

# LIQUEFIED NATURAL GAS (LNG)

## About Liquefied Natural Gas

Liquefied Natural Gas, or LNG, is considered among the world's cleanest fossil fuels, with lower greenhouse gas (GHG) emissions than other conventional fuels. It is the best readily available, proven and commercially scalable fuel for the maritime industry to use today.

LNG is made from natural gas (predominantly methane) that is cleaned, cooled and compressed until it becomes a liquid (at -259°F/-162°C), making it easy to store and carry as our fuel source to generate power and propulsion.

## CARNIVAL CORPORATION'S APPROACH TO LNG

Reducing GHG emissions is our #1 sustainability priority. We are pursuing net zero GHG emissions from ship operations by 2050 and already are producing ~15% less total GHG emissions today than our peak historical year (2011), despite increasing capacity by roughly 38% in that time.

We've reached this and other sustainability milestones with aggressive, ongoing climate actions – including investing in LNG-powered vessels. Carnival Corporation pioneered LNG in the cruise industry in 2018 and we now lead the industry, operating 11 LNG cruise ships (as of Nov. 2025). We will have 18 LNG-capable ships by the end of 2033, representing ~33% of our capacity.

**LNG is an important steppingstone in our industry's ongoing journey to reduce its environmental footprint.**

Here's why:

- LNG delivers **immediate GHG reductions**, and in the absence of proven and commercially scalable fuel for the maritime industry today, is the best readily available fuel to help significantly reduce direct GHG and other atmospheric emissions and particulate matter **now**.
- LNG reduces carbon emissions by up to 20% and almost totally avoids emissions of nitrogen oxide, sulfur oxide and particulate matter.
- LNG provides a viable step along a multi-decade transition pathway to future bio-methane and synthetic-methane (Liquefied Bio-Methane and Liquefied e-Methane [e-LNG]).
- Our dual-fuel LNG engines can run on biodiesel and synthetic diesel, once available, as well as bio-methane and synthetic methane without any modifications.

**LNG is one of the many ways we are driving down our emissions footprint.** Other programs include:

- Transforming to a more efficient fleet with 23% of our total fleet capacity representing newer, more efficient ships as of year-end 2025.
- Cutting fuel use by ~5% per ship with fleetwide energy efficiency upgrades (LED lights, HVAC automation, variable speed drives on pumps & fans, etc.).

## QUICK FACTS

- **LNG cuts tank-to-wake carbon emissions by up to 22%, particulate matter by 95-100%, nitrogen oxides by 85%, and emits effectively zero sulfur oxides (vs. marine diesel).**
- **Pioneered LNG in the cruise industry in 2018.**
- **Lead the industry in operating LNG ships:**
  - 11 LNG cruise ships (as of Nov. 2025).
  - 18 LNG cruise ships making up ~33% of total capacity (by year end 2033).
- **AIDA Cruises launched the world's first LNG-powered cruise ship in 2018 – AIDAnova.**
- **Carnival Cruise Line's *Mardi Gras* was the first LNG-powered cruise ship in North America (2020, Port Canaveral).**

- Equipping 70% of our ships with shore power connections to switch off ship engines in port and plug in to the local electric grid (where available).
- Trimming fuel use for propulsion by 5% with Air Lubrication Systems-equipped ships gliding on air bubbles for less friction and easier propulsion (operating on 10 ships in our fleet).
- Regularly piloting other next-generation emission-reducing technologies such as maritime-scale battery systems, a methanol-powered fuel cell and biofuels as a fossil fuel replacement.

While LNG will always be part of the solution, it will take a mix of fuels and propulsion/energy solutions to achieve our goal of net zero emissions from ship operations by 2050.

## CARNIVAL CORPORATION'S LNG PROGRAM TIMELINE

- 2018:** AIDAnova (AIDA Cruises)
  - *Cruise industry's & Carnival Corporation's first LNG-enabled ship*
- 2019:** Costa Smeralda (Costa Cruises)
- 2020:** Iona (P&O Cruises)
- 2020:** Mardi Gras (Carnival Cruise Line)
  - *First LNG-enabled cruise ship in North America*
- 2021:** AIDAcosma (AIDA Cruises)
- 2021:** Costa Toscana (Costa Cruises)
- 2022:** Carnival Celebration (Carnival Cruise Line)
- 2022:** Arvia (P&O Cruises)
- 2023:** Carnival Jubilee (Carnival Cruise Line)
- 2024:** Sun Princess (Princess Cruises)
- 2025:** Star Princess (Princess Cruises)
- 2027:** Carnival Festivale (Carnival Cruise Line)
- 2028:** Carnival Tropicale (Carnival Cruise Line)
- 2029:** New Ship (Carnival Cruise Line)
- 2030:** New Ship (AIDA Cruises)
- 2031:** New Ship (Carnival Cruise Line)
- 2032:** New Ship (AIDA Cruises)
- 2033:** New Ship (Carnival Cruise Line)

## METHANE SLIP

Small amounts of unused (uncombusted) methane may “slip” into the exhaust stream emitted by LNG engines. The cruise industry has committed to mitigating methane slip to make LNG an even better option. As of 2025, efforts already have cut levels of methane slip by 60% in less than a decade, and experts believe methane slip will no longer be an issue by 2030.<sup>1</sup>

<sup>1</sup> 2026 report by SEA LNG

## PARTNERS IN PURSUIT OF NET ZERO EMISSIONS

We are partnering with others to reduce emissions and develop alternative fuels and technologies, including:

- Clean Shipping Alliance
- Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping
- Methane Abatement in Maritime Innovation Initiative (MAMII)
- SEA-LNG
- Society for Gas as a Marine Fuel

This document may include claims related to our greenhouse gas emissions reductions, goals, initiatives, accomplishments and progress reports. Supporting data for such greenhouse gas emissions claims, including data verification information, is published in our Sustainability Reports on [carnivalcorp.com/impact](https://carnivalcorp.com/impact) on an annual basis.



Carnival Corporation Fact Sheet | February 2026  
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