Retrofit Turnkey Solution

Consultancy → Engineering → Purchasing → Construction

Clear Responsibility | **Open Price of 3rd Party** | **High Project Management Efficiency** | **Dynamic Efficiency Improvement Suggestions**

01

Consultancy & 3D Scanning Survey

- Feasibility Study Report
- Concept Report

02

Equipment Selection & Purchase

- Maker authorizations 30+
- Multiple makers selection
- Open price of equipment

03

Design & Class Review

- High accuracy, ensure minimum onsite modification
- Fast drawing delivery, design on direct 3D modeling
- Average 13 years design experience

04

Material & Fabrication

- Self-own workshop
- Design team in charge of quality control of material and fabrication ensure minimum onsite modification

05

Installation, Commissioning & After-sales Service

- Several yard's representative, such as Beihai, SHG, CUD, ZTHI, Zhoushan Longshan, etc
- Maker Authorizations 30+
- 200+ technicians

06

Supervision & Electrical Retrofit

- Supervisors 30+
- Electric modification: MSBD/AMS/GPS/VRC and other peripheral systems modify, such as Hyundai, JRCS, BEMAC, Taiyo, TERASAKI, Kongsberg, etc.

07

Sea Trial & Training

- Seaman book 50+
- Onboard Sea trial or measurement
- Regular training
- Customized training

About SmartEco

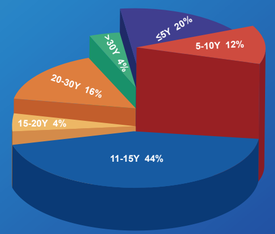
Abundant Retrofit Engineering Experience

Established in	Retrofit & New Projects	Cooperated Manufacturers	Design Engineers
2017	1,000+	30+	30+

Self-Own Multi-Team Cooperation

- Green decarbonization retrofit team for feasibility Study & Design.
- New energy R&D team for new technology evolution
- Technical & engineering team for installation & electrical modification

Design Engineer Experience Average 13.8Y



- Work Experience Ratio

WinKong Marine Engineering Co., Ltd.

Platform website: www.marinsmart.pro
Company website: www.winkong.net

Tel: +86 0532 83838072
E-mail: newmkt@winkong.net

Social Media: @winkongmarine

www.marinsmart.pro

WINKONG

SMARTECO

Green Decarbonization Solutions of Full Life Cycle

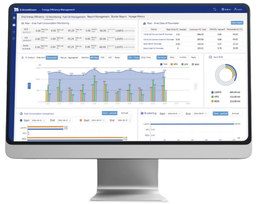
- Package with Ship Energy Efficiency Management for Data Analysis
- Power System Optimization Solutions
- Propulsion System Optimization Solutions
- Hydrodynamic Optimization Solutions
- Emission Reduction Solutions
- Alternative Fuel/Energy Supply System Retrofit

Green and Low-Carbon Solutions, Empower Clean Shipping

WinKong Marine Engineering Co., Ltd.

Green Decarbonization Solutions of Full Life Cycle

Based on Energy Efficiency Management (EEM) System



Advantages of EEM

- Approved by class.
- Data acquired automatically, accurate and credible.
- Connected automatically with DNV OVD for verification, generate DCS and MRV reports, providing data support for owner's EU ETS and FuelEU.
- Continuous energy efficiency optimization suggestions.

Provide Multiple Engineering Solutions

Options

Power System Optimization

- Shaft Generator Retrofit
- AMP-Alternative Maritime Power (Shore Power System)
- VFDs Modification
- LED Retrofit
- Electric Power Quality Optimization

Hydrodynamic Optimization

- High Efficiency Propeller Retrofit/Modification
- PSV(Pre-shrouded vanes) Retrofit
- HVAF(Hub vortex absorbed fins) Retrofit
- PSS Retrofit
- WID Retrofit
- FR Retrofit

Propulsion System Optimization

- Rotor Sailor Retrofit
- ALS(Air lubrication system) Retrofit
- TCCO(Turbo charger cut-out) Modification

Emission Reduction

- OCCS(Onboard carbon capture system) Retrofit
- EGCS Retrofit
- SCR Retrofit
- Ship GHG Comprehensive Solutions

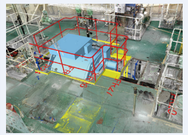
Alternative Fuel/Energy Supply System Retrofit

- Methanol Low-flashiont Fuel Supply System (LFSS) Design
- LNG Fuel Gas Supply System (FGSS) Design
- Ammonia Fuel Gas Systems (AFSS) Design

Shaft Generator Retrofit Case

The shaft generator retrofit plan could allow vessel to only run Main Engine and Shaft Generator without running D/G during seagoing, which can improve the energy saving by 3%~8% and upgrade the SEEMP level subject to different vessel types.

3D Modeling Design

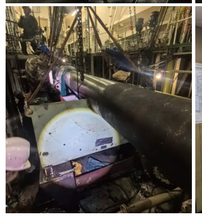


Installation Info

- Install between main engine and intermediate bearing.
- After calculating the strength requirement of the intermediate bearing, the strength of the intermediate bearing bush changed from 302kN to 478kN. Load test of shafting.
- The installation was carried out in a Chinese shipyard, the installation period was 25 days (including 5 days of commissioning), and the time in dock was 9 days (with energy saving appendages retrofitting).
- 5 days of peripheral electrification (simultaneous).

Vessel Type	230K Bulk carrier	Class: ABS
Main Engine	MAN B&W 6S80MC-C, MCR 23,280kW	
Shaft Generator	1,400kW	

Content	Before	After
Main engine power	6,900kW	8,230kW
M/E SFOC	174.2g/kWh	172.3g/kWh
M/E daily fuel consumption	28.8t	34.0t
Generator power	1,200kW	0kW
Generator SFOC	242g/kWh	0g/kWh
Daily fuel consumption of generator	7.0t	0t
Daily fuel consumption（M/E+A/E）	35.8t	34.0t
After retrofit Daily fuel savings	1.78t	
Savings on daily fuel costs @550 USD/t LSHFO	979USD	
Save maintenance cost @USD/d	145.5USD	
Sailing days per year	240	
Annual fuel savings	427.2t	
Annual cost savings	269,880USD	
Fuel saving rate	**5.0%**	



Hydrodynamic, AMP, VFDs Retrofit Case

Hydrodynamic Optimization

Advantages: Economic Practicability · High Energy-Saving Efficiency · Compatibility&Adaptability · Technical Maturity

Cases

PBCF(Propeller Boss Cap Fin)				PSV(Pre-shrouded Vanes)			
	Case Info	Energy saving	ROI (Year)		Case Info	Energy saving	ROI (Year)
	Vessel Type 57K BC	2%	1~2		Vessel Type 180K BC	4.6%	1~2

Alternative Maritime Power

Installation type:

- Container unit type
- Modified original room
- New AMP room

Cable reel modeling design

Cable reel installation

Electrical cabinet installation

System test

VFDs - Modification

General Information

Type	DWT	Main Engine	M/E MCR
Bulk Carrier	85,000	B&W 6S60ME	9,660kW x 89.0 rpm

VFDs Retrofit Selection

Equipment	Power(kW)	Quantity(ea)	Modification Plan
Main cooling sea water pump	55	1+1(standby)	1) Add VFD + control panel 1set 2) Add Temp. sensor 3pcs -Main cooling sea water pump outlet -before Sea Water Overboard valve -M/E Cool. F.W. System outlet 3) Add outlet Press. Sensor 1pc
G/E cooling fresh water pump (driven by G/E)	/	1+1(standby)	No need to modify
M/E fresh water cooling pump	18.5	1+1(standby)	No need to modify

Equipment

Item	Q'ty
VFD + Control Panel	1set
Temp. Sensor	3pcs
Press. Sensor	1pc
Junction Box	1set