GE Power Conversion
Naval Electric Power, Propulsion & Energy Systems

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We are Power Conversion, GE’s electrification business

**Segments**
- Energy and E-Infrastructure
- Marine and Oil & Gas
- Process Industries & Mining

**Solutions**

**ELECTRIFICATION CAPABILITY**
- Motion: Electricity Generation: Power Quality & Distribution

**DIFFERENTIATORS**
- AC & DC Advanced Architectures,
- LV and MV System Engineering,
- Power & Energy Management, Digital Solutions
Naval hybrid and full electric drive

Integrated full electric propulsion (IFEP) and hybrid electric drive (HED).

From ASW surface combatants to the latest fast fleet support tankers.
GE integrated electric power & propulsion – complete scope

Prime Mover

- Switchboards
- Harmonic Filters
- Motor Control Centres

Electrical Equipment

- Propulsion Drives
- Auxiliary Drives
- Active Filters
- Link Converters
- DC Architectures

Power Electronics

- Propulsion Motors
- Generators
- Linear Machines
- Energy Storage

Electrical Machines

- Power Management
- Control & Automation
- Distribution
- Vessel Management
- Damage Control
- Dynamic Positioning
- Autonomous systems

APM & Energy Optimizer

GE’s System Integration

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Trusted by the world’s leading navies

1,400+ vessel references across GE’s Marine Solutions

Naval electrification specialists

600+ Naval ships

118 naval electric & hybrid references

15 leading navies

30 classes of electric & hybrid naval ships

170+ Passenger & Transport

800+ Offshore

More references than any provider.

Powering and propelling over 90% of the UK Royal Navy and RFA fleet. (major vessels)

The only electric propulsion drive systems (IFEP) at sea on US Navy ships.

IFEP – integrated full electric propulsion

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The only electric propulsion systems at sea on US and UK Navy ships.
Up to 65,000T.
Up to 110MW.

Eight classes of hybrid and electric logistic support ships for six navies.
Why electrification?
Solution options to achieve mission capability

Energy is one of the biggest enablers of technology advantage and mission success.
Mission trends impact on future ship’s power & energy system

- Shift to higher voltages and efficient architectures in a single, smart, connected power network
- Integrating propulsion and ship service for maximum mission flexibility, facilitating power growth
- Availability for different types of loads – pulsed, slow speed, rapid acceleration
- Intelligent use of a mix of energy sources, including stored energy and new clean tech insertion

"… The age of the electric ship….Buy as much power as you can afford because it’s like RAM on your computer, you’re going to need more as soon as you buy it.”
Adm John Richardson, US Navy

New combat and mission systems, inc DEW and sensors
Enhanced connectivity needs
Reduced manning & remote operations
Flexibility for multi-roles or environments
Benefits of integrated electric propulsion systems

IFEP by GE.

Powerful, flexible, future-proof
- Max e-power capability
- Max operational and design flexibility and resilience
- Power for future growth
- Best overall fuel & energy efficiency
- Balanced energy supply & demand
- Versatile configuration & layout in platform, especially for survivability
- Shock rated, power dense
- GE control, automation and intelligent power management for true system integration

GE Power Conversion - Naval Electric Propulsion Experience

ESB Credit: US Navy
Naval integration and proving...

GE’s ‘SQEP’* people are qualified and experienced in naval performance standards.

Providing systems that are fit for naval missions and survivability.

High performance motors, drives, and control and automation working together as a system

- Shock proof motors
- Shock proof LV PTO/PTI drives
- Shock proof MV drives
- Shock proof MV switchboards
- Shock proof transformers
- Shock proof automation
- Signature performance and management

*Suitably qualified, experienced personnel
Designing and proving **both hybrid and electric** systems to realize energy efficient architectures.

Integrating systems to manage electrical-mechanical interfaces and load effects

Test and emulation to reduce risk ahead of sea trials

...In GE’s dedicated Marine Power Test Facility (MPTF)

**Unique global facility**

Naval centre of excellence (COE)

Extended to bring in GCS systems

Platform for new technology evaluation and introduction

Evaluate upgrades and modernisations ahead of installation

Customer training, inc USN DDG 1000 crew
Ready to support navies’ next stage of transformation.