



Biodiesel Seaward Bound
On Course Toward
Sustainable Transportation

BioShip

Newsletter

June 2006

Biodiesel Seaward Bound!

The **BioShip** project charts new waters on a course set out during two earlier projects testing biodiesel: the **BioMer** project on tour boats out of the Old Port of Montréal and the **BioPêche** project on a fishing vessel off the Gaspé Peninsula.

In the wake of satisfactory results from those projects, Maritime Innovation, Transport Desgagnés Inc. and the Sine Nomine Group are now embarking on another project to test the use of biodiesel, this time to fire one of the generators of a merchant vessel flying the Canadian flag and plying the waters of the Great Lakes, St. Lawrence River, Maritime Provinces, eastern Canadian Arctic and the open sea.

The project will test the use of biodiesel to power generators, assess generator performance, measure the reduction in polluting and greenhouse gas (GHG) emissions, determine the benefits of biodiesel in reducing maintenance costs, and investigate the overall potential and constraints involved in using biodiesel in marine shipping.

Biodiesel Supply

From late June to mid-October 2006, one of the generators aboard Transport Desgagnés' *M/V Anna Desgagnés* will be fuelled with B20, a blend of 20% biodiesel to 80% petrodiesel. Rothsay Biodiesel is the company that will produce the 115,000 litre supply of animal-fat-based biofuel needed aboard for the project. The reduction in the vessel's CO₂ emissions is estimated at just over 400 equivalent tons. The biodiesel produced by Rothsay Biodiesel meets ASTM D 6751 quality standard, the only standard for pure biodiesel (B100) recognized in North America.

Four-Part Project

The **BioShip** project goes beyond simply measuring polluting emissions; it will also highlight the impact of biodiesel on the performance of a merchant vessel's generator and assess the biofuel's economic, technical and operational advantages for the shipping industry. The project comprises the four parts below.

Determining Fuel Characteristics

A specialized lab will determine the chemical and energy characteristics of the reference petrodiesel and B20 used for the project.

Measuring Polluting Emissions

Before and after switching over to biodiesel, Environment Canada's Environmental Technology Centre (ETC) will use mobile gear to measure the emissions produced by the generator on board the *Anna Desgagnés*. The results will provide a basis for comparing the fuels used (petrodiesel and B20).

Measuring Performance

Maritime Innovation will study the impact of biodiesel on the performance of one of the four 6 cylinder SKL generator sets producing electricity aboard. The *Anna Desgagnés* crew will keep a log of all pertinent details for technical follow-up.

Drafting a Final Report

At the end of the project, data collected will be thoroughly analyzed, and findings and recommendations set down in a final report.



Biodiesel – A Rising Tide

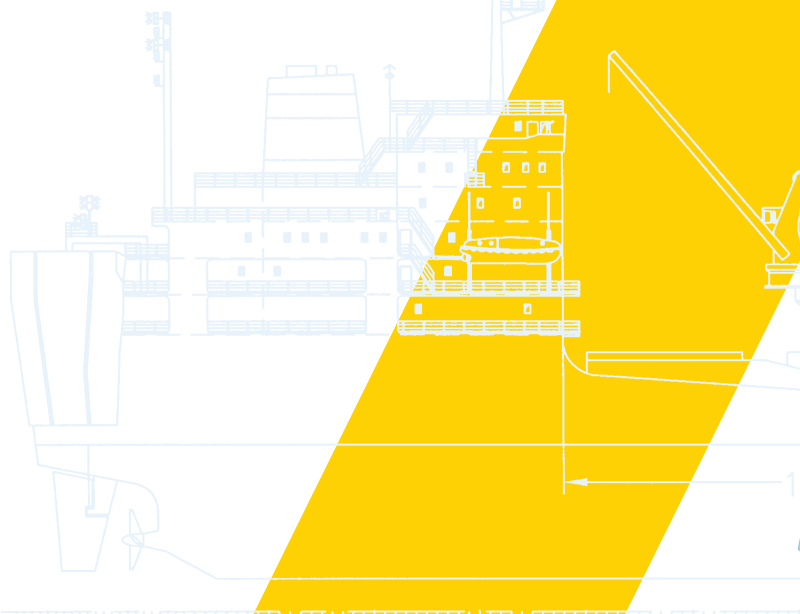
Biodiesel is a methyl ester produced from a chemical reaction between a light alcohol and animal fat or vegetable oil. It is a biofuel that can be used in various blends to replace petrodiesel. It is safe, non-toxic, and biodegradable, and can be produced from local, renewable resources. In Québec, it has the added advantage of being produced by recovering and reusing waste (agro-industry by-products), fitting perfectly into the drive toward sustainable development. Among the impressive list of benefits it offers are its positive influence on the greenhouse effect, air pollution and thus the environment, climate and public health, and the wealth and jobs created by the technological progress underlying its development. Biodiesel is widely recognized as helping to reduce polluting and GHG emissions. Since it is composed of about 11% oxygen by mass, biodiesel in a blend makes petrodiesel burn better, considerably reducing carbon monoxide (CO) emissions. The same holds true for emissions of total hydrocarbon (THC), total particulate matter (PM) and fine particulate matter (PM_{2.5}), the last including some particulates causing cancer. Its production-consumption cycle entails no emission of GHGs.

Besides its strictly environmental qualities, biodiesel is easy to use, since unlike other alternative fuels, no changes are needed either to the existing infrastructure for fuel distribution and delivery or to the diesel engines or generators running on B2 to B20 blends. Biodiesel is also a light solvent that cleanses tanks, fuel lines and injection systems and keeps them clean, thus facilitating maintenance. Its lubricating power is clearly superior to that of petrodiesel, reducing system wear and increasing service life.

Biodiesel blends are thermally stable and not significantly altered even when subjected to temperatures above 70°C. Despite its higher cloud point than petrodiesel, biodiesel remains a secure and efficient fuel for use in cold weather, provided a few simple conditions are met.

Ship and Master

The *Anna Desgagnés*, part of the Transport Desgagnés fleet, is a multipurpose 17,850 ton merchant vessel flying the Canadian flag. It is used to ship a range of cargo between a large number of ports along the St. Lawrence Seaway, Gulf of St. Lawrence, Great Lakes, Maritime Provinces and eastern Arctic. From June to October 2006, the ship will log some 38,800 km (see accompanying route), during which B20 will power on an experimental basis one of the four generators aboard. This innovative project testifies to Transport Desgagnés' commitment to protecting the environment and the efforts the shipowner is ready to deploy for greener operations.



M/V Anna Desgagnés Specifications

Builder:	Warnowwerft, Warnemünde, Germany, 1986
Flag:	Canadian
Type:	Multipurpose Lo Lo/Ro Ro vessel
Class:	Lloyd's 100A1, LMC, Ice 1A
Compliance certificates:	SOLAS, MARPOL, ISM, ISPS, USCG, Suez, Panama, St. Lawrence Seaway
Special features:	Quarter stern ramp on starboard side with a maximum loading capacity of 45 MT Tweendecker convertible to single-decker
Deadweight:	17,850 MT
Length:	173.50 m (569.22 ft)
Breadth:	23.05 m (75.62 ft)
Moulded depth:	13.70 m (44.95 ft)
Cargo shipped:	Miscellaneous and non-standard cargo, containers, heavy machinery, trucks, and freight for special projects

Engines

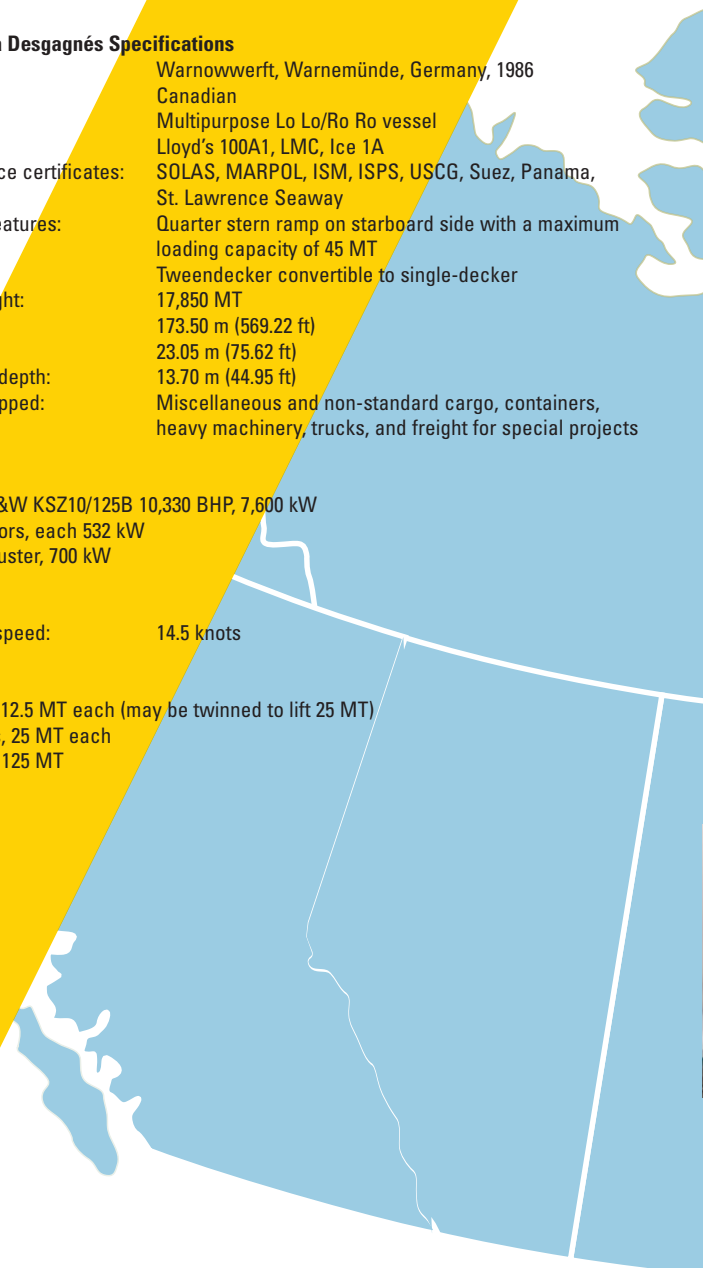
1 MAN B&W KSZ10/125B 10,330 BHP, 7,600 kW
4 generators, each 532 kW
1 bow thruster, 700 kW

Speed

Average speed: 14.5 knots

Cranes

4 cranes, 12.5 MT each (may be twinned to lift 25 MT)
2 derricks, 25 MT each
1 derrick, 125 MT



The BioShip's Ports of Call – 2006 Season





Hands at the BioShip Helm

Implementation Partners



Affiliated with the Institut maritime du Québec, Maritime Innovation is a centre for applied research in maritime technology. Recognized by the Québec government as a technology transfer centre, Maritime Innovation is active in the navigation, marine information system and marine engineering sectors, and also offers R&D, technical support and technology monitoring services. Participation in the **BioMer** and **BioPêche** projects are among its achievements. Maritime Innovation will be contributing \$42,500 toward the **BioShip** project. Website: www.innovationmaritime.ca

Transport Desgagnés, a Groupe Desgagnés subsidiary, carries out shipping operations on the Great Lakes, St. Lawrence, Maritime Provinces, eastern Canadian Arctic and U.S. eastern seaboard. Almost all company vessels are classified for navigation in ice. Transport Desgagnés specializes in shipping bulk liquids, chemicals, and bulk dry and general cargo. The good safety record of its ships, which sail reliably between Canadian ports and off to major international ports, has earned the company its customers' trust. Transport Desgagnés is contributing over \$225,000 to the **BioShip** project. Website: www.desgagnes.com



The **Environmental Technology Centre** (ETC) is providing the project with specialized scientific support, thanks to its expertise in measuring air pollutants and pollution from mobile and fixed sources, analyzing organic and inorganic compounds, and evaluating and restoring contamination sites. The ETC is contributing and estimated \$10,000 to the **BioShip** project. Website: www.etccentre.org



With expertise in market development for new technology related to the transportation and energy sectors, the Sine Nomine Group has several projects to its credit. Noteworthy examples are its organization and management of the **BIOBUS** and **BioMer** biodiesel demonstration projects and its collaboration in the **BioPêche** project. The Sine Nomine Group has also just produced a Canadian roadmap for the development of a biodiesel distribution infrastructure. Sine Nomine Group financing of the **BioShip** project totals \$10,000. Website: www.SineNomine.ca

Financing Partner



As part of its strategy to promote innovation and find solutions to reduce GHGs in the commercial transportation sector, Transport Canada decided to support the **BioShip** project under its Freight Efficiency Program. The project will help assess the benefits of using biodiesel in the Canadian transportation sector and will promote the potential marketing of this biofuel produced from renewable resources. Funding from the government of Canada totals \$200,000. Website: www.tc.gc.ca

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To learn more about the **BioShip** project, visit the Websites of Maritime Innovation (www.innovationmaritime.ca) and Transport Desgagnés (www.desgagnes.com), or phone Richard Lavoie at 418-725-3525 extension 319 (Maritime Innovation) or Carole Campeau at 418-692-1000 (Transport Desgagnés Inc.).