Integrated Power and Energy System for Research Vessels
Milestones of a 170 Year History

1816 – 1892
Company founder, visionary and inventor

1866
The dynamo makes electricity part of everyday life

1959
SIMATIC makes Siemens a leader in automation technology

1983
First magnetic resonance imaging scanner goes into operation

2012
Test operation of the world’s largest rotor for offshore wind turbines

Werner von Siemens

1847
Pointer telegraph lays the foundation of Siemens as a global company

1925
Siemens electrifies the Irish Free State with a hydroelectric power plant

1975
Breakthrough of high-voltage direct current (HVDC) transmission

2010
TIA Portal takes automation a stage further

2016
World’s most efficient combined cycle power plant
Siemens’ Excellence in the Global Marine Market

Leader in technology with 165 years of engineering, innovation, quality, and reliability

Proven History
• 1879 - World’s first company to electrify a ship
• 1886 - Built world’s first ship with electric propulsion
• 1900s - Specialized in marine design, manufacture and commissioning of automation, electrical and propulsion solutions worldwide

Siemens Today
• Leader in advanced diesel-electric propulsion systems
  • Over 260 vessels in operation worldwide
Elektra – 1886 The Vessel Without a Chimney
Naval & Commercial Ships – Siemens Marine Portfolio

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Evolving Maritime Environment

Current Challenges
• Environmental concerns
• Cost savings
• Safety
• Increased complexity of shipboard systems

Owners are demanding higher rates of return on investment, and both operators and passengers require safe vessels with low noise and vibration
Industry Response that Meet the Challenges

Innovative propulsion systems:
• Variable-speed Diesel-electric
• Hybrid
• All-electric vessels

Condition Monitoring Systems

Product Lifecycle Management (PLM) Software
Applying Existing Technology to Maritime Industry
Siemens Integrated Diesel Electric Systems
Noise and vibration are cut significantly by reducing speed at any load below rated power.
Variable Speed System Fuel Savings

Fuel consumption is dramatically reduced at low loads for variable-speed gensets compared to fixed-speed gensets.

This is a large benefit while the vessel is performing scientific operations.
DC system increases efficiency for battery operation

• Higher efficiency compared to AC system

• Addition of ESS/Batteries can significantly alter and improve vessel operations
  • All electric propulsion for noise sensitive and emission-free operations
  • Peak shaving- less speed variation, ability to reduce size of engines
  • Spinning reserve - generator bridging and no idle back up generator running
  • Safety power back-up - Power to maintain position and operation until power is restored, or safely terminate operation in case of power loss
Reduced Footprint

DC systems provide streamlined operations with smaller mechanical footprint

- Eliminate transformers
- Drives are centrally located instead of all over the vessel
- Approximate space savings of 30%
Siemens BlueDrive PlusC
Variable Speed System (BlueDrive PlusC) Snapshot

Environmental value
• Reduction of fuel consumption in all operating conditions
• Reduction of CO₂
• Zero emission operation

Key feature
• DC power network
• Variable speed of generators
• Easy integration of alternative energy sources
• Completely integrated electrical system

Scope of supply
• BlueDrive PlusC frequency converter
• Power management/power plant protection
• Batteries
• LV propulsion motors/generators

Customer benefit
• Improved overall efficiency
• Improved flexibility for alternative energy sources
• Highest redundancy
• Extended maintenance intervals for main engines
• Reduce engine run time
• Reduce fuel consumption
• Reduce maintenance
• Reduce operational costs
• Increase profitability
• Improve safety
• Reduce or eliminate noise and vibration
Questions?

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