

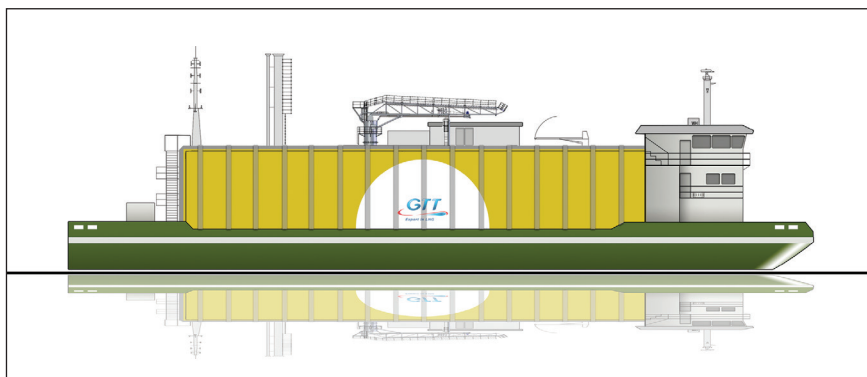
Queue barging

A new LNG bunker barge developed by Knud E. Hansen and GTT, and taking operations at the Port of Piraeus as its template, promises to offer superior manoeuvrability and flexibility, as well as a 50% reduction in costs, compared to larger, conventional LNG carriers

Rock-bottom oil prices over the past few years may have played a part in hindering the anticipated roll-out of a sufficient, global LNG supply infrastructure across key international ports – but, without a doubt, natural gas remains a strong future contender in the green ship technology stakes.

It could be argued that reduced fuel costs have removed some of the sense of urgency in realising a reliable, worldwide LNG supply network. However, some forward-thinking port authorities have pressed on regardless, developing strategies to turn their ports into workable and safe LNG bunkering zones. One such body is the Piraeus Port Authority, which has recognised the potential commercial benefits of offering LNG at its location, easily accessible from both Europe and the Mediterranean. As well as attracting the operators of dual-fuel vessels making frequent calls at the EU’s emission control areas (ECAs), an LNG hub at Piraeus would also be very appealing to those companies that have incorporated natural gas into their cruise and ferry operations as a cost-effective alternative to low-sulphur-content marine fuels.

Earlier in summer, it was revealed that the Port of Piraeus intends to invest in an LNG feeder and bunkering vessel, *Amaltheia*, which will feature an LNG capacity of between 1,400-2,000m³, and



A rendering of Knud E. Hansen’s and GTT’s proposed LNGBunker-5k barge; the vessel will feature an LNG capacity of 5,000m³, care of a lightweight membrane tank

which will be tasked with serving Piraeus as well as the ports at Patras and Heraklion – situated approximately 215km and 330km away, respectively.

This news was accompanied by the hosting of a technical workshop focused on LNG bunkering operations in the port, in which representatives of the Port of Piraeus, class society Lloyd’s Register and shipping companies and designers from Greece and Italy discussed technical, operational and regulatory issues affecting LNG supply in this region.

Local approach

The commissioning of *Amaltheia* is no surprise. As Panos Kounenakis, naval architect and marine engineer at vessel design house Knud E. Hansen, comments: “Large LNG carriers have operated worldwide for decades with an excellent safety record.” However, a more ‘localised’ approach to LNG supply has informed the development of Knud E. Hansen’s LNGBunker-5k concept, a barge design developed in collaboration with GTT, a major player in the development of LNG containment systems.

Kounenakis continues: “The development of an efficient global distribution network for ports and regasification facilities is

already challenging the shipping industry and current regulatory frameworks. It is generally acknowledged, however, that such a network will require new, small-scale LNG supply vessels.”

In essence, the LNGBunker-5k is “similar to a conventional, port-based bunker barge – only with the ability to transport LNG”, Knud E. Hansen senior marine engineer Michael Mills tells *Ship & Boat International*. Focused primarily on “simplicity and flexibility”, this self-propelled barge will be trusted with LNG supply and bunkering operations in its home port and around surrounding coastal waters, featuring superior manoeuvrability to the vast majority of LNG carriers (especially in ports with restricted waters or shallow draughts). Propulsion-wise, the barge will be equipped with two stern thrusters and a pump jet.

Another advantage of the more compact barge approach would be competitive CAPEX and OPEX. For instance, Mills explains: “The cost of the LNGBunker-5k would be approximately 50% of a ship-shaped gas carrier that has to travel long distances to serve the port in question.” Instead, the barge will be instantly on hand to connect to the local pipeline infrastructure and refuel vessels, thereby avoiding the need to pay

TECHNICAL PARTICULARS	
LNGBunker-5k	
Length, oa.....	63.8m
Breadth, moulded.....	16.2m
Depth.....	5.6m
Draught.....	3.6m (scantling)
Displacement.....	3,225tonnes
Service speed.....	8knots
Crew.....	>12

(sometimes substantial) charter rates for external, larger vessels, as well as reliance on road tankers to enter the port and drive up to the quay, Mills adds.

Gas capacity

In its current form, the proposed LNGBunker-5k model will measure nearly 64m in length and will feature an LNG capacity of 5,000m³, courtesy of a GTT-manufactured Mark III membrane containment system. Kounenakis notes: “[This] system was preferred to other tank types of similar volume due to the benefits of more efficient space utilisation, better lightship weight and the possible future growth of demand.” The tank has an LNG transfer rate of 650m³ per hour.

Mills says: “Primarily the vessel is sized to match the likely operational scenarios of large cruise passenger ships, container ships and pure car/truck carriers [PCTCs].” As a rough guide, he adds, the LNGBunker-5k’s capacity should prove sufficient to provide

either two standard cruise ship top-ups, at approximately 2,000m³ per tank, or a single top-up for one of the larger cruise vessel types – such as Carnival Cruise Lines’ new 135,000gt behemoth, *Carnival Vista*.

A barge with this LNG capacity will also be able to cater to larger numbers of ro-pax ferries requiring smaller volumes – a vessel sector, Mills opines, that is set to grow significantly over the next few years.

In terms of power, and befitting its ‘green’ status, the LNGBunker-5k has been designed to accommodate a set of three dual-fuel engines with a total installed power of less than 2MW, enabling the vessel to achieve a cruise speed of 8knots when navigating coastal areas.

Also, as part of the ongoing development process, and in conjunction with a major equipment supplier, Knud E. Hansen reveals that it is investigating the technical and economic feasibility of an alternative hybrid power plant incorporating an energy storage/battery

system with just two dual-fuel generators. This could enable potential operators to choose a power plant that best suits their operating requirements.

The LNGBunker-5k concept also incorporates a high degree of flexibility. “If needs be, we can scale this design up and create a larger version,” says Mills. Similarly, clients will be able to customise and create bespoke versions of the concept to suit their specific in-port and operational needs, right down to the selection and sizing of auxiliary LNG equipment, including boil-off gas (BOG) compressors, loading arms and transfer pumps.

For now, Knud E. Hansen is talking to shipyards with a view to creating the first prototype of the LNGBunker-5k. As an affordable and simple means of restocking gas-fuelled vessels without resort to complex logistical considerations, this solution could prove a vital link in the wide-scale development of functional and profitable LNG hubs. **SBI**