

Sustainability at Holland America Line

Holland America Line (HAL) was proud of its reputation as a sustainability leader in the global cruise industry. Bill Morani, vice president for safety and environmental systems, was responsible for ensuring that the company and fleet complied with both safety and environmental regulations and policies. In light of the maritime industry's significant environmental impacts and its complex and rapidly evolving regulatory environment, Morani was thinking about how to prioritize the company's current sustainability initiatives. His musings were interrupted as Dan Grausz, executive vice president for fleet operations, came into his office waving an article. The Stena Line, a ferry operator, had reduced fuel use on one of its vessels by installing two wind turbines on deck, the article reported. Grausz, who also served as leader of the company's fuel conservation committee, reminded Morani that wind turbines were one of 56 initiatives HAL was evaluating. It had been assigned a low priority, but Grausz asked Morani if he thought that should be reconsidered.

HAL, headquartered in Seattle, Washington, was founded as a shipping and passenger line in 1873 and offered its first vacation cruises in 1895. In 1989, HAL became a wholly owned subsidiary of Carnival Corporation. HAL maintained its own identity, operating its own fleet, and managing its marketing, sales, and administrative support. In 2011, HAL operated 15 mid-size ships, mostly in the premium segment, and expected to carry 750,000 passengers to 350 ports in 100 countries. The company had more than 14,000 employees.

HAL was widely recognized as a leader in the cruise industry in its environmental sustainability. In 2006, HAL had received the Green Planet Award, which recognized eco-minded hotels, resorts, and cruise lines for outstanding environmental standards. This award was based on the company's ISO14001 certification and the installation of shore power plug-in systems on three ships. In 2008, Virgin Holidays awarded HAL its Responsible Tourism Award based on its reduction of dockside emissions, increased use of recycling, and adoption of a training program to avoid whale strikes. In 2011, HAL was named the World's Leading Green Cruise Line at the World Travel Awards in London, and in both 2010 and 2012 the company had received the Gold Environmental Protection Award from the U.S. Coast Guard.

Morani was particularly proud of the progress HAL had made in improving fuel efficiency; the company had reduced its fuel use per passenger per nautical mile by 20 percent between 2005 and 2011. Burning less fuel meant lower emissions of carbon dioxide, sulfur

By Murray Silverman, San Francisco State University. This is an edited version of a longer case, "Protecting Our Oceans: Sustainability at Holland America Line," copyright © 2012 by Murray Silverman; all rights reserved. This version was edited, abridged, and used by permission of the author. A full set of footnotes is available in the longer case. The case was developed with the cooperation of Holland America and the support of the Center for Ethical and Sustainable Business at San Francisco State University and the Campbell Foundation. This case was prepared as a basis for class discussion rather than to illustrate the effective or ineffective handling of an administrative situation.

and nitrous oxides (SOX and NOX), and particulate matter (PM). These emissions were increasingly regulated, because of rising concerns about both their health and environmental impacts. According to Morani:

Fuel conservation is our go-to strategy. It is a win-win. By consuming less fuel, we are not emitting as much exhaust containing greenhouse gases and other pollutants, while reducing HAL's fuel costs. And, by the way, the money saved through fuel conservation can help offset the increased cost of cleaner fuel.

Morani put aside his thinking about broader sustainability priorities in order to look into the wind turbine idea.

The Global Cruise Industry

Taking a cruise was very popular among tourists, and the cruise industry was one of the fastest growing sectors of the tourism industry. The modern cruise industry traced its beginnings to the early 1970s, when the industry began offering Caribbean cruises from Miami, Florida. As it evolved, the industry created a reasonably priced opportunity for many people to experience a resort-type vacation. Sometimes, cruise ships were referred to as floating hotels or marine resorts, because they had sleeping rooms, restaurants, entertainment, shops, spas, business centers, casinos, swimming pools, and other amenities, just like land-based resorts.

By the mid-2010s, cruise ships traveled in every ocean, frequently visiting the most pristine coastal waters and sensitive marine ecosystems. Among the most popular destinations were the Caribbean, the Mediterranean Sea, various European ports, the Bahamas, and Alaska. Worldwide, approximately 2,000 ports were capable of receiving cruise ships. Destinations varied from tropical beaches like Cozumel, to nature-based destinations such as Alaska, to historical and culturally rich locations such as Istanbul. The cruise product was highly diversified, based on destination, ship design, on-board and on-shore activities, themes, and cruise lengths; accommodations and amenities were priced accordingly. Classifications ranged from budget to conventional to premium and, lastly, to luxury. The passenger capacity of cruise ships tended to be larger in the budget and conventional categories and varied from a few hundred to over 5,000 passengers.

The popularity of cruising was reflected in its growth. Since 1980, the number of passengers had grown by an annual rate of 7.6 percent. Between 1990 and 2010, more than 191 million passengers took a cruise. Twenty-four percent of the American population had cruised at least once. Passengers were predominately Caucasian (93%), well educated, and married (83%). Their average age was 46, with an average household income between \$90,000 and \$100,000. The leading factors in the customer's selection of a cruise package were destination and price; industry executives believed that few customers considered a cruise line's environmental practices in their choice. As demand grew, the industry responded by building more cruise ships. As of 2012, 256 cruise ships plied global waters. Newer ships tended to be bigger, and they often included innovative amenities such as planetariums and bowling alleys.

Cruise lines were a \$30 billion a year global industry. In 2012, three major companies dominated the industry: Carnival Corporation (52 percent of passengers), Royal Caribbean Cruises Ltd. (21 percent), and Norwegian Cruise Line (7 percent). Each of these companies had a number of brands, allowing them to operate within various pricing segments. The industry was organized into the Cruise Line Industry Association (CLIA), whose membership included 22 of the world's largest cruise line companies and accounted for 97% of the demand for cruises.

The World's Oceans

HAL and the cruise industry as a whole relied on the oceans as their most important resource. The unspoiled waters and coral reefs at port destinations were a major attraction for passengers. Oceans, which covered 71 percent of the Earth's surface, provided many benefits for society. They were a source of food, in the form of fish and shellfish, and were used for transportation and recreation, such as swimming, sailing, diving, and surfing. They provided biomedical organisms that helped fight disease. And, the ocean played a significant role in regulating the planet's climate by absorbing carbon dioxide and heat.

Yet, in the mid-2010s, the oceans faced many environmental threats:

Overfishing: More than half the world's population depended on the oceans for their primary source of food, yet most of the world's fisheries were being fished at levels above their maximum sustainable yield. Furthermore, harmful fishing methods were unnecessarily killing turtles, dolphins, and other animals and destroying critical habitat.

Pollution: Eighty percent of all pollution in seas and oceans came from land-based activities. More oil reached the ocean each year as a result of leaking automobiles and other nonpoint sources, for example, than was spilled by the Exxon Valdez. An enormous amount of oil had been accidentally spilled from ships, destroying aquatic plant and animal life.

Eutrophication: Another serious ocean threat was algal blooms caused mainly by fertilizer and topsoil runoff and sewage discharges in coastal areas. As algae died and decomposed, water was depleted of available oxygen, causing the death of other organisms such as fish.

Ocean acidification: Carbon dioxide in the atmosphere, caused mainly by the burning of fossil fuels, was a well-known contributor to global warming. But, it also acidified the oceans. When absorbed in water, carbon dioxide was converted into carbonic acid, which in turn dissolved reefs needed by organisms such as corals and oysters, threatening their survival.

Ocean warming: Atmospheric warming also increased the temperature of the ocean, reducing the generation of plankton, the base of the ocean's food web, and leading to significant marine ecosystem change.

Tourism: While tourism generated vast amounts of income for host countries, it could also have adverse environmental impacts, especially in heavily visited coastal areas. Sewage and waste from resorts, hotels, and restaurants could find their way into bays and oceans. Careless diving, snorkeling and other tour activities could damage coral reefs.

Environmental Impacts of the Cruise Industry

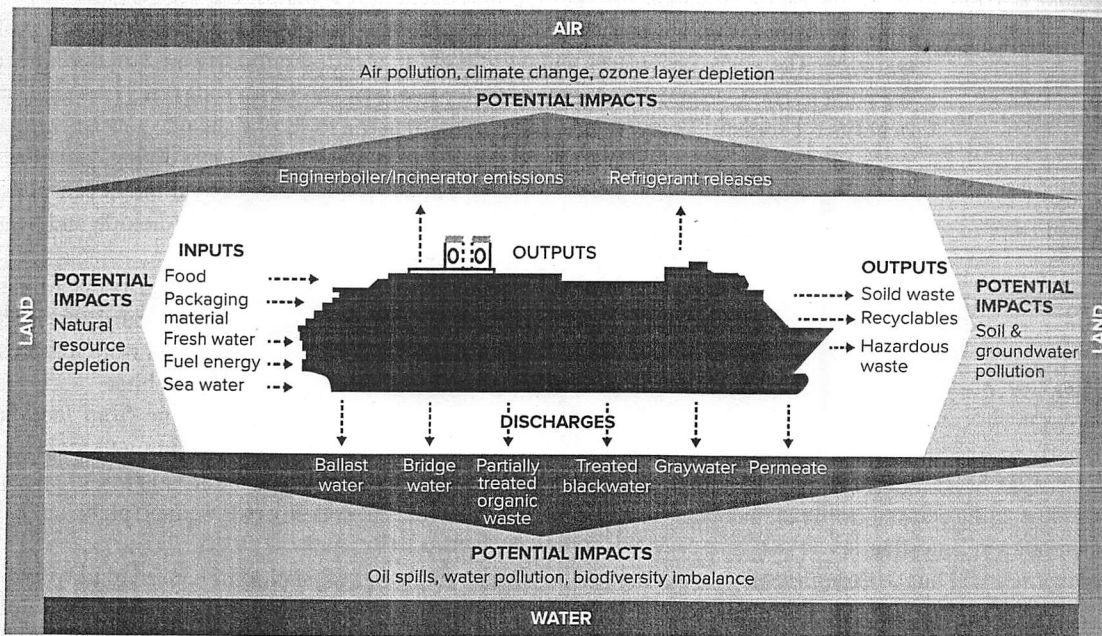
In a number of ways, the cruise industry contributed to these threats to ocean health. The primary inputs for a cruise were food, packaging materials, fresh and sea water, and fuel. As these inputs were processed over the course of a cruise, they produced discharges or waste with environmental impacts on water, air, and land. These impacts are diagrammed in Exhibit A.

Discharges to Water

The primary discharges to water from a cruise ship were blackwater (sewage), graywater (from showers, sinks, laundry, and the galley), and bilge water (potentially oily water leaked from engines and equipment that accumulated in the bilges).

Exhibit A

Environmental Aspects and Potential Impacts from Cruise Ship Operations



Source: Holland America Lines.

Blackwater contained pathogens, including fecal coliform bacteria, which could contaminate fisheries and shellfish beds, risking human health. On most cruise ships, sewage was treated using a marine sanitation device (MSD) that disinfected the waste prior to discharge. A newer technology, called advanced wastewater purification systems (AWWPS), was capable of producing water effluent as clean as or cleaner than that produced by many municipal treatment plants. International and U.S. regulations required that treated sewage be discharged at least 3 nautical miles from shore and untreated sewage at least 12 nautical miles from shore. All discharges were banned in certain sensitive zones.

Graywater could also contain pollutants, including oil, detergents, grease, suspended solids, nutrients, food waste, and small concentrations of coliform bacteria. U.S. regulations prohibited the discharge of graywater within three miles of the coast in California and Alaska. Voluntary industry standards specified a distance of at least four miles from the coast.

Bilge water. Regulators required that discharged bilge water contain less than 15 ppm (parts per million) of oil and could only be discharged while the vessel was en route and not operating in protected zones.

Solid and Hazardous Waste

Cruise ship waste streams could be either hazardous (e.g., chemicals from dry cleaning or photo processing, solvents, and paint waste) or nonhazardous (e.g., food waste, paper, plastic, and glass). Waste could be discarded either in the water or on land.

The potential impact from pollution by solid waste on the open ocean and the coastal environment could be significant, including aesthetic degradation of surface waters and

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coastal areas. Sea birds, fish, turtles, and cetaceans could be entangled in waste and injured or killed. The disposal of food wastes in restricted areas could cause pollution.

Air Emissions

Cruise ship engines were designed to generate the energy they needed both for propulsion and for operating lights, refrigeration, heating and cooling, and other onboard services. The main fuel used by cruise ships was the relatively dirty-burning heavy fuel oil (HFO). Distillate and low-sulfur fuel oil (LSFO) offered a cleaner alternative to HFO, but usually cost between 10 and 50 percent more. Fuel costs typically accounted for around 15 percent of operating costs on a cruise ship.

Engine exhaust was the primary source of air emissions; these included carbon dioxide, nitrous and sulfur oxides, and particulate matter. Around 2 to 3 percent of global carbon dioxide emissions came from maritime shipping, mostly from the 50,000 merchant ships plying the ocean. The 350 cruise ships contributed in a small way to this problem. The impact of shipping on SOX and NOX was greater: the maritime industry as a whole accounted for approximately 4 percent and 7 percent, respectively, of global SOX and NOX emissions, with cruise ships contributing part of this.

Regulation of the Maritime Industry

Regulations governing the maritime industry and its environmental impacts were complex and multilayered. Shipping activities were governed by a mixture of United Nations conventions, the international law of the sea, the laws of various nations, and voluntary rules established by industry trade associations.

Several formal institutions and instruments provided mechanisms for cooperation among national governments in managing the ocean commons. The International Maritime Organization (IMO), a specialized agency of the United Nations, regulated the international shipping industry. One of its most important initiatives was the IMO Convention for the Prevention of Pollution from Ships, known as MARPOL (for "marine pollution"). Ships operating under the flags of countries that had signed the MARPOL convention were subject to its rules. (Countries responsible for 99 percent of marine shipping had signed.) Other international agreements included the UN Convention on the Law of the Sea (UNCLOS), a comprehensive treaty establishing protocols for the use and exploitation of the ocean and its resources. The International Whaling Convention regulated the hunting of great whales. Overall, regulations of the maritime industry had become stricter over time, as concern about the ecological health of the oceans had grown. For example, international bodies had created special emission control areas, where discharges of airborne pollutants were sharply curtailed.

The country where a ship was registered, called the *flag state*, was obligated to ensure that its ships complied with regulations set down in international conventions to which the flag state was a signatory. Even if a ship was registered in a flag state that had not ratified a particular IMO convention, it had to obey rules adopted by any nations it visited. Since almost all cruise ship ports were in nations that had ratified the IMO regulations, as a practical matter, cruise ships were required to abide by IMO regulations.

Individual nations had also established their own regulations, and cruise ships had to follow the rules of any country they visited. For example, in 2009 the United States and Canada joined together to establish an Emissions Control Area covering all of North America, with the goal of reducing pollution in coastal waters. In situations where national rules were stricter than those of international conventions, the cruise industry had to follow the national rules.

In addition, the CLIA had developed its own waste management practices and procedures. In many instances, these voluntary environmental standards exceeded the requirements of both U.S. and international laws. For example, while regulations permitted the discharge of untreated blackwater 12 nautical miles from shore, CLIA standards called for treating all blackwater using advanced water purification systems, no matter how far from shore it was discharged. However, CLIA did not proscribe the manner in which the voluntary standards were to be implemented, nor impose penalties for failing to follow them.

Holland America Lines was committed to meeting or exceeding the standards established by all relevant international and national laws (including those of the Netherlands, where its ships were registered), as well as the CLIA standards.

HAL's Sustainability Practices

HAL operated its sustainability programs relatively independently of its parent firm, Carnival. The Safety and Environmental Management Systems (SEMS) Department oversaw HAL's programs in this area. Bill Morani served as vice president for SEMS; he, in turn, reported to Dan Grausz, executive vice president of fleet operations. SEMS was responsible for ensuring that all employees understood their roles and responsibilities. It also developed written environmental procedures, emergency preparedness plans, and performance targets and oversaw a rigorous environmental audit program. Onboard each ship, a safety, environmental and health (SHE) officer advised the captain's staff on compliance policies, processes, and environmental regulatory requirements.

In 2009, HAL released its first sustainability report covering activities from 2007–09; a second report was issued in 2012. Their sustainability reports used the Global Reporting Initiative's (GRI) G3 Guidelines as its organizing framework. The data in this baseline report was not independently verified, although this was not unusual among first-time GRI reporters. Their environmental management system (EMS) was recertified in 2009 and 2012 as meeting ISO 14001 environmental standards.

HAL's sustainability reports documented the company's progress in a number of areas. These included the following highlights:

- HAL was instrumental in developing advanced wastewater purification systems (AWWPS) technology for use in cruise ships, first installed on the MS Statendam in 2002. These systems used a combination of screening, maceration, biodigestion, ultra-filtration, and ultraviolet light to clean wastewater to a much higher standard than conventional systems. By 2012, 12 of HAL's 15 ships used AWWPSs (compared with 40 percent in the rest of the industry). HAL was also a leader in improving bilge water treatment prior to overboard discharge.
- HAL also had used various conservation strategies to reduce the amount of water used and discharged. In 2009, HAL used their environmental management system (EMS) to set a target of using 7 percent less water than in 2008. They exceeded the target using a number of approaches including low-flush toilets, low-flow showerheads and faucets, and specialized pool filters.
- HAL had taken steps to reduce its solid waste flow. Onboard, paper and cardboard were shredded and often incinerated to reduce the fire load carried by the vessel. Food waste was run through a pulper and discharged more than 12 nautical miles from shore. The company recycled much of its glass, paper, cardboard, aluminum, steel cans, and plastics on shore. It replaced highly toxic dry-cleaning fluids with a nontoxic technology, developed a paint and thinner recycling program, and implemented a list of approved

chemicals to reduce the use of toxics. HAL donated many partially used products and reusable items (mattresses, toiletries, linen, clothing, etc.) to nonprofit organizations.

One supply issue that received special attention was the sustainability of seafood served on board. In 2010, Hal partnered with the Marine Conservation Institute (MCI) to protect marine ecosystems in a program called "Our Marvelous Oceans." MCI was a nonprofit organization working with scientists, politicians, government officials, and other organizations around the world to protect essential ocean places and the wild species in them. Under the terms of the partnership, HAL committed to purchasing sustainable seafood to be served on board. It also developed a series of video programs about the oceans to be shown to guests, and supported MCI grants to graduate students and young scientists in marine ecology. As part of the partnership, MCI staff evaluated the sustainability of over 40 species of fish. HAL committed to use best choice items where available and to discontinue purchase of not-sustainable species. When more information was needed, HAL went back to the suppliers, who in many cases were able to find sustainable alternatives (such as Dover sole caught with hook and lines). HAL's senior managers embraced this program, even though in some cases the cost of fish was higher.

Managing Fuel Conservation at HAL

As part of its overall sustainability initiatives, in 2005, HAL's parent, Carnival Corporation, set an ambitious goal of increasing fuel efficiency as measured by the amount of fuel used per lower berth per nautical mile by 20 percent by 2015. In order to meet this goal, HAL had established a cross-functional fuel conservation committee in 2007 that systematically identified and assessed fuel reduction opportunities, based primarily on projected fuel savings and return on investment (ROI). The committee had been very effective in adopting successful initiatives based on established financial criteria, and HAL reached the 2015 target in 2011. Exhibit B shows the company's improved fuel efficiency over time, as well as its mix of fuels used. It shows that although fuel use increased overall (due to an expanding fleet and more passengers), fuel used per lower berth steadily decreased.

HAL had reduced its fuel use through a variety of techniques, including:

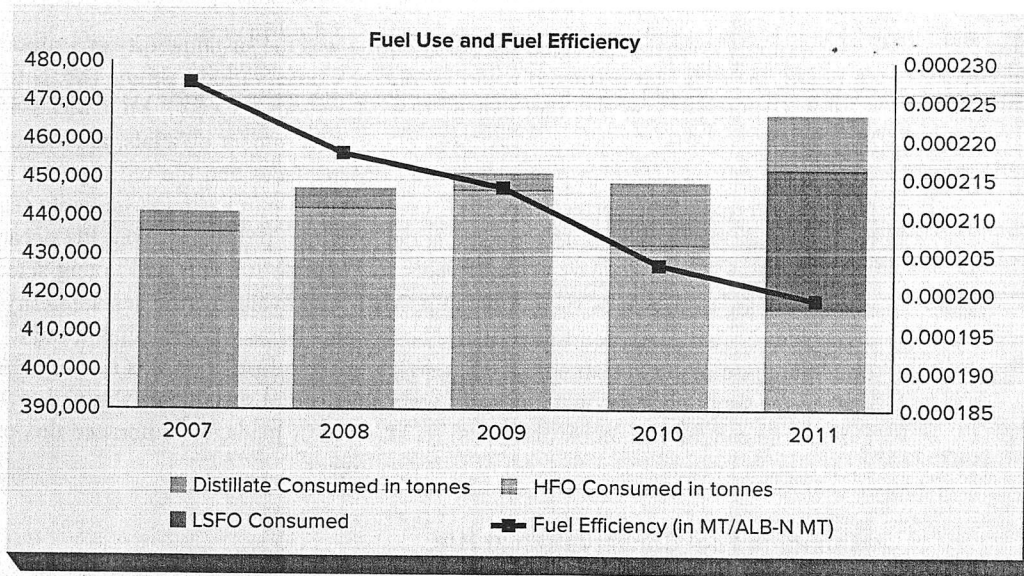
- Using more energy-efficient equipment and ships.
- Conserving energy.
- Plugging into shore power when docked.
- Encouraging competition among vessels on energy efficiency.
- Sharing best practices from high-performing ships.
- Providing monetary incentives to senior shipboard staff to encourage fuel conservation practices.

In 2012, the fuel conservation committee was evaluating close to 50 initiatives to improve efficiency even further. These initiatives fell into five broad categories, most of which required capital investments in new and modified equipment:

- Sailing and maneuvering (6 initiatives), such as using software to optimize speed and maneuvering.
- Modifying or adding equipment (28 initiatives), such as upgrading air conditioner chiller control systems.
- Operational improvements (8 initiatives), such as running a seawater cooling pump while in port.

Exhibit B

Fuel Use and Fuel Efficiency at Holland America Line



Source: Holland America Line.

Note: Fuel efficiency is measured as metric tons of fuel per lower berth/nautical mile.

- Monitoring various sources of energy consumption (10 initiatives), such as installing meters in electrical substations to monitor the energy consumption of various users.
- Waste heat recovery (4 initiatives), such as adding an additional heat exchanger to reuse high temperature waste heat for potable water heating.

The committee's spreadsheets included estimates of potential savings from each initiative and the cost per ship. Typically, the estimates of savings were measured in terms of percentage of overall fuel budget. For the 38 initiatives for which estimates had been made, 13 would probably save 0.25 percent of fuel or less, 16 would save between 0.26 and 0.99 percent, and 9 would save more than 1 percent. The committee also tracked whether each initiative was proven or assumed to be viable and its stage of implementation (study, funding required, implemented, or discontinued). Finally, based on all of this information, the committee assigned a priority (1, 2, or 3) to each initiative. Because the capital budget available to pursue fuel conservation projects was limited, even initiatives with a priority of 1 might not be implemented, or might not be implemented fleetwide. When the committee concluded that a proposed fuel conservation initiative should be implemented, it was pilot-tested on a single ship. Performance was tracked, and if the results met investment criteria, the initiative would be eligible to be rolled out to other ships.

Because of the unproven nature of the wind turbine initiative and skepticism on the part of HAL's engineering department, the fuel conservation committee had earlier assigned it a priority "3" and an estimated fuel savings of less than 0.25 percent. However, when Morani read the article about Stena Line (a ferry line providing service between Britain, Holland, and Ireland), he wondered if this option should be revisited. He learned that the two turbines installed on the Stena Jutlandica could generate about 23,000 kilowatt hours per year, equivalent to the annual domestic electricity consumption of four average homes or a reduction in fuel consumption of between 80 and 90 tons per year.

Morani began to inquire internally at HAL about the wind turbine idea. One of his direct reports had received unsubstantiated information that the Stena Line installation was projected to be very cost effective, and—contrary to intuition—the turbines actually reduced aerodynamic drag on the ferry. Morani also found another article describing how Hornblower Cruises planned to launch a hybrid vessel to take passengers on sightseeing, dinner, and social events in New York Harbor. This 600-passenger vessel would incorporate wind turbines, solar panels, and hydrogen fuel cells in addition to its diesel engine. The company believed the combination of alternative power generators would result in fuel savings that justified the investment.

Morani also consulted with Pieter Rijkaart, former director of New Builds, who had led the design and built most of HAL's current fleet. Rijkaart echoed the skepticism expressed by other engineers. For example, the engineers had noted that a cruise liner was much larger and more streamlined than a ferry, raising questions about the applicability of the Stena Line's performance results. Cost was also an issue. A pilot-test on one ship would require a large up-front investment in addition to the cost of the turbine, as it would have to be anchored to the deck and tied into the electrical grid on the ship. Rijkaart also voiced aesthetic concerns. Cruise ships were designed to be beautiful, and having bulky wind turbines on the deck could be an eyesore. Lastly, the amount of energy supplied by the wind turbines would account for an extremely small percentage of the ship's energy needs.

Morani wondered whether using wind turbines might bring intangible benefits. HAL had already demonstrated a proactive interest in alternative energy initiatives. For example, HAL had installed heat reflective film on windows to reduce the transfer of heat to the interior, thus reducing the load on air conditioners. At a cost of \$170,000 per ship, and a projected fuel savings between 0.5 to 1.0 percent, three ships had already installed this technology, and other ships awaited funding. HAL had adopted an initiative involving the pumping of used cooking oil into the fuel line. This low-cost option had resulted in both the reduction of fossil fuel and avoidance of the disposal cost of drums of used cooking oil.

Wind turbines represented another opportunity for HAL to explore using alternative energy. While this could contribute to HAL's reputation as a sustainability leader in the industry, Morani did not believe that reputation should be factored into the decision. "We don't talk about whether something will get good press," he commented. While the turbines would produce only a very small amount of the electricity used on the boat, they would contribute to reduced fuel use. Morani did not have enough information to estimate ROI or payback. Given the dozens of other proposed initiatives, he wondered whether it made sense to expend effort on this particular initiative. On the other hand, he commented, "I would be concerned that we could be missing an opportunity." Morani was eager to pull together his thinking on the wind turbine initiative for the upcoming fuel conservation committee meeting.

Discussion Questions

1. What are the most significant environmental issues facing Holland America Line (HAL)?
2. In what ways has HAL gone "beyond compliance" in its environmental initiatives?
3. Do you consider HAL an ecologically sustainable organization (ESO), and why or why not? What additional steps would HAL need to take to become an ESO?
4. What are the advantages and disadvantages to HAL of its sustainability practices?
5. What action would you recommend Morani take with respect to the wind turbine initiative? If you are not sure, what additional information would be helpful?