Located 40 km south of Bandung in West Java, Wayang Windu Power Generation is operated by Star Energy Geothermal (Wayang Windu) Limited, a wholly owned subsidiary of Star Energy. It is managed under a Joint Operation Contract with Pertamina to develop geothermal resources within the 12,960 hectare contract area. An Energy Sales Agreement between Star Energy, Pertamina, and PLN, a state owned utility company, gives Star Energy the right to develop up to 400 MW of electricity-generating capacity over a period of 42 years, with each generating unit being scheduled to operate for at least 30 years. The JOC has the potential to ultimately deliver more than the already-contracted 400 MW of base load electricity to power hungry West Java.

This power plant gets its name from Mt Wayang and Mt Windu in the highlands of Pangalengan, West Java. The plant uses flash steam technology, with the steam generating electricity by driving the turbine directly. The steam is produced at more than 300°C, and contains virtually no pollutant gasses or CO2. Wayang Windu is the world’s most efficient geothermal facility. The Wayang Windu Geothermal Power Station is the largest geothermal power station in Indonesia.

Wayang Windu 1 began operation in 2000, with power equipment supplied by Fuji Electric Co. At the time, the 110MW turbine was the world’s largest single cylinder machine. There are two-phase fluid pipelines with central separators, and integrated pressure control. Since startup, the generator has supplied 110MW at night and 105MW in the day into the State Electricity Company PLN’s grid.

In 2nd of March 2009, the Indonesian Minister of Energy and Resources officially opened Wayang Windu Unit 2, with generation capacity from a single turbine/generator, of 117 MW.
So, Wayang Windu is now delivering a total of 227 MW of electricity to its buyer, PLN, which dispatches the electricity into the West Java transmissions grid. The potential for significant further expansion at Wayang Windu became apparent during the development drilling for Unit 2. Some of the wells drilled for Unit 2 tested more than 50 MWe of steam, and are producing sustainability at over 40 MWe, probably the largest sustainability steam production in the world for a single well.

Planning is now well advanced to expand Wayang Windu further, through the addition of a third Unit with generation capacity of 127 MW. Unit 3 should be on stream by mid-2014. In February 2010, Star Energy finalized a US$350 million bond issue, the proceeds from which will be used partly to fund the initial drilling and development work for Unit 3, with that worth due to commerce in the middle of 2010, using a drilling rig designed and built to Star Energy Geothermal specifications.

Source: Star Energy website

Background:

In Dec 1994, Mandala Nusantara Ltd (MNL) signed a contract to develop Wayang Windu. At the time, MNL was a joint venture of Asia Power (65%), PT Bumi Mandala Perkasa (25%), an affiliate of PT Humpuss, and Waikato SOE, a spinoff of Electricity Corp of New Zealand (10%). In mid-1997, Fuji Electric was awarded a contract for two 110-MW, single-cylinder steam turbines, the largest of their kind to that date. In early 2000, Asia Power decided to divest its stake and project lenders CS First Boston and Deutsche Bank took a 50% share. In January 2001, Unocal (which had a 5% share) took an additional 45% and assumed operational responsibility for Wayang Windu. Star Energy acquired the 110MW Wayang Windu geothermal plant in November 2004. It owns the plant through its 100%-owned subsidiary Magma Nusantara Limited (MNL).

Star Energy has also trading carbon credits from its Wayang Windu Unit 2 with the United Nations. The scheme could provide the plant with up to $8 million per year in carbon credits. If the plants continuously produce 600,000 tons of carbon a year, Wayang Windu can get $8 million a year.
# Indonesia Power Generation

## Geothermal Power Plant

**Location**: Pangalengan, Bandung, West Java  
**Kind of Fuel**: Geothermal  
**Power Capacity**:
- Unit 1: 110 MW  
- Unit 2: 117 MW  
- Unit 3: 127 MW (under construction)

**Owner**: Star Energy Geothermal (Wayang Windu) Limited  
**Shareholders**: Star Energy Geothermal Pte Ltd = 80% + Mitsubishi Corp = 20%  
**Activity Since**: 2000  
**Contact**: Hendra Tan – Director - Treasury & Financial Planning  
**Address**: Wisma Barito Pacific, Star Energy Tower, 8th - 11th floor, Jl. Let. Jend. S. Parman Kav 62-63, Jakarta 12710  
**Email**: Hendra.tan@starenergy.co.id  
**Phone & Fax**: Phone : +6221 532 5828, Fax : +6221 5366 0558  
**Web**: [www.starenergy.co.id](http://www.starenergy.co.id)

### Turbine Specifications

<table>
<thead>
<tr>
<th>No. Unit</th>
<th>Manufacturer</th>
<th>Type</th>
<th>Serial Number</th>
<th>Generator</th>
<th>COD</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuji Electric</td>
<td>Single cylinder, double flo and condensing</td>
<td></td>
<td>Fuji Electric</td>
<td>2000</td>
<td>110</td>
</tr>
<tr>
<td>2</td>
<td>Fuji Electric</td>
<td></td>
<td></td>
<td>Fuji Electric</td>
<td>2009</td>
<td>117</td>
</tr>
<tr>
<td>3 *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>127</td>
</tr>
</tbody>
</table>

*under construction*
1. Chart on Investment Scheme

```
100 % subsidiary of MC

20 %

SEGHPL

80%

SEGPL (Supervises geothermal power projects in Indonesia)

Owning and operating company of Wayang Windu

Owning and operating company of other geothermal plants

Mitshubishi Corp = MC
Star Energy Geothermal Pte Ltd = SEGHL
```

2. Star Energy Geothermal Pte Ltd.
   (1) Location : Singapore
   (2) Foundation : December, 2005
   (3) Capital : US$ 213 Million
   (4) Representative : Mr. Rudy Suparman, Director & CEO

3. Mitsubishi Corporation
   (1) Head Office : 3-1, Marunouchi 2-Chome, Chiyoda-ku, Tokyo, 100-8086, Japan
   (2) Yr of establishmnt : 1950
   (3) Capital : JPY 204 billion
   (4) Representative : Ken Kobayashi, President and Chief Executive Officer

Source : Mitsubishi website