

Roles and Activities of JOGMEC for the Geothermal Development in Japan



Japan Oil, Gas and Metals National Corporation

Mission

Secure constant and stable supplies of oil, natural gas and mineral resources to support industries and citizens in Japan through various activities relating these resources.

Activities

Oil & Gas
Upstream
Investment and
Research &
Development



Metals Strategy &
Exploration, and
Technology
Development



Stockpiling



Mine Pollution
Control



Coal Strategy &
Exploration, and
Technological
Support



Geothermal
Resources
Development



■ **Maximum target**

Promote the activation of domestic geothermal development

■ **Assignments**

- Financial supports for the exploration and development cost
- Reduce exploration risk (Geological aspect)

■ **JOGMEC implements three approaches**

- Financial supports
(Subsidy, Equity Capital, Finance, Liability Guarantees)
- Technology development
- Potential survey__Regional air-borne geophysical survey

Outline of Financial Assistance by JOGMEC

Potential Survey	Exploration	EIA	Development	Operation
<ul style="list-style-type: none"> - Geological Survey - Geophysical Exploration - Structural Boring 	<ul style="list-style-type: none"> - Drilling of Investigation Well - Discharge Test 	<ul style="list-style-type: none"> - Environmental Impact Assessment 	<ul style="list-style-type: none"> - Drilling of Production Well & Reinjection Well - Construction, Start-up & Commissioning of Power Plant 	<ul style="list-style-type: none"> - Commercial Operation <div style="border: 1px dashed black; padding: 5px;"> <p>Feed-in Tariff Scheme (FIT)</p> <p>Electric utilities purchase electricity generated from renewable sources</p> </div>  <p>Hatchobaru (Oita Pref.)</p>

Resource Risk

Financial Assistance provided by JOGMEC

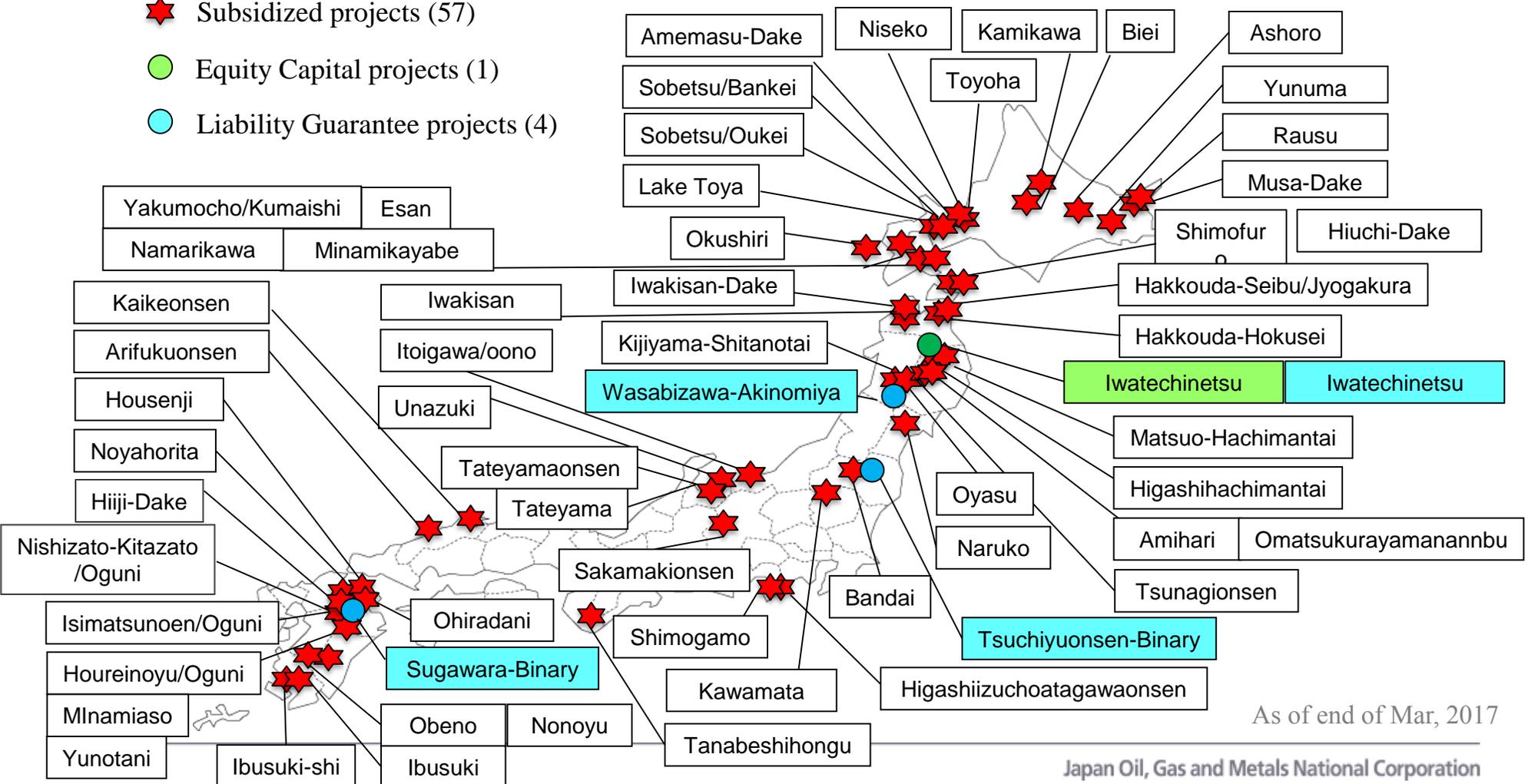
Subsidy	Equity Capital	Liability Guarantees
<ul style="list-style-type: none"> - Up to 50%~100% of necessary funds 	<ul style="list-style-type: none"> - Up to 50% of equity capital 	<ul style="list-style-type: none"> - Up to 80% of loan provided by financial institutions

Research & Development (Budget of JOGMEC : 1.0 billion yen (9.8M US\$))

Adopted Projects from FY2012 to FY2017

Currently, more than 40 exploration projects are on the road by electric companies, oil companies, mining companies, local government and other entities.

- ★ Subsidized projects (57)
- Equity Capital projects (1)
- Liability Guarantee projects (4)



As of end of Mar, 2017

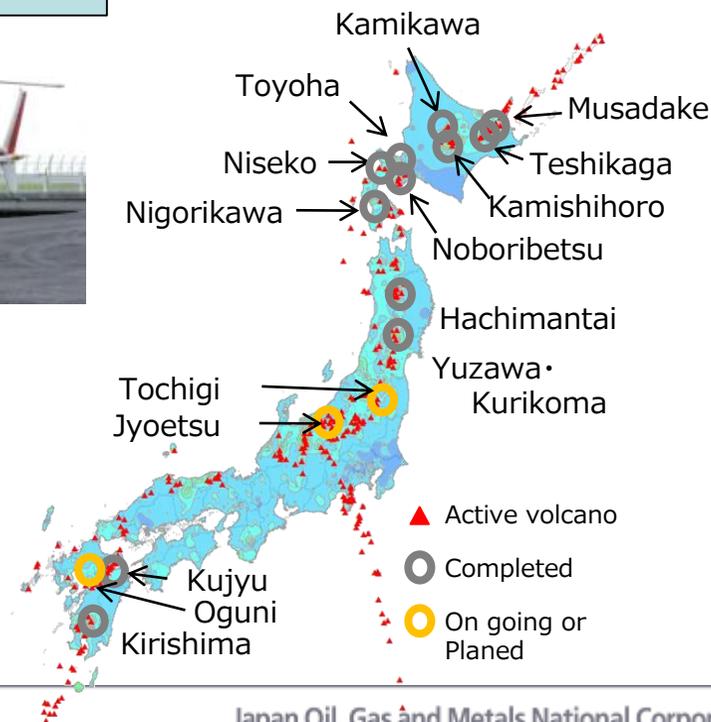
JOGMEC conducts heli-borne geophysical survey that aims to acquire basic data for the evaluation of geothermal resources in order to promote geothermal development start-up.

No limitation in national parks!

Time Domain Electromagnetic Survey (HTEM)



Air-borne Gravity Gradiometer (AGG)



➤ Artificial recharge by river water (EGS technology)

The research and development to stabilize the geothermal production by improving evaluation accuracy of fluid flow, and optimizing artificial recharge technique.



Yanaizu-nishiyama power plant

➤ Technology for Exploration of Geothermal Reservoirs

Improvement of exploration accuracy will be expected by applying the seismic method to image the geothermal reservoir structure by solving these issues.



➤ Drilling Technology

Develop the PDC* bit cutter and body for geothermal well drilling and conduct verification test in order to reduce a drilling cost.

*PDC : Polycrystalline Diamond Compact





Thank you for your attention!