



# GREEN POWER AHEAD



EUROPE'S  
FIRST  
HYBRID  
TUGBOAT  
[WWW.KOTUG.COM](http://WWW.KOTUG.COM)



**e-KOTUG**  
HYBRID POWERED

# ABOUT KOTUG

KOTUG is an international maritime service provider. Combining a century of experience with a modern and powerful fleet of (Rotor®)tugs, KOTUG has built its reputation as a competitive and innovative player in the maritime industry for harbour towage, coastal & deep sea towage, terminal towage, salvage and emergency response, tug management, chartering, brokerage, offshore services and assistance to the dredging industry. KOTUG continuously strives for operational excellence to offer its clients the highest standards of service with a safe, efficient and eco friendly operation.



## KOTUG'S GREEN PERFORMANCE

Backed by years of experience and knowledge, international maritime service provider KOTUG has built its reputation as an innovative player. KOTUG and its workforce have adopted an active Go Green policy. We have embraced the dual challenges of sustainability and innovation, and have incorporated these values into our business strategies. The most visible evidence of our green credentials are voluntary sulphur free bunker fuels, the "green passport" issued for our tug materials, washable filters, LED lighting on board, shore-power in port and, last but not least, we have also won the "Inland Shipping Fuel Saving Competition" – an initiative of the Dutch Government. With its E-KOTUG, KOTUG demonstrates its ongoing commitment to the environment and emissions reduction.

## MOVING AHEAD WITH GREEN ENERGY "E-KOTUG"

The development of a hybrid Rotor®Tug presented KOTUG's green policy with a new challenge. In partnership with AKA in Canada, supplier of the Xeropoint Hybrid Propulsion System, an extremely eco friendly, fuel-saving tugboat was developed. One of the newest Rotor®Tugs, "RT Adriaan" was retrofitted with this system with which the electric motors, diesel engines, generators and powerful energy dense lithium polymer batteries will be controlled. This results in very efficient and eco friendly sailing with optimizing working conditions for the crew and minimizing the environmental impact without compromising a high level of performance.

After its proven and classified conversion in February 2012, RT Adriaan is Europe's first Hybrid Rotor®Tug to rejoin the KOTUG fleet and provides green assistance for customers in the Port of Rotterdam. KOTUG emphasises that the hybrid option is the best solution for harbour tugboats serving clients and harbours who have been looking to minimize emissions and at the same time providing economic advantages.

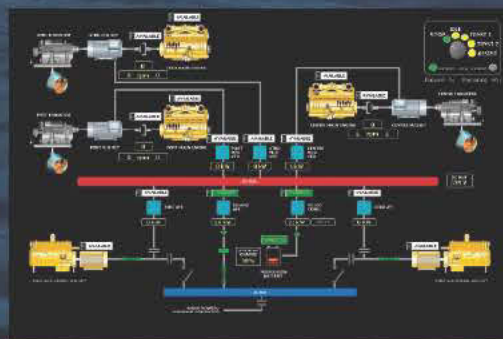
## A HYBRID ROTOR®TUG: AN UPGRADED PERFORMANCE

The addition of a hybrid propulsion system further enhances the vessel's performance and operational capabilities while providing dramatically improved efficiency. The additional flexibility with respect to propulsion plant configuration allows the vessel to run the minimum number of diesel engines required at any given time. The use of advanced energy storage also permits extended periods of operation where no diesel engines are required.

# HYBRID+ TUGNOLOGY



▲ part of the battery pack  
▼ part of the Hybrid Management System



▲ computer scheme  
▼ Hybrid Control Panel



## E-KOTUG: CLEAN AND SIMPLE

### REDUCED EMISSIONS OF CO<sub>2</sub>, NOX AND PM

With Xeropoint Hybrid technology, engines run at or near best efficiency- and only when needed. Lower fuel usage and cleaner combustion contribute to reducing harmful emissions.

### IMPROVED FUEL ECONOMY

The main engines of Rotor®Tugs are designed for a high output. Because Hybrid technology divides the propulsion load between diesel and electrical sources, it means no unnecessary idling of diesel engines.

### NOISE REDUCTION

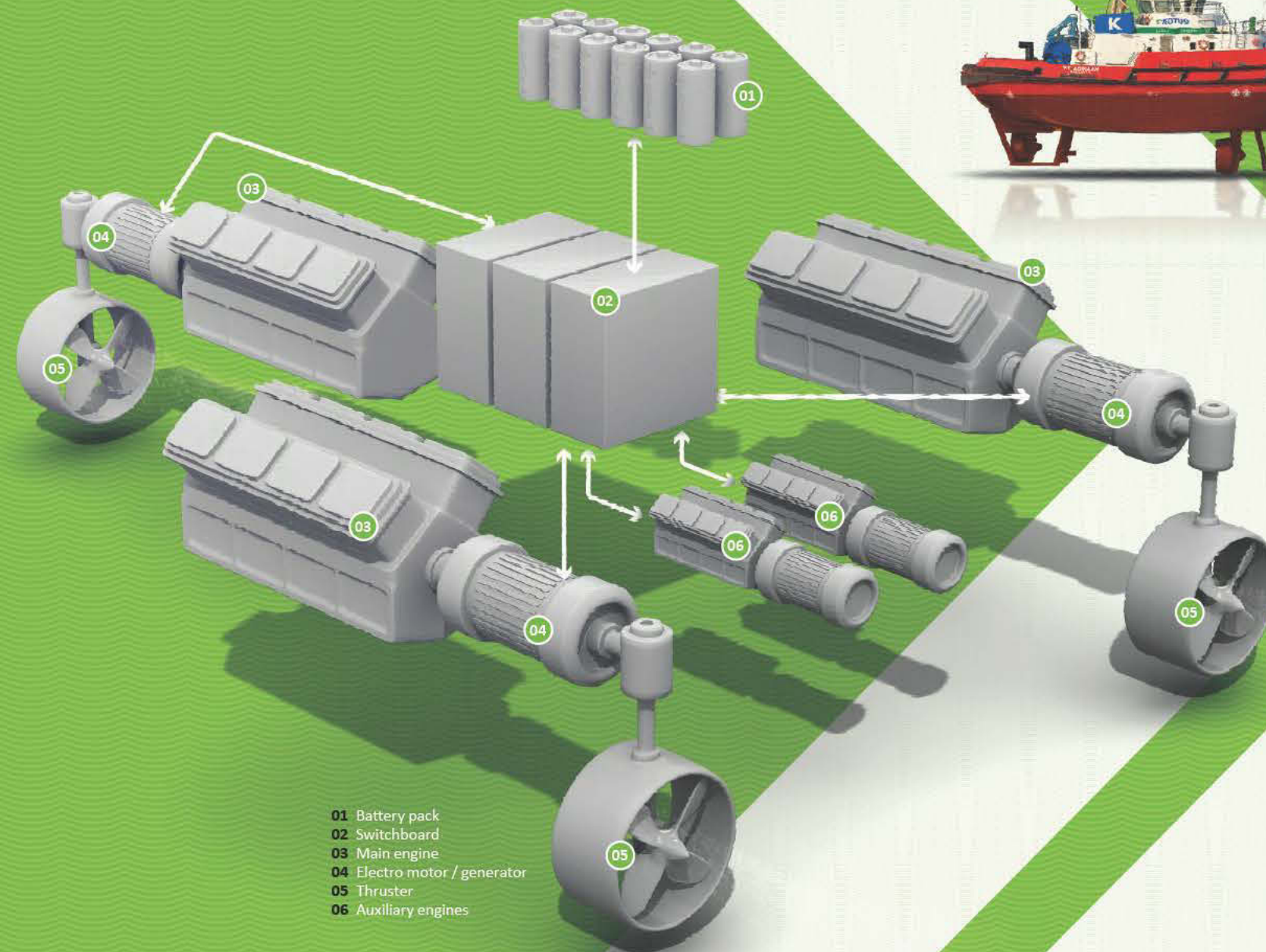
For standby or for low power operations, electrical energy storage permits the vessel to be operated in noiseless zero emissions mode, with no diesel engines running.

### MAINTENANCE SAVINGS

Hybrid technology means minimized engine use and more time between engine overhauls and oil and filter changes.

### HEALTHY WORKPLACE

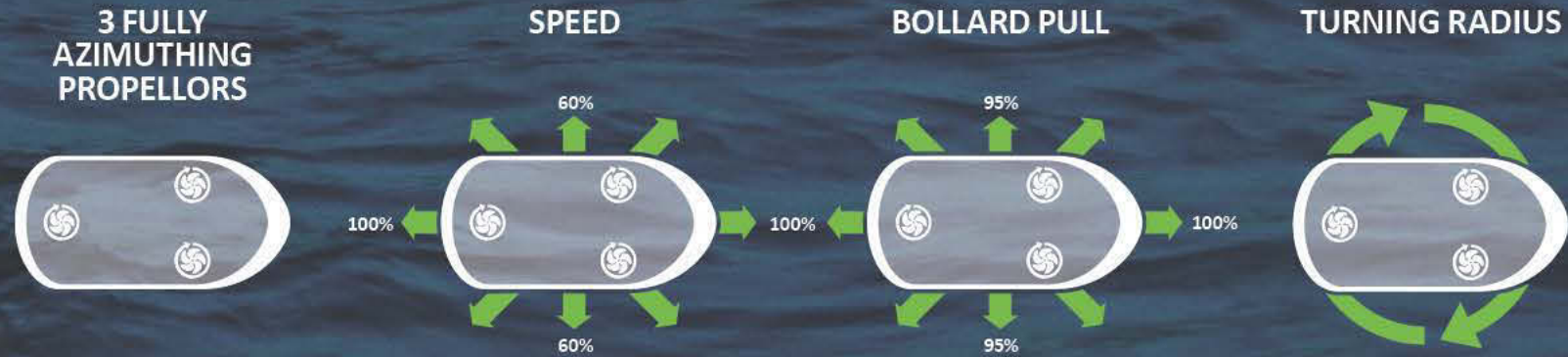
Hybrid technology allows main engines to be shut down during transit. Fast switching from hybrid modes with electrical motors to conventional modes with diesel engines is possible. For low power operations E-KOTUG is operable on battery power alone.



- 01 Battery pack
- 02 Switchboard
- 03 Main engine
- 04 Electro motor / generator
- 05 Thruster
- 06 Auxiliary engines



# SOPHISTICATED ROTOR TUGS



Rotor®Tugs are unique in the marine industry as they have three azimuthing drives: two forward and one aft as opposed to the more conventional Z-Drive vessels with only two drives at the stern or at the bow. The result is a highly maneuverable tugboat with excellent stability features. Rotor®Tugs have been a real game changer with respect to tugboat design. The large skeg, typical on conventional tugboats, is replaced by an azimuthing propulsion unit. As a result, the manoeuvrability and operational capability of the vessel improves

dramatically. A real advantage for a narrow lock or bridge passage and assisting in confined areas and in extreme offshore conditions. The design produces a highly manoeuvrable boat with excellent stability characteristics. For many jobs, this results in a more efficient operation; fewer tugs are needed. Rotor®Tugs have proven their operational effectiveness and have been adopted by fleets around the globe.



PRINCIPAL CHARACTERISTICS HYBRID E-KOTUG "RT ADRIAAN"			
Length LOA / LPP	32 / 28,65 m	Beam	12 m
Draft min / max	5,95 / 6,45 m	Air draft	12 m
Gross tonnage	463	Net tonnage	138
Classification	LRS ⚓ 100 A1, Tug ⚓ LMC ,UMC		
TECHNICAL CHARACTERISTICS HYBRID E-KOTUG "RT ADRIAAN"			
Built	2010	Hybrid System	Xeropoint
Hybrid retrofit	2012	Energy Storage	Lithium Polymer Batteries
Main engines Motor/Generators	3x Caterpillar 3512 C-HD 3x Teco- Westinghouse	Auxiliary engines	2x 200 kW Caterpillar C 9 1x 36 kW Caterpillar C 4.4
Kilowatt (assist) Kilowatt (transit)	3x 1765 kW From 500 kW – to 1765 kW	Brake horse power	6884 hp
Bollard pull	84 tons	Maximum speed	12,5 knots Assist mode 10 knots Transit mode
Towing equipment	2x aft towing winch and 1x fwd towing winch	Manoeuvrability	3x Z-drives Schottel SRP 1215 FP





**SALES INFORMATION E-KOTUG  
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**STAKEHOLDERS  
AND PROJECT  
SUPPLIERS:**



ROTTERDAM CLIMATE INITIATIVE



CENTA Nederland B.V.

