



Haalbaarheidsstudie 'Boomkorvissen op aardgas'

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Feasibility study into gas-driven beam trawling

Hart, P. 't (Koers & Vaart BV);

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The Dutch Maritime Network Foundation and InnovationNetwork jointly performed this feasibility study into gas-driven beam trawling. Gas has become cheaper than oil in recent years and is abundantly available. So could gas be an attractive alternative fuel for oil? The big question concerned the feasibility of converting fishing vessels from gas oil to natural gas. And by feasible we mean three things: is conversion technically possible, is (liquid) gas sufficiently available, and can the fisherman recoup the investment within a reasonable space of time?

Pieter 't Hart of Koers & Vaart BV conducted this research for us on the basis of an existing typical 42-metre-long beam trawler currently active in the Dutch North Sea Fisheries Sector. Can this ship, the Aardgas 1 (AG-1), be converted from gas oil to natural gas? And can this be done within the construction and safety requirements of the inspection & certification agency (the Inspectorate of Transport, Public Works and Water Management) which largely follows the guidelines of the International Maritime Organization (IMO)? IMO has developed a specific code, named 'bulk liquid and gases (IMO-BLG)', that gas-driven ships must satisfy.

How is gas stored on board?

Though cleaner than gas oil, natural gas has a much smaller per-litre energy content. If you fuel up with compressed natural gas (CNG), you need five times the volume to fish the same number of hours at

sea. With liquid natural gas (LNG), however, you need only twice the volume. Which is why we opted in this study for liquid gas stored at a temperature of minus 162 degrees in special twenty-foot cryogenic containers. A normal fishing week requires two full cryogenic containers. The best place for these two containers is below decks: transverse installation in the net storage area seems a feasible option.

Can the existing engine run on LNG?

There is still little experience with gas engines on relatively small ships, such as fishing vessels. It was found that current ship engines are not technically capable of burning 100% gas. But a mixture consisting of a maximum of 70% gas and 30% gas oil is perfectly possible. The existing engine can be converted into a dual-fuel engine. Engines manufactured by Caterpillar are currently the most suitable type for this purpose. The engine conversion involves placing a gas train and installing an electronic engine management system. Other requirements are a vaporizer for transforming the liquid LNG back into gas, a filling system and adequate safety measures. All these seem technically feasible.

Is natural gas sufficiently available?

At present, LNG cannot be obtained as an engine fuel in the Netherlands. The nearest supplier is based in Zeebrugge in Belgium. However, a large natural gas terminal is being built on the Maasvlakte (Port of Rotterdam) and is due to be operational in late 2011. This so-called Gate Terminal is designed to reconvert LNG into gas and pump it into the pipeline network. Other plans for LNG terminals are still on the drawing board. The government could stimulate suppliers to deliver LNG as a fuel for combustion engines. Such measures are conceivable in the future. Clearly, the municipalities must also cooperate by granting permission for the delivery of LNG at the port.

How much cheaper is natural gas than gas oil?

Since 2003 LNG has been cheaper than oil. This is due to market conditions and the more efficient processing of gas into LNG. The average difference in the 2005-2008 period was between 17 and 26 eurocents per litre of gas oil. The annual saving on the AG-1's fuel bill can run up to an estimated € 135,000 to € 360,000, depending on the country that the LNG comes from.

What is the cost of converting the AG-1 and what is the earn-back time?

The costs of converting a ship and engine are substantial. Adapting the AG-1 model ship to all the specifications described above would cost an estimated €700,000 in total. However, hiring instead of buying the cryogenic containers would cut the costs by up to two hundred thousand euros. And it may also be possible to dispense with electronic engine management, which would save a further two hundred thousand or so.

An investment of € 700,000 cannot possibly be recouped quickly with cheap LNG. But a government subsidy of e.g. 40% of the investment costs would bring conversion within reach, particularly if the cryogenic containers are leased rather than purchased and if electronic engine management is not necessary. In this case, switching from gas oil to LNG is definitely an economically viable proposition. Giat,

