

### Brief Overview of Geothermal Regulation in Japan

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#### 1. Introduction

Geothermal energy has increasingly attracted attention worldwide as a stable and low-carbon renewable energy source capable of contributing to energy transition and decarbonization goals. Unlike solar and wind power, geothermal energy can provide continuous baseload power generation, making it an important component of long-term energy policy.

Japan possesses one of the world's largest geothermal resource potentials due to its volcanic geography. At the same time, however, geothermal development in Japan has historically progressed more slowly than expected. This is partly because geothermal resources are often located near hot spring areas, national parks, and environmentally sensitive regions, resulting in complex regulatory and social considerations.

Against the backdrop of GX (Green Transformation), energy security concerns, and decarbonization policy, geothermal development has recently regained policy attention in Japan. Nevertheless, geothermal projects remain subject to multiple legal and regulatory frameworks involving environmental regulation, land use, hot spring protection, and infrastructure development.

This article provides a brief overview of the current status of geothermal regulation in Japan.

## 2. Policy Background and Energy Transition Context

In recent years, Japan has strengthened its policy focus on renewable energy as part of its commitment to achieving carbon neutrality by 2050.

Within this context, geothermal energy has increasingly been recognized as:

- a domestic energy resource;
- a stable renewable energy source;
- an energy security measure; and
- a potential contributor to regional economic development.

Compared with fossil fuel imports, geothermal energy may enhance Japan's long-term energy self-sufficiency. In addition, geothermal power generation is expected to complement intermittent renewable energy sources such as solar and wind power.

As a result, the Japanese government has promoted various measures designed to encourage geothermal exploration and development, including financial support, exploration assistance, and regulatory coordination.

## 3. Key Legal and Regulatory Frameworks

### 3.1. Hot Springs Act

One of the most distinctive aspects of geothermal regulation in Japan is its relationship with the Hot Springs Act.

Because geothermal resources are often located near hot spring areas (onsen areas), geothermal development projects may raise concerns among local hot spring operators regarding potential impacts on hot spring water supply and temperature.

Under the Hot Springs Act, prefectural governors regulate the drilling of hot spring wells and related activities.

As such, geothermal developers are normally required to obtain permission under the Hot Springs Act. In practice, geothermal developers are often required to engage in extensive consultation and coordination with local stakeholders and hot spring communities.

### 3.2. Natural Parks Act

Many geothermal resource areas in Japan are located within or near national parks or quasi-national parks. Accordingly, geothermal projects may become subject to regulation under the Natural Parks Act.

Activities such as:

- drilling;
- road construction;
- land modification; and
- infrastructure installation

may require approvals from environmental authorities depending on the location and scale of the project.

Historically, environmental restrictions under the Natural Parks Act were considered one of the major obstacles to geothermal development in Japan. In recent years, however, the government has gradually revised certain operational policies in order to facilitate renewable energy development while maintaining environmental protection.

Nevertheless, environmental review and coordination requirements remain significant practical considerations for geothermal developers.

### **3.3. Environmental Impact Assessment Act**

Large-scale geothermal development projects may also become subject to the Environmental Impact Assessment Act.

Environmental assessments may involve evaluation of:

- impacts on ecosystems;
- landscape and scenery;
- water resources;
- local communities; and
- biodiversity.

Because geothermal projects are often located in environmentally sensitive regions, environmental review procedures can become lengthy and complex.

As a result, environmental permitting and stakeholder engagement are important elements of geothermal project development in Japan.

### **3.4. Forest and Land Use Regulation**

Geothermal projects may additionally require compliance with:

- the Forest Act;
- land development regulations;
- agricultural land regulations; and
- local zoning and construction rules.

In mountainous areas, developers may also need to obtain permits relating to forest land development, erosion prevention, and infrastructure access.

Accordingly, geothermal projects in Japan typically involve coordination with multiple governmental authorities at both national and local levels.

## **4. Economic and Infrastructure Issues**

In addition to regulatory issues, geothermal development in Japan faces several economic and infrastructure-related challenges.

Geothermal projects generally require:

- substantial upfront exploration costs;
- long development timelines;
- geological risk assessments; and
- extensive infrastructure investment.

Moreover, exploration risks remain relatively high because geothermal resource conditions cannot always be fully identified before drilling.

To address these issues, the Japanese government and JOGMEC (Japan Organization for Metals and Energy Security) provide various forms of support for geothermal exploration and development.

In recent years, geothermal energy has also been discussed in connection with broader GX and energy security policy initiatives, particularly as Japan seeks to diversify its energy supply sources.

## 5. Growing Importance of Geothermal Energy in the GX Era

As global decarbonization efforts accelerate, geothermal energy is increasingly expected to play a more important role within Japan's energy transition strategy.

In particular, geothermal energy possesses several characteristics that are attracting renewed attention:

- stable baseload generation;
- domestic energy production;
- low carbon emissions; and
- compatibility with long-term energy security goals.

At the same time, balancing renewable energy development with environmental protection and local stakeholder interests remains a major policy challenge.

Accordingly, future geothermal regulation in Japan will likely continue evolving through a combination of:

- environmental regulation;
- energy policy;
- local coordination frameworks; and
- renewable energy promotion measures.

## 6. Conclusion

Japan possesses significant geothermal resource potential, and geothermal energy is increasingly recognized as an important component of the country's GX and energy transition strategy.

At the same time, geothermal development in Japan remains subject to a complex regulatory environment involving the Hot Springs Act, Natural Parks Act, Environmental Impact Assessment Act, and various land use regulations.

Because geothermal projects frequently intersect with environmental protection, local community interests, and infrastructure development, legal and regulatory coordination remains a critical issue for project implementation.

As Japan continues pursuing decarbonization and energy security objectives, geothermal regulation is likely to remain an important area of legal and policy development in the coming years.

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