

The Distributed Power Generation Ace

MEGANINJA Goes Global

Quick Mobility, Quick Installation,
Quick Commissioning!
Container-Configured Gas Power
Generation System Transported by Trailer



On-site installation crew



MEGANINJA delivered to Dongguan City (for Dongguan Xinao Gas)

Shifting Towards Distributed Power Generation

In many developing countries, power grid expansion has been unable to keep pace with rapid economic growth, leaving some regions with insufficient power supply. Meanwhile, in developed countries, a shift is underway towards a low-carbon, high-efficiency next-generation energy infrastructure based on smart community concepts.

Both Asia and Africa have recently seen remarkable economic growth, but in both regions, the lack of power is a growing

concern. Securing a stable power supply is an urgent priority in China where consumer markets are exploding, and in Thailand and Indonesia where an influx of global companies is taking place. Vast natural gas reserves discovered in Algeria and Nigeria are raising hopes for gas-fueled power generation.

Against this background, gas engine distributed power generation systems are attracting attention. Small-scale power generation systems can be installed in individual consumer areas where power is needed, serving as "local production for local consumption" energy resources. They

require no massive power grids and are not only cost saving and quick to install, but also offer the advantage of reduced energy loss through transmissions. Naturally, potential risks of large-scale power generation systems are averted.

Abundant stores of natural gas – the system's main fuel source – exist around the world, making it the most readily available fuel for a stable power supply. Moreover, of all fossil fuels, it produces the lowest emissions when burned and offers a clean energy alternative from an environmental perspective.

The Small Mobile Power Plant MEGANINJA Heads Overseas

The issue of power instability is becoming apparent worldwide. As one solution, MHI has developed a natural gas engine distributed power generation system: the container-configured "MEGANINJA". In July 2012 the first two units were delivered to Dongguan City, an industrial area in China's Guangdong Province, for use as a backup power system to keep factories running in case of power blackouts from excess demand in the summer.

MEGANINJA is an ISO 40-foot container packed with all equipment necessary for power generation. It can be loaded onto a trailer and quickly taken to wherever needed. It is, so to speak, a mobile power plant. Pipes and wires can be connected in a single step, and installation takes no time at all. The power generation unit is mounted with an engine that runs on natural gas, and as long as the gas pipes and wiring are ready, power generation can begin within 24 hours of the container's arrival. This is the first system in the world to compress conventional installation time of up to one month down to one day.

The system can also accommodate cogeneration through simultaneous use of a separate waste heat recovery unit that increases energy efficiency by harnessing the exhaust gas

*MEGA: Mitsubishi Energy Gas Package

New Engineering Base Opens Up New Distributed Power Generation Markets

On October 1, 2012, MHI established a new base in Shanghai for its distributed power generation business: Gas Engine Distributed Power Generation Engineering Center.

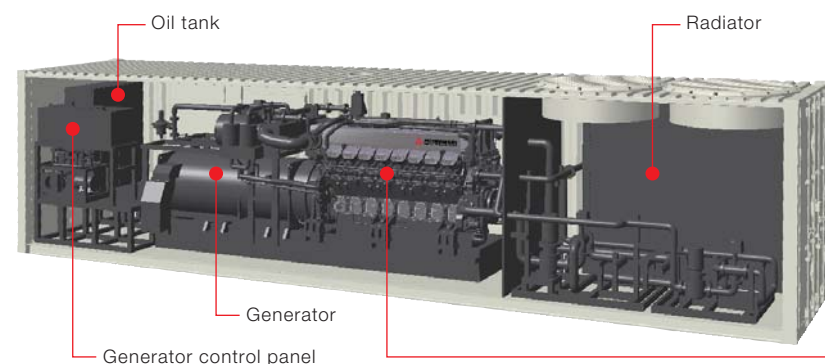
The Center offers engineering, sales and after-sales service functions with the intent of advancing and expanding the market. Internal sections include system engineering and energy solution business consulting, where effective systems tailored to customer needs are formulated, and a monitoring center that supports the administration of delivered systems.

In the U.S. where galvanized by its shale gas revolution, in Africa and other countries with abundant natural gas resources, and for virtually everyone around the world waiting for a stable power supply, the possibilities for distributed gas engine power generation expand into the future. MHI's challenge to the energy growth market has only just begun.



Gas Engine Distributed Power Generation Engineering Center (Shanghai, China)

MEGANINJA main equipment



Heart of the MEGANINJA: a high efficiency gas engine (1,500kW)

MEGANINJA: The Compilation of MHI's Engine Technology

MHI is one of the few manufacturers in the world who produces a wide lineup of engines in-house, ranging from engines for power generation to those for ships, vehicles, aircraft and rockets. MEGANINJA is the crystallization of MHI's total engine technology and expertise.

During development, the tricky part was designing a layout in which all five pieces of equipment – gas engine, generator, radiator, generator control panel and oil tank – would fit inside a 40-foot container. To realize this, we had to optimize their relative positions and scale down the equipment itself. With the radiator, for example, we reviewed the position of the cooling fan and halved its length by increasing the air volume. To facilitate maintenance and replacements, we also made the equipment self-contained so that each component could be individually accessed.

We delivered and installed the units (in Dongguan City) in July. Since this was our very first installation, there were a few things that didn't go well initially.

However, following a series of intensive meetings with the customer (Dongguan Xinao Gas) and staff from local associated companies, we pooled our mutual expertise to resolve these issues and managed to make up for lost time. As a result, we were able to make good on our promise of power generation within 24 hours of arrival, and for this the customer offered a heart-warming "thank you."

China plans to introduce gas engine distributed power generation systems with a total output of 50GW by the year 2020. With the establishment of the Gas Engine Distributed Power Generation Engineering Center in Shanghai to solidify our foothold in the Chinese market, we would then like to advance into the global market.



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