

# ECOSPEED<sup>®</sup>

SHIP HULL PERFORMANCE TECHNOLOGY



**The revolutionary ship hull coating  
system that saves millions**

# Ecospeed

**E**cospeed is a system for ship hull protection and fouling control which results in the smoothest hull for the longest time and therefore the highest fuel economy for the service life of ships.

Ecospeed consists of:

- simply 1000 µm or more of a single, glassflake-reinforced coating
- no primer, no mid-coat, no tie-coat, no top-coat
- applied to bare, well prepared steel, aluminum or GRP at new-build or in drydock
- applied in two or more coats, each 500µm thick, with a minimum overcoat time of about three hours and no maximum overcoat time
- no special application procedures or equipment required
- tough, resilient, impenetrable, impermeable
- certified as an ice-abrasion resistant coating
- 10-year extendable warranty

Combined with:

- routine in-water conditioning and cleaning that minimizes hull friction for the life of the vessel
- can be cleaned in the water as often as needed to keep the hull free of fouling
- no damage to coating
- no harm to the environment
- routine cleaning makes the hull smoother and improves fuel efficiency over life of vessel.



*Ecospeed hull coating system provides a smooth, fuel-efficient, corrosion-proof hull for the life of your vessel.*



# How Ecospeed saves money

**C**onventional ship hull coating systems depend on a soft surface leaching poisons into the sea to kill marine fouling organisms (and other life forms) or on a slippery, toxic surface to make it hard for marine fouling to attach. The effectiveness of these coatings is short-lived and they need to be replaced frequently. They also need to be cleaned in the water in between drydockings, but they are not

suited to such cleaning.

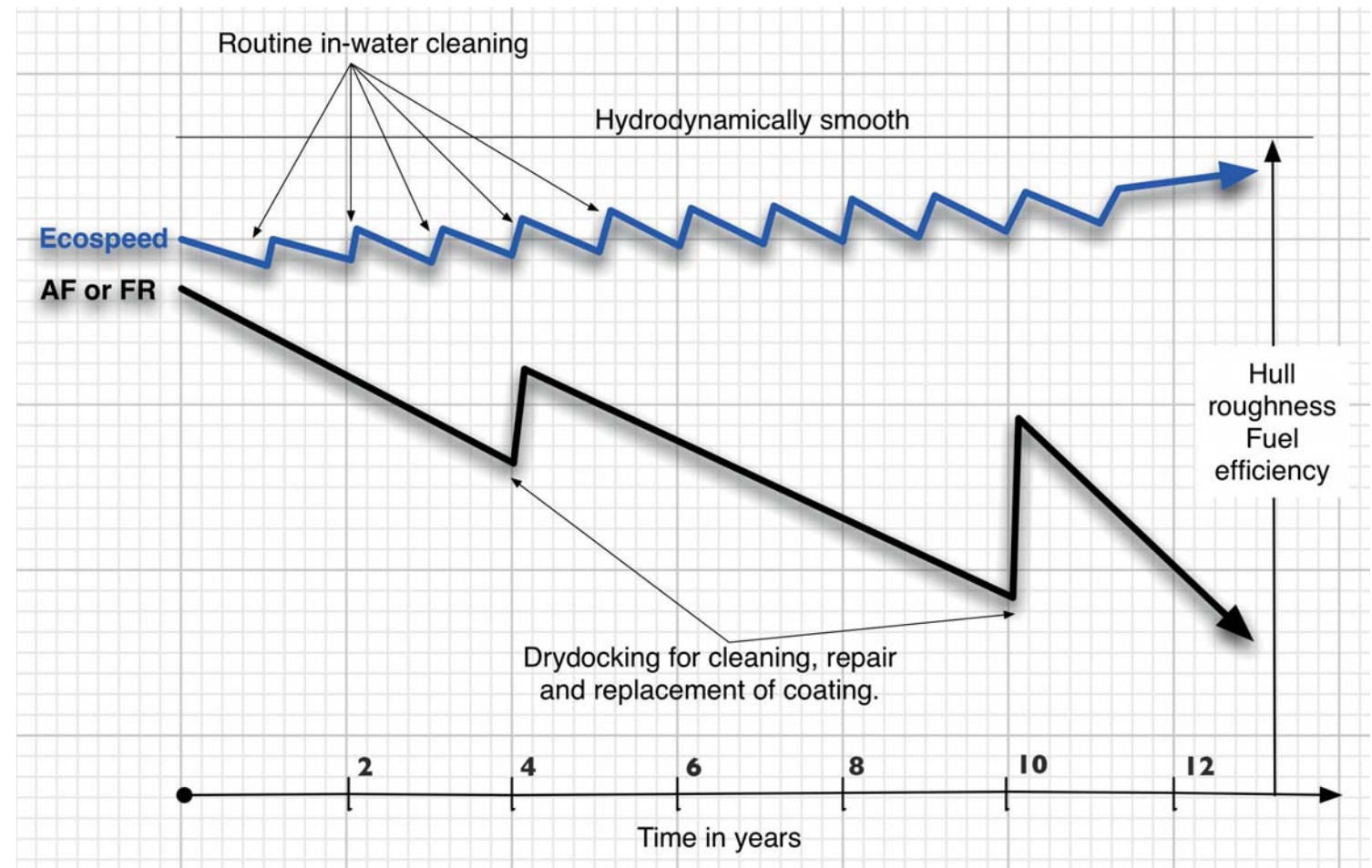
Ecospeed is based on a different approach:

1. Provide the hardest, toughest, longest lasting hull protective coating available
2. Clean off the fouling before it slows the ship down and multiplies your fuel bills.

Ecospeed uses elbow grease instead of toxic chemicals. It is kinder than another hull coating system to your bank balance, your ship and the environment.

The following charts compare the characteristics of Ecospeed STC with conventional antifouling and foul-release coatings.

Characteristics	Biocidal Antifouling Coating	"Non-stick" foul-release coating	Hard, inert, surface treated composite (STC)
Soft	✓	✓	X
Hard	X	X	✓
Leaches biocides	✓	?	X
Toxic	✓	✓	X
Deters fouling	✓	✓	X
Easily damaged	✓	✓	X
Completely non-toxic	X	X	✓
Requires frequent replacement	✓	✓	X
Suffers long-term paint degradation	✓	✓	X
Gets smoother over time	X	X	✓
Lasts for the life of the ship	X	X	✓
10 year warranty minimum	X	X	✓
Suitable for in-water cleaning	X	X	✓
Requires regular in-water cleaning	X	X	✓
Gets rougher with in-water cleaning	✓	✓	X
Ice-abrasion resistant	X	X	✓



# Save millions in drydock expenses and off-hire time



*Hull of cruise ship after 5 years with Ecospeed coating with no replacement or major repair. This is the state of the hull when the ship came out of the water, without any cleaning or touch-up in drydock.*



**When your hull coating never needs replacing or major repair, you can save a lot of money in drydock fees, off-hire time, materials and labor.**

Most hull topcoats are designed to be replaced once or twice every five years. The full hull coating scheme has to be fully replaced every 10 - 15 years down to bare steel. Over that time period, the coating degrades and becomes rougher

until it's no longer worth trying to patch it up. And it costs you a fortune in fuel to compensate for the additional hull friction.

Imagine a coating that's guaranteed for 10 years and is expected to last 25 without replacement or major repair. A coating that gets smoother over time, not rougher.

Imagine coming into drydock after 3 or 5 years and

finding that your hull coating only requires a few minor touch-ups and doesn't even need to be washed off.

Just think how much money you will save.

Call us today for a quote to convert your hull to Ecospeed or start off right, with Ecospeed, on a new build.



# Key applications

**While Ecospeed can successfully be applied to almost any ship, there are specific vessel types and circumstances where Ecospeed is most applicable and offers a particularly strong financial benefit compared to other coating systems.**

## Icebreakers and ice-going vessels

Ecospeed is not a specialized ice coating. It is just as applicable on ships sailing in the tropics as those working in ice-laden waters. However, Ecospeed is probably the best all-around coating available for ice-going ships and icebreakers:

1. Class-certified ice-abrasion resistant.
2. Outlasts dedicated ice protection coatings as shown over and over in use. 10-year warranty, lasts the life of the ship with minor touch-ups.
3. Low friction ice coating, saves fuel.
4. Easy to apply, no special equipment or conditions required.
5. Completely non-toxic.

## Cruise ships and ferries

There are a number of reasons why Ecospeed is the best coating system for cruise ships and ferries:

1. Much more economical in the long term than

any other type of coating with regard to fuel savings, materials labor and drydock savings, off-hire time savings, asset protection, ease and speed of application.

2. Non-toxic, non-polluting, lower GHG and other environmental advantages.
3. Easy to keep the waterline clean and looking good (aesthetic value).
4. For ships such as cruise vessels and ferries which have a predictable, fixed route, it is easy to arrange in-water cleaning which keeps the hull smooth and clean without interfering with the ship's scheduled operations.
5. Reduced frequency of and time in drydock.





## Offshore vessels and rigs

Offshore vessels have special requirements when it comes to hull coating systems. 10, 15, 25 even 40 years on station without going to drydock for repair/replacement requires ultimate protection from corrosion. Fouling must not penetrate the coating and must be cleaned off for class inspection and to reduce the vessel's added weight.

The Ecospeed coating system is ideally suited to hull protection of such vessels:

1. applied to a thickness of 1000µm, can be increased to 1500µm or 2000µm
2. completely impenetrable by any type of fouling organism

3. accumulated barnacles, worms, coral and weed can be completely removed by divers with appropriate equipment without any damage to the coating
4. cleaning can be repeated as often as needed
5. guaranteed for 10 years, extendable for thicker Ecospeed applications combined with proper maintenance.

## Other applications

Any vessel afloat, from a small yacht or work-boat through any type of naval vessel, bulk cargo ships and tankers, up to the largest container ships and ULCCs can all benefit from the Ecospeed hull coating system and will find it

to be the most economical and effective system available.

1. any ships expected to operate in sensitive sea areas need a non-toxic hull
2. ships and boats working in harsh environments,
3. boats in harbors working in mechanically demanding conditions
4. ships looking for extended drydocking intervals without sacrificing fuel efficiency due to bio-fouling and hull coating degradation
5. any ship that wants to save fuel costs through sensible, economic hull protection and fouling control methods.

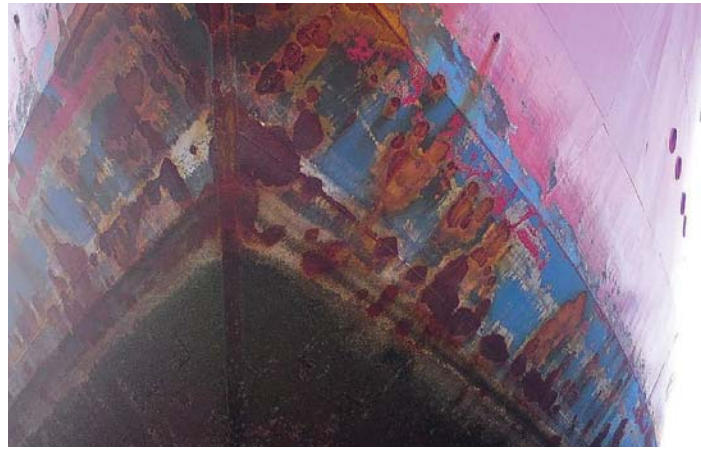




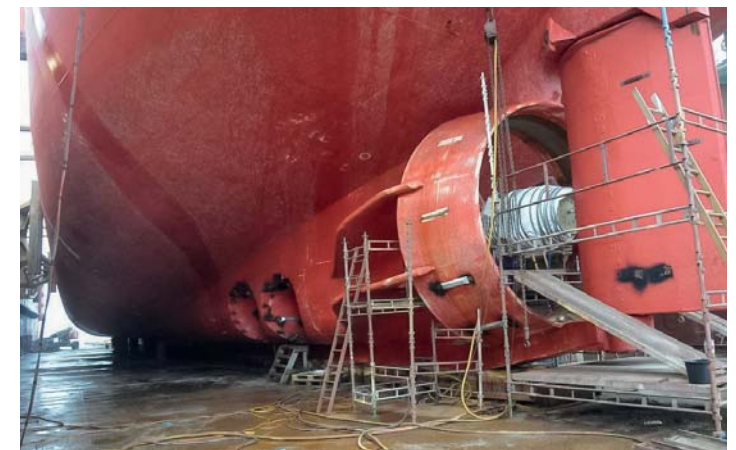
# Case studies: Ice-going vessels

**W**hen British Antarctic Survey's RRS (Royal Research Ship) *Ernest Shackleton* was drydocked in Denmark, the superintendent, engineers and paint specialists there to check the condition of the hull paint were amazed. After two seasons of battering its way through ice up to 2.5 meters thick with a high content of gravel and volcanic lava adding to its abrasiveness, the hull coating was virtually intact and undamaged. This was in strong contrast to the *Shackleton's* previous drydocking, when almost the entire hull, bearing a conventional ice-going underwater hull coating, was practically stripped to bare, unprotected steel.

“The biggest thing was the surprise at seeing the areas where you'd expect it to have taken a lot of damage... when she first came out of the water and onto the blocks it was a complete shock to all those present. All of us there commented on the condition of the hull and in particular that there was negligible damage at the bows, merely some scratch marks. None of us there would have predicted this. I then jokingly asked the question, ‘Are you sure you've taken this ship to the ice?’” Stephen Lee, then Senior Marine Engineer at BAS, mainly responsible for choosing Ecospeed, recalling the reaction of those present when the *Ernest Shackleton* was first pulled out of the water at Frederikshaven drydock in early 2011. Two seasons of heavy ice later, the hull was in much the same condition.



*Left: RRS Ernest Shackleton, icebreaker and Antarctic supply ship, after a season in ice with conventional ice-going paint.*

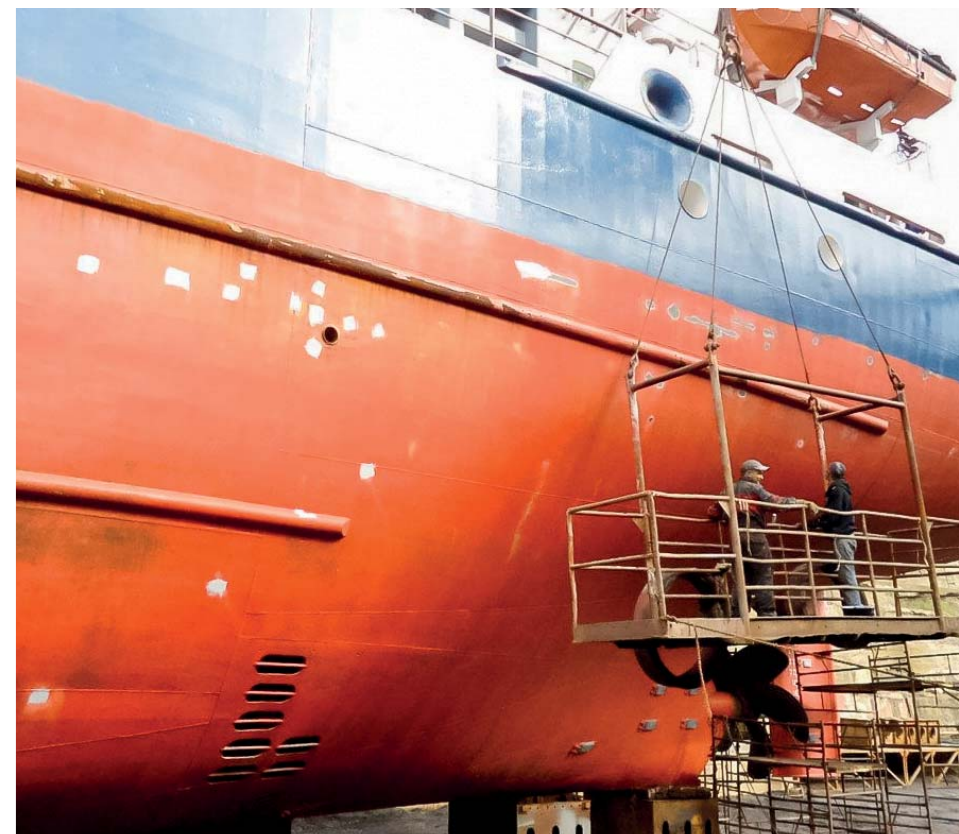


*Right: Same ship after four seasons in heavy ice after Ecospeed was applied to the hull, with no repair or re-coating during those four years.*





**Ice going general cargo vessel.** Left. The state of the hull after one season in the ice using a conventional coating, five years after the hull was originally coated but with the coating repaired on an annual basis. Center. Two years after Ecospeed was applied (no repair). Right. The state of the hull seven years after the Ecospeed application, with no repair in the meantime. The shipping company's manager of chartering points out, "There really is no other coating that could stand up to seven years of trading in ice and still remain intact and not in any need of repainting or anything beyond very minor touch-ups."



**Ice going general cargo vessel.** Left. The state of the hull after one season in the ice with a conventional ice coating, before Ecospeed was applied. Center. The same hull after 2 1/2 years of trading in ice in Baltic waters. Right. The condition of the hull 5 years after the initial application with no repair or repainting. Touch-ups of very minor mechanical damage to the coating in progress in drydock.

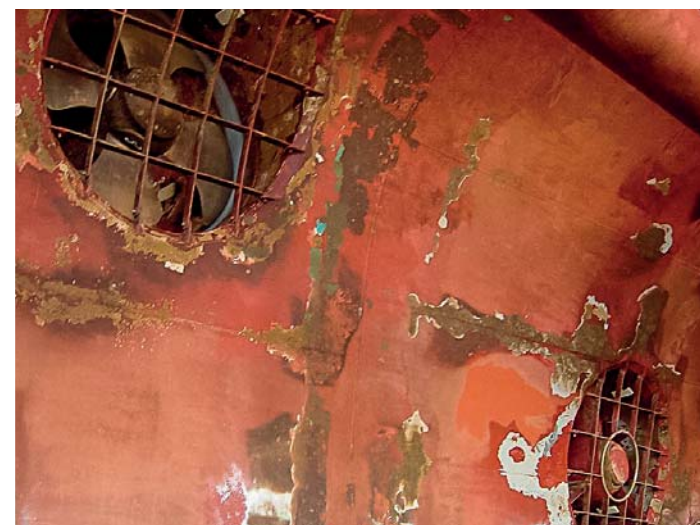


# Cruise and ferry

**A**n increasing number of ferry lines are converting to Ecospeed for their fleet. The ease of cleaning, lack of maintenance, repair or replacement of the coatings in drydock, the fuel savings attained, the environmental benefits and the aesthetic improvements make this a very viable switch.

The coating at most requires minor touch-ups during routine drydocking and this can be accomplished very rapidly. Any repairs blend in perfectly and do not make the hull rough. The coating is very strong and resilient and is the best possible protection against corrosion available today.

A major cruise line began using Ecospeed in 2006 when it converted one of its ships from a (badly deteriorated) TBT SPC to Ecospeed. The first two photos on this page show the state of the hull after 7 years in service with the TBT coating. The third photo shows underwater cleaning of the hull with Ecospeed. The fourth photo shows the condition of the coating with fouling partially washed off in drydock in 2010 and the fifth photo shows the condition of the hull after being washed off in drydock in 2013, 7 years after Ecospeed was applied. This is the original coating. The president of the cruise line announced that the coating change on the ship resulted in a 10% improvement in fuel efficiency. Two newbuilds were coated with Ecospeed as a result.







*Ecospeed is ideally suited for cruise vessels and ferries*



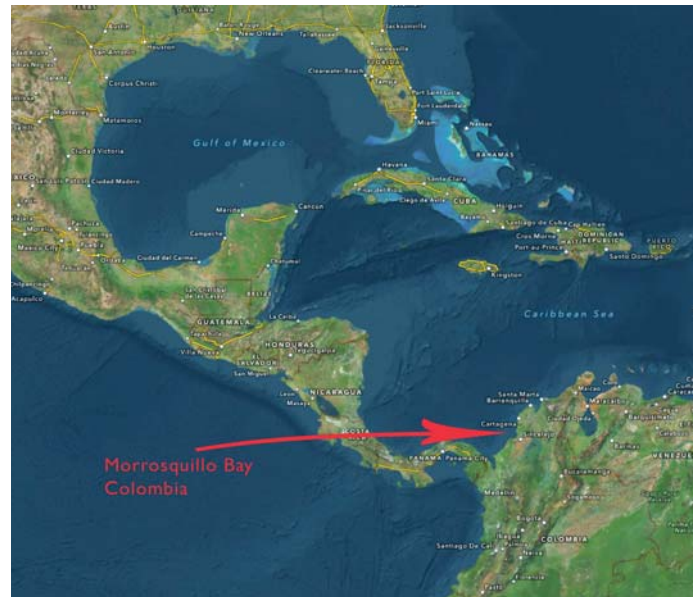
# Offshore

**I**n order to tap into Colombian stranded gas reserves, Pacific Rubiales Energy Corporation and EXMAR have partnered in a project to build and operate a floating LNG liquefaction and storage unit, the Caribbean FLNG, which will be stationed at a jetty several kilometers off the Caribbean coast of Colombia for at least 15 years.

To protect the hull of the Caribbean FLNG, keep it clean and facilitate class inspections over that time period EXMAR has applied Ecospeed, on the vessel's hull. The coating is the best choice of protection of offshore vessels and structures that need to be kept on site in production for extended periods of time (15, 20, 25 or even 40 years) without drydocking. The 15-year guarantee and the environmental safety of the coating make it even more attractive.

**Ecospeed is a pre-qualified coating system in accordance with Norsok standard M-501, Rev.5, June 2004.**

The Norsok standards are a series of standards relevant to offshore installations developed by Norwegian petroleum industry. Norsok M-501 specifically deals with anticorrosive coating systems and the processes related to their application. It covers the selection of coating materials and defines the requirements of surface preparation, application procedures and inspection.





# Quick reference chart

## Why Ecospeed®?

**W**hat is Ecospeed? Ecospeed is an underwater ship hull protection and fouling control system. It consists of a tough, long-lasting, glassflake reinforced coating combined with routine in-water cleaning/conditioning. One application lasts the life of the hull. It does not degrade but becomes smoother over time with regular in-water cleaning. It can be used on any ship or submerged structure, steel, aluminum or GRP. It has the potential of great financial savings. It is designed with environmental protection in mind and is entirely environmentally safe.

### Ultimate hull protection

#### Complete corrosion protection

- Hard, tough, glassflake-based
- Flexible, very strong adhesion, thick coating
- Impermeable and impenetrable

**Long-lasting – one application lasts the life of the ship.  
No reapplication needed, only minor touch-ups in dry-dock.**

- 10-year extendable warranty

#### Cleanable in the water

#### Gets smoother with underwater hull cleaning

#### Ultimate protection for rudders and underwater gear

- Ecoshield – a very strong version of Ecospeed designed for rudders, bulbous bows and underwater gear, prevents cavitation and corrosion damage
- Protects rudders, stabilizer fins, bulbous bow (ice), thruster tunnels, nozzles and other underwater gear

#### Ice class coating (certified)

- Abrasion resistant
- Low friction
- Stays on when other coatings are removed by the ice

#### Protection for offshore, stationary vessels

### Economical benefits

#### Enormous fuel savings (10 - 25% compared to conventional AF and FR coating systems)

- A smooth hull
- No long term paint degradation
- Becomes hydrodynamically smoother over time with routine cleaning
- AF and FR coatings typically degrade over time, with 20 - 45% fuel penalty after 10 - 15 years
- Easy to keep clean of fouling (can be kept to a light slime at most)

#### Reapplication costs saved (no reapplication needed)

#### Drydock savings (fewer and shorter drydockings since no need to repaint)

#### Ease of application

- Two homogeneous coats, 500µm each, no primer, midcoat, tie coat or any other coat)
- 3 hour minimum overcoat time, no maximum
- No special environmental requirements
- No special equipment needed

#### Easy and quick to repair in drydock

#### Does not interfere with other work in drydock

#### Greatly reduced total ownership cost

#### Better appearance of the hull

#### Better environmental reputation

### Environmental benefits

#### Reduced GHG

- Smoother hull = lower fuel consumption = reduced emissions

#### No toxic emissions to environment

- No heavy metals such as copper, zinc, tin
- No co-biocides such as Irgarol, Diuron and others

#### No contamination of water column or sediment

#### No harmful effects on non-target marine life

#### Prevents hull-borne invasive aquatic species spread

- Ships sail with clean hull, potential invasive species removed

#### Very low VOCs

#### Can be cleaned in the water safely

- No damage to coating
- No harm to environment

#### No repeat application, no cumulative environmental impact from preparation and application



# Calculating the cost difference

**We** have developed a tool for calculating the potential savings any ship can achieve by switching from its existing hull protection and fouling control system to Ecospeed, based on your figures, not ours.

We would like to invite you to take advantage of this comparison tool and calculate the savings you could be experiencing.

Please contact us to take up on this offer, or with any questions you may have:

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