The tank storage sector and the taxonomy regulation

How tank storage companies support the EU Green Deal

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Foreword:

Tank storage, agile sector in the energy transition

All eyes are on the energy transition: some investors stop investing in certain sectors while others engage with these parties to support the transition. During this challenging transition phase, tank storage companies can ensure price stability in the energy market and can play an important supporting role in the transition to a new energy system.

This paper gives insight in the different ways the tank storage sector contributes to the various aspects of the EU's Taxonomy Regulation. For example, the tank storage sector develops initiatives in the field of hydrogen, flow batteries and advanced biofuels, which will enable the transition to a net zero economy. Investing in the energy sector now will contribute to a sustainable energy system in the future. But before businesses and households can switch to renewable forms of energy, society faces a highly uncertain transition phase in the coming years. This uncertainty is further aggravated by geopolitical tensions and high energy prices.

In an uncertain geopolitical context, tank storage companies store strategic reserves on behalf of the Central Body for Petroleum Products (COVA). Because of the large Dutch storage capacity, Dutch tank storage companies also contribute to strategic reserves of other European countries. The availability of independent tank storage furthermore enables a strong chemical industry and a strong logistics sector, contributing to European strategic autonomy.

Currently the tank storage sector still largely stores fossil fuels, but this is changing fast. In the transition to a more sustainable energy system the sector grasps new opportunities. VOTOB companies are strongly committed to working with partners toward the European Green Deal goals, while strengthening the strategic autonomy and energy security of the Netherlands and Europe.

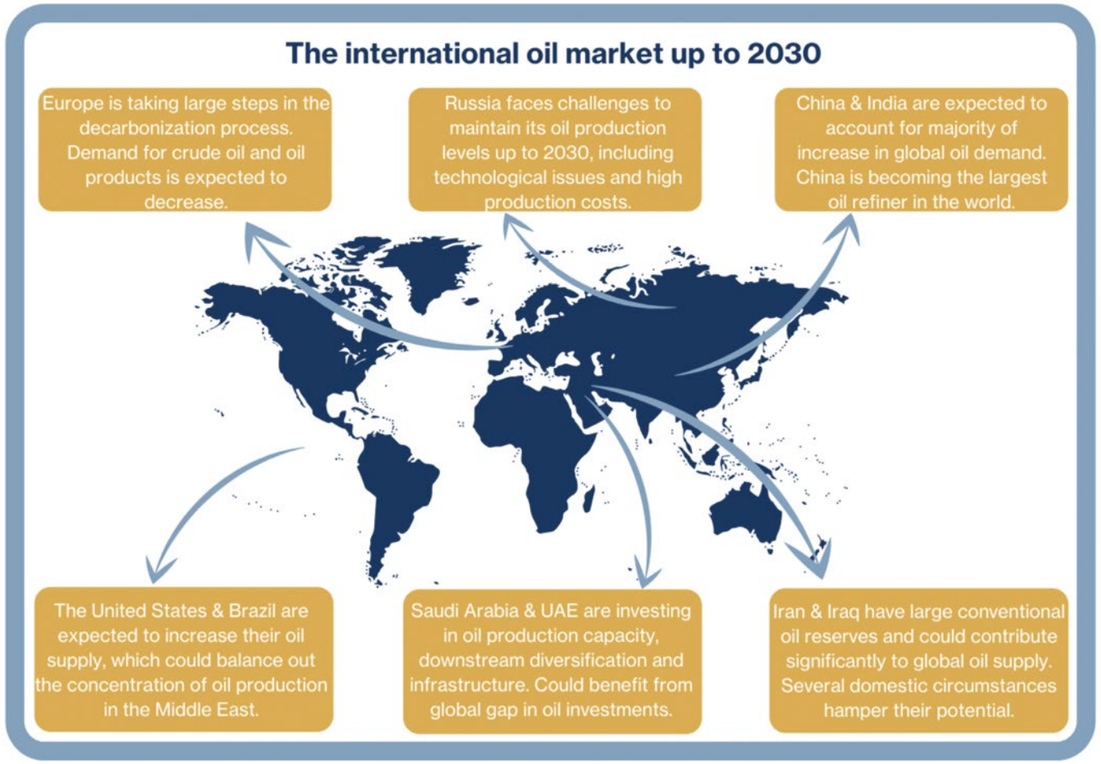
Willem-Henk Streekstra,
Director of VOTOB

Environmental and geopolitical challenges ahead

Reaching climate neutrality in 2050 is a collective goal of governments, businesses and citizens in Europe. A smooth energy transition requires cooperation between all parties involved. Tank storage companies have the experience, knowledge, infrastructure, licenses and permits necessary for facilitating flows of both fossil fuels and low-carbon energy carriers. The sector will therefore play a crucial role in emerging supply chains and international markets for hydrogen, flow batteries and advanced biofuels. Investments in the energy sector now contribute to tomorrow's sustainable system.

Within the EU, policies are guided by the climate neutrality ambitions set in the European Green Deal. In order to align with the sustainable ambitions of the EU, the tank storage sector is committed to implementing reporting requirements that stem from different legislative acts. The requirements are often complex, due to the global nature of the companies and the different jurisdictions in which they operate. The EU Taxonomy is the instrument that aims to stimulate investments in environmentally sustainable activities and therefore ensure that European companies are doing their part in contributing to climate goals.

Not only do governments require reporting on topics like environment, safety and social aspects; more and more investors, clients and the general public want to know more about the standards companies adhere to. Several tank storage companies make a yearly sustainability report, based on ESG metrics. The tank storage sector is convinced that security of supply is an important part of a sustainable business.



Source: The Hague Centre for Strategic Studies – European tank storage in global supply chains: outlook to 2030

European energy policy has for a long-time balanced security of supply and strategic autonomy with climate goals and energy affordability. Currently, European energy policy is led by geopolitical concerns and security of supply, but affordability and sustainability remain key considerations. Despite geopolitical issues, in particular the war in Ukraine, European energy dependency on Russia is still sizable. In 2021, Russia accounted for 40% of European natural gas consumption, or 155 billion cubic metres. Europe is also dependent on Russian oil, but the mature global oil market and possibility to bring oil from other suppliers makes this dependency relatively less salient compared to gas.[1]

Europe's increased dependence on pipeline gas and LNG imports will make countries more vulnerable to supply disruptions, price fluctuations and overall market volatility. At the same time, the European refining and chemical sectors are losing competitive margins compared to low-cost producers like China and Middle Eastern countries. As such, an important part of European domestic demand for oil products, natural gas and chemical products will be met through imports, making tank storage increasingly important for domestic security of supply, securing transport fuels for citizens, diesel for harvesting of crops and heating for houses. The continued volatility in energy markets and tensions between security of supply, price and climate, can be mitigated by strong and well developed infrastructure, such as an energy storage sector. Tank storage companies safeguard stocks and provide a degree of stability in a highly uncertain world.

The energy sector is expected to significantly change, with new products, supply chains and infrastructures being established. In the mid-term, the old system will co-exist with the new one, ensuring sufficient energy supplies until the low-carbon carriers can do so independently. While the chemical industry will undoubtedly work towards decarbonization, the types of chemicals used in our societies will largely remain the same in the mid-term. The key change centers around circularity efforts, as the industry adopts a more sustainable production process. This paper shows how tank storage can support European climate goals, while taking into account strategic autonomy.

1 https://hcss.nl/wp-content/uploads/2022/04/European-Tank-Storage-in-Global-Value-Chains-HCSS-2022.pdf.

Economic importance of the tank storage sector

The tank storage sector is an essential component of the European and Dutch economies, ensuring that sufficient supplies of energy and feedstock are available to households and industries. Tank storage companies store liquid and gaseous products on an industrial scale: kerosine and gasoline for transportation, naphtha for plastics and medicines and palm oil for shampoos, deodorants and food products. Independent tank storage allows its customers, whether they are international traders or domestic industries, to safely store their liquids.

The Netherlands is a hub of connectivity due to the massive throughput of its ports and airports. The tank storage sector contributes to the Dutch and European strategic autonomy by supporting strong transport sectors. The port of Amsterdam is the largest gasoline port in the world, playing a key role in international trade.[2] The port of Rotterdam is the largest port outside of Asia, but also Europe's largest bunkering port.[3] It is estimated that 11 million m3 of fuel is annually supplied to vessels passing Rotterdam. The port of Rotterdam provides € 45.6 billion (or 6,2% of GDP)[4] and a total of 385.000 jobs in 2020. Moreover, the port's advantageous position in international trade means that Rotterdam is a key price-setting location in the global petroleum market, allowing for slightly lower prices.

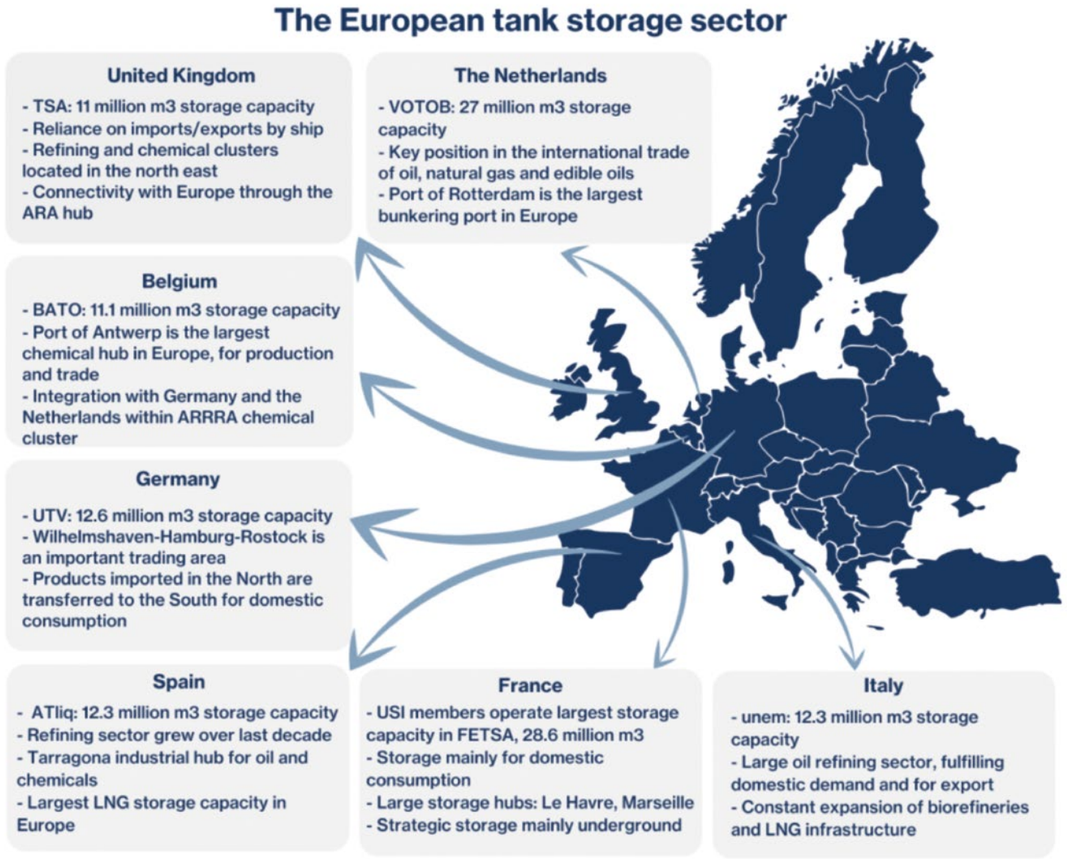
Dutch storage companies are connected to all airports in The Netherlands as well as some abroad. As example, in 2019, 71.7 million passengers and 1.57 million tons of cargo passed through Schiphol.[5] Approximately half of the kerosene used in Schiphol

2 Port of Amsterdam, "Gasoline: The World's Largest Gasoline Port," June 8, 2020, https://www.portofamsterdam.com/en/business/cargo-flows/liquid-bulk/gasoline.

3 "Rotterdam Bunker Port," Port of Rotterdam, accessed August 18, 2021, https://www.portofrotterdam.com/en/logistics/cargo/liquid-bulk/rotterdam-bunker-port.

4 Port of Rotterdam, "Facts & Figures," 2020, https://www.portofrotterdam.com/sites/default/files/2021-06/facts-and-figures-port-of-rotterdam.pdf.

5 Schiphol Group, "Key Figures 2019," 2020.



Source: The Hague Centre for Strategic Studies – European tank storage in today's global value chains

(55 %) is transported through a 16 km underground pipeline, connecting the airport to storage facilities in the port of Amsterdam.[6]

In the edible oils industry, storage companies also fulfil a hub function. On a yearly basis, € 15 billion worth of oils and fats are imported into the Netherlands, whereas the export value reaches € 12 billion.[7] A proportion of 80 % of the produced vegetable oils in the Netherlands are exported, such as soybean and palm oil.[8] Edible oils and fats are mainly used for human and animal consumption.

The six vegetable oil refineries in the port of Rotterdam serve the broader food, oleochemical and energy industries.[9] Among others, they produce, rapeseed oil or sunflower oil. These are raw materials for biodiesel, which is used to decarbonize road transportation.

The Netherlands, Germany, and Belgium account for 40 % of all European chemical production.[10] Together, the three countries host the Trilateral Chemical Region, also known as the Antwerp-Rotterdam-Rhine-Ruhr-Area (ARRRA) chemical cluster. This

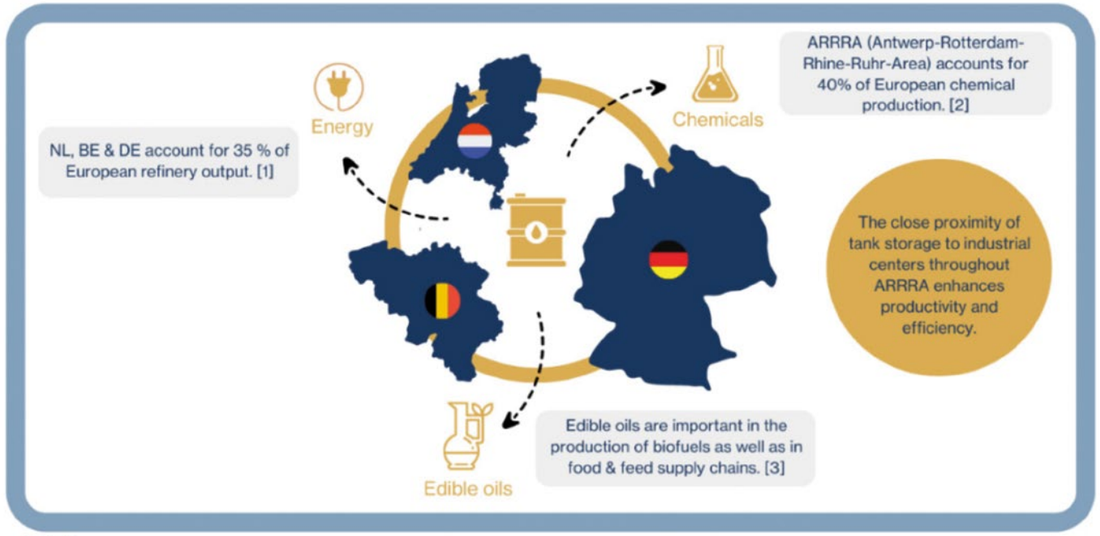
6 Port of Amsterdam, "Kerosene: Facilities for Storage and Transport," accessed August 18, 2021, https://www.portofamsterdam.com/en/business/cargo-flows/liquid-bulk/kerosene.

7 "De oliën- en vettenketen," MVO, July 29, 2021, https://mvo.nl/organisatie/de-keten.

8 Vernof, "About VERNOF", 2020, https://www.vernof.com/home-en/.

9 "Vegetable Oil Refining," Port of Rotterdam, accessed August 16, 2021, https://www.portofrotterdam.com/en/setting/industry-port/refining-and-chemicals/vegetable-oil-refining.

10 "Refining and Chemicals," Port of Rotterdam, accessed August 16, 2021, https://www.portofrotterdam.com/en/setting/industry-port/refining-and-chemicals.



Sources:
[1] Data from JODI, 2021.
[2] "Our Region," Trilateral Chemical Region, accessed August 2, 2021, https://www.trilateral-chemical-region.eu/ueber-uns; "Refining and Chemicals."
[3] European Commission, "EU Agricultural Outlook for Markets and Income, 2019-2030," 2019, 26, https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report_en.pdf.

Source: The Hague Centre for Strategic Studies – European tank storage in today's global value chains

highly interconnected industrial hub has a turnover of € 180 million and provides 350.000 direct jobs.[11] The ability of industries to source materials directly from the chemical and petrochemical clusters is highly advantageous. Continuous supplies of feedstock, whether sourced domestically or imported, are stored in tanks, ensuring that sudden shocks in supply chains can be effectively overcome and potential damages to European industry can be minimized.

The close proximity of storage to industrial centers enhances productivity and efficiency. The Netherlands has six active petroleum refineries, five in the port of Rotterdam and one in Zeeland.[12] These are connected to each other, to other industrial sites and storage facilities by 1.500 km of pipelines.[13] In the absence of sufficient domestic storage capacity and of low-cost, efficient transport and handling processes, industrial production would struggle to achieve competitive margins relative to the Middle East or Asia.

Storage capacity is essential to give the market time to reduce the imbalance between physical supply and demand and it stabilizes prices. By holding inventories of liquid and gaseous products, tank storage acts as a buffer in the physical market, contributing to price stability and reducing uncertainty.

Briefly, tank storage contributes to European strategic autonomy, strengthen the competitive position of the Dutch and European industry and safeguards strategic reserves. In order to maintain strategic oil reserves, the Dutch national agency in charge of strategic reserves (COVA), relies on the services of independent tank storage companies. Through 11 bilateral agreements with other EU member states, the Dutch government guarantees stockholding for other countries in Dutch tank storage.

11 "Our Region," Trilateral Chemical Region, accessed August 2, 2021, https://www.trilateral-chemical-region.eu/ueber-uns.
12 C. Oliveira and K.M. Schure, "Decarbonisation Options for the Dutch Refinery Sector" (The Hague: TNO, PBL, 2020), page 7.
13 Oliveira and Schure, page 7.

How tank storage support the EU Green Deal

In order to meet the EU's climate and energy goals for 2030 and reach the objectives of the European Green Deal, investments towards sustainable projects and activities are necessary. To achieve this, a common language and a clear definition of the term 'sustainable' is needed. Hence, a common classification system for sustainable economic activities – an EU Taxonomy Regulation – has been created.

The European Taxonomy Regulation helps investors to identify sustainable investments, defining when activities and assets lead to – or facilitate – sustainability[14], or when assets support the transition to a climate-neutral economy[15] (see table 1). Moreover, the EU Taxonomy Regulation sets specific environmental objectives that investors should consider in their assessment of sustainable investments (see table 2).

The tank storage sector complies with this regulation in several respects. In this chapter the question is answered how. In the tables underneath, concrete activities are matched with requirements from the Taxonomy Regulation.

14 article 9-15 and 16 of the Taxonomy Regulation.
15 article 10 of the Taxonomy Regulation.

Investments should facilitate sustainability

Definition of sustainable investment, EU Taxonomy Regulation[16]	The role of tank storage companies
Regulation (EU) 2020/852 (article 9-15) - The activity and asset lead to sustainability in one of the 6 objectives	Tank storage companies already contribute to the industrial upscaling of alternative energy carriers such as biofuels and synthetic fuels for European blending obligations (following the revised Renewable Energy Directive II). Storage companies can facilitate the import, trade and storage of hydrogen and hydrogen carriers. Currently most companies explore opportunities in the field of hydrogen. Storage companies are involved in the recycling of plastics on a large scale. Plastics are for example converted into pyrolysis oil and methanol, which in turn is used as fuel or as feedstock for the chemical industry. Storage capacity for pyrolysis oil and methanol from waste is already being used with the needed additional operations. Storage companies also play an important role in the storage and sometimes processing of used oils and fats.
Regulation (EU) 2020/852 (article 16) - The asset is a *facility* for sustainability	The sector offers facilities for the storage of liquid and gaseous substances, regardless of the type of liquid or gas. The type of liquid or gas is determined by the market. When more sustainable aviation fuels or liquid organic hydrogen carriers reach technological maturity and costs relative to other fuels decrease, tank storage will provide facilities to support the large-scale deployment of these low carbon energy sources. An important asset of the storage sector is the availability of space, the right permits and expertise to deal with (hazardous) substances, complex logistics operations by ship, train, pipelines or transport cars. Tank storage companies have space and will increasingly use it to carry out new additional operations at their current site for new energy carriers (independently or in a joint venture).
Regulation (EU) 2020/852 (article 10.2) - The asset *supports the transition* to a climate-neutral economy	The international role of Dutch tank storage in stabilizing and mitigating volatility in the market is undeniably significant. During the transition period, infrastructure and services both for fossil fuels and for new energy carriers will co-exist. In doing so, an abrupt and chaotic phase-out of fossil fuels, characterized by disruptions in energy supply and sharp increases in prices, is mitigated.

Table 1. Definition of sustainable investment in the EU Taxonomy Regulation and the contribution of tank storage

Climate change mitigation

Currently the tank storage sector still largely stores fossil fuels, but this is changing fast. In the transition to a more sustainable energy system the sector grasps new opportunities in the field of advanced biofuels, hydrogen and hydrogen carriers, LNG, pyrolysis and flow batteries. In transforming their storage assets so that they can store alternative energy carriers, the tank storage sector is a key player in the energy transition.

An important asset of the storage sector is the availability of land[17], the right permits and expertise to deal with (hazardous) substances, complex logistics operations by ship, train, pipelines or transport cars. Tank storage companies have the physical space and will increasingly use it to carry out additional operations onsite for new energy carriers (independently or in a joint venture).

16 https://eur-lex.europa.eu/eli/reg/2020/852/oj/eng.

17 Different studies indicate that during the energy transition more space will be needed to produce and store new and green energy carriers. https://smartport.nl/wp-content/uploads/2021/11/SmPo_TNO-Ruimtelijke-effecten-van-de-energietransitie-casus-Haven-Rotterdam_final.pdf.

Specific environmental objectives

Environmental objectives of the EU taxonomy	The role of tank storage companies
1. Climate change mitigation (elaborated underneath)	Substantial contribution through the storage, blending and handling of: a. Hydrogen and hydrogen carriers (ammonia, methanol, liquid organic hydrogen carriers, liquefied hydrogen etc.) b. Advanced biofuels and synthetic biofuels c. Liquefied natural gas (LNG) d. Pyrolysis e. Flow batteries (electricity storage)
2. Climate change adaptation	Our members take into account flood risks, peak rainfall drought and heat stress annually and in their business plans, in accordance with regulations.
3. The sustainable use and protection of water and marine resources	- Water treatment installations - Protective measures in case of spills
4. The transition to a circular economy	- Substantial contribution through the storage and handling of liquid waste used for recycling in industrial production.
5. Pollution prevention and control	Contribution by: - reducing own greenhouse gas and other emissions - preventing accidental spills of hazardous substances in water, soil and air.
6. The protection and restoration of biodiversity and ecosystems	*Not applicable*

Table 2. Environmental objectives of the EU Taxonomy Regulation and the contribution of tank storage

The international role of Dutch tank storage in stabilizing and mitigating volatility in the market is undeniably significant. During the transition period, infrastructure and services for both fossil fuels and new carriers are necessary. This can help avoid an abrupt and chaotic phase out of fossil fuels, characterized by disruptions in energy supply and sharp increases in prices.

A. Hydrogen

Green hydrogen is expected to be the center piece of the new energy system, playing an important role in decarbonizing hard-to-abate sectors like steel or petrochemical industry as well as maritime and air transport. Yet the costs for transport, storage and usage of different hydrogen carriers remain high. Because of large volumes of renewable energy needed to produce green hydrogen, Europe will likely import half of its green hydrogen demand by 2050.[18]

Tank storage is important for supporting domestic production of hydrogen in the Netherlands. More importantly, however, tank storage companies can expand their activities into transport and handling of hydrogen in its various forms, enabling hydrogen imports.

Storage companies already have some of the needed infrastructure for certain hydrogen carriers. Both in Rotterdam and in Amsterdam hydrogen initiatives are currently being developed with partners. Since gaseous hydrogen cannot be stored or transported easily, technologies for different hydrogen carriers are currently being developed and expected to reach maturity in the next decades. Many tank storage companies already have facilities to store methanol or ammonia, which are two of the main contenders to become dominant hydrogen carriers in the next years. Moreover, liquid organic hydrogen carriers (LOHCs)

18 "Decarbonised hydrogen imports into the European Union: challenges and opportunities," October 2021, 5, https://www.weltenergierat.de/publikationen/studien/hydrogen-imports-into-the-eu/.

can use existing diesel and gasoline infrastructure for distribution, storage and transport.

Each of these hydrogen forms comes with advantages and disadvantages in terms of policy ambitions, energy required for conversion or toxicity levels. When it comes to ammonia, a highly toxic chemical, tank storage companies have developed the expertise and appropriate rules of conduct to safely store it. Ammonia requires specialized knowledge to ensure storage and handling that is safe for people and the environment.

Whereas technologies need to further mature, costs have to decrease and end-users need to be prepared to adapt their current processes to hydrogen, tank storage companies are in the advantageous position to in some cases relatively easy expand, retrofit and modernize their current infrastructure to support the deployment of hydrogen.

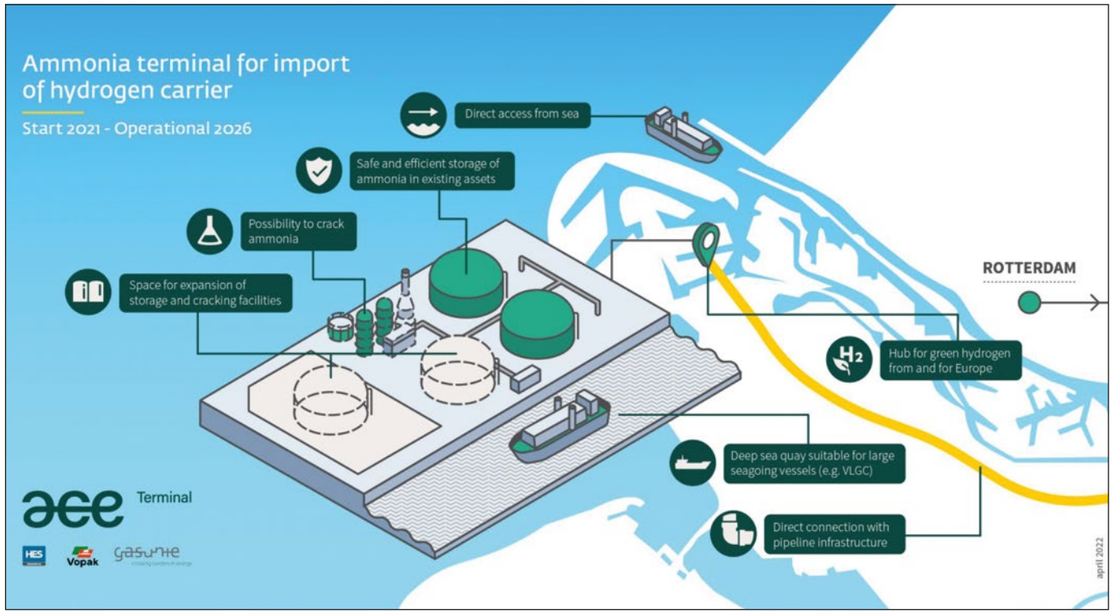
Tank storage companies have a two-fold role. First, they facilitate the development and expansion of hydrogen usage. As the demand for hydrogen will expand, tank storage companies will be able to match this amount by storing the supplies of hydrogen in the needed form (ammonia, LOHC, etc.). Tank storage companies are a key component of the energy supply chain and they will continue to have this role. Second, they are taking a proactive role in supporting the development of new technologies.

Source: port of Rotterdam, photographer Jerry Lampen

Storage companies are exploring the possibilities of expanding their role in the supply chain by taking on new services that will be required in the new energy system. For instance, the conversion of imported hydrogen carriers into a form of hydrogen that can be used domestically, or the transport of hydrogen, could be roles assumed by tank storage companies. Since many of the hydrogen technologies (e.g., LOHC) as well as end-user applications that will use hydrogen are not yet mature, tank storage companies are actively contributing to determining the most cost and time effective and least energy intensive ways of achieving a hydrogen-based world.

Example - HES International joins forces with Vopak and Dutch energy infrastructure company Gasunie to develop an import terminal in the port of Rotterdam for ammonia as a hydrogen carrier. Work will begin in Q2 2022 on the basic design of the terminal which will be situated on the Maasvlakte, and be known as ACE Terminal. The site has space for a facility to convert ammonia into hydrogen. The terminal will use the port's existing infrastructure, and will eventually be connected to Gasunie's national hydrogen network, to serve the expected future hydrogen market in northwest Europe. The partners expect the terminal to be operational by 2026.

Example - Vesta Flushing has begun to recommission two existing refrigerated ammonia storage tanks and will double this capacity to 128.000 m^3. Moreover, Vesta started a 'tank-to-cracker-to-pipeline'-project to create a full supply chain set up. Green hydrogen will be produced from solar energy in the Middle East. There H2 will be used to make ammonia that will be shipped to Flushing, where Vesta will either crack the ammonia back to hydrogen and feed this into the Gasunie Hydrogen Backbone grid, or supply green ammonia as bunker fuel or supply the surrounding industry with ammonia.



Source: ACE Terminal

B. Conventional, advanced and synthetic biofuels

One of the core functions of tank storage companies is blending liquids in bulk. In the context of climate change mitigation, this blending fuels with biofuels is particularly important. So far, conventional biofuels have been essential in the decarbonization of road transport. Whereas conventional biofuels pose challenges due to their use of starch feedstocks, advanced and synthetic biofuels are gaining importance. These are produced in a sustainable way and are expected to become long-term solutions for the largest consumers of petroleum products: road, aviation and maritime transport. Tank storage companies have an essential role in the storage, handling and blending of biofuels into conventional energy carriers.

The blending target of biofuels into fossil fuels in the EU is 14 % up to 2030 and is expected to become even more ambitious due to the expected revision of the Renewable Energy Directive.[19] Conventional fuels might be blended with low-carbon ones, and eventually fully replaced. Biodiesel (HVO/FAME)[20] and e-diesel[21] represent alternatives for diesel, while gasoline might be substituted by bioethanol and e-gasoline.[22] Whereas existing fossil fuel storage infrastructure can be used with limited or no modifications for biodiesel, e-gasoline, and e-diesel, important changes are required for others like bioethanol, hydrogen, and methanol.[23]

Blending conventional with sustainable fuels will be an important transition step in road, aviation, and maritime transport up to 2030 and beyond.

19 European Commission, "Amendment Renewable Energy Directive 2030," 2021, 15, https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf.

20 The Hydrotreated Vegetable Oils (HVO) and Fatty Acid Methyl Ester (FAME) biodiesel are biofuels that could substitute gasoil and diesel, respectively. The main difference between HVO and FAME stems from their chemical compositions. FAME is the most widely used biofuel in Europe, although using HVO yields less NOx emissions and has better storage stability. See Ondrej Cerny et al., 'Implications of the Energy Transition for the European Storage, Fuel Supply and Distribution Infrastructure' (Trinomics, 2021), p. 26.

21 E-fuels are renewable electricity-based liquids and have non-biological origins. The most commonly used such fuel is hydrogen, which can either be used directly as a fuel or in a different form, such as methanol or ammonia.

22 Cerny et al., "Implications of the Energy Transition for the European Storage, Fuel Supply and Distribution Infrastructure," 16.

23 Cerny et al., 6.

Since blending and bringing products to specific user requirements are core tasks of tank storage companies, they will play a key role in supporting the decarbonization of transport. The stricter the European blending targets, the quicker the demand for blended products will grow. In turn, this will increase the complexity of end products that different customers require, leading to an expanding need for highly specialized services. The expertise and infrastructure of tank companies can facilitate this process.

The increase in blending requirements for biofuels and conventional fuels will lead to a wide range of specifications that end-products must adhere to. Depending on the customer, different percentages of the same biofuel will be mixed with a conventional one. All these slightly different products must be stored separately. This requires specialized knowledge and expertise, which can be found within the tank storage sector.

Example - Eurotank Amsterdam (ETA, part of VTTI) is investing in the conversion of its gas oil tanks, making them suitable for storing biofuels, mixed biofuels and hydrotreated vegetable oil (HVO), following a successful pilot project. The project will realise a total capacity of 75,000 cubic metres and the first phase will be commissioned at the end of this year. It is an important step for ETA, in its ambition to provide storage for renewable energy and play an important role in the energy transition of the Port of Amsterdam.

C. Liquified natural gas

Major geopolitical events such as the war in Ukraine emphasize the need for sufficient and affordable energy supplies across European countries. In 2020, renewable energy sources (wind, solar, biomass etc.) accounted for 11.1 % of the Netherlands' total energy supply.[24] In the next years, the energy produced from petroleum oils and coal will be replaced by low-carbon sources. But at the moment, renewables alone cannot support the uninterrupted functioning of the Dutch and European economies. As a result, natural gas will be used as a grid-balancing energy source until renewables can take over.

The tank storage sector plays an important role in storing liquefied natural gas (LNG) around the world. In this way, storage companies can mitigate the volatility associated with the transition to a new energy system. Tank storage companies would ensure reliable and readily available energy supplies when variable energy sources like wind and solar power are not able to deliver sufficient electricity, whether due to weather conditions or an insufficient share in the energy mix.

The storage of LNG has come to the forefront of policy agendas after the Russian-Ukraine war in 2022. Dependency on Russian natural gas is a geopolitical vulnerability that the EU as well as member states are trying to mitigate.[25] The Netherlands, Germany and most of the other European countries have announced their intention to increase the capacity of LNG import and storage capacity.[26] 25 Investments in LNG infrastructure are substantial and so far, licensing and permitting was a long burdensome procedure. However, the urgency brought by the war in Ukraine is making LNG a more favorable contender for security of supply in the transition period. Companies such as Vopak are already very active in LNG storage in the Netherlands and abroad. The tank storage sector could support Europe's ambitions to reduce dependency on Russia in the next 10-15 years, before the energy transition can be completed.

24 rgy-consumption-from-renewable-sources-in-2020.

25 "Press Conference on the REPowerEU Communication," Text, European Commission, March 8, 2022, https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_1632.

26 Ministerie van Economische Zaken en Klimaat, "Kabinet neemt maatregelen om beschikbaarheid gas zeker te stellen en afhankelijkheid sneller af te bouwen," Rijksoverheid, March 14, 2022, https://www.rijksoverheid.nl/actueel/nieuws/2022/03/14/kabinet-neemt-maatregelen-om-beschikbaarheid-gas-zeker-te-stellen-en-afhankelijkheid-sneller-af-te-bouwen; Nikolaus J. Kurmayer, "Germany Signs Initial Contract to Build First LNG Terminal," Euractiv, March 7, 2022, https://www.euractiv.com/section/energy/news/germany-signs-first-stage-contract-to-build-first-lng-terminal/.

Source: Gate Terminal

In the Netherlands, natural gas has a historically important role due to abundant reserves. Today, as domestic gas production is being phased out, the Netherlands is increasingly relying on the spot market, meaning that global market volatility could severely impact prices.[27] Tank storage companies have played a balancing role in global energy supply chains for decades. As the global market for natural gas has been rapidly developing, Vopak and its joint venture partner Gasunie are providing increasingly essential buffers in the natural gas spot market, especially considering the weight of the Netherlands in this sector. The Dutch Title Transfer Facility (TTF) is the most important gas trading hub in Europe, having overtaken the UK's National Balancing Point (NBP).[28] In 2020, over 70 % of European gas trade took place through the TTF.[29] By storing increasing volumes of liquefied natural gas in the Netherlands and in Europe, tank storage companies can help balance the supply and demand for gas, decreasing price and market volatility.

LNG storage is becoming ever more important in absorbing supply shocks and responding to rapid changes in demand. Spare storage capacity accommodates the sharp rises in imports during cold winters, ensuring that Europeans are able to heat their homes. Domestic inventories ensure that, in the case of a supply shock, the country can continue its socio-economic activities without any significant disturbance.

Example - Gate terminal (Rotterdam) is Royal Vopak and Gasunie's first foray into the LNG market in The Netherlands and has been in operation since 2011. The imported LNG is unloaded at the terminal, stored and regasified before it is delivered to the transmission network for the European markets. The terminal has a throughput capacity of 12 billion cubic meters per year (bcma) which can be extended to 16 bcma in the future.

27 Simon Blakey et al., "The Swing in Dutch Gas: From Autonomy to Full Dependence," Strategic Report (IHS Markit, November 2018), 5, https://cdn.ihs.com/www/pdf/1118/IHS-Markit-The-Swing-Dutch-Gas.pdf.

28 Patrick Heather, "European Traded Gas Hubs: The Supremacy of TTF," Oxford Energy Comment, May 2020, 4.

29 IEA, "Gas Market Report, Q1-2021," 2021, https://www.iea.org/reports/gas-market-report-q1-2021.

D. Pyrolysis

Circular approaches to industrial processes could further support climate goals. Liquid waste can be stored by tank companies in order to be further recycled. An emerging technology in plastic recycling is based on pyrolysis. It consists of plastic being thermally tracked in the absence of oxygen, which fragments it into smaller hydrocarbon molecules and hence leads to the production of so-called pyrolysis oil.[30] This technology is still under development, but it is a promising way of reducing plastic waste and ultimately replacing fossil fuels from the production of plastics and other chemicals. Europe currently has a total of 10 commercial scale pyrolysis plants that are either built or currently under construction.[31]
In the Netherlands, plants are planned and under construction, intended to convert 20.000 ton and 60.000 ton of plastic waste into pyrolysis oil annually respectively.[32]

Example – Xycle, a joint venture of NoWit, Patpert Teknow Systems and Vopak, will construct a plant in the port of Rotterdam that will convert 20.000 tons of non-mechanically recyclable plastic into high-quality sustainable raw material annually. Construction of the first Xycle plant is scheduled to start in Q4 of 2022. This will provide the chemical industry with a responsible alternative raw material for the production of new plastics.[33]

30 Carina Oliveira, "Technology Factsheet: Pyrolysis Oil Production from Plastic Waste" (TNO, September 28, 2020), https://energy.nl/wp-content/uploads/2020/09/Pyrolysis-oil-production-from-plastic-waste_28-09-2020.pdf.

31 Interreg North-West Europe, "Designing Value Chains for Carbon Based Elements from Sewage," December 2020, 21, https://www.nweurope.eu/media/12964/201230_market-potential-study-final_01.pdf.

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E. Electricity storage and flow batteries

Electricity storage can be essential in providing the necessary backup capacity when those variable renewable energy sources are not producing sufficient electricity. The future development of battery storage in the electricity sector holds important implications for tank storage, especially when it comes to flow batteries. This emerging technology relies on storing liquid catholytes and anolytes in separate tanks, which are then pumped into a stack with electrodes divided by a thin membrane. Tank storage companies could play an important role here, although the maturity of this technology has not yet been achieved.

Example: In Q2 of 2021 Vopak announced that it signed a Joint Development Agreement with Elestor for the development of a hydrogen bromine flow battery. The joint ambition is to scale up the electricity storage capacity of these flow batteries from 200 kWh to 3,000 kWh in a period of 2 years and then further develop it to industrial scale. This development is part of Vopak's New Energy strategy.[34]

Pollution prevention and control

Independent storage companies do not own any of the products they store. Rather, the sector facilitates international trade, supports industries, and safeguards strategic supplies, by renting their infrastructure. Whereas the tank storage sector in the Netherlands is working on reducing its own GHG emissions, it can support other actors along energy supply chains to take significant steps toward decarbonization. The sector is a facilitator that depends on sufficient demand from consumers and supply from producers to store new energy products. What storage companies can do is provide the necessary infrastructure and services that their clients need for low-carbon energy products, like hydrogen, methanol, flow batteries and sustainable aviation fuels.

VOTOB and its members believe that emissions of hazardous substances should be limited as much as possible. Sometimes companies anticipate environmental requirements and go beyond the requirements in their permits. The careful storage and handling of hazardous chemicals is supported by extensive expertise, knowledge and skills, established over time. The Safety Maturity Tool developed by VOTOB allows companies to monitor and evaluate their performance regarding safety standards, leading to the continuous improvement of protocols, systems and knowledge. Much expertise on safe storing and handling has been accumulated over the years so that storage companies can support their clients in adopting new products.

34 https://www.vopak.com/ventures?language_content_entity=en.

Way forward

The storage sector has been supporting Europe's strategic autonomy and economic development for decades and even centuries. Companies have been adapting to new circumstances, through the discovery of new technologies, new raw materials or new trade routes. Now, like every other social player, tank storage companies are adapting their businesses and infrastructures to contribute to the broader energy transition. They can support players along energy supply chains and facilitate change.

Any disruptive technology brings about challenges and opportunities. The demand for certain low carbon fuels like diesel or gasoline blended with synthetic fuels has been increasing in the last decade. The blending requirements are expected to increase with the revised Renewable Energy Directive. However, other fuels are still at a very early stage. Hydrogen will start being imported across Europe in the next 5 years, but only in the long term will it become truly prominent. The recycling of chemical waste and large-scale electricity storage are still in their infancy.

Tank storage companies are in the prime position to contribute to the energy transition due to their expertise, knowledge, physical space as well as worldwide connections and experience. For technologies that are already established, like advanced and synthetic biofuels and methanol or ammonia as hydrogen carriers, tank storage companies are ready to support their large-scale deployment. Depending on the energy carrier, tank storage companies can further develop the array of services they offer and include new and extra operations for their clients in an efficient way. In the case of flow batteries and pyrolysis, tank storage companies are taking a pioneering role, investing in pilot projects and research. Their skills, knowledge and networks are irreplaceable in the energy transition. Financial support from investors is key for further developing infrastructure and expertise, while also contributing to turning new energy carriers into realistic and productive options for households, industries and full societies.

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