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Domestic Exploration & Production Division East Japan Regional Office Nagaoka Field Office

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INPEX

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Nagaoka Field Office Profile



INPEX, a natural gas company

Operations in Japan and around the world

INPEX CORPORATION (INPEX) is an energy development company engaged in oil and natural gas projects on a global scale. Through the exploration, development, production and supply of crude oil and natural gas, INPEX strives to meet the energy needs of Japan and countries around the world. At INPEX, we continue to pursue our challenges every day.



Global Operations

INPEX is involved in oil and natural gas projects across more than 20 countries, including Japan.



The oil and natural gas supply chain from exploration to delivery

INPEX is consistently involved in all aspects of the oil and natural gas business, from exploration and drilling to production and distribution.

1. Exploration

Oil and natural gas lying beneath the earth's surface is explored using the latest technology.



2. Drilling

To extract oil and natural gas, production wells are drilled using drilling rigs.



3. Development

The extracted oil and natural gas is refined and processed.



4. Transportation

Oil and natural gas products are delivered to city gas companies and industrial customers.



Responding to Japan's Energy Challenges from Nagaoka and Niigata Prefecture

Japan's largest natural gas field is in Niigata Prefecture. In prehistoric times when the Japanese archipelago was below the sea surface, lava emitted from the eruption of a submerged volcano was cooled by seawater and turned into a volcanic rock formation. This formation evolved into a natural gas reservoir that today lies deep below the Nagaoka area. Niigata Prefecture boasts Japan's largest natural gas production volume and reserves, most of which is attributed to Nagaoka. INPEX will continue to provide a stable supply of natural gas in support of Japan's energy security.



1 Koshijihara Plant



The Koshijihara Plant commenced production operations in 1984 and currently has a gas processing capacity of 4.2 million m³ per day, which is among the largest in Japan. The plant engages in electrical power generation in addition to natural gas and condensate production, making it unique among energy facilities in Japan.

2 Oyazawa Plant



The Oyazawa Plant, which has been operational since 1994, was constructed to meet rising domestic demand for natural gas and to establish a stable supply infrastructure. Currently, the plant's gas processing capacity is 1.66 million m³ per day.

3 Well Sites



Multiple well sites are each equipped with a production well to produce oil and natural gas. To withstand heavy snow during winter, the wellheads are protected inside solid, snow-proof structures.

(Photo: Minami-Asahihara Well Terminal)



Christmas Trees

Christmas Trees are safety devices mounted on production wells to ensure the controlled production of oil and natural gas. They are so named because their numerous valves give them the appearance of Christmas trees.

4 Sekihara Plant



The Sekihara Plant was built to inject natural gas into the Sekihara Gas Field, a depleted gas reservoir situated north of the Minami-Nagaoka Gas Field that is used to store natural gas. The plant also provides the stockpiled natural gas when necessary.



Minami-Nagaoka Area

Deposits of natural gas lie underground beneath this entire area.

- = Well terminal
- = Pipeline
- 1** = Koshijihara Plant
- 2** = Oyazawa Plant
- 3** = Well terminal: Minami-Asahihara Terminal
- 4** = Sekihara Plant



Japan's largest natural gas reservoir underground offers considerable potential.

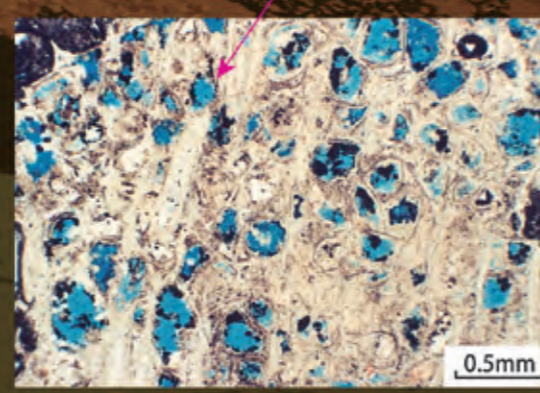
Numerous formations lie underground beneath INPEX's operating site in Minami-Nagaoka. Of these, the Green Tuff formation lying between 4,000 and 5,000 meters underground houses a giant natural gas reservoir six kilometers long, three kilometers wide and one kilometer deep—Japan's largest. Natural gas produced in Niigata Prefecture has the potential to contribute to the stable supply of energy to Japan and create the power that will support the country for many years.



Photomicrograph of Green Tuff Reservoir Rock

The Green Tuff Formation got its name from the green colored appearance of the accumulated rocks. There are many "pores," or gaps, in which natural gas and oil have accumulated. The fine-grained Nanatani Formation covering the Green Tuff Formation acts as a lid trapping natural gas and oil to form the reservoir.

※ Photo: The pores (filled with blue resin) are saturated with natural gas.



Producing Natural Gas Rig — Drilling machinery and equipment used for drilling wells

Wells are required for the production of crude oil and natural gas. To drill deep into the ground, a steel tower called a derrick is installed, and drilling is performed by connecting numerous long drill pipes. The derrick is equipped with machinery and equipment needed for drilling operations, and these are collectively referred to as a rig.



Drill Bit — Drill heads used to cut through bedrock

A special drill head called a drill bit is attached to the end of drill pipes. Rotating the drill bit under the immense weight of the drill pipe perforates the hard bedrock.



The History of Natural Gas Development in Niigata Prefecture



Photo: Shin-Sekihara Well No.4 undergoing a natural gas production test in 1979

INPEX started developing oil and natural gas in Niigata Prefecture in the 1950s. Later, as exploration work was carried out in Kubiki, Kashiwazaki and Nagaoka, the Minami-Nagaoka Gas Field was discovered in 1979. As a result of various technical studies, the Minami-Nagaoka Gas Field was determined to have the largest reserves and production capacity in Japan. In 1981, a production well was drilled and a natural gas production processing facility was constructed. In 1984, the Koshijihara Plant finally started production operations. In addition, development work started in the Oyazawa area to meet the growing demand for natural gas. In 1994, the Oyazawa Plant was constructed and the supply of domestic natural gas was enhanced dramatically. Today, a production system is in place to safely and stably supply oil and natural gas to customers 24 hours a day, 365 days a year. Looking ahead, INPEX will continue to strive to be a key player in natural gas development and supply.

Transforming Japan's largest natural gas development site into an integrated energy operation

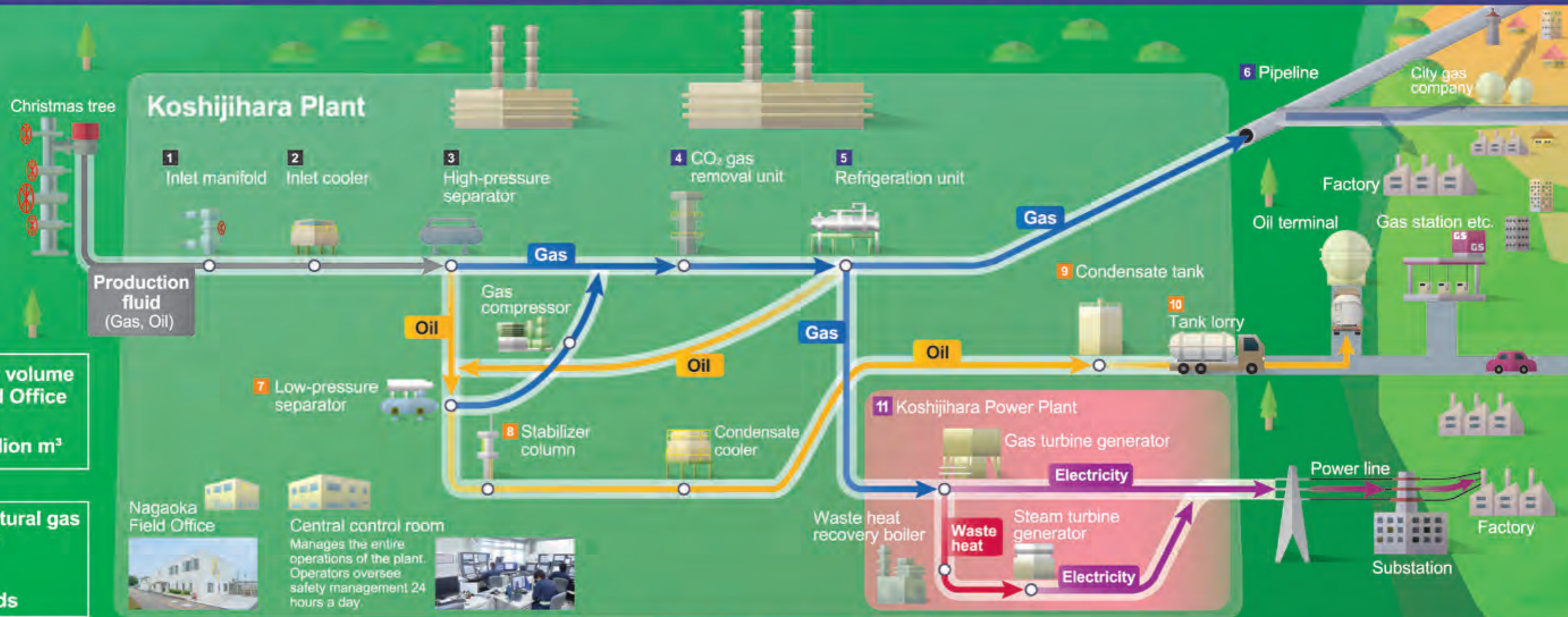
The Nagaoka Field Office continues to develop, produce and supply natural gas and associated condensate, a very light crude oil. The field office also engages in various other operations including the reutilization of depleted gas fields and natural gas-fueled power generation operations. It is essentially an integrated energy operation built around natural gas.

Daily natural gas supply volume from the Nagaoka Field Office

Up to **5.2 million m³**

Equivalent to the daily natural gas consumption of

2.6 million average households



Flow of production fluid (Gas, Oil)

1 Inlet manifold



Collects production fluid (oil, gas, etc.) from well terminals around the plant.

2 Inlet cooler



Control the temperature of production fluid to the optimal level for processing.

3 High-pressure separator



Separates production fluid into gas, oil and water.

Flow of Oil

7 Low-pressure separator



Separates gas, oil and water through further pressure reduction.

8 Stabilizer column



Heats and adjusts steam pressure to safely transport oil by tank lorry.

9 Condensate tank



Stores oil produced at the plant.

Flow of Gas

4 CO₂ gas removal unit



Removes carbon dioxide from gas using amine solutions.

5 Refrigeration unit



Cools and adjusts the dew point of gas to safely introduce gas into the pipeline and prevent the accumulation of liquid inside the pipeline.

6 Pipeline



Transports refined and treated gas to city gas companies and other users.

10 Tank lorry



Transports oil to the oil terminal.

11 Koshijihara Power Plant



Output: Approximately 55,000kWh

A natural gas-fueled gas turbine combined cycle thermal power plant is located adjacent to the Koshijihara Plant. Since 2007, INPEX has been supplying electricity to retail power companies. The generated electricity is distributed to the substation via a dedicated power line.

Natural Gas Trunk Pipeline Network

Ensuring the safe and stable supply and distribution of natural gas

INPEX

INPEX distributes natural gas produced in Niigata Prefecture combined with re-gasified LNG (liquefied natural gas) from overseas to customers in Niigata as well as Tokyo and seven other prefectures through its natural gas trunk pipeline network via the Naoetsu LNG Terminal. INPEX ensures the safe and stable supply and distribution of natural gas produced in Niigata Prefecture through its network of pipelines, an important lifeline for the local and regional communities.

Social Contribution Activities

Working closely together with Niigata now and into the future.

The exploration, development, production and supply of oil and natural gas can only be accomplished by working closely together with the local community. As a company with strong ties to Niigata, INPEX will continue to be involved in local activities.



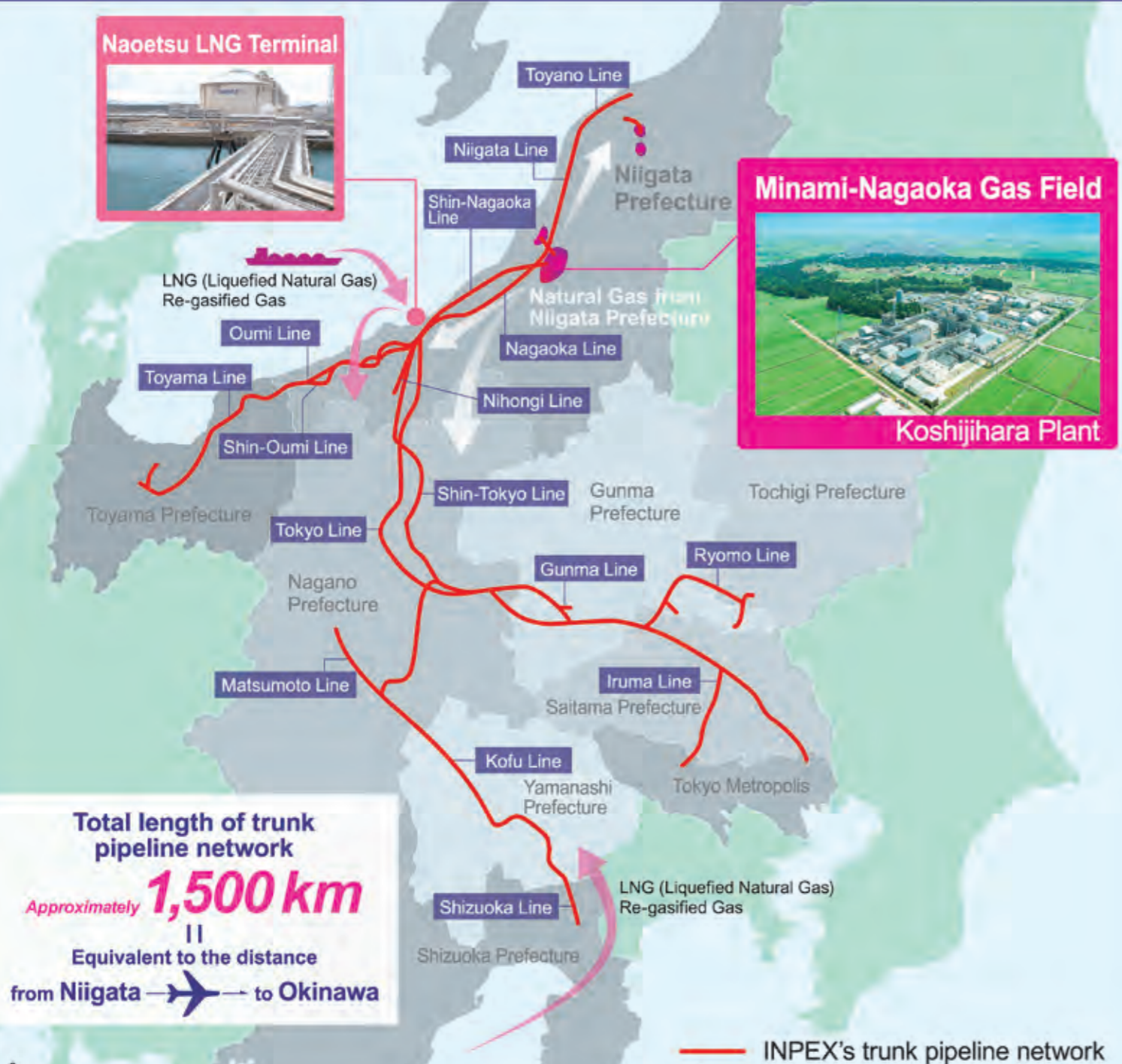
Naoetsu LNG Terminal



Minami-Nagaoka Gas Field



Koshijihara Plant



Kitsunedaira Donguri-no-Mori (Forest Management) Project [Biannual]



Twice a year, in spring and autumn, INPEX develops and nurtures relations with the local communities through forest management activities aimed at creating a forest blessed with an abundance of acorns and mushrooms.

Nagaoka Fireworks Festival



INPEX supports the Nagaoka Fireworks Festival as an official partner and annually sponsors the shosanjakudama, a particularly large and vivid firework that lights up the night sky of Nagaoka. INPEX will continue to honor its strong commitment to the local community.

Youngsters' Science Festival



INPEX sponsors and participates in the Niigata Prefecture edition of the "Youngsters' Science Festival," which aims to inspire children and nurture their interest in science.

Festival of Light



During firefly season (early summer), the Koshijihara Plant is included as a scenic stop on organized tours of the Koshiji landscape.