

ENERGY CONVERSION SOLUTIONS



In response to the ever-increasing need for sustainable operations, Alewijnse is at the forefront of designing environmentally friendly energy conversion and energy-efficiency systems for maritime and industry. In this brochure, you will find everything about our latest developments in energy conversion, driven by innovation, digitalisation, and standardisation. Alewijnse is here for analysis, advice, and the implementation of the latest technologies, helping you face the future with confidence.

Hybrid energy solutions

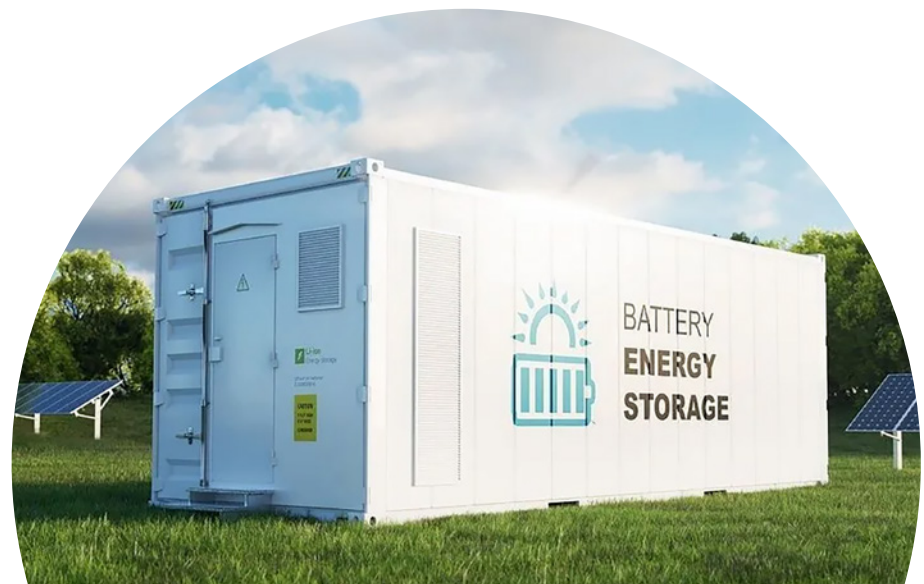
Hybrid applications in the maritime industry cover a wide variety of disciplines. Dual fuel systems and battery storage for spinning reserve and peak shaving are becoming increasingly integral to the technical scope of modern fleets and are widely implemented in existing vessels. Solutions you can expect from Alewijnse in this respect include:

- Modeling, supply, and integration of energy storage solutions
- Modeling, supply, and integration of AC and DC grid electric propulsion drive solutions
- Design of power conversion control and monitoring systems
- Supply and integration of hybrid fuel power management systems
- Battery sizing
- Hybrid grid AC/DC optimization for newbuilds

Power quality measurement & analysis

In marine power plants power quality is essential. AC grid can be disrupted by harmonic distortion that needs to be measured, analysed and mitigated. EMC effects in DC grid can be much more severe than in AC grid power plants. Higher drive switching frequencies, combined with inadequate filtering and earthing measures, can result in poor fuel efficiency and reliability, increased generator maintenance, and excessive wear on connected semiconductors.

Alewijnse offers services to measure and analyse these effects in the time domain during the operation of existing vessels or during HAT and SAT of new builds. If required, we will provide an improvement plan as part of our recommendations to the customer.



Hardware-in-the-loop testbed (HIL)

Alewijnse uses a Hardware-in-the-Loop (HIL) testbed to verify hybrid grid solutions before detailed engineering begins. This real-time software model tests and validates system performance, including short-circuit and fuse selectivity. HIL improves safety, reduces lead time, and supports evidence-based engineering. Consultancy for HIL modeling is available and refundable if the project proceeds.

Return of investment calculations

Alewijnse emphasises that hybrid solutions must be backed by detailed power flow analysis tailored to the operational profile to find the optimal system. They use mathematical models and big data to analyse power events and optimise hybrid system sizing and type. Their maintenance data is integrated via Pareto analysis to offer customers the best proposals. Deliverables include clear ROI forecasts, fuel savings, installed footprint, and maintenance impacts. They also provide consultancy feasibility studies for single vessels or fleets. Consultancy fees for ROI calculations are reimbursed if the project proceeds and becomes part of the basic engineering phase.



→ Client benefits

- Improved design quality and reduced technical risks
- Validation of component selection through load flow and short-circuit studies
- Verification of protection and coordination system





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Our goal is to co-create value with and for our customers and partners. We aim to develop and improve electrification and automation solutions which are innovative, sustainable and of the highest quality. We focus on making a valuable contribution to successful projects in the maritime and industrial sectors.

(Headquarters)
Energieweg 44
6541 CX Nijmegen
The Netherlands

T +31 (0)24 371 6100
T +31 (0)622 509 009 (24/7 Service)
info@alewijnse.com
www.alewijnse.com

WeConnect.