

Membership case study: Carnival Corporation



CO2 Emission Reductions for a Large Fleet of Cruise Ships

At Carnival Corporation, the world's largest cruise company, one of the ways we are demonstrating our commitment to sustainability is by significantly reducing the CO2 emissions from our fleet of 100 large cruise ships.

CONTEXT & OBJECTIVES:

Carnival Corporation & plc is a global cruise company and one of the largest vacation companies in the world. Our portfolio of leading cruise brands includes Carnival Cruise Lines, Holland America Line, Princess Cruises and Seabourn in North America; P&O Cruises (UK), and Cunard in the United Kingdom; AIDA Cruises in Germany; Costa Cruises in Southern Europe; Iberocruceiros in Spain; and P&O Cruises (Australia) in Australia.

We at Carnival Corporation & plc believe that sustainability is about preserving our environment, respecting our employees and communities, and returning value to our shareholders.

Sustainability is not a cost of doing business; it is a way of doing business. As one of the largest vacation companies in the world, Carnival has been committed since our inception to operating responsibly.

We recognize that our success is tied to protecting the environment, safeguarding and developing our workforce, strengthening stakeholder relationships, enhancing the port communities that we visit and maintaining our fiscal strength. We also recognize that, in today's business climate, the viability of our business as well as our reputation depends on being more sustainable and transparent.

One way of demonstrating this commitment to sustainability has been by reducing the CO2 emissions from our fleet of 100 large cruise ships. Carnival set an overall corporate target of a 20 percent reduction by 2015, from our 2005 baseline, in the intensity of CO2 emissions from shipboard operations (as measured in kg of CO2 per ALB-km).

CO2 resulting from fuel consumption by our ships represent a very significant proportion of the total emissions from our operations.

Note: ALB means "Available Lower Berth", which is a standard cruise industry metric of ship passenger capacity.

SOLUTION

Of the fuel consumed on a typical cruise ship about 60% is used to propel the ship and a further 10% on powering the auxiliary services for the ship's engines. The other large consumer is air conditioning and ventilation at about 20%, the remainder being used in lighting, galley's and for other passenger services etc.

Using this information as a starting point Carnival created a programme to reduce fuel consumption and hence CO2 emissions to meet the 20% target. The first step was to set up a process to share knowledge across our 10 cruise brands and 6 operational centers. We then instigated an effective programme to identify potential energy saving technology and operational procedures, using the experience of our senior technical and operational staff. Selected technologies and procedures were then trialled on our ships.

In addition to technological fixes we also changed some of our cruise itineraries to reduce ship speeds and distance sailed without impacting the attractiveness of our cruises to our passengers.



Once a technology or procedure was proved to be effective we commenced retrofitted to our existing ships and installing it on our new ships before they leave the shipyard. Amongst the technologies we have considered are:

- Vessel shore power installations (“Cold Ironing”)
- Voyage optimization tools
- Optimization of diesel generator use at sea and in port
- Installation of more energy efficient lighting
- Ship trim optimization using dynamic trimming software
- Engine Room Ventilation Variable Frequency Drive fans
- More efficient variable speed pumps.
- Hull surface and propeller cleaning in dry dock and during operations;
- Enhanced hull antifouling coatings.
- Improving efficiency and use of waste heat from engine exhausts for fresh water production.
- Air Conditioning upgrades – upgrading or replacing chillers, air handling equipment, and automation.

OUTCOMES

The results from all this work have been very heartening. From 2005 to 2012 we reduced our CO2 emission intensity by approximately 18% and between 2012 and 2015 we will achieve the remaining 2% reduction to meet our target, probably ahead of schedule.

In addition to demonstrating our commitment to sustainability and reducing our environmental footprint, this also translates into significant cost savings. During 2012 we spent \$2.4 billion on fuel which was our largest operating expense.

All this work will help us to achieve the SSI 2040 Vision by addressing the Key Area for Action – Pioneer/implement aggressive improvements in energy efficiency for new ship designs, retrofitting and operations.

We have demonstrated our ability to substantially improve energy efficiency and will continue to do so through our ongoing, programme to retrofit further efficiency improvements into our existing fleet and to improve the efficiency of our new builds.



What are the first steps people can take to replicate this idea/initiative?

1. **Identify the main consumers of energy** on your vessels and the key areas where technology or operational changes can reduce fuel consumption.
2. If possible **work together across your organisation to share knowledge and best practice** or work with others, for example in a trade association.
3. Carefully **select and trial potential improvements before committing** to a full retrofit programme



More information:
www.carnivalcorp.com