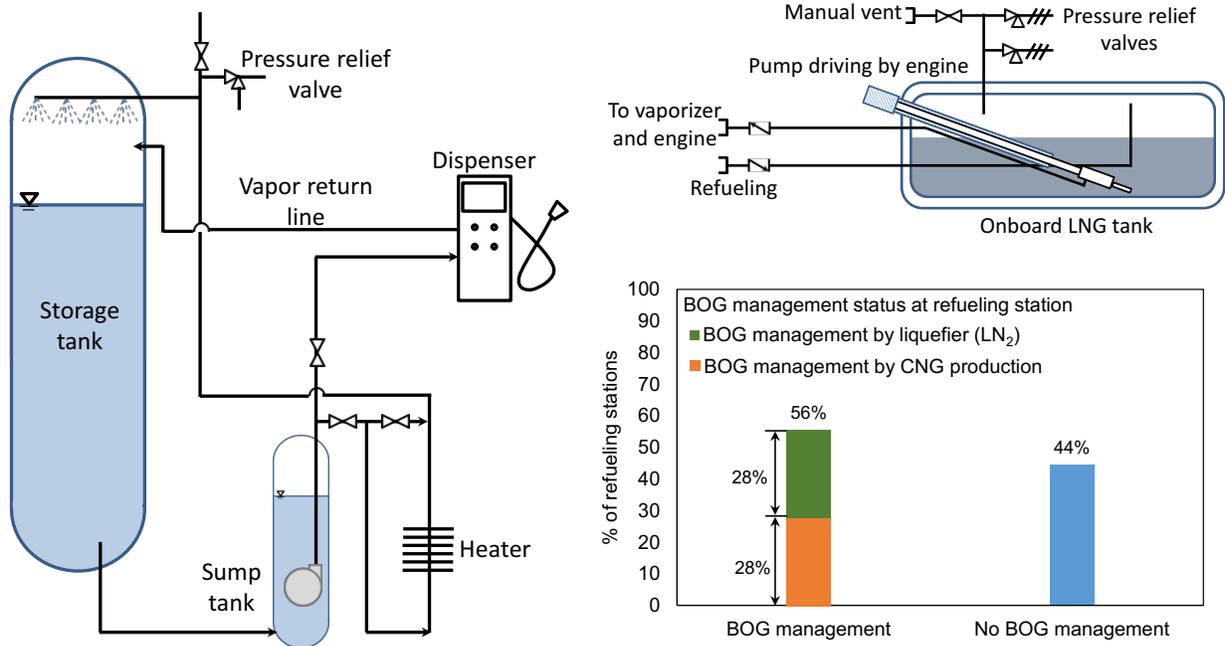


Research highlights from “A review of liquefied natural gas refueling station designs” published in the *Renewable and Sustainable Energy Reviews*



- The announcements at the 21<sup>st</sup> Conference of Parties (COP) in Paris indicate that reaching the 2°C scenario targets would require immediate and significant changes over the next three decades (as opposed to changes occurring over centuries).
- CO<sub>2</sub> and methane emissions account for 92% of global greenhouse gas emissions.
- Methane is the main constituent of NG and has up to 85 times more impact on climate change than CO<sub>2</sub> in a 20-year period.
- The transmission and storage sector contributes to 33–35% of methane emissions.
- The distribution sector, which includes refueling stations and fueling process, contributes to 28% of methane emissions.
- Daily methane emissions from liquefied natural gas (LNG) refueling stations vary between 0.1% and 10% (volume basis).
- The majority of operational LNG refueling stations in the world have no boil-off gas (BOG) management.
- To reduce the pressure of LNG tanks onboard vehicles prior to filling, the BOG is vented to the atmosphere, is collapsed in the tank, or is returned to the refueling station.
- The critical analysis of different designs of LNG refueling stations indicates that 44% of designs have no BOG management, 28% of designs rely on liquid nitrogen condenser or a liquefier to condense the BOG, and 28% of designs compress the BOG to produce compressed natural gas.

- Our research shows that in China and the U.S., where stations with BOG management are rare, the number of LNG refueling stations has increased by 32 and 3 times, respectively, between 2010 and 2015.
- This study highlights the fact that as heavy fuel oil and diesel are replaced by LNG, it is critical to pay proper attention to the design of the LNG supply chain and LNG refueling stations to minimize or eliminate BOG venting and reduce greenhouse gas emissions.

## **Reference**

A. Sharafian, H. Talebian, P Blomerus, O.E. Herrera, and W. Mérida, (2016) “A review of liquefied natural gas refueling station designs,” *Renewable and Sustainable Energy Reviews*, Vol. 69, pp. 503–513.

Link: <http://www.sciencedirect.com/science/article/pii/S1364032116309406>