| Genco        | Price                                    | Capacity | Acquirer  |
|--------------|--|----------|---|
| Tuas Power   | \$3.07 billion                           | 2,670 MW | Huaneng   |
| Senoko Power | \$2.58 billion<br>+ \$228 million (debt) | 3,300 MW | Marubeni (30%), Suez (30%),<br>Kansai (15%), Kyushu (15%), and JBIC (10%) |
| PowerSeraya  | \$2.4 billion<br>+ 131 million (debt)    | 3,100 MW | YTL   |

# Singapore Gencos

## Who were the bidders?



# Singapore Gencos Post-closing Transactions



| Transaction              | Loan Amount    | Tenor    | Banks   | Timing            |
|--------------------------|----------------|----------|---|-------------------|
| Tuas Power Refinancing   | \$1.63 billion | 18-month | Original Banks: BNP, Calyon, DBS, Fortis, OCBC and SMBC                         | 2Q 2009           |
| Senoko Power Bridge Loan | \$2.03 billion | 18-month | Lead Banks: ANZ, BTMU, DBS, Dexia, Dresdner, KBC, Mizuho, Natixis, OCBC and RBS | 1st 2009 selldown |

# India – “Power for All” by 2012

## Mundra Ultra Mega Power Plant Program



Accolades showered Tata Power's \$4.256 billion 4,000 MW coal-fired Mundra UMPP Project, to be constructed on a BOT basis.

Especially significant for the Indian power sector was the return of foreign lenders, which shunned India power deals following the Dabhol saga in the late 1990s. International financial institutions and multilaterals such as the Asian Development Bank, the International Finance Corp., The Import and Export Bank of Korea and BNP Paribas participated in the \$3.3 billion debt financing, of which \$1.46 billion was Rupee-denominated.

For the project, Tata Power secured its own coal supply and as such, took a 30% stake in Bumi Resources of Indonesia.

# The Philippines – National Transmission Corporation (Transco)

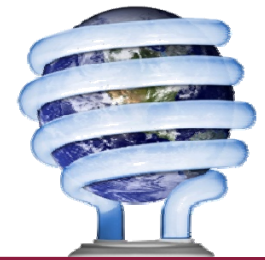


Comprised of State Grid Corporation of China, Monte Oro Grid Resources Corp. and Calaca High Power Corp., National Grid Corporation of the Philippines (NGCP) secured the franchise approval from the Philippine Congress in December 2008 to operate Transco under a 25-year concession. NGCP won the concession in late 2007 with an offer to PSALM of \$3.9 billion.

A \$1 billion downpayment has been made with the remainder to be paid through the life of the concession. Monte Oro is currently seeking a \$300 million loan from local and foreign banks to fund the acquisition.

# Energy and Power Opportunities in 2009

## British Gas



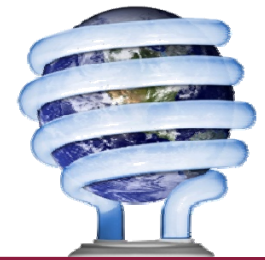
The long-anticipated divestment of 3.0 GW of global power assets beckons, complementing the current auction of 1.2 GWs in the United States. BG seeks to prop up its balance sheet after a \$4.4 billion of gas acquisition in Australia.

In Asia, the BG assets are as follows:

- a 40% stake in the companion 1,000 MW Santa Rita and 500 MW San Lorenzo power stations in the Philippines
- a 20% stake in the Genting Sanyen 760 MW combined cycle gas power station in Malaysia

Note: First Gen is seeking a 40% partner in its Red Vulcan Holdings Corp., which acquired a 60% stake in PNOC Energy Development Corporation, a leading geothermal power producer.

# CITIC Pacific PRC Power Portfolio



After suffering \$1.9 billion in wrong-way bets on the Australia dollar last year, CITIC Pacific has commenced the first in a possible series of divestments of its assets with the \$290 million sale of a 20% stake in North United Power Corp. to Guangdong Yudian Group. The power company operates 12.54 GWs of coal-fired power in Inner Mongolia. In early May 2009, CITIC Pacific continued its divestment of non-core assets by selling its stake in China Railway Construction for HK\$230 million via a private placement.



# CITIC Pacific PRC Power Portfolio



Possible solicitations for the following:

| Name           | Location               | Capacity   | Fuel | Ownership                                |
|----------------|------------------------|------------|------|--|
| Ligang         | Wuxi, Jiangsu          | 2,700 MW   | coal | 65% of Phases I and II, 71% of Phase III |
| Hanfeng        | Handan, Hebei          | 2 x 660 MW | coal | 15%                                      |
| Huai Bei       | Huai Bei, Anhui        | 650 MW     | coal | 12.5%                                    |
| Kaifeng        | Kaifeng, Henan         | 125 MW     | coal | 50%                                      |
| Zhengzhou      | Zhengzhou, Henan       | 1,000      | coal | 50%                                      |
| Inner Mongolia | Hohhot, Inner Mongolia | 2 x 200 MW | coal | 35%                                      |
| Weihai         | Weihai, Shangdong      | 36 MW      | coal | 49%                                      |
| Chenming       | Shouguang, Shandong    | 24 MW      | coal | 49%                                      |

# Babcock and Brown Infrastructure Asset Sales



No fewer than four asset sales are currently being conducted by Babcock and Brown Infrastructure, including:

- Dalrymple Bay Coal Terminal – Acquired in 2002, DBCT is one of the world's largest coal terminals @72 m+pa (Queensland) (Macquarie advising)
- PD Ports – Binding offers by 2Q or 3Q 2009 (Dresdner/RBS)
- Euroports – Closing by end of 2Q 2009
- WestNet Rail – Ongoing discussions with interested parties. End of 4Q 2009 closing

# AES DevCo

## A 24,000 MW Development Pipeline



In early 2009, Credit Suisse initiated the process for AES DevCo – an opportunity to joint venture with AES on projects in 15 jurisdictions. AES DevCo is somewhat similar to the Globeleq portfolio except that AES did not contribute any operating assets to the development portfolio.

In Asia, the pipeline includes these jurisdictions:

| Country        | Capacity | Fuel  |
|----------------|----------|-------|
| China          | 427 MW   | Hydro |
| Vietnam        | 1,200 MW | Coal  |
| India/Pakistan | 3,600 MW | Coal  |
| Australia      | 400 MW   | Coal  |

# Indonesia's Power System Development Plan, 2009-2018



PT Perusahaan Listrik Negara (Persero) (PLN) has completed its 10-year power plan and has arrived at the following conclusions:

- 1) to match an electricity demand growth of 9.69% per annum, the power sector requires a 5.7 GW expansion/year on average
- 2) coal-fired power stations will be the most prominent fuel type
- 3) RE will take more prominence, especially geothermal power
- 4) IPP projects total 22.2 GW
- 5) PLN's Projects total 35.2 GW in the next decade

# Indonesia's Power System Development Plan, 2009-2018



## ORIGINAL VERSION

| OWNER                  | TYPE          | 2010       | 2011         | 2012         | 2013         | 2014         | TOTAL         |
|------------------------|---------------|------------|--------------|--------------|--------------|--------------|---------------|
| PLN                    | Geothermal PP |            | 100          | 160          | 205          | 190          | 655           |
|                        | HEPP          |            |              | 174          |              |              | 174           |
|                        | CCPP          | 80         | 310          | 1,050        |              |              | 1,440         |
|                        | Coal STPP     | 17         | 787          | 1,956        | 2,206        | 414          | 5,380         |
| <b>Sub Total PLN</b>   |               | <b>97</b>  | <b>1,197</b> | <b>3,340</b> | <b>2,411</b> | <b>604</b>   | <b>7,649</b>  |
| IPP                    | Geothermal PP |            | 20           | 365          | 470          | 615          | 1,470         |
|                        | Coal STPP     | 56         | 114          | 66           |              | 2,000        | 2,236         |
| <b>Sub Total IPP</b>   |               | <b>56</b>  | <b>134</b>   | <b>431</b>   | <b>470</b>   | <b>2,615</b> | <b>3,706</b>  |
| <b>Total PLN + IPP</b> |               | <b>153</b> | <b>1,331</b> | <b>3,771</b> | <b>2,881</b> | <b>3,219</b> | <b>11,355</b> |

Source: Original RUPTL 2009-2018

# Indonesia's Power System Development Plan, 2009-2018



## PROPOSED VERSION

| OWNER                  | TYPE          | 2009       | 2010       | 2011         | 2012         | 2013       | 2014         | TOTAL        |
|------------------------|---------------|------------|------------|--------------|--------------|------------|--------------|--------------|
| PLN                    | Geothermal PP |            | 5          | 108          | 365          | 185        | 305          | 968          |
|                        | HEPP          |            |            |              | 174          |            | 1,000        | 1,174        |
|                        | CCPP          |            | 80         | 310          | 1,050        |            |              | 1,440        |
|                        | Coal STPP     |            | 17         | 787          | 956          | 206        | 414          | 2,380        |
| <b>Sub Total PLN</b>   |               |            | <b>102</b> | <b>1,205</b> | <b>2,545</b> | <b>391</b> | <b>1,719</b> | <b>5,962</b> |
| IPP                    | Geothermal PP | 117        | 65         | 50           | 663          | 555        | 2,315        | 3,765        |
|                        | Coal STPP     |            | 56         | 114          | 66           |            |              | 236          |
| <b>Sub Total IPP</b>   |               | <b>117</b> | <b>121</b> | <b>164</b>   | <b>729</b>   | <b>555</b> | <b>2,315</b> | <b>4,001</b> |
| <b>Total PLN + IPP</b> |               | <b>117</b> | <b>223</b> | <b>1,369</b> | <b>3,274</b> | <b>946</b> | <b>4,034</b> | <b>9,963</b> |

\* As Proposed in Limited Cabinet Assembly (21/01/09)

# Macquarie International Infrastructure Fund Miaoli Wind Co., Ltd.



- Macquarie seeks to divest its 100% stake in Miaoli Wind, a 49.8 MW wind power project on two sites in Miaoli County, Taiwan
- Asset highlights:
  - 15-year PPA with a 5-year renewal
  - PPA tariff of NT\$2/kWh (6 cents) fixed by Taiwan Power Company
  - O&M by Enercon GmbH
  - O&M term: 12-year fixed fee contract with 3-year renewal option
  - Turbine availability guaranteed at 97 percent
  - Valuation of S\$23.9 million (as of December 31, 2008)
  - Net debt of S\$85.8 million with no significant debt repayments due until 2012

# Mongolia

## Oyu Tolgoi and Tavan Tolgoi

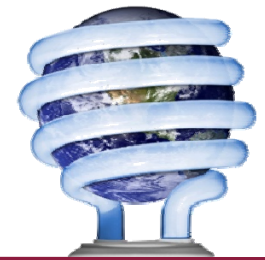


- Oyu Tolgoi (“OT”) – a \$3 billion copper and gold mining project Ivanhoe Mines and Rio Tinto. Development costs may exceed \$7 billion
- Tavan Tolgoi (“TT”) – Described as the world’s largest undeveloped coal field (estimated at 6 billion tons), TT will yield massive coal deposits as well as the potential for large electricity-by-wire power stations
- Several issues have delayed OT, as well as other mega mining projects. These issues include:
  - 1) the level of Mongolian Government ownership
  - 2) taxation issues
  - 3) infrastructure

A 2006 law stipulates that the State share up to 34 percent of deposits found with private funds and up to 50 percent of those discovered with State funds



# China's First Experimental Solar Thermal Power plant



- Construction has begun on Asia's first solar thermal power plant at Dahan, a suburb of Beijing not far from the Great Wall. The Dahan solar project will feature:
  - a 1.5 MW power plant (designed by the Chinese Academy of Sciences). The output from the Dahan plant is expected to be increased to 5-10 MW by 2015
  - a total investment of 100 million yuan (US\$14.7 million)
  - offtake will provide power to 30,000 households by 2010
  - the plant will cover an area the size of 10 football pitches, or 0.13 square km
  - unlike photovoltaic solar panels, which produce electricity directly from sunlight, solar-thermal power is based on an array of mirrors that focus the Sun's rays onto a receiver
- The National Development and Reform Commission has decided that China will build at least 150 MW of solar-thermal power generating capacity by 2015

# The Irony that is India

## India's Power Dilemma



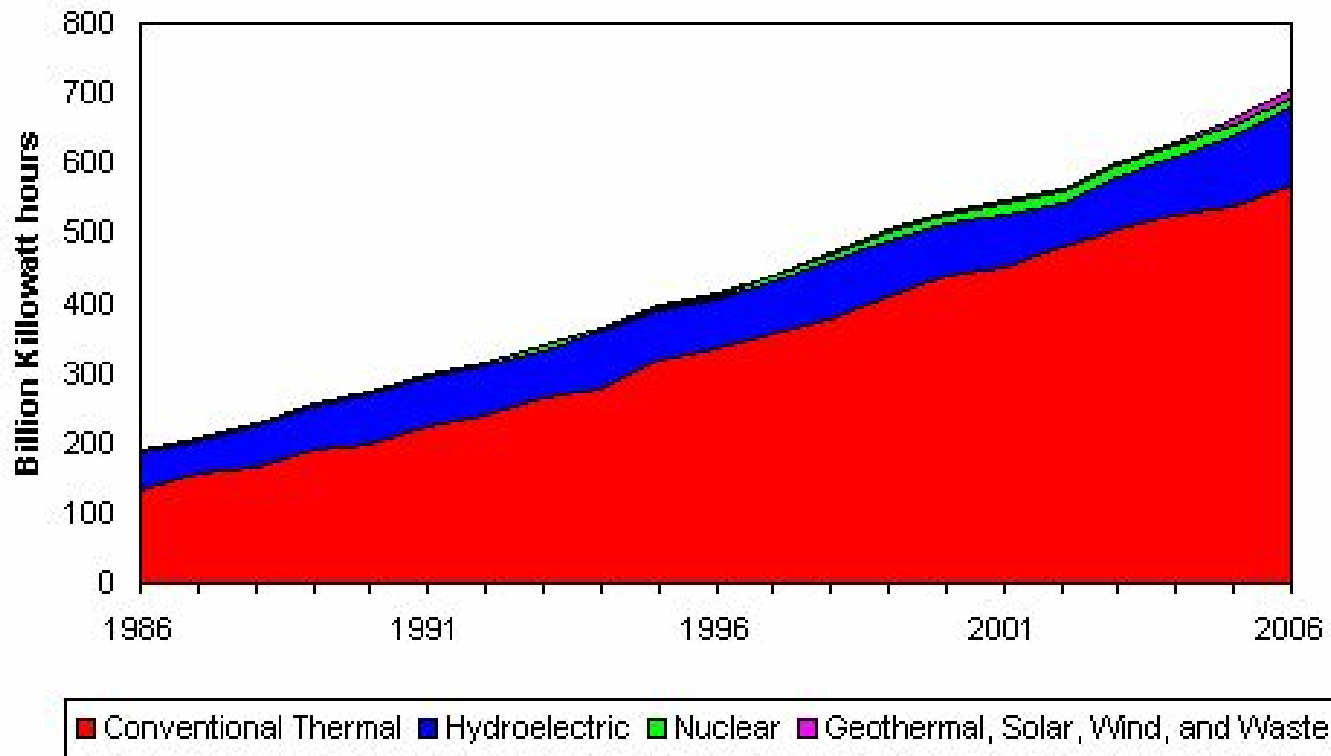
- India sought to complete 78,000 MW of new capacity between 2007 and 2012, but progress thus far has been spotty. Only 4,900 MW of the planned 11,000 MW came online in 2008-2009
- Although overall power generation in India has increased significantly, as shown by the following chart, significant capacity has stayed unused because of problems with the supply of coal, gas and uranium

# The Irony that is India

## India's Power Dilemma (Cont'd)



**Electricity Generation by Type, India  
1986-2006**



Source: 2009 NewsBase Ltd.

# The Irony that is India

## India's Power Dilemma (Cont'd)

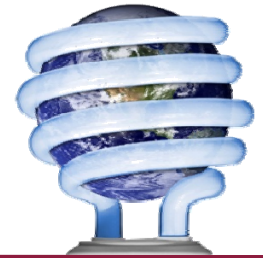


- Fuel Shortages

- A significant portion of India's 147,000 MW of installed capacity is idle, as a result of fuel shortages with coal, gas and uranium supplies, which cause outages and load shedding across nearly all states
- Coal-based power generation comprises 76,000 MW, much of which suffers from a massive coal shortage. Most utilities, including the flagship National Thermal Power Corporation, currently import coal
- Gas-fired projects, with a nationwide capacity of 14,600 MW, have been operating at a load factor of around 52% because of feedstock shortages
- In the 4,120-MW nuclear sector, the load factor has dipped under 50%, as uranium mining has decreased

# India

## Coalbed Methane Projects – 8th Round



- India seeks to boost its coalbed methane (CBM) sector by offering 26 CBM exploration and production blocks during three rounds of upcoming auctions
- The Directorate General of Hydrocarbons expects this to bring up to 5 million cubic metres per day online over the next 3-4 years, increasing CBM reserves to 453 billion cubic metres
- In the upcoming 8th round of New Exploration Licensing Policy bids, an initial 10 areas with CBM are available, forming the fourth round of CBM assets (CBMIV) to be auctioned off
- The proposed CBM-IV round includes one block each in Singroli (Madhya Pradesh), Sohagpur M (Chhattisgarh), Talcher (Orissa), Mannargudi (Tamil Nadu), Assam, Rajmahal (Bihar), Orissa, Satpura (Madhya Pradesh) and two blocks in Wardha Valley (Maharashtra)
- Incumbents: State-owned Oil & Natural Gas Corp., Great Eastern Energy Corporation Ltd., Reliance Energy, Arrow Energy (India), US-based Coalgas Mart, BP Exploration (Alpha) Ltd.