Rehabilitation Project of Power Generation System at Karai 7 Mini Hydro Power Plant

Jakarta, 2019-Oct-21
**Voith Fuji Hydro K.K. – Company Profile**

**History**
- Established October 1, 1997
- Joint Venture Company between Voith Hydro and Fuji Electric Co, Ltd.
  (Issued Capital 8 M €, 50/50)

<table>
<thead>
<tr>
<th>Key Figures</th>
<th>Business Volume</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>10 Billion JPY</td>
<td>134</td>
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**Products**
Plant Engineering for Hydro Power Stations
- Hydro Turbines and auxiliaries
- Hydro Generator and auxiliaries
- Control, automation and other el. equipment
Voith Hydro – Global Locations

North America
- York (PA) / USA
- Chattanooga (TN) / USA
- Mississauga (ON) / Canada
- Montreal (Brossard, QC) / Canada
- Huixquilucan / Mexico

Latin America
- São Paulo / Brazil
- Manaus / Brazil
- Lima / Peru
- Santiago / Chile

Europe
- Heidenheim / Germany
- St. Pölten / Austria
- St. Georgen / Austria
- Västeras / Sweden
- Milano / Italy
- Oslo / Norway
- Trondheim / Norway
- Sarpsborg / Norway
- Tolosa (Ibarra) / Spain
- Pilsen / Czech
- Ankara / Turkey
- Inverness / Scotland / GB

Asia
- Shanghai / P.R. China
- New Delhi (Noida) / India
- Vadodara / India
- Kawasaki / Japan
- Seoul (Wando) / Korea
- Jakarta / Indonesia
Project Scheme

JCM Model Project (FY2018), approved in Feb 2019.
PP (Japan): Voith Fuji Hydro K.K.
PP (Indonesia): PT Global Karai Energi
The Karai 7(2 x 3.54MW) hydro project is located in Simalugun province and is located approximately 100km south from Medan, Sumatra's main city.
Component Condition before Rehabilitation

The existing equipment has poor performance due to serious cavitation and erosion.
By introducing the latest turbine technology of Voith Hydro, High Velocity Oxygen Fuel (HVOF) coating to increase wear resistance and replacement of generator, the maximum output and plant availability is expected to be increased by 19% & 8% respectively.
Voith Hydro-Automation
State-Of-The-Art Control, Monitoring and Analysis

• Voith Hydro has developed full scale of automation products – governors and controls as well as sub-systems – since 1891.
• We have full knowledge of:
  – Plant equipment and processes
  – Selection and design of most suitable automation systems
  – Integration of all plant systems and plant-related functions
  – Needs of owners to ensure optimal plant specific functions
Karai Upgrade

HyCon Automation – SCADA – All functions on board

HyCon Automation supports all SCADA functions

- Message systems
- Graphics
- Operation
- Standard Interfaces
- Communication
- Sequences
- Reporting system
- Archiving system
Expected GHG Emission Reductions

1,133 tCO$_2$/year

= Reference CO2 emissions [tCO2/year]
  - Project CO2 emissions[tCO2/year]
= (Power generation after rehabilitation[MWh/year]
  - Power generation before rehabilitation[MWh/year])
  × emission factor [tCO2/MWh]

In 22 years, whole CO2 emission is 24,926 tCO$_2$
Project Schedule

Aug, 2019: Contract Signed

Oct, 2019 – Sep, 2020: Design and manufacturing of equipment

Sep-Nov, 2020: Installation and Commissioning