

Transition to a Multi-Fuel Port

Shipping worldwide uses some 256 million tonnes of fuel per year, most of it obtained from oil. Its combustion raises the concentration of CO₂ in the atmosphere which in turn has an influence on climate change. It also causes emissions of pollutants such as sulphur oxides (SO_x), nitrogen oxides (NO_x) and particulates (PM), with negative consequences for local air quality.

The International Maritime Organisation (the UN agency responsible for shipping around the world) and the European barge industry will impose strict standards in the near future aimed at reducing emissions of CO₂ and pollutants into the atmosphere. Standards which the shipping industry can observe only by making the transition from fossil fuels to renewable sources of energy.

Port of Antwerp as a Multi-Fuel Port

Antwerp is the fifth-largest bunkering port in the world. It therefore has an important role to play in the transition to "green" fuels. Port of Antwerp aims to become a Multi-Fuel Port by 2025, a port where in addition to conventional fuels, alternative, more sustainable fuels can also be made available. Specifically we will achieve this by:

- Including methanol, hydrogen gas and electrical energy in the bunkering market
- Further expanding LNG bunkering (at the moment some 750 tonnes of LNG is bunkered annually in the port of Antwerp)
- Developing conventional bunkering into a fully fledged port service in its own right, with the introduction of a robust licensing system and a digitisation path.

Challenges for the implementation of new fuels

Regulatory

International and local regulations must not stand in the way of innovation. On the other hand, clear, practical agreements are needed to permit the introduction of new or alternative fuels in a safe and sustainable way. There must be a predictable framework for investors, without creating intermediate layers of oversight or imposing expensive obligations.

Financial

New, sustainable technologies are often confronted with strict regulations, with consequent high costs for obtaining permits and certification. Scientists call this the "sustainable innovation paradox."

Developing technical designs and building up know-how also mean that the costs for first movers or early adopters are higher than for followers.

The first investors in the early stages of the market – mainly on the supply side – do not yet benefit from advantages of scale, so that fixed costs eat up a large portion of their turnover.

Supply chain

From the economic point of view, supply and demand have to develop in step with each other in order to justify investments. In operational terms this means it is important to have at least a minimum service on the supply side (bunkering companies) before the demand side (shipping companies) can develop. Space must be made available in the ports – both on land and on the water – to permit the development of facilities.

Around the world there are some 400 ports where ships can bunker. It is not necessary for all these ports to make the transition at the same time, but equally it is clear that the port of Antwerp cannot do it alone.

Technology

Before these new fuels can be used on a really wide scale, various technological developments are needed in the fields of bunkering, energy storage and energy conversion in fuel cells or combustion engines. Also, the regulations must be adapted to permit new designs, type certification, procedures for registration of individual ships and permits for bunkering facilities.

Not in my backyard

Fuels such as LNG, hydrogen gas and methanol have risk profiles that differ from conventional fuels – as do batteries – even although conventional fuels can also be dangerous for people and the environment. It would therefore be wrong to assume that terminal operators and other players in the port will welcome bunkering operations in their own backyard without further objection. Beware the NIMBY effect.

How will Port of Antwerp deal with these challenges?

Port of Antwerp will meet these challenges on the basis of its four different roles.

Port of Antwerp as regulator

The Port Police Regulations provide a clear, transparent framework for bunkering of alternative fuels. There are two aspects to this:

1. *A licensing system*: the existing conventional bunkering system in Antwerp is organised as an open market, regulated by the Port Authority by means of a non-

exclusive permit regime. We will also introduce a licensing system for bunkering of methanol, hydrogen and electrical energy. We are now working with a standardised audit to ensure that the permit procedure is applied in a consistent way.

2. *Bunkering procedures*: thanks to well-defined operational procedures – from demand to supply and after-care in bunkering operations – we are able to guarantee a maximum level of safety and quality.

Port of Antwerp as landlord

Port of Antwerp provides a bunkering map showing where various fuels can and cannot be bunkered in the port. Secondly we will ensure that there is sufficient space available within the port for bunkering of hydrogen gas, methanol and electrical energy. Thirdly we are working on an incentive policy to give a helping hand to pioneers in the use of new fuels.

Port of Antwerp as community builder

We are collaborating with other ports. Examples include the Clean Marine Fuels workgroup of the World Ports Sustainability Programme and the World Ports Climate Action Plan (WPCAP). We are also participating in European projects with research institutes, suppliers, bunkering companies and shipping operators. Further we are taking steps to broaden the basis of local support, providing assistance with applications for subsidies, and actively seeking out new opportunities.

Port of Antwerp as operator and facilitator

As well as talking the talk we are also walking the walk. We are converting our tugs to run on methanol, and we have opted for all-electric water buses on the Albert canal route. We also take the use of new fuels as a positive criterion when selecting service providers in the port.

LNG as a template for alternative fuels

Fortunately we are not starting from zero, as we can build on the lessons already learned from the development of LNG.

Thanks to the specific properties of LNG in comparison with fuel oil, much attention has been paid to its use as a fuel by government authorities, classification companies, shipping operators and ports over the last decade.

1. At organisational level the International Association of Ports and Harbours (IAPH) has developed an *audit tool* that can be used by ports to award permits to bunkering companies in accordance with the very highest industry standards.
2. At operational level IAPH has also developed *bunker checklists* that many ports around the world have incorporated in their port regulations.

3. Thanks to detailed risk analyses we have determined where and under what conditions LNG may be bunkered in the port of Antwerp. The result is our LNG Bunkering Map.

On the basis of all these instruments we now have a set of basic principles that can be applied to other alternative fuels. In this way LNG functions as a template for other alternative fuels and plays an important role in the transition.

What's next?

A Multi-Fuel Port by definition does not exclude particular forms of energy.

In the short term we have opted to include methanol, hydrogen gas and electrical energy in the bunkering market. There are sufficient indications that these fuels will find eager acceptance by barge, shortsea and deep-sea shipping, and they will also pass our "sustainability check."

As regards other alternatives such as dimethyl ether, ammonia, ethane, formic acid and LPG we will keep a close eye on developments. We are positioning ourselves in a fast-changing world and we welcome new ideas, initiatives and technologies within the port platform.

Margin lines

Stricter standards demand transition to alternative fuels

The International Maritime Organization (IMO) decided in 2018 that shipping would have to at least half its greenhouse gas emissions by 2050 with respect to the 2008 level, and stated the ambition of a 70% reduction. The European barge industry for its part has adopted the target of being completely climate-neutral by 2050.

As regards air quality, the IMO has decreed that as of 1 January 2020 shipping must comply with a stricter worldwide limit of 0.5% for the sulphur content of fuel. As of 2021 stricter standards for emissions of nitrogen oxides by ships' engines will apply in the European Nitrogen oxides Emission Control Area (NECA). European barges have already been operating with low-sulphur fuel oil (10 ppm) since 2012, and emission limits for engines have applied since 2001. These limits have been tightened over the years, and the latest emission standards apply as of 2019.

Operational measures along will not be enough to meet these increasingly strict standards; instead shipping must switch from fossil fuels to renewable energy sources.

Sustainability check for alternative fuels

When it comes to selecting the alternative fuels on which we will concentrate, we take various aspects of sustainability into account:

Planet



The fuel must have a positive impact on climate and air quality in comparison with conventional fuels. When it comes to greenhouse gases it is important to take into account not only the emissions from combustion in the engine but also the emissions created during production and transport of the fuel. As for air quality we look at the direct emissions of pollutants such as sulphur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter (PM).

People



It must be possible to bunker with the fuel in a safe way. To ensure this we take measures to reduce the risks to a minimum. Furthermore, cleaner air means a better quality of life for people.

Prosperity



A Multi-Fuel port must contribute to the economy of the future in which sustainable fuels will play an increasingly important role. In addition the use of a new fuel demands a certain degree of technological maturity in terms of demos, proofs of concept and indeed cargo sailing.

Partnership



Port of Antwerp partners with port industry, customers, technology suppliers and service providers to achieve a Multi-Fuel Port in a sustainable way.