Companies Set Up to Run World’s Most Advanced Coal-Fired Thermal Power Plants in Fukushima

Mitsubishi Corporation Power Ltd., a subsidiary of Mitsubishi Corporation, along with Mitsubishi Heavy Industries, Ltd., Mitsubishi Electric Corporation, Tokyo Electric Power Company Holdings, Inc. and Joban Joint Power Co., Ltd. have established two joint ventures, Nakoso IGCC Power GK\textsuperscript{1} and Hirono IGCC Power GK\textsuperscript{2}, for the construction and operation of the world’s most advanced coal-fired power plants in Fukushima, Japan. Approvals that were previously granted to Tokyo Electric Power Company Holdings, Inc. and Joban Joint Power Co., Ltd., following the environmental impact assessment they had undertaken on behalf of the project, were today transferred to the newly established companies.

The total cost of the project surpasses 300 billion yen, a portion of which will be financed from contributions made by the five participating companies. The remainder will be sourced from a number of domestic financial institutions, including The Bank of Tokyo-Mitsubishi UFJ, Ltd., Development Bank of Japan Inc., Mizuho Bank Ltd., Sumitomo Mitsui Banking Corporation and Fukushima’s The Toho Bank, Ltd. In terms of project financing, this is considered to be one of the largest ever of this scale domestically. All the contributors have signed on to providing financing within the context of their support for recovery in Tohoku following the Great East Japan Earthquake and Tsunami of 2011.

The five companies reached a basic agreement for this project on August 19, 2015, and have since been working out the details for a start-up of operations during the early 2020s. With the construction and operating companies established, financing procured, and the relevant environmental approvals obtained, the project is now ready to get underway.

Going forward, then, Nakoso IGCC Power GK and Hirono IGCC Power GK will each set up and operate a 540 megawatt plant, one next to Joban Joint Power Co., Ltd.’s Nakoso Power Station in Iwaki City and the other at the site of TEPCO Fuel & Power, Inc.’s Hirono Thermal Power Station in the Futaba District, respectively. The new facilities will utilize next generation clean coal technology based on the Integrated coal gasification combined cycle, or IGCC\textsuperscript{3}, with operations slated to start in September 2020 in the case of the Nakoso plant and in September 2021 in the case of the Hirono plant.

With the support and cooperation of the community and the national government and that of the prefectural and local governments in Fukushima, Nakoso IGCC Power GK and Hirono IGCC Power GK will leverage the experience and know-how that their parent companies have developed in the power generation business to procure the relevant materials and execute construction as well as to undertake follow-up surveillance assessments once operations get underway. The expectation is that this project will go a long way in contributing to economic revitalization\textsuperscript{4} in Fukushima and help shore up the prefecture’s industrial base.
*1 Nakoso IGCC Power GK was established with capital from the five partners - Mitsubishi Corporation Power Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Electric Corporation, Tokyo Electric Power Company Holdings, Inc. and Joban Joint Power Co., Ltd., and inherited the environmental approvals which were secured by Tokyo Electric Power Company Holdings, Inc. and Joban Joint Power Co., Ltd. following an assessment undertaken at the Nakoso site.

*2 Hirono IGCC Power GK was established with capital from the four of the partners - Mitsubishi Corporation Power Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Electric Corporation, and Tokyo Electric Power Company Holdings, Inc., and inherited the environmental approvals which were secured by Tokyo Electric Power Company Holdings, Inc. following an assessment undertaken at the Hirono site.

*3 Integrated coal Gasification Combined Cycle (IGCC)
IGCC systems generate power using a combined cycle format incorporating coal gasification and both gas and steam turbines. IGCC systems offer enhanced generation efficiency**, as well as reductions in carbon dioxide (CO₂) emissions of about 15% in comparison with the latest conventional coal fired power plant.

** Thermal efficiency: approximately 48% (net thermal efficiency based on a lower heating value basis)

*4 From the start of relevant environmental assessment through to implementation of operations, the project is expected to generate an economic ripple effect in Fukushima Prefecture estimated at 80 billion yen per plant over the next few decades, with employment opportunities for up to 2,000 persons/day at the peak of construction.

Appendices
- Outline of Operating Companies
- Outline of Generation Facilities
Outline of Operating Companies

1. Nakoso IGCC Power GK
   - Established: August 2, 2016
   - Registered Name: Nakoso IGCC Power GK
   - Headquarters: Kawada-102-3, Iwama-machi, Iwaki-shi, Fukushima, Japan
   - Shareholder Breakdown: Mitsubishi Corporation Power Ltd., 40%; Mitsubishi Heavy Industries, Ltd., 40%; Mitsubishi Electric Corporation, 10%; Tokyo Electric Power Company Holdings, Inc., 5% and Joban Joint Power Co., Ltd., 5%.
   - Representative Partner: Mitsubishi Corporation Power Ltd.
   - Capital: 100 million yen
   - Main Business: Power generation by way of IGCC (integrated coal gasification combined cycle) systems
   - Location: Iwama-machi, Iwaki-Shi, Fukushima, Japan
   - Generating Capacity: 540 megawatts
   - Expected Start Date: September 2020

2. Hirono IGCC Power GK
   - Established: August 2, 2016
   - Registered Name: Hirono IGCC Power GK
   - Headquarters: Futatsunuma-58 Shimokitaba, Hirono-machi, Futaba-gun, Fukushima, Japan
   - Shareholder Breakdown: Mitsubishi Corporation Power Ltd., 40%; Mitsubishi Heavy Industries, Ltd., 40%; Mitsubishi Electric Corporation, 10%; Tokyo Electric Power Company Holdings, Inc., 10%
   - Representative Partner: Mitsubishi Corporation Power Ltd.
   - Capital: 100 million yen
   - Main Business: Power generation by way of IGCC (integrated coal gasification combined cycle) systems
   - Location: Hirono-machi, Futaba-gun, Fukushima, Japan
   - Generating Capacity: 540 megawatts
   - Expected Start Date: September 2021

3. Corporate Logo

   - The F-shaped design is meant to capture the concepts of Fukushima, Fukkou (which is the Japanese word for Recovery) and Future
   - The Colors: Blue indicates ongoing technology development, Yellow represents focus on human resource development, while Green captures our focus on the environment and the tinge of orange, the same color as the Fukushima flag, captures the fact that IGCC technology is being nurtured in Fukushima
4. Illustrations of the Completed Plants

The Nakoso Site

The Hirono Site
Outline of Generation Facilities

1. Outline of Generation Facilities

<table>
<thead>
<tr>
<th>Item</th>
<th>Overview</th>
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<tbody>
<tr>
<td>Plant Type</td>
<td>Air-blown Integrated Coal Gasification Combined Cycle</td>
</tr>
<tr>
<td>Plant Output</td>
<td>540MW (gross)</td>
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<tr>
<td>Plant Efficiency</td>
<td>Approx. 48% (net)</td>
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**Main Components**

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<thead>
<tr>
<th>Item</th>
<th>Overview</th>
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<tbody>
<tr>
<td>Gasifier System</td>
<td>Dry feed, Air Blown, Two-Staged Entrained Bed</td>
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<tr>
<td>Gas Clean-up System</td>
<td>Wet Clean-up System (MDEA)</td>
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<tr>
<td>Gas Turbine</td>
<td>Open Cycle Single Shaft Type</td>
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2. Mechanism of Integrated coal Gasification Combined Cycle (IGCC)

![Gasification Combined Cycle Diagram]

3. Construction Schedule

**The Nakoso Site**

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<td>Site Preparation</td>
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<td>Gas Clean-up System</td>
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<td>Combined Cycle System</td>
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<td>Discharge System</td>
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<td>Coal Handling System</td>
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<td>Commissioning</td>
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<td>▼Start of Operation</td>
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**The Hirono Site**

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<tr>
<td>Modification of Existing Facilities</td>
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<td>Gas Clean-up System</td>
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<td>Combined Cycle System</td>
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<td>Sea Water Intake and Discharge System</td>
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<td>Coal Unloading and Handling System</td>
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Company Outlines

1. Mitsubishi Corporation
Headquarters: 3-1, Marunouchi 2-Chome, Chiyoda-Ku, Tokyo Japan
Established: July 1, 1954
Capital: 204.4 billion yen
Business Activities: MC is a global integrated business enterprise that develops and operates businesses across virtually every industry including industrial finance, energy, metals, machinery, chemicals, foods, and environmental business. MC’s current activities are expanding far beyond its traditional trading operations as its diverse business ranges from natural resources development to investment in retail business, infrastructure, financial products and manufacturing of industrial goods.
No. of Employees: 68,247 (consolidated, as of March 31, 2016)
Representative: Takehiko Kakiuchi, President and CEO

2. Mitsubishi Corporation Power, Ltd
Headquarters: 6-1, Marunouchi 2-Chome, Chiyoda-Ku, Tokyo Japan
Established: October 1, 2015
Capital: 50 million yen (as of March 31, 2016)
Business Activities: Investment and development of domestic energy businesses.
No. of Employees: 69 (as of March 31, 2016)
Representative: Go Ishikawa, President

3. Mitsubishi Heavy Industries, Ltd.
Head Office: 16-5 Konan 2-chome, Minato-ku, Tokyo, Japan
Established: January 11, 1950
Capital: 265.6 billion yen (as of March 31, 2016)
Major Business: Energy & Environment; Commercial Aviation & Transportation Systems; Machinery, Equipment & Infrastructure; Integrated Defense & Space Systems
No. of Employees: 83,932 (consolidated, as of March 31, 2016)
Representative: Shunichi Miyanaga, President and CEO

4. Mitsubishi Electric Corporation
Head Office: 2-7-3, Marunouchi, Chiyoda-ku, Tokyo, Japan
Established: January 15, 1921
Capital: 175.8 billion yen (as of March 31, 2016)
Major Business: Development, manufacture, sales and service of energy and electric systems, industrial automation systems, information and communication systems, electronic devices, home appliances, etc
No. of Employees: 135,160 (consolidated, as of March 31, 2016)
Representative: Masaki Sakuyama, President and CEO

5. Tokyo Electric Power Company Holdings, Inc.
Head Office: 1-1-3 Uchisaiwai-cho, Chiyoda-ku, Tokyo, Japan
Established: May 1, 1951
Capital: 1,400.9 billion yen (as of March 31, 2016)
Major Business: Electric power supplier and its related businesses, and gas fueling business, etc.
No. of Employees: 32,440 (Non-consolidated, as of March 31, 2016)
Representative: Naomi Hirose, President

Head Office: Kanda-sudacho 1-1, Chiyoda-ku, Tokyo, Japan
Established: December 23, 1955
Capital: 56 billion yen (as of March 31, 2016)
Major Business: Wholesale power supply activities, etc by thermal power generation
No. of Employees: 229 (as of March 31, 2016)
Representative: Toshiaki Koizumi, President