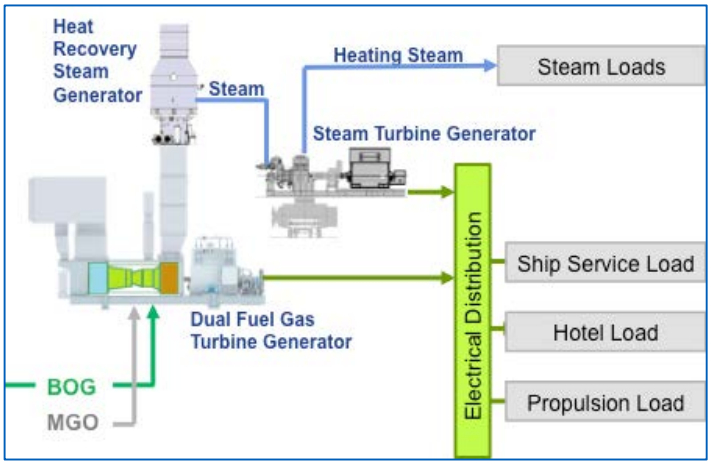
# GE COmbined Gas turbine Electric and Steam (COGES) System: By the Numbers




Typical GE COGES arrangement for LNG tankers, container ships, ferries, cruise ships and other commercial ships.

## $1+ million per year savings over 20 years

The standard 174,000 cubic meter liquefied natural gas (LNG) carrier design using GE's COmbined Gas turbine Electric and Steam (COGES) system offers savings calculated at about US$20 million over the life of the ship.

**100% ship power and propulsion and 99% reliability**
Efficient and reliable COGES system provides for all ship power and propulsion needs. The GE gas turbine is dual fuel capable and fuel flexible. For instance, it can operate either on an LNG carrier's cargo of Boil Off Gas (BOG) or on Marine Gas Oil (MGO).

**$400,000 per year cost OPEX reduction**
With little crew required underway, COGES makes possible this savings via the reduction of four licensed crew members versus diesel-powered ships.

**4,000m$^3$ additional LNG cargo space**
Hudong-Zhonghua Shipbuilding Co. Ltd.'s 178,000m$^3$ COGES LNG carrier design will provide additional LNG cargo space versus a traditional 174,000m$^3$ LNG carrier powered by dual fuel engines.

**40% lighter with a 60% smaller footprint**
A gas turbine-based system versus a medium speed diesel system produces the same power but within a much smaller space. Gas turbine propulsion arrangements onboard a ship require reduced structural steel to support the system within and free up more revenue generating payload space.

GE Aviation (Cincinnati, OH)
www.ge.com/marine

**Imagination at work.**

(8-18)

# GE COmbined Gas turbine Electric and Steam (COGES) System: By the Numbers

**0 methane slip, no pilot fuel and exhaust after treatment equipment**
Along with these cost-savings, a COGES system has negligible lubricating oil consumption.

**45 state rooms on *Queen Mary* 2 cruise ship**
Gas turbines placed inside the exhaust stack at the top of the world's largest transatlantic liner opened up additional space in the hull below.

**300 man-hours per year**
Maintenance of the COGES system is easy, requiring minimal crew.

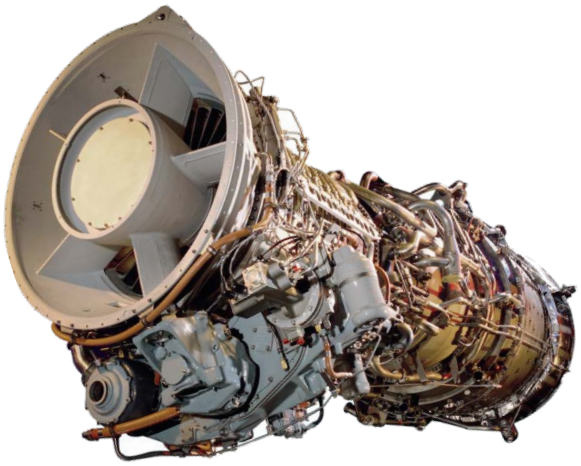
**24 to 48 hours**
The entire turbine can be removed onboard and replaced to reduce downtime, and with minimal interruption to ship operations.

**90 marine gas turbines delivered for commercial ships**
GE engines operate on 17 cruise ships (8 with COGES arrangements), 19 fast ferries, 8 fast cargo ships and 5 high-speed yachts in various propulsion configurations.

**70 million hours**
GE gas turbines operating on gas -- more than 21 MILLION of those hours on dual fuel-equipped engines -- both on and offshore.

**35 navies globally**
Some 1,500 GE marine gas turbines power nearly 600 military ships, logging some 15 million operating hours.

GE marine gas turbines meet Tier III IMO/Tier 4 United States Environmental Protection Agency $NO_x$ requirements today....all the while providing owners and operators with a flexible design and reduced life cycle costs.



GE's 25.1 MW marine gas turbine

GE Aviation (Cincinnati, OH)
www.ge.com/marine