Introduction of SION Small Hydropower Project

10MW Small Hydropower Plant in North Sumatra by PT. Citra Multi Energi

Seminar on the JCM Implementation in Indonesia
October 21st, 2019

Takashi Kanazawa
TOYO ENERGY FARM CO., LTD
Preface — Objective of the Project

➢ Imbalance between electricity supply & demand in North Sumatra

➢ Potentiality of small hydropower in substitution for conventional energy sources as well as a key factor for developing low-carbon society

➢ Challenges to tackle on hurdles and issues of developing this kind of renewable energy project. (esp. financing at an early stage and O&M)

Our ultimate goal is to contribute to the establishment of sustainable, low-carbon society through the diffusion of Japanese new and innovative technologies
TOYO Energy Farm

Government of Japan

CME
(PT. Citra Multi Energi)

Government of Indonesia

PLN

PPA (by FIT)

JCM Grant

ANANTAKA

Equity 51%

Civil Eng. Construction

FS and Designing

Hydropower Facilities

O&M and Monitoring

CME

SION PJ SPC

TOYO Energy Farm

(JCM Applicant)

Financial & Local Mngt.

Japanese Engineering Farm

Industrial Machinery Company
Voith Fuji Hydro

Industrial Machinery Company

O&M Company

Local Contractors

Consulting & Support

Project Monitoring

MRV* Supporting

Local arrangement & support

JICA

IIF

Indonesia Infrastructure Finance

TOYO Construction VIETNAM

(JCM Applicant)

Industrial Machinery Company

Voith Fuji Hydro

TOYO Engineering Farm &

Japanese Engineering Farm

Followed by

KOE Kankyo Business

(JCM Support)

Financing & Local Mngt.

Alamport Inc.
About TOYO Group

Toyo Group will demonstrate the synergy effects of our various businesses, by a one-stop business scheme.

expand our business fields based upon

**General Construction & Real Estate Businesses**

realize an earth-friendly society using **Renewable Energy**…

provide trusted, safe and tasty **Agricultural Products**…

Our Goal is to realize a community where everyone can benefit from safe, convenient and green environment.
PT ANANTAKA HIDRO INDONESIA (ANANTAKA), was incorporated in Oct 2014 with the objective of developing Green Energy in Indonesia.

- Targets to develop several projects in Indonesia with total capacity of 100 MW.
- ANANTAKA projects under development:

  - SION PROJECT 10 MW
    - UNDER CONSTRUCTION (COD Q1 2020)
  - KOMBIH PROJECT 15 MW
    - UNDER DEVELOPMENT
  - SIMOLAP PROJECT 5 MW
    - UNDER DEVELOPMENT

**ANANTAKA project philosophy:**
- Develop Green project that contribute multiple effects to the surrounding society
- Max energy production efficiency
- Min maintenance requirements
- Structurally able to withstand natural mishap
- Project is designed and constructed in compliance with international environmental standards
Renewable Energy & Plant Engineering Business

Mega-solar Power Plant

Small Hydropower Generation

Renewable Energy Business

Plant Engineering Business

Methane Fermentation Biomass Power Plant

Wood Biomass Power Plant
SION Small Hydropower Project — Site Location

- **Location**: Lake Toba, Silangit AP, Sion Site, Weir/Intake, GRP Pipe & Maintenance Road, Powerhouse

![Map of Sion Site with key locations marked](image-url)
The SION small hydropower project was adopted as the “JCM Model Project 2016” under the supervision by Ministry of Environment of Japan.

### Project Name & Location
10MW Small Hydropower Generation Project in North Sumatra
Humbang Hasundutan, North Sumatra, Indonesia

### Power Plant Type
Run of river, Small Hydropower Plant (@Simonggo River)

### Representative entity
Toyo Energy Farm Co., Ltd.

### Local partner
PT. Citra Multi Energi

### Power generating Capacity
10MW (5MW×2)

### Estimated Power generation
68.78GWh / Year

### Completion
January, 2020

### Amount of CO2 reduction
47,182 tons / Year
SION Small Hydropower Project — *Hydropower Equipment*

Small hydropower generating equipment used in this project is manufactured by Voith Hydro India, which is an affiliate company of Voith Fuji Hydro, Japan.

**Specifications**

Generator Type: Horizontal Shaft Francis Turbine and Generator

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head (Ht)</td>
<td>72.60 m</td>
</tr>
<tr>
<td>Hydropower Generation (Pt)</td>
<td>6,050 kW</td>
</tr>
<tr>
<td>Rotate Speed (N)</td>
<td>500min⁻¹</td>
</tr>
<tr>
<td>Generator Power (Pg)</td>
<td>7,176 kVA</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50Hz</td>
</tr>
<tr>
<td>Power Factor (Pf)</td>
<td>0.85 / 1.0</td>
</tr>
<tr>
<td>Rated Voltage (Vg)</td>
<td>6.3 kV</td>
</tr>
</tbody>
</table>
Glassfiber Reinforced Polyester (GRP) Pipes are used for the movement of water. GRP pipes utilized in SION PJ are manufactured by SUBOR, Turkish company. Fundamental choices between open-cut channel or installing GRP pipes?

Specifications*

Length: 12 m. (Standard) /
    0.3- 15 m. (On demand) 6 m
Diameter (DN): 250 – 4,000 mm 3,000mm
Rigidity (SN): 2,500 - 5,000 - 10,000 N/m²
Pressure (PN) 1 - 32 Atm.

Construction Progress

Powerhouse Area

Weir Area

GRP Pipe Installation
Challenges in implementing the Project

1. Preliminary Survey/Feasibility Study
   - Had to be carefully conducted esp. from environmental and technical aspects

2. Cultural and Language Barriers
   - Need to understand cultural differences especially in communication and decision making process
   - Critical to have site controller(s) who can translate “What should be done & Why” to construction workers

3. Conformity with Local Community
   - Reminding the fact that we are “OUTSIDERS”
   - Be aware and admire the life of local community
TERIMA KASIH!

Thank you for your kind attention.

(Exhibits to follow.)
Managing the Group Companies
- TOYO HOLDINGS Co., Ltd.

Real Estate・Construction Business
- TOYO CONSTRUCTION Co., Ltd.
- OKADA REAL-ESTATE Co., Ltd.
- TOYO RENEWAL Co., Ltd.

Energy・Plant Engineering
- TOYO ENERGY FARM Co., Ltd.
- TOYO ENERGY SOLUTION Co., Ltd.
- TOYO YABU BIO ENERGY Co., Ltd.

Agriculture Business
- TOYO YABU AGRICULTURAL PRODUCTION Co., Ltd.
- HOKKAIDO AGRI MART Co., Ltd.
Company name: TOYO HOLDINGS Co., Ltd.

Representative Director: Yoshimitsu Okada

Location: 11th Yurakucho Building 1-10-1 Yurakucho, Chiyoda-ku, Tokyo

Contact: TEL +81-(0)3-4400-6104  FAX +81-(0)3-3286-8700

Established: September 28th, 2005

Equity: ¥10,000,000

Business Overview: Managing the Group Companies and additional related businesses.

Employee: 40 people
<table>
<thead>
<tr>
<th><strong>Company name</strong></th>
<th>TOYO CONSTRUCTION Co., Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Representative</strong> Director</td>
<td>Yoshimitsu Okada</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
</tr>
<tr>
<td>[Main office]</td>
<td>7-1-11 Shibamata, Katsushika-ku, Tokyo</td>
</tr>
<tr>
<td>[Yuurakucho office]</td>
<td>1-10-1 11F Yurakucho, Chiyoda-ku, Tokyo</td>
</tr>
<tr>
<td>[Koiwa office]</td>
<td>1-26-11 Nishikoiwa, Edogawa-ku, Tokyo</td>
</tr>
<tr>
<td>[Saitama office]</td>
<td>1-10-18 Takasago, Urawa-ku, Saitama</td>
</tr>
<tr>
<td>[Fukushima office]</td>
<td>1-2-3 Nakamura, Souma-shi, Fukushima</td>
</tr>
<tr>
<td>[Yabu office]</td>
<td>1153-3 Oyabu, Yabu-shi, Hyogo</td>
</tr>
<tr>
<td>[Mito office]</td>
<td>2-1-26 Daikucho, Mito-shi, Ibaraki</td>
</tr>
<tr>
<td>[Noda office]</td>
<td>524-8 Noda, Noda-shi, Chiba</td>
</tr>
<tr>
<td>[Shinkoiwa office]</td>
<td>1-52-10 Shinkoiwa, Katsushika-ku, Tokyo</td>
</tr>
<tr>
<td>[Gunma office]</td>
<td>2523-5 Kamishiroi, Shibukawa-shi, Gunma</td>
</tr>
<tr>
<td>[Tateishi display housing area]</td>
<td>2-16-7 Tateishi, Katsushika-ku, Tokyo</td>
</tr>
<tr>
<td><strong>Contact</strong></td>
<td>TEL +81-(0)3-5694-1321  FAX +81-(0)3-5694-2324</td>
</tr>
<tr>
<td><strong>Established</strong></td>
<td>November 10, 1971</td>
</tr>
<tr>
<td><strong>Equity</strong></td>
<td>¥ 480,000,000</td>
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<tr>
<td><strong>License Number</strong></td>
<td>Specific construction industry / Demolition industry</td>
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<tr>
<td></td>
<td>Minister of Land, Infrastructure and Transport (Special-28) No. 17297</td>
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<tr>
<td></td>
<td>First class architect office  Tokyo Governor Register No. 43467</td>
</tr>
<tr>
<td></td>
<td>Residential Building trading business</td>
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<td></td>
<td>Minister of Land, Infrastructure and Transport (4) No. 6834</td>
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<tr>
<td><strong>Business Overview</strong></td>
<td>Construction and design supervision</td>
</tr>
<tr>
<td></td>
<td>Building · Mansion · Apartment · Office Building · Store · Shrines and temples · Shopping centers · Personal housings · Elderly welfare facilities · Social welfare facilities · Medical facilities etc.</td>
</tr>
<tr>
<td></td>
<td>Real estate sales, brokerage business · Development of residential areas · Sales of residential buildings</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>130 people</td>
</tr>
</tbody>
</table>
## Company Overview

<table>
<thead>
<tr>
<th>Company Name</th>
<th>TOYO ENERGY FARM Co., Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Representative</strong></td>
<td>Yoshimitsu Okada</td>
</tr>
<tr>
<td><strong>Director</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
</tr>
<tr>
<td>[Main Office]</td>
<td>1-2-3 Nakamura, Souma-shi, Fukushima</td>
</tr>
<tr>
<td>[Sales Office]</td>
<td>7-1-11 Shibamata, Katsushika-ku, Tokyo</td>
</tr>
<tr>
<td>[Yurakucho Office]</td>
<td>1-10-1 11F Yurakucho, Chiyoda-ku, Tokyo</td>
</tr>
<tr>
<td>[Mito branch]</td>
<td>2-1-26 Daikucho, Mito-shi, Ibaraki</td>
</tr>
<tr>
<td>[Hanyu branch]</td>
<td>1466 Honkawamata, Hanyu-shi, Saitama</td>
</tr>
<tr>
<td>[Yabu branch]</td>
<td>1153-3 Oyabu, Yabu-shi, Hyogo</td>
</tr>
<tr>
<td><strong>Contact</strong></td>
<td>TEL +81-(0)3-5622-5707 FAX +81-(0)3-3673-3511</td>
</tr>
<tr>
<td><strong>Established</strong></td>
<td>August 13, 2012</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>¥480,000,000</td>
</tr>
<tr>
<td><strong>Business Overview</strong></td>
<td>Generating Mega solar power, Small hydro power, Wood biomass power, Bio-methane gas, Wood biogas power. Manufacture and sales of biomass and incinerator business. Various EPC, retail electricity, waste heat utilization business Hydroponic cultivation farm management, vegetable processing business (cut vegetable factory, juice processing factory) Functional vegetable development project, high sugar content tomato farm management, consolidation of agricultural industry Tsukuba Collaborative Research (Optimized production system by IOT using AI) Natural energy business development support, hydroponic cultivation farm management support, employment support for the elderly / disabled person</td>
</tr>
<tr>
<td><strong>Employee</strong></td>
<td>25 people</td>
</tr>
</tbody>
</table>
ANANTAKA Projects - 1

SION PROJECT 10 MW

- Site Survey at Simonggo River
- Socialisation of Land Acquisition
- Ground Breaking Ceremony
- Soil Excavation at Water Way Area

- Access to HEPP SION Location
- Independence Day Celebration
- Soil Excavation at Power House
- Spoil Bank Area