Tide Sjo and Gasnor Notes

Tide Sjo Overview

Tide Sjo is a 160-year-old Norwegian transit operator that operates buses and ferriesthroughout Norway. Since 2009, Tide has operated the passenger ferry service between Oslo and Nesodden. There are currently three 600-passenger LNG ferries operating out of central Oslo. The municipal government mandated LNG operation as part of the contract for the service over this route and Tide won the 15-year contract with two five year options at the end. Tide Sjo receives a monthly subsidy as part of this contract and in turn is responsible for all operational and capital costs. Norwegian ferry operators are eligible for a subsidy of up to 80% of the cost for projects that reduce NoX emissions from the NoX Foundation. These projects can include the cost differential of LNG vs. diesel construction, which in this case was about $3.6 million per ship. Tide Sjo officials declined to say how much they received for this project. Operators are also able to avoid carbon taxes on natural gas that is used in lieu of diesel. For these reasons Tide believes the operating cost of the LNG vessels are slightly lower than if they were diesel.

Operational and Maintenance Issues

The three vessels are each equipped with two (2) 450 KW diesel and 2 340 KW Mitsubishi LNG engines. Tide Sjo officials indicated Rolls Royce engines would have been their preferred option if available but all their engines were too powerful for vessels of this size at the time of procurement. The Mitsubishi engines are slightly underpowered and this has caused some issues with the power management system since the diesels have faster response times and accelerate faster. As a result, they have burned more diesel over the first two years of operation than originally anticipated. The vessels have not had any other significant operational problems and they anticipate maintenance costs being the same, or possibly slightly lower, over the life of the ship. The engines were recently opened at the recommended 8,000 hours of service life interval recommended by Mitsubishi and looked like new in terms of cleanliness, an experience noted by other operators and witnessed by the consultants on other vessels.

The Tide Sjo boats, as well as the other vessels in Norway, operate emergency shutdown engine rooms. This means in the event of a gas leak the engine room containing the gas engine where the leak occurs is shutdown automatically and the vessel has to switch to diesel power or operate on the remaining gas engines.

Crew Training

All crew members on the LNG powered ferries must take a two-day gas training course then go through familiarization on the vessel before taking part in the bunkering process. There is a four-person crew consisting of a captain, chief engineer, and two deckhands.

Bunkering and Public Outreach

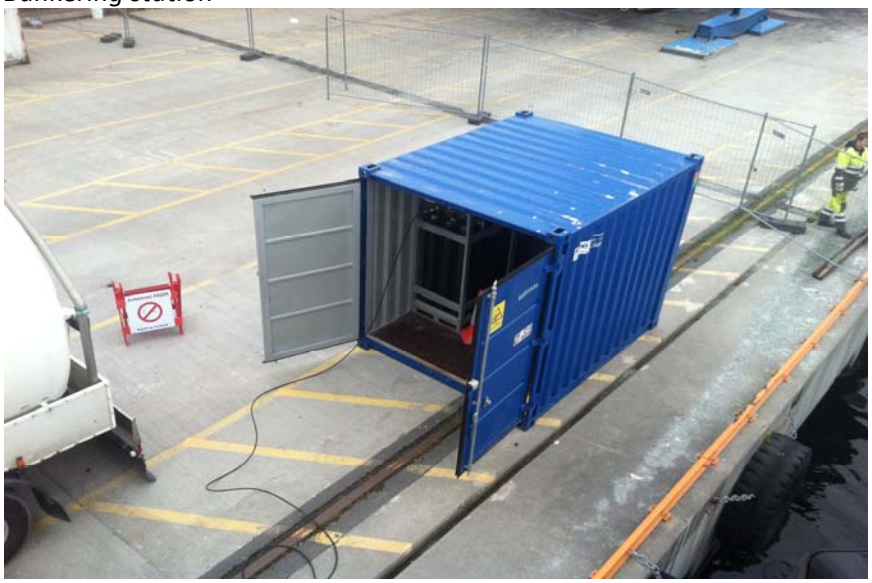
The ferries are fueled every three weeks on a pier in the Port of Oslo, located near the city center. Tide Sjo officials indicated no significant public outreach effort regarding safety was needed. Gasnor, their LNG supplier, led the safety planning, which consisted of a four-hour planning meeting with local fire and police officials to develop an emergency response plan.

The actual fueling takes place with an adjustable hose that is attached to the fueling truck. All three vessels fuel from the same truck and the line is cleared with nitrogen before and after the fuelings on each vessel to ensure that LNG does not leak into the atmosphere. The driver and both deckhands monitoring the fueling, who are stationed at the above deck bunkering station, all wear hazardous materials protective suits. The Chief Engineer monitors the process from the deck and the fueling can be halted by any of the three, who are in radio contact, if necessary. A Gasnor official indicated that 50,000 fillings have been done throughout the country without incident. Upon completion of the fueling, the truck driver, crew at the bunkering station, and Chief Engineer go through an extensive safety checklist as the nitrogen is clearing the line and valves and the hose is disconnected.

Bunkering station crew member

Vessel being fueled

Bunkering station



Nitrogen tanks located at terminal

Truck driver and Chief Engineer verifying amount delivered

LNG Supply

The LNG used by the three vessels is delivered from Bergen, a 322 mile drive, the longest distance Gasnor delivers LNG with their fleet of 16 supply trucks.They also have supply vessels that deliver LNG to coastal facilities.The official from Gasnor noted several key points for the supply:

- It is important to test the vessel engines with the LNG that will be used as the gas composition varies by source. These three vessels were built in France and they brought LNG from Norway to test the engines.
- Shoreside fixed fueling facilities and tanks can save money and ease concerns about on-time delivery, but it only make sense if there is enough LNG consumption to justify the capital expense. In the case of Tide Sjo, there is not enough LNG consumption to justify such an infrastructure expense and the vessels do not need to be refueled often.
- Gasnor generally enters into long-term 7-10 year contracts that have a fixed side that adjusts with the consumer price index and a commodity side that adjusts with the fluctuations in gas price.
- The gas index price has historically been linked to the oil index in Norway.