

TECHNO-ECONOMIC ANALYSIS SERVICE

International regulations, fuel saving measures and increased efficiency demands are key drivers in today's shipping industry. Owners, operators and designers are often left guessing what measures will help address their unique circumstances and the unintended consequences that may be caused by necessary tradeoffs.

Techno-economic models developed by ABS provide decision support on operational aspects, technical management, equipment selection and strategic business planning. These comprehensive sensitivity studies are used to assist with project evaluations and provide benefits from efficiency options with a transparent understanding of expected savings and potential trade offs.

ABS techno-economic models are tailored to the vessel's technical specification. In association with

the client's investment and operational strategies, these models simulate a range of scenarios and combinations of operating conditions under various economic outlook assumptions.

A LIFE CYCLE APPROACH

The models utilize the Life Cycle Cost Analysis (LCCA) approach based on the recognized methodology of the National Institute of Standards and Technology (NIST) Handbook 135 Life-Cycle Costing Manual. The LCCA approach, also known

THE PROCESS

The ABS techno-economic evaluation service is based on a stage gate approach to support the decision-making process. It is performed in three stages of increasing model accuracy confidence level:

STAGE 01

Initial evaluation of best- and worst-case scenarios.

STAGE 02

Using analyses results that yield more accurate cost-benefit information, the techno-economic model is enhanced and simulation cases are extended. Project criteria are re-assessed to support a "go/no go" decision.

STAGE 03

Upon completion of the project, the techno-economic evaluation is re-assessed by application-relevant data from harbor trials, sea trials or operation of the vessel depending on the actual application.



as the Total Cost of Ownership (TCO) methodology, can be leveraged not only toward more efficient operations and lower fuel costs but to negotiate higher charter rates and increase an asset's resale value.

Technology options are evaluated to assess the operational efficiency and competitiveness of newbuild or existing vessels as new designs enter into service. The life cycle approach provides a clear evaluation of the cost differentials through a comprehensive inventory of all relevant projects and operational costs in present value terms. Newbuild and retrofit technology decisions can be simulated for a single vessel or a series of vessels using a range of plausible

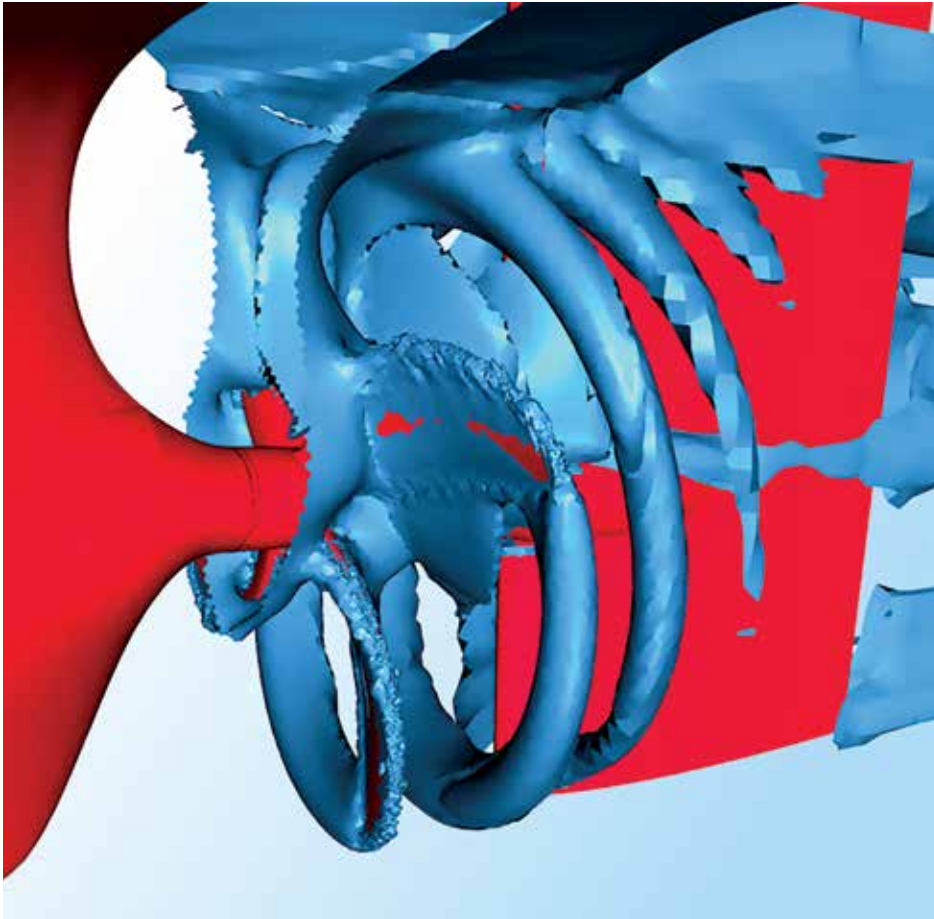
regulatory compliance requirements scenarios. The simulation outcomes are evaluated on the basis of project finance criteria such as discounted payback period, saving-to-investment ratio, net savings and other key performance indicators.

Past examples of ABS techno-economic evaluations include:

- Design optimization for a range of operational profiles
- Bulbous bow retrofit study for a series of container vessels
- LNG-Ready concept design evaluation for Ultra Large Containerships (ULC)
- LNG as fuel vs scrubber for trading in Emission Control Areas (ECA)

The ABS Energy Efficiency team is multi-disciplinary, with extensive experience in ship hydrodynamics, numerical modeling, model testing, full scale measurements, design, ship management and operations and regulatory compliance. Each service builds upon the ABS position as a leading provider of classification and regulatory compliance services, and seeks to further its mission of protecting life, property and the environment.

Leveraging extensive experience and knowledge enables ABS to provide detailed and in-depth recommendations supported by advanced tools to help owners and operators meet their operational and regulatory needs.



For additional information on ABS' Energy Efficiency services, please contact us at: energyefficiency@eagle.org



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