Feature Meeting Problem-Solving Needs around the World

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MEGANINJA: A Solution to Energy Demands for Distributed Power Generation Systems

Sales of MEGANINJA, MHI's container-configured gas engine power generation system, began in June 2012. MEGANINJA can begin generating power within 24 hours of delivery, and — as a distributed power generation system — is attracting attention for its ability to rapidly meet power supply demands in regions with insufficient power generation infrastructures and emergency power supply demands in developed countries.

"Quick mobility, quick installation, quick commissioning!" for regions with insufficient power generation infrastructures

Many emerging countries still have regions where power grids and other infrastructure are unable to keep pace with growing demands for power. In China, the government has announced plans to introduce distributed power systems with a total output of 50GW* by 2020. Meanwhile, developed nations are working to popularize distributed power systems, which are energy efficient and disaster resistant, and are working towards the construction of smart communities in which such systems are a prerequisite.

Looking to raw materials and fuels, the soaring price of crude oil, vast natural gas reserves identified in Africa, and the extraction of shale gas in the U.S., all seem to forecast the further popularization of natural gas. In addition, natural gas is well-suited for co-generation systems–the high-efficiency energy systems that use heat and steam as well as electricity.

In response to these factors, MHI developed the MEGANINJA, a distributed power system run on natural gas, and began marketing it in June 2012. The MEGANINJA, a package product consisting of a 1.5 MW gas engine, generator, oil tank and control console loaded into an ISO 40-foot (approx. 12m) container, is capable of generating power soon after being transported to its installation site by trailer. It can also accommodate cogeneration system through simultaneous use of a 20-foot container for waste heat recovery, and with its quick transport, quick installation and quick commissioning, is able to promptly respond to power and heat demands in any area.

A mobile power plant: all the equipment necessary for power generation packaged in an ISO 40-foot container.

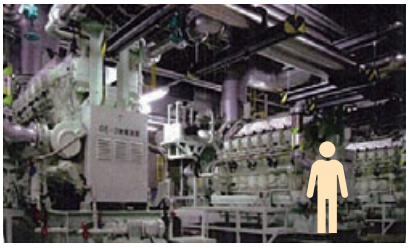
In July 2012, the first two MEGANINJA units were delivered to a Chinese gas company, Dongguan Xinao Gas, where they are being used as backup power sources during interruptions in the power supply. There is also growing interest from regions in other countries with insufficient infrastructures, and from corporations in developed countries examining countermeasures for power peaks as part of their BCPs (business continuity plans).

* GW: Gigawatt, or 1,000,000,000W.
The generating capacity of an average nuclear power plant is 1GW.

Power generation within 24 hours, maintenance within 24 hours

Installation of conventional gas engine power generation systems takes approximately 30 days before the system is operable. With the MEGANINJA, all necessary equipment has been packed into the container in advance, and simple coupling units are used for wirings and pipings. Even if several containers are being installed, this configuration makes it possible to "just set them down" and begin power generation within 24 hours of delivery. In addition, when a unit requires major repairs, it may be exchanged with another unit, and this process takes merely 24 hours.

Conventional gas engine power generation facility

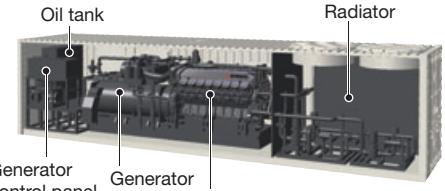


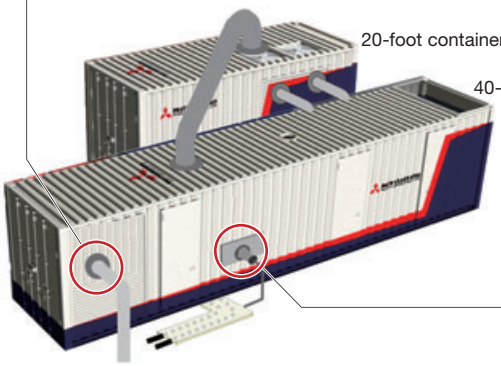
Quick setup method –"just set it down"

Gas piping connections

Gas piping connection simplified with camlock fittings

MEGANINJA's all-in-one configuration structure

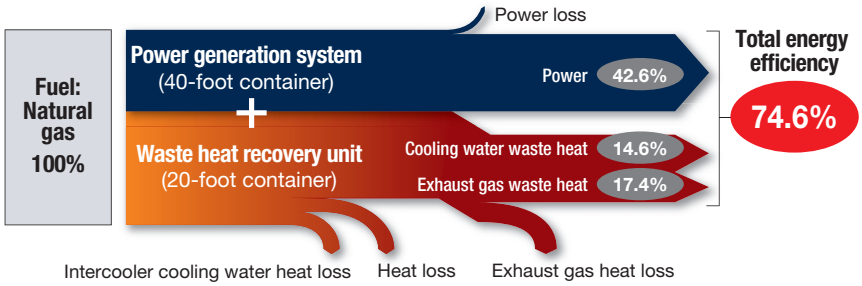




Cable connections

Wiring connections simplified with quick connector

Cogeneration raises total energy efficiency to 74.6%



High power generation efficiency (42.6%), low NOx concentration (200ppm and less than 200ppm)

A Miller cycle gas engine, in which the expansion ratio is larger than the compression ratio, enables the achievement of a 42.6% power generation efficiency rating. In addition, electronic control results in optimal mixing of fuel and air, maintaining NOx density within 200ppm without after treatment.

Heart of the MEGANINJA: a high-efficiency Miller cycle gas engine

Responding to diverse global needs for distributed gas power generation systems

Stable power supplies are in demand around the world, including China and Southeast Asia. MHI responds to these diverse global needs with its distributed gas engine power generation systems.

June 2012: MOU signed with China Huadian Corporation on development of advanced technology for distributed power generation systems and their commercialization.

July 2012: First and second MEGANINJA units delivered to China's Dongguan Xinao Gas.

July 2012: Delivered a sample GS16R2-PTK generator set to Russia.

October 2012: Gas Engine Distributed Power Generation Engineering Center established in Shanghai, China.

April 2013: Stationary gas engine generator set delivered to Dongguan Xinao Gas.

July 2013: MEGANINJA installation at MHI's Machine Tool Headquarters (Ritto) for electricity peak-cut during summer.

Left: Director Ying of China Huadian Electric Research Institute
Right: (Then) MHI Executive Vice President Tsukuda

Signing of MOU with China Huadian Corporation on distributed power generation systems in June 2012

Voice Expectations of MHI

Expectations for MHI's continued contributions to natural gas power generation in Dongguan City, China

We supply natural gas to China's Dongguan City, a city famous for its manufacturing industry. In China, environmental problems caused by coal use are worsening, and clean natural gas power generation, which is gentle on the environment, is seen as promising. Power demands in Dongguan City are on the rise due to economic development, while planned power cuts are being implemented because of chronic power supply insufficiencies. As a result, I found the MEGANINJA appealing; it runs on natural gas and can be promptly installed in areas where power is insufficient. I feel that MHI is putting its total strength into the natural gas power generation business in Dongguan City, and I look forward to continuing our partnership with them in the future.

Dai WenDe
Former CEO,
Guangdong Dongguan XinaoGas