



Port of Amsterdam
De Ruijterkade 7
1013 AA Amsterdam
+31 20 5234 500
portofamsterdam.com/en/circular-economy



Circular ambition

Port of Amsterdam's ambition is the leading hub European hub for recycling and upgrading waste streams into (chemical) building blocks for the industry. We aim at integrating existing industry and logistical service providers to new technologies, such as carbon capture usage, power to gas or lignocellulosic fuels and chemistry.

Whatever the technology or raw material, the Port of Amsterdam is with all its current and future assets working on sustainable production by clustering initiatives, hosting innovations and bringing the strength of the combination of port, city and airport closely linked together.

Innovative companies choose Port of Amsterdam

Already several innovative companies chose the Amsterdam port for exactly those reasons. For example Chaincraft, the leading technology provider for the conversion of organic waste into medium chain fatty acids. Next to a demo plant, they also have a pilot facility installed in Port of Amsterdam's innovation hub, Prodock. Also Integrated Green Energy Solutions (IGES) has chosen Amsterdam. The presence of all port logistics, liquid bulk handling and the proximity of a waste cluster, made this company decide to build its first low value waste plastics pyrolysis plant in Amsterdam. Bio Energy Netherlands is building its first biomass gasifier to produce first class quality syngas to be used for energy purposes (electricity and district heating). In a later stage, the company is dedicated in producing chemical building blocks from its syngas and providing hydrogen.

"We are excited that we attract these very innovative technology providers", says Roon van Maanen, Head of Department Circular & Renewable Industry at Port of Amsterdam. "We may not be the best known place for large scale chemical industry, but we have a large ecosystem of a divers range of waste streams, dry and liquid bulk terminals and technology providers that together are able to create new value chains. The reason we can attract these companies is also that the port is very close to both the city and the airport. A unique combination that makes it even smarter for businesses to demonstrate new technologies. Customers and financiers are never far away!" If you want to know more, please do send an email to roon.van.maanen@portofamsterdam.com.



Chaincraft

This start-up company started at Wageningen University developed a fermentation platform to convert organic waste into medium chain fatty acids. The Port of Amsterdam co-funded the establishment of the first pilot plant in the port and later also financially supported the first demo plant 10,000 tons per year (in operations since 2018). Chaincraft already plans on constructing its first commercial plant in the port of Amsterdam.

Bart Raedts, director Chaincraft:

"What we found in Amsterdam is a vibrant biobased and waste to value cluster on which we could further develop our fermentation platform to convert biomass to medium chain fatty acids and and other biobased molecules . The port helped us a great deal in opening its network and being able to support us financially. The Amsterdam region is not only home of a large industrial area, the port, but also is close to the city and the airport. For us doing business and developing our technology on one spot made us choose for the Amsterdam port."

Port of Amsterdam circular hotspot



They considered Amsterdam.



Port of Amsterdam circular hotspot



BIOPARK AMSTERDAM

The 20 ha/49 acre space for a biorefinery linked to: tank storage facilities; own quay; hydrogen production; steam; waste water treatment; feedstock availability (used cooking oil, lignocellulosic residues, woody biomass and organic waste).

www.portofamsterdam.com/en/biobased-economy

CO2 & STEAM

The OCAP pipeline connecting the port of Rotterdam to Amsterdam is the source for CO2. The renewable carbon from Waternet and AEB will soon be supplied to the OCAP. Renewable steam will be available from the waste to energy power plant.

PRODOCK

The Port of Amsterdam has developed a site for circular companies that have outgrown the lab phase to further develop in a dedicated site, Prodock. This concept offers in- and outdoor space, office space and a network and platform of start-ups and investors. One of its inhabitants is the Calcite Factory, an initiative of Advanced Minerals and Waternet. In this pilot plant calcite is taken from drinking water. Part of the calcite can be used in the process again, so fully circular, and part of it can be used in the paper and glass industry.

www.prodock.nl



THE CITY WASTE CLUSTER

AEB (1) is the Amsterdam waste to energy company that produces electricity, heat and steam. The company has an ambition to render the vast stream of organic household waste into more valuable materials. **Waternet** (6) is the Amsterdam water company that controls the total water cycle. It is strategically located next to AEB for optimal synergies of waste and feedstock. Waternet produces 11 Nm3 biogas/annum. OrangeGas sells part of that gas as vehicle fuel, CNG.

THE BIOREFINERY CLUSTER

The Biorefinery cluster formerly known as 'Greenmills', this cluster is one of the largest biorefinery clusters in Europe. With companies like **Rotie** (7), **Biodiesel Amsterdam** (3), **Orgaworld** (8) and **Chaincraft** (5) this cluster produces over 25 million m3 of biogas, 5 MW of electricity and heat, 5,000 tons of fertilizer from organic waste, and 120,000 tons of biodiesel from animal fat and used

cooking oil. The technology company Chaincraft is building a 10.000 tons demo-plant for fermentation of organic waste into medium chain fatty acids. In 2019 a 10 MW biomass to syngas plant will start operation, producing electricity and heat at first stage.

R&D AND INNOVATION INFRASTRUCTURE

The Amsterdam area has a long standing tradition in chemical innovation and R&D. **Shell Global Solutions** (8), is situated near the port for over 100 years with over 1,000 researchers. With companies like **Albemarle** (1) on research and innovation on catalysts and the renowned institutes at the **Amsterdam Science Park (ASP)** (3) Amsterdam is an important centre for chemical innovation. The Port collaborates with **Amsterdam Science Park** and **Innovation Lab Chemistry Amsterdam** (3) on developing pilot infrastructure for chemical start-ups. To that end, the Port created **Prodock** (1), a warehouse

and community for accelerating biobased and circular innovation. The Amsterdam chemistry community has its own on- and offline platform, Amsterdam Chemistry Platform with a trimonthly session, Chem2Gether.

CHEMICAL COMPANIES

Chemical companies within the port like **Albemarle** (1), **IGES** (2), **ICL Fertilizers Europe** (4), **Oxea** (5), **PPG** (6) and **Sonneborn** (7), are innovative specialty chemical plants where co-siting and collaboration options are possible.

LOGISTICS AND INFRASTRUCTURE

The port houses a wide array of storage capacity. Storage tanks of **Oiltanking** has on its premises a biodiesel plant and a direct **kerosene pipeline** to International airport Schiphol. A **steam pipeline** is projected from AEB to several sites. Close by is the Linde-owned **OCAP CO2 pipeline**. Besides companies such as **NWB**, **Koole** and **CWT**

are all specialized in biobased liquid or dry bulk logistics, e.g. sugars syrup, ethanol, veg oils and biomass.

BIOBASED PROJECTS

Biobased projects in the port are focussed on collaboration between the Port, Waternet and AEB in **Clean Capital**. The port and AEB work together in establishing a biomass power plant, turning woody biomass in electricity, heat and steam. Waternet and AEB are also involved in **Power to Protein**, to use electricity surpluses for bacterial production of protein. Within Clean Capital a diversity of conversion platforms are being tested, e.g. HTU/pyrolysis of organic waste, power to methanol and power to gas. The port has reserved 20 hectares for further develop a new biorefinery to offer a platform of sugars, lignin, steam, gasses and infrastructure for pilots and pre-commercial technologies, the **Biopark Amsterdam**. (2)