

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

Overview of Project Finance for Geothermal Power Projects

Prepared for World Bank Seminar, July 20th, 2018

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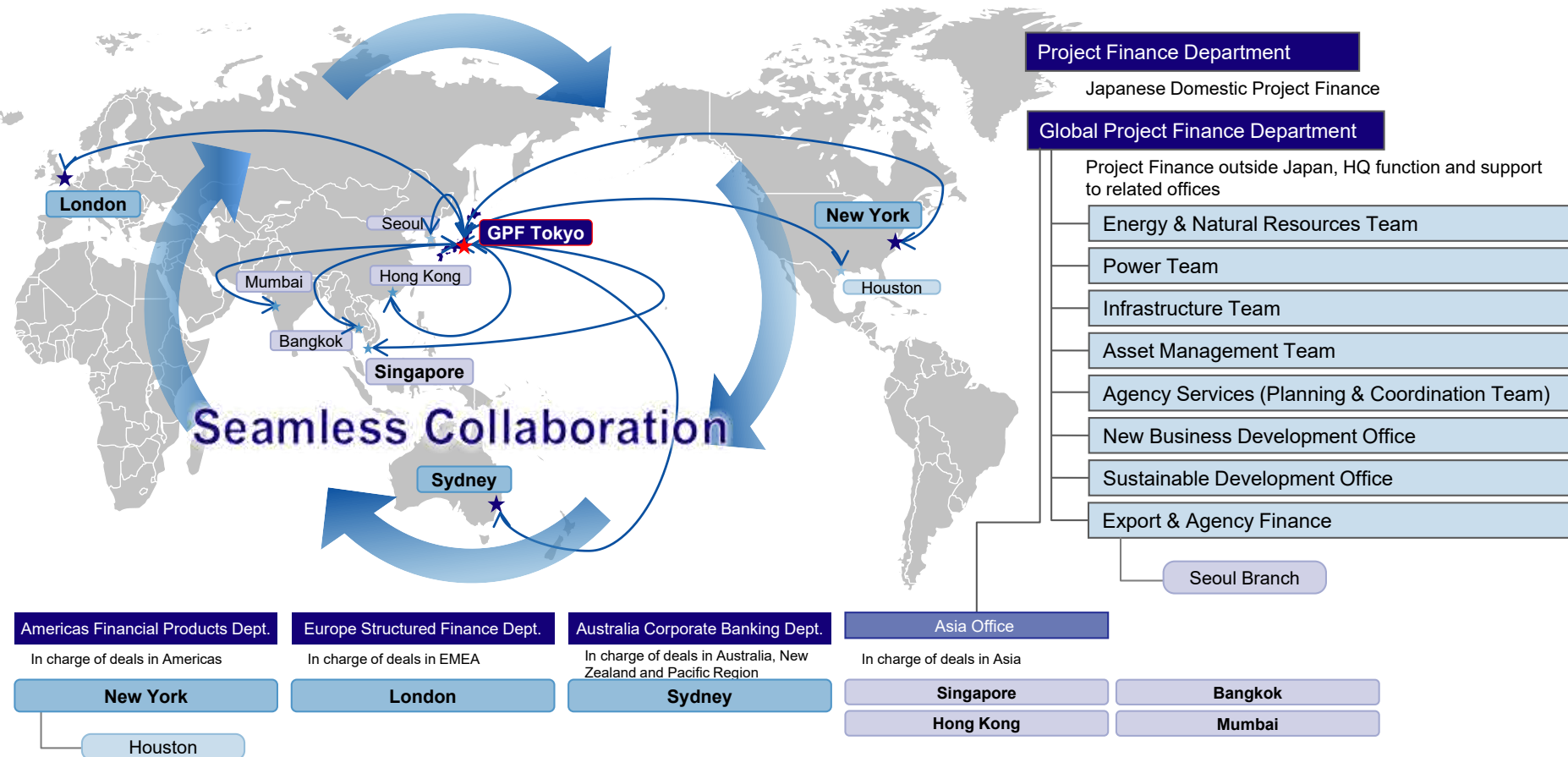
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1. Mizuho's Project Finance

Mizuho's Project Finance – Organizational Structure

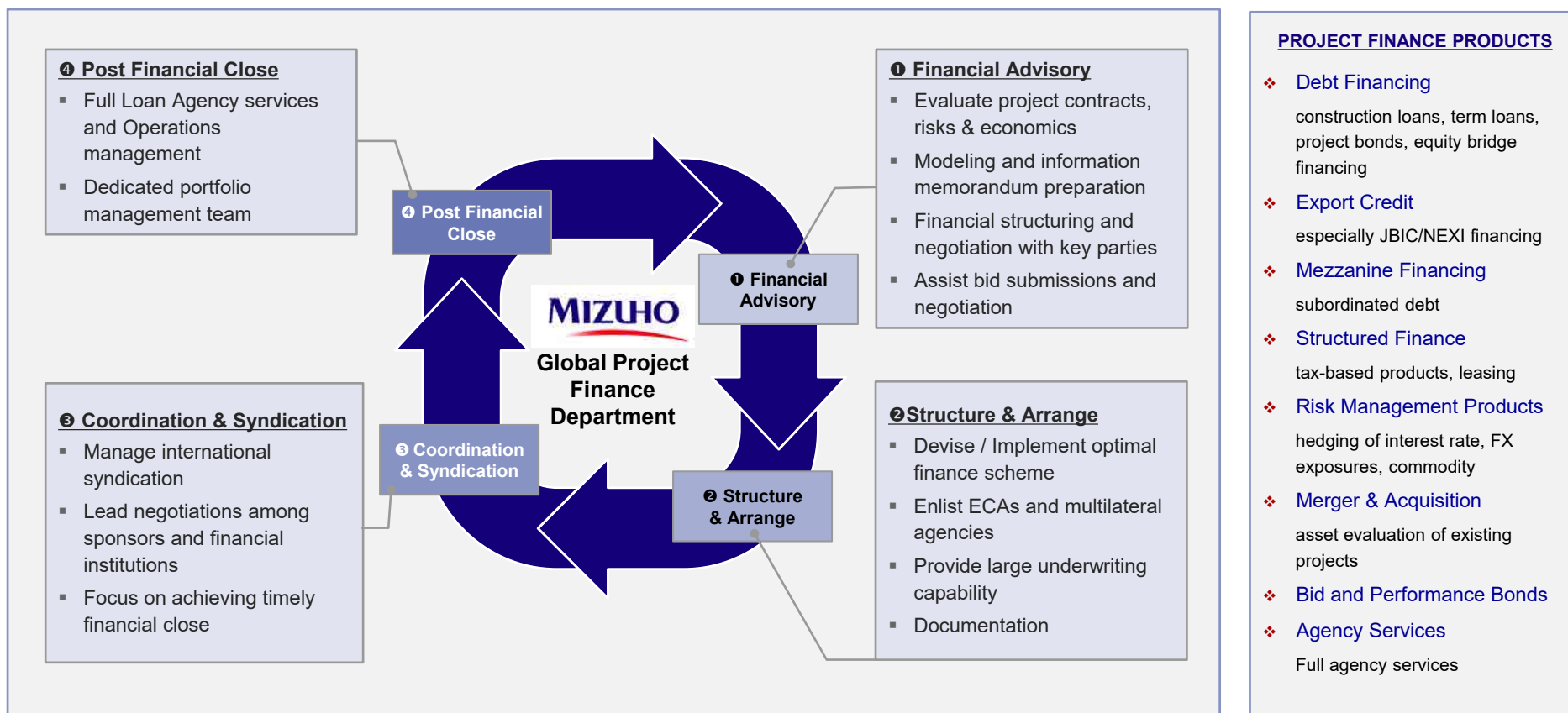
- Mizuho has over 30 years of experience in the advising, structuring, arranging, closing, and distributing complex multi- source project finance transactions throughout the world.
- Mizuho PF team can utilize its extensive branch network worldwide, and its huge asset basis.
- For Project Finance, more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



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.



2. Key Considerations from PF Lenders' Perspective

Key Risk Allocation at each stage from financing arrangement perspective

Stage	Key Activities	Allocation of Responsibilities			Key Considerations	Suggestions
		Host Government	Developer	Lenders		
Baseline Study	<ul style="list-style-type: none"> □ Surface geo-scientific exploration □ Baseline environmental studies □ Pre-FS study, etc 	X			<ul style="list-style-type: none"> ✓ It costs approx. US\$ 1 - 2 Million ✓ The data and reports will be used for the preparation of the competitive bid. 	<ul style="list-style-type: none"> ✓ Outsourcing the surveys to the external advisors. ✓ It helps to accumulate the experiences.
Tender and Exploration	<ul style="list-style-type: none"> □ <u>Tender to decide the developer</u> 	X			<ul style="list-style-type: none"> ✓ Evaluation of experienced geothermal developers and reliable technology/equipment. ✓ Methodology to determine the tariff 	<ul style="list-style-type: none"> ✓ Follow the international procurement rule of ADB and the World Bank ✓ All bids should be denominated in USD. ✓ FITs is not always best option.
	<ul style="list-style-type: none"> □ <u>Exploration activities to verify the reserve</u> 	X	X		<ul style="list-style-type: none"> ✓ 3 – 4 wells shall be drilled for the capacity of 50MW. It costs approx. US\$ 30 – 40 million. ✓ Lenders are basically reluctant to finance the upfront reserve verification 	<ul style="list-style-type: none"> ✓ Availability of governmental fund is a key driver for the process. ✓ Reserve consultant should be retained for the verification process. ✓ Tariff adjustment mechanism should be introduced.
Financing	<ul style="list-style-type: none"> □ <u>Finance Arrangement</u> 	X	X	X	<ul style="list-style-type: none"> ✓ Lenders' Due Diligence should be completed. 	<ul style="list-style-type: none"> ✓ Governmental body's assistance to get the developer obtain permissions is a key.
Construction and Operation	<ul style="list-style-type: none"> □ <u>Construction and geothermal reserve development</u> 	X	X	X	<ul style="list-style-type: none"> ✓ Governmental support to ensure the offtaker's obligation is crucial. ✓ Management of construction and drilling schedule 	<ul style="list-style-type: none"> ✓ Governmental body's assistance (Direct Support) to ensure the offtaker's obligation is a key.
	<ul style="list-style-type: none"> □ <u>Operation</u> 	X	X	X	<ul style="list-style-type: none"> ✓ Governmental support to ensure the offtaker's obligation is crucial. ✓ Management of make up wells 	<ul style="list-style-type: none"> ✓ Governmental body's assistance (Direct Support) to ensure the offtaker's obligation is a key.

Key Considerations from PF Lenders' Perspective

Key Considerations	PF Lenders' Concern	Key DD Points
Resource Verification	<ul style="list-style-type: none"> ✓ Appointment of well experienced reserve consultant ✓ Application of methods applied in other cases (e.g.: volumetric method, 3D simulation) 	<ul style="list-style-type: none"> ✓ Validation by consultant: 90% probability of reserve amount based on volumetric as well as 3D simulation.
Debt Sizing	<ul style="list-style-type: none"> ✓ 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 	<ul style="list-style-type: none"> ✓ 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	<ul style="list-style-type: none"> ✓ Interface between Drilling Activities and plant construction ✓ Volume of Contingency Equity based on a stress case 	<ul style="list-style-type: none"> ✓ 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	<ul style="list-style-type: none"> ✓ Advice from reserve consultant regarding the degradation rate under stress case ✓ Validity of Make-up Well Plan which is to mitigate degradation risk 	<ul style="list-style-type: none"> ✓ Validity of appropriate degradation rate by comparing with other deals ✓ Validity on numbers of Make-up Well under stress case ✓ Additional drilling reserve account

3. Case Studies

3. Case Studies

1.) Sarulla Geothermal Power Project

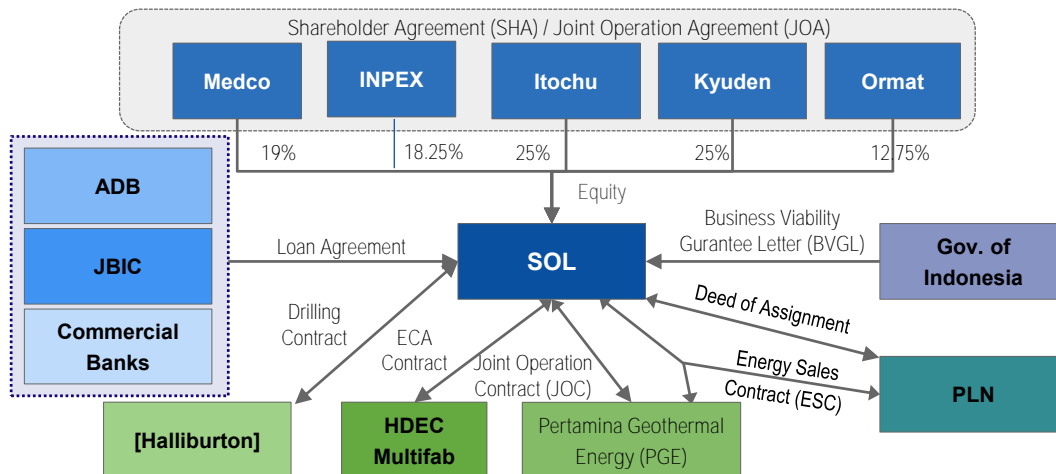
Mizuho acted as FA and MLA to the project consortium for the Sarulla Geothermal Power Project

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

- 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 Structure]



[Project Site]



3. Case Studies

2.) Muara Laboh Geothermal Power Project (1/2)

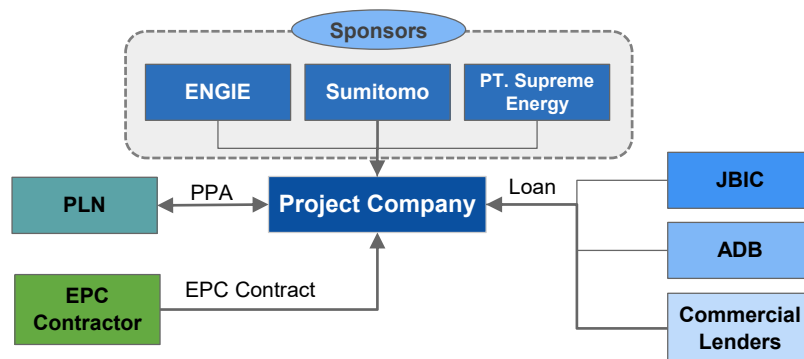
Mizuho acted as FA and Structuring Bank to the lenders for the Muara Laboh Geothermal Power Project

Project Overview (FC achieved in January 2017)

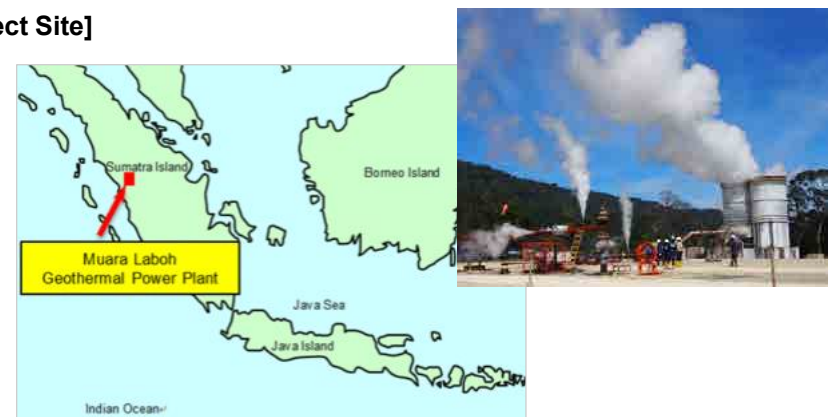
Borrower	PT. Supreme Energy Muara Laboh
Capacity	80MW
Sponsors	ENGIE, Sumitomo, PT. Supreme Energy
Project Cost	Approx USD580 million
Debt Amount	Approx USD440 million
Facility Type	Assuming a package of JBIC Direct Loan, ADB Direct Loan, ADB CTF, Commercial Loan with ADB or NEXI cover.
Lenders	Commercial Lenders, JBIC, ADB
EPC	Consortium of Sumitomo and Rekayasa (Turbine: Fuji)

- 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]



[Project Site]



3. Case Studies

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

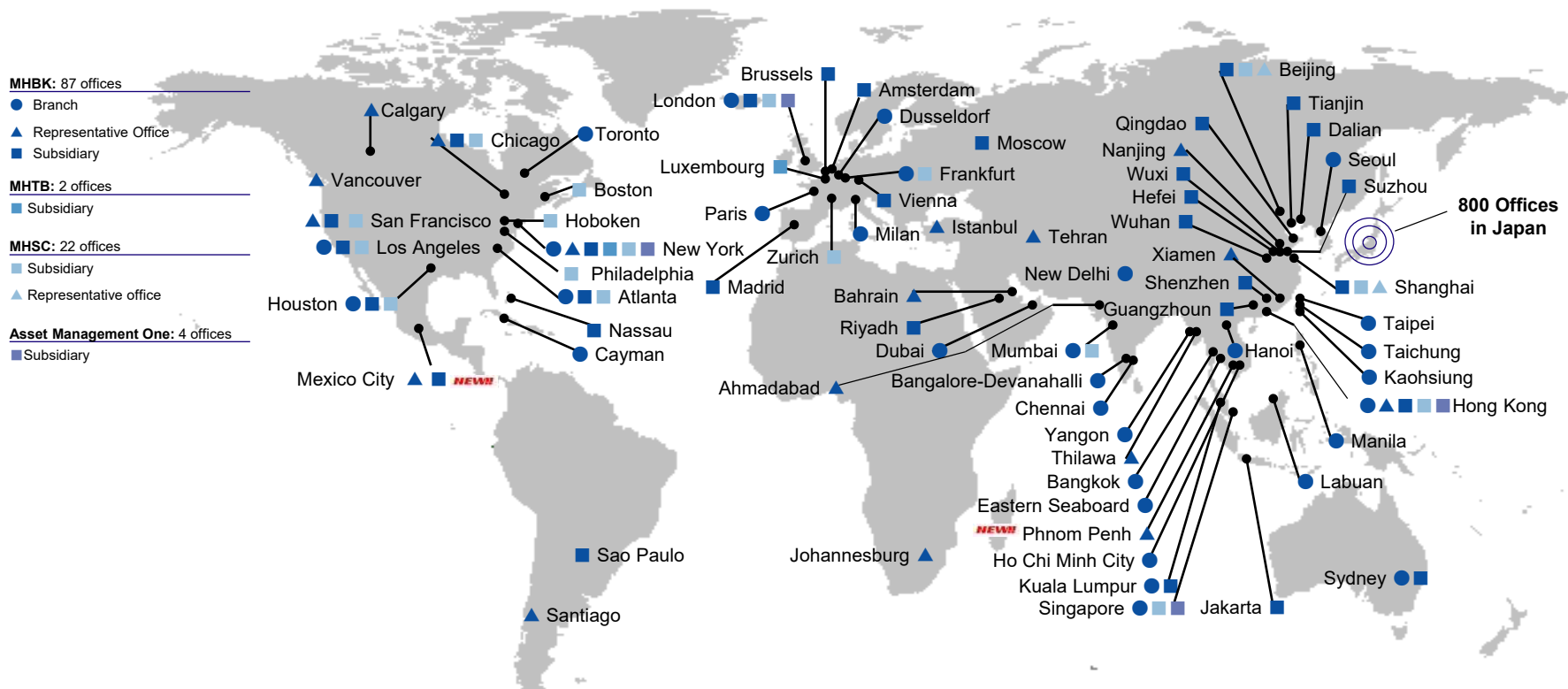
	2011	2012 - 2013	2014-2015	2015-2016
Milestone Events	<p>PPA Negotiation</p> <p>PPA was signed in March 2011</p>	<p>Reservoir Exploration Activities</p> <p>JBIC, ADB, CTF and NEXI Reserve DD</p>	<p>Tariff Negotiation with PLN</p> <p>Tariff Approval Process in GOI</p> <p>Tariff MoU was signed in February of 2015</p>	<p>Lenders' DD Documentation</p> <p>Signing in January of 2017</p>
Mizuho's Works	<ul style="list-style-type: none"> □ <u>Support PPA negotiation</u> ✓ Assist sponsors in negotiating the commercial terms of PPA with PLN 	<ul style="list-style-type: none"> □ <u>Support Lenders' Reserve DD</u> ✓ Assist sponsors in selecting JBIC, ADB and NEXI's reserve consultant. ✓ Assist JBIC, ADB and NEXI in conducting their reserve DD. 	<ul style="list-style-type: none"> □ <u>Lenders' Technical Due Diligence</u> <ul style="list-style-type: none"> ✓ 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 □ <u>Lenders' Reserve Due Diligence (substantially complete before key Milestone)</u> <ul style="list-style-type: none"> ✓ 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. 	<ul style="list-style-type: none"> □ <u>Facilitate Lenders' comprehensive DD</u> ✓ Due Diligence coordination for JBIC, ADB and NEXI as Structuring Bank. □ <u>Facilitate financing documentation</u> <ul style="list-style-type: none"> ✓ 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.



The Americas

- Canada**
 - Toronto
 - Vancouver
 - Calgary
- U.S.A.**
 - Boston
 - New York
 - Hoboken
- Philadelphia
- Atlanta
- Chicago
- San Francisco
- Los Angeles
- Houston
- Mexico**
 - Mexico City

- Brazil**
 - Sao Paulo
- Chile**
 - Santiago
- Cayman Islands**
 - Cayman
- Bahamas**
 - Nassau

Europe / Middle East

- United Kingdom**
 - London
- Germany**
 - Dusseldorf
 - Frankfurt
- Austria**
 - Vienna

- France**
 - Paris
- Italy**
 - Milan
- Spain**
 - Madrid
- Belgium**
 - Brussels

- Netherlands**
 - Amsterdam
- Russia**
 - Moscow
- Turkey**
 - Istanbul
- South Africa**
 - Johannesburg

- Iran**
 - Tehran
- Bahrain**
 - Bahrain
- UAE**
 - Dubai
- Saudi Arabia**
 - Riyadh

Asia / Pacific

- China**
 - Beijing
 - Dalian
 - Guangzhou
 - Hefei
 - Hong Kong
 - Nanjing
 - Qingdao
- Shenzhen
- Suzhou
- Tianjin
- Wuhan
- Wuxi
- Xiamen

- Taiwan**
 - Gaoxiong
 - Taichung
 - Taipei
- Korea**
 - Seoul

- India**
 - Ahmadabad
 - Bangalore
 - Chennai
 - Mumbai
 - New Delhi

- Singapore**
 - Singapore
- Vietnam**
 - Hanoi
 - Ho Chi Minh City

- Malaysia**
 - Kuala Lumpur
 - Labuan
- Indonesia**
 - Jakarta
 - Wuhan
- Philippines**
 - Manila

- Thailand**
 - Bangkok
 - Eastern Seaboard
- Myanmar**
 - Yangon
 - Thilawa

- Cambodia**
 - Phnom Penh
- Australia**
 - Sydney

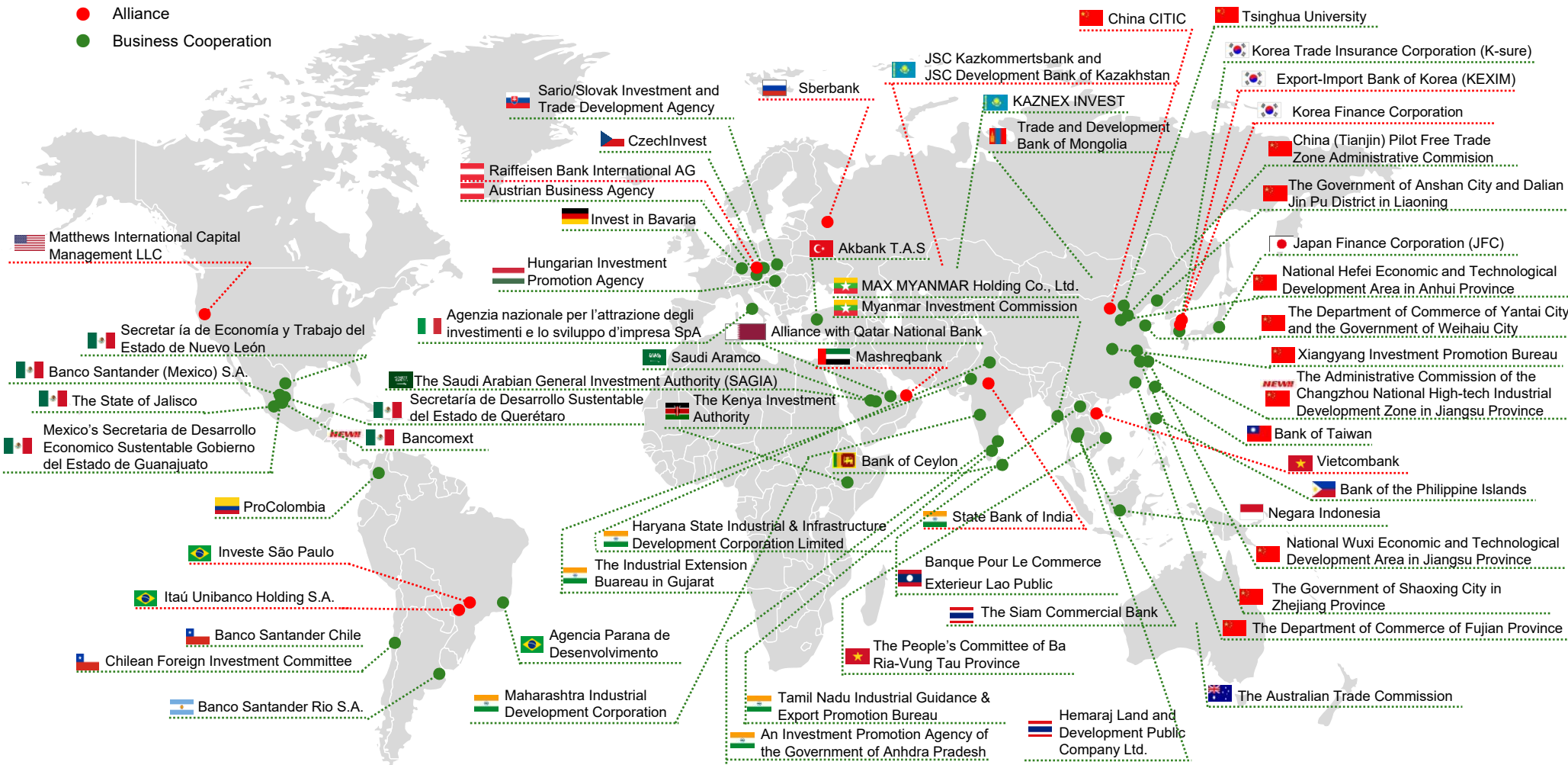
As of June 30, 2017

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



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

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Building the future with you

Thank You

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