

Keppel O&M's Circular Economy Initiative – Converting an LNG Tanker into a Floating Liquefaction Vessel

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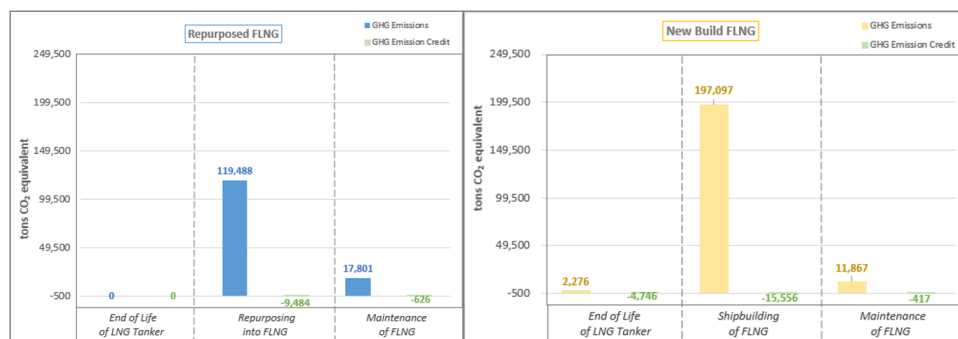
In its move towards greater sustainability, Keppel Offshore & Marine (Keppel O&M) has through its wholly-owned subsidiary, Keppel Shipyard Ltd, introduced a repurposing initiative converting Liquefied Natural Gas (LNG) tankers at end-of-life into Floating Liquefaction Vessels (FLNG). This approach is consistent with a circular economy business model where material, product and component lifetimes are extended and resources recovered, encouraging material efficiency and reducing the carbon footprint of FLNGs.

ERM was commissioned by Keppel O&M to undertake a scoping study assessing the Greenhouse Gas (GHG) emission and steel savings related to the repurposing initiative compared to building a new FLNG. With this study in hand, Keppel O&M aims to communicate the positive impacts of FLNG conversions to interested stakeholders and positively influence their procurement policy.

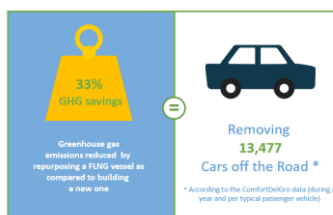
Based on a streamlined life-cycle GHG assessment, the following stages were assessed: i) end of life of the LNG tanker; ii) vessel repurposing / shipbuilding stage; and iii) FLNG's maintenance. The stages assessed only include those that differ between the repurposed and new build FLNG, i.e. excluding the manufacturing, operation and maintenance of the LNG tanker, as well as the operation and end of life of the FLNG.

Supporting Keppel's broader sustainability goals

Based on Keppel O&M's circular economy initiative, repurposing an LNG tanker into an FLNG allows 39% virgin steel savings when compared to building an FLNG from scratch.^{1,2} Reference to the streamlined life-cycle GHG assessment, the likely GHG emission savings are estimated to be about 33% when compared to the new build vessel.³ The savings almost exclusively occur during the repurposing stage. The results are based on certain assumptions, uncertainties and limitations that are all documented in the main report.^{4,5}



The GHG savings are equivalent to removing about 13,500 cars off the road for a year.



Conclusion

By enabling a second lease of life for vessels, Keppel O&M not only delivers more function from less consumption, but it also helps to avoid the environmental impacts caused during vessel decommissioning. This circular economy initiative should be replicated as a best practice offering businesses the prospect of delivering more sustainable products, as well as securing bottom line savings.

¹ Equivalent to about 29,000 metric tons of virgin steel saved

² The same design, lifetime and annual LNG production were assumed for the repurposed and new build FLNG

³ On a whole vessel basis, the savings are equivalent to 63,343 metric tons of CO₂ equivalent

⁴ A factor of 1.5 was used to reflect the increase maintenance burden in the case of a repurposed vessel

⁵ The allocation method used for steel scrap recycling follows an end-of-life recycling approach