World Bank Seminar:
“Climate Investment Funds” experience: Finance, Technology, and Japanese companies

Overview of Project Finance for Geothermal Power Projects

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Mizuho Bank, Ltd.
Global Project Finance Department
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1. Mizuho’s Project Finance
Mizuho’s Project Finance – Organizational Structure

- Mizuho has over 30 years of experience in the advising, structuring, arranging, closing, and distributing complex multi-source project finance transactions throughout the world.
- Mizuho PF team can utilize its extensive branch network worldwide, and its huge asset basis.
- For Project Finance, more than 220 full-time professionals covering all over the world, all industries.

**Global Project Finance Department**
- Project Finance outside Japan, HQ function and support to related offices
  - Energy & Natural Resources Team
  - Power Team
  - Infrastructure Team
  - Asset Management Team
  - Agency Services (Planning & Coordination Team)
  - New Business Development Office
  - Sustainable Development Office
  - Export & Agency Finance

**Project Finance Department**
- Japanese Domestic Project Finance

**Seamless Collaboration**
- Americas Financial Products Dept.
  - In charge of deals in Americas
    - New York
    - Houston

- Europe Structured Finance Dept.
  - In charge of deals in EMEA
    - London

- Australia Corporate Banking Dept.
  - In charge of deals in Australia, New Zealand and Pacific Region
    - Sydney
    - Hong Kong

- Asia Office
  - In charge of deals in Asia
    - Singapore
    - Bangkok
    - Mumbai

- Seoul Branch

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Mizuho PF team can utilize its extensive branch network worldwide, and its huge asset basis.

For Project Finance, more than 220 full-time professionals covering all over the world, all industries.
Mizuho’s Project Finance – Our Product Offering

Our Service Offerings Across the Lifecycle of a Project

- Mizuho provides its expertise and services to the clients for each stage of project development starting from origination through the final stage of financing to even post-closing.

- Mizuho is also a member of the Equator Principles Financial Institutions (EPFI), a group of 40 other major global private and governmental institutions that have established common standards that private financial institutions apply to determine, assess and manage environmental and social risks in project financing. As the first Asian bank to adopt the Equator Principles in 2003, we have over 10 years of experience implementing Equator Principles for Project Finance and Financial Advisory deals, around the globe and across various industry sectors.

### PROJECT FINANCE PRODUCTS

- **Debt Financing**
  - construction loans, term loans, project bonds, equity bridge financing
- **Export Credit**
  - especially JBIC/NEXI financing
- **Mezzanine Financing**
  - subordinated debt
- **Structured Finance**
  - tax-based products, leasing
- **Risk Management Products**
  - hedging of interest rate, FX exposures, commodity
- **Merger & Acquisition**
  - asset evaluation of existing projects
- **Bid and Performance Bonds**
- **Agency Services**
  - Full agency services

### Global Project Finance Department

- **Post Financial Close**
  - Full Loan Agency services and Operations management
  - Dedicated portfolio management team

- **Financial Advisory**
  - Evaluate project contracts, risks & economics
  - Modeling and information memorandum preparation
  - Financial structuring and negotiation with key parties
  - Assist bid submissions and negotiation

- **Structure & Arrange**
  - Devise / Implement optimal finance scheme
  - Enlist ECAs and multilateral agencies
  - Provide large underwriting capability
  - Documentation

- **Coordination & Syndication**
  - Manage international syndication
  - Lead negotiations among sponsors and financial institutions
  - Focus on achieving timely financial close
2. Key Considerations from PF Lenders’ Perspective
<table>
<thead>
<tr>
<th>Stage</th>
<th>Key Activities</th>
<th>Allocation of Responsibilities</th>
<th>Key Considerations</th>
<th>Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Study</td>
<td>□ Surface geo-scientific exploration □ Baseline environmental studies □ Pre-FS study, etc</td>
<td>X</td>
<td>✓ It costs approx. $1 - 2 Million</td>
<td>✓ Outsourcing the surveys to the external advisors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ The data and reports will be used for the preparation of the competitive bid.</td>
<td>✓ It helps to accumulate the experiences.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ Evaluation of experienced geothermal developers and reliable technology/equipment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ Methodology to determine the tariff</td>
<td></td>
</tr>
<tr>
<td>Tender and Exploration</td>
<td>□ Tender to decide the developer</td>
<td>X</td>
<td>✓ 3 – 4 wells shall be drilled for the capacity of 50MW. It costs approx. $30 – 40 million.</td>
<td>✓ Availability of governmental fund is a key driver for the process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ Lenders are basically reluctant to finance the upfront reserve verification</td>
<td>✓ Reserve consultant should be retained for the verification process.</td>
</tr>
<tr>
<td></td>
<td>□ Exploration activities to verify the reserve</td>
<td>X</td>
<td></td>
<td>✓ Tariff adjustment mechanism should be introduced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing</td>
<td>□ Finance Arrangement</td>
<td>X</td>
<td>✓ Lenders’ Due Diligence should be completed.</td>
<td>✓ Governmental body’s assistance to get the developer obtain permissions is a key.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction and Operation</td>
<td>□ Construction and geothermal reserve development</td>
<td>X</td>
<td>✓ Governmental support to ensure the offtaker’s obligation is crucial.</td>
<td>✓ Governmental body’s assistance (Direct Support) to ensure the offtaker’s obligation is a key.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>✓ Management of construction and drilling schedule</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Operation</td>
<td>X</td>
<td>✓ Governmental support to ensure the offtaker’s obligation is crucial.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>✓ Management of make up wells</td>
<td></td>
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</tbody>
</table>
## Key Considerations from PF Lenders’ Perspective

<table>
<thead>
<tr>
<th>Key Considerations</th>
<th>PF Lenders’ Concern</th>
<th>Key DD Points</th>
</tr>
</thead>
</table>
| **Resource Verification** | ✓ Appointment of well experienced reserve consultant  
 ✓ Application of methods applied in other cases (e.g.: volumetric method, 3D simulation ) | ✓ Validation by consultant: 90% probability of reserve amount based on volumetric as well as 3D simulation. |
| **Debt Sizing** | ✓ Appropriate level of debt sizing  
 (e.g.: coal-fire 1.25x – 1.30x, hydro power 1.30x – 1.40x, geothermal 1.40 – 1.50x)  
 ✓ Debt Sizing based on a situation that assumes a combined stress case | ✓ Verification of geothermal degradation rate in a stress case  
 ✓ Verification of Make-up Well number and additional wells during operation period  
 ✓ Application of Cash Sweep Mechanism, when DSCR lowers than certain level |
| **Sizing of Contingency Budget** | ✓ Interface between Drilling Activities and plant construction  
 ✓ Volume of Contingency Equity based on a stress case | ✓ Verification of stress case by consultation: validity of schedule, number of failed wells, Contingency Plan etc.  
 ✓ Thorough arrangement by technical consultant and reserve consultant: verification on interface plan and schedule management |
| **Degradation rate and Make-up well** | ✓ Advice from reserve consultant regarding the degradation rate under stress case  
 ✓ Validity of Make-up Well Plan which is to mitigate degradation risk | ✓ Validity of appropriate degradation rate by comparing with other deals  
 ✓ Validity on numbers of Make-up Well under stress case  
 ✓ Additional drilling reserve account |

(Source) Mizuho Bank
3. Case Studies
Mizuho acted as FA and MLA to the project consortium for the Sarulla Geothermal Power Project

**Project Overview (FC achieved in September 2014)**

- **Borrower**: Sarulla Operation Limited
- **Capacity**: 321MW
- **Sponsors**: Itochu, Kyushu, INPEX, Medoco Energi, Ormat
- **Project Cost**: Approx USD1,600 million
- **Debt**: Approx USD1,150 million
- **Facility Type**: JBIC Direct Loan, ADB Direct Loan, ADB Clean Tech Fund, Commercial Loan with JBIC EPRG
- **Lenders**: JBIC, ADB, Mizuho and other commercial banks
- **EPC**: Hyundai Construction and Engineering

**[Project Structure]**

- The financing was procured as a package of JBIC (US$ 490 mio) / ADB direct loan (US$ 250 mio), ADB CTF (US$ 100 mio) and commercial bank loan (US$ 330 mio) with JBIC extended political risk guarantee.

- It is noted that Sponsors achieved the entire COD of 3 units in May 2018. Compared with the original assumption of February of 2018, the schedule was almost within the target timeline.

- We would like to highlight that CTF contributed to reduce financing costs and improve sponsors’ return due to the facts that its base rate is fixed and it can be drawdown entirely upfront upon FC to compensate for sponsors’ preinvestment related to reserve drilling activities.

- It is to be noted that PLN and Pertamina are amongst the major project counterparties. Mizuho, as a Financial Advisor, has on-going experience in actively supporting a project consortium in negotiation with these institutions.

- Mizuho assisted Sponsors in achieving the successful financing closing of USD 1,150 million debt. We have the most up to dated lenders’ positions on geothermal project.

**[Project Site]**

(Source) Project Finance International
3. Case Studies
2.) Muara Laboh Geothermal Power Project (1/2)

Mizuho acted as FA and Structuring Bank to the lenders for the Muara Laboh Geothermal Power Project

<table>
<thead>
<tr>
<th>Project Overview (FC achieved in January 2017)</th>
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</thead>
<tbody>
<tr>
<td>Borrower</td>
</tr>
<tr>
<td>Capacity</td>
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<td>Sponsors</td>
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<tr>
<td>Project Cost</td>
</tr>
<tr>
<td>Debt Amount</td>
</tr>
<tr>
<td>Facility Type</td>
</tr>
<tr>
<td>Lenders</td>
</tr>
<tr>
<td>EPC</td>
</tr>
</tbody>
</table>

- Mizuho acted as the Financial Advisor as well as the DD Coordinator to the Muara Laboh consortium and Lenders in connection with PPA negotiation, the tariff negotiation with PLN and organization of financing structure for the development of Muara Laboh geothermal power project. In this capacity, we were heavily involved in all aspects of financial and commercial structuring of transaction, and maintained an active communication with JBIC.

- The financing was procured as a package of JBIC (US$ 200 mio) / ADB direct loan (US$ 90 mio), CTF (US$ 19 mio) and commercial bank loan (USD 133 mio) with NEXI cover.

- We would like to highlight that CTF contributed to reduce financing costs and improve sponsors’ return due to the facts that its base rate is fixed and it can be drawdown entirely upfront upon FC to compensate for sponsors’ pre-investment related to reserve drilling activities.

[Project Structure]

(Source) Website of Sumitomo, JBIC, and NEXI
### 3. Case Studies

#### 2.) Muara Laboh Geothermal Power Project (2/2)

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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>PPA Negotiation</strong></td>
<td>PPA was signed in March 2011</td>
<td>Reservoir Exploration Activities</td>
<td>Tariff Negotiation with PLN</td>
<td>Lenders’ DD Documentation</td>
</tr>
<tr>
<td><strong>Mizuho’s Works</strong></td>
<td></td>
<td>JBIC, ADB, CTF and NEXI Reserve DD</td>
<td>Tariff Approval Process in GOI</td>
<td>Signing in January of 2017</td>
</tr>
</tbody>
</table>

- **Support PPA negotiation**
  - Assist sponsors in negotiating the commercial terms of PPA with PLN

- **Support Lenders’ Reserve DD**
  - Assist sponsors in selecting JBIC, ADB and NEXI’s reserve consultant.
  - Assist JBIC, ADB and NEXI in conducting their reserve DD.

- **Lenders’ Technical Due Diligence**
  - Review the package of EPC tender documents
  - Review the package of Drilling tender documents
  - Review the technical aspects of CF model if required.
  - Review any other technical items

- **Lenders’ Reserve Due Diligence**
  - (substantially complete before key Milestone)
  - Review the schedule of drilling activities.
  - Review the interfacing schedule of the plant construction
  - Review the technical inputs related to drilling in CF model
  - Review any other terms related to drilling activities.

- **Facilitate Lenders’ comprehensive DD**
  - Due Diligence coordination for JBIC, ADB and NEXI as Structuring Bank.

- **Facilitate financing documentation**
  - Draft information memo.
  - Draft financing term sheet.
  - Coordinate the discussion on financing documents.
Appendix – Mizuho’s World Wide Network
Appendix: Mizuho’s Worldwide Network

Our Overseas Office Network

Mizuho’s extensive office network, approximately 115 offices (including subsidiaries and affiliates) in 38 countries and regions outside Japan to respond to its customers’ diversified and globalizing financial needs while supporting the smooth progress of economic activities.
Mizuho has also established a worldwide network through the alliance and business cooperation with governmental agencies and local financial institutions illustrated below to enhance Mizuho’s capabilities to respond to a wide variety of customer needs.

As of June, 2017  (Source) Mizuho Financial Group HP

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**Appendix : Mizuho’s Worldwide Network**

**Our Alliance and Business Cooperation**

Mizuho has also established a worldwide network through the alliance and business cooperation with governmental agencies and local financial institutions illustrated below to enhance Mizuho’s capabilities to respond to a wide variety of customer needs.

- **Alliance**
- **Business Cooperation**

![Diagram of Mizuho’s Worldwide Network](image-url)
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