

The green home port of Europe



Port of
Antwerp
Bruges



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‘We intend to become the first port in the world to reconcile people, climate and economy.’



The green energy gateway to Europe

No surprise – 2021 turned out to be yet another challenging year for our port. Yet, despite being confronted with the Corona crisis, the Suez incident, the labour shortage and other challenges, we were still able to achieve growth in Antwerp and Zeebrugge compared to 2020, thanks to our resilience and the agility of thousands of employees.

Port of Antwerp-Bruges is more than a port, more than transport, more than tons, more than TEUs. And it's not just about profit, money and jobs. As one of Europe's most important ports, we have an essential social role to play: we are a port made up of people, for people. We intend to become the first port in the world to reconcile people, climate and economy.

And all this in today's VUCA – volatile, uncertain, complex and ambiguous – world. Agility, resilience and continuity must therefore remain the common thread running through our operations. But we can't just pursue short-term solutions. It is essential to take a long-term perspective and use forward thinking. We want to be a frontrunner, to be the spark igniting change, both inside and outside the port community, both locally and internationally. Port of Antwerp-Bruges

is transitioning from being a passive landlord to an active community builder, becoming the 'glue' in ambitious sustainability projects starting out from Antwerp and Zeebrugge and with the potential to become international trailblazers. Our ultimate goal? To become Europe's green energy gateway.

This is why we are working on pioneering flagship projects focused on carbon capture and storage (CCS), the circular economy, waste heat, alternative marine fuels and green hydrogen, the energy of the future. Green hydrogen, produced with renewable energy, is set to play a decisive role in the energy transition. We want to become the European hub for imports of green hydrogen and an active frontrunner in the hydrogen economy. Why? Because our complementary port sites clearly have the right assets to become a leader here. While the sun and wind need to become the renewable energy sources of the future, there is just not enough wind or solar energy in Belgium and Western Europe. Yet other regions have sun, wind and space in abundance. The solution? Importing renewable energy from these regions.

As such solutions are complex, the port is joining forces with major industrial and public players, each with their own expertise. Our hydrogen

import coalition is focusing on concrete projects shaping the production, transport and storage of green hydrogen. Port of Antwerp-Bruges is home to Europe's largest chemicals cluster in Antwerp, while Zeebrugge is an important LNG port and has access to offshore wind farms. When does it get interesting? When we have the capability to store the green energy arriving in Zeebrugge, convert it into green hydrogen and transport it to the Antwerp chemicals cluster with its major consumers of energy, and to the European hinterland. The large scale achievable within our ports is key to leveraging the implementation of a true hydrogen economy.

Thanks to the complementarity of the two ports, Port of Antwerp-Bruges is stronger and the best answer to the challenges of today and tomorrow. It presents the perfect opportunity to build on our rich experience of the past to ensure our long-term future. And to fulfil our role not only as a key economic player, but also as a key driver of Belgium's energy transition. That is why I am very positive about the future of Port of Antwerp-Bruges. You as well?

Jacques Vandermeiren,
CEO Port of Antwerp-Bruges

The historic agreement between Antwerp and Bruges

The unified port is Flanders' economic driver

Stop saying Port of Antwerp and Port of Zeebrugge. Start saying Port of Antwerp-Bruges. Through the merger, the two ports are strengthening their position in the global logistics chain and targeting sustainable growth. 'Moreover, together we are better equipped to face the challenges of the future, as well as being able to take the lead in the transition to a low-carbon economy', stated Annick De Ridder and Dirk De fauw in unison.

Handling 157 million tons of container traffic a year, the merged port is set to become one of Europe's leading container ports, one of its largest breakbulk ports and its largest vehicle transshipment port. In addition, the port will account for more than 15 percent of Europe's total gas imports. And obviously, it will remain Europe's most important petrochemical hub. Last but not least, it will also become the largest cruise port in the Benelux.

While tonnage and TEUs are crucial, our ambition obviously doesn't stop there', said Annick

The unified Port of Antwerp-Bruges is ready to become the energy gateway to Europe

De Ridder, the Antwerp vice-mayor and President of the board of directors of the merged Port of Antwerp-Bruges. 'Together we are set to become even more attractive to existing customers, to new investors and to all other stakeholders. And we are indisputably the economic engine of Flanders.'

'By combining our strengths with the qualities of Antwerp, we can do more and better', confirmed Dirk De fauw, the mayor of Bruges and Vice-President of the new port authority. 'We are doing this in the interest of our port community, our city of and our region. Port of Antwerp-Bruges has the goal of becoming the first world port to reconcile the economy, people and climate.'

In both Antwerp and Zeebrugge, sustainability was already a core strategic focus. The combination of Antwerp's industrial cluster and Zeebrugge's coastal location presents an opportunity to address

energy challenges in Flanders and beyond. For example, Port of Antwerp-Bruges wants to become the leading European import hub for green hydrogen and to actively pioneer the hydrogen economy. In addition, the port, together with its industrial and maritime customers, is further focusing on reducing its carbon footprint and is researching the application of Carbon Capture, Utilisation & Storage (CCUS). The merged port sees its future very clearly as a 'green port' and the 'energy gateway to Europe'.

How did the idea of the merger come about?

ANNICK DE RIDDER: 'Studies confirmed that the two ports complemented each other. >



‘Combining our strengths will enable us to do more and to do things better.’





‘The concrete tipping point was when we started using “we” and “our port” in the discussions between the port and city authorities. Call it a kind of benign Stockholm syndrome.’

Annick De Ridder,
Vice-Mayor of the City of Antwerp and
President of Port of Antwerp-Bruges

› Operating in a competitive international market, economies of scale are important. Together, we can ensure sustainable growth while remaining committed to the energy and digital transition. We are becoming even more resilient and competitive, thereby attracting investment and strengthening employment.

DIRK DE FAUW: ‘In the merger discussions, a mutual bond of trust, understanding and commitment gradually grew, especially as Tom Hautekiet’s

commercial vision, as Port of Zeebrugge CEO, was very much in line with the ambitions of Antwerp CEO Jacques Vandermeiren. Not only the port companies, but also the people living in the vicinity of the ports, customers and stakeholders are set to reap the benefits.’

Where was agreement reached quickly and what required more deliberation?

DE RIDDER: ‘The strength of our ports is dependent on the day-to-day outstanding efforts of their employees. So it’s only natural that we spent a lot of time deliberating on how to best fit our employees into the new port. All employees are remaining on board. In a single integrated company, the necessary synergy gains will be generated through smart collaboration; that goes without saying. We also very quickly reached agreement on our sustainability goals and our will to drive the energy transition. It was our complementarity that brought us together. That, by the way, is also reflected in the name for our merged port, Port of Antwerp-Bruges. A name, moreover, that nicely links two strong international ‘brands’.’

DE FAUW: ‘Every aspect, every potential change, was first studied in-depth and extensively discussed, with transparent agreements as the result. And remember, it’s a merger, not a takeover. With its cruises, car industry, container capacity and traffic to the United Kingdom, Zeebrugge offers interesting additions to the Antwerp activities. Conversely, the chemical cluster around Antwerp and the port’s strong inland waterways position create opportunities for Zeebrugge, given that we

are also set on gaining an international position as a green energy hub. Financially, the two platforms no longer have to compete against each other for public or private investment. This gives us opportunities to develop joint innovative and sustainable projects and strengthen our international position.

What have you learned about each other in the meantime?

DE FAUW: 'What fascinates me most is the inventiveness of the Antwerp colleagues. Antwerp is constantly striving for new concepts to take sustainability up to the next level, a mentality that we in Zeebrugge willingly raise our hats to. And I have learned that certain clichés about the Antwerp people are unjustified – but I'm not going to elaborate on that (laughs). In the meantime, I have also learned about Antwerp's international participations and consulting work in the rest of the world.'

When did you realise that the negotiations were set to succeed?

DE RIDDER: 'The concrete tipping point? The moment in autumn 2020 when, in the talks between the two port and city authorities, we as negotiators spontaneously began using "we" and "our port". Call it a kind of benign Stockholm syndrome (laughs). Quite a feat for two cities known for their chauvinism. By the way, I was charmed by the Bruges cordiality and honesty. When something wasn't quite right, it was addressed immediately. But that's obviously only possible after each side has gained the trust of the other side.'

'Financially, the two platforms no longer have to compete against each other for public or private investments. This gives us opportunities to develop joint innovative and sustainable projects and strengthen our international position.'

Dirk De fauw,
Mayor of the City of Bruges and Vice-President
of the Port of Antwerp-Bruges

DE FAUW: 'By the way, our two cities are getting to know each other more and more. Who knows what other twinning projects will follow'.

Won't the chauvinism of the Bruges and Antwerp populations clash?

DE RIDDER: 'Rivalry is fun when it's healthy rivalry. The same goes for chauvinism. It is precisely because you're proud of your own city that you can best appreciate the pride of others. I love coming to Bruges, especially when Antwerp FC returns home with three points (laughs). Although that wasn't the case last time And if you ask me to choose between our two typical beers, a bolleke Koninck and a Brugse Zot, I'll go for the latter as I only drink lager-type beer. Out of chauvinism, I'll treat the mayor of Bruges to a Tripel d'Anvers.'

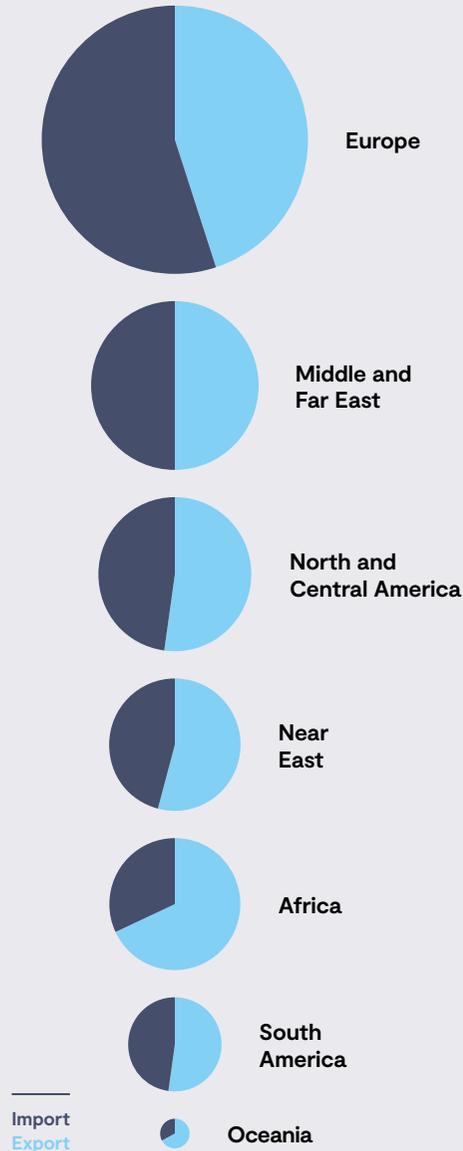
DE FAUW: 'A West Fleming always behaves with humility and hospitality. The Bruges population will thus adapt easily (laughs). But I'm not going to speak about football – out of respect for Annick ...' ●



A world port...

With a total throughput of 289 million tons per annum, the Port of Antwerp-Bruges is an important hub for global trade. Its central location, extensive connections and outstanding infrastructure make the port with its two sites the ideal choice for anyone wanting to do business.

289
million tons
of maritime freight
transported



containers

159 million tons
or **14,2** million TEU



breakbulk

13.2 million tons
(rolling stock excluded)



roll-on/roll-off

19.2 million tons
or **3** million new vehicles



liquid bulk

82.4 million tons
including **11.4** million tons
of energy gas



dry bulk goods

15.1 million tons

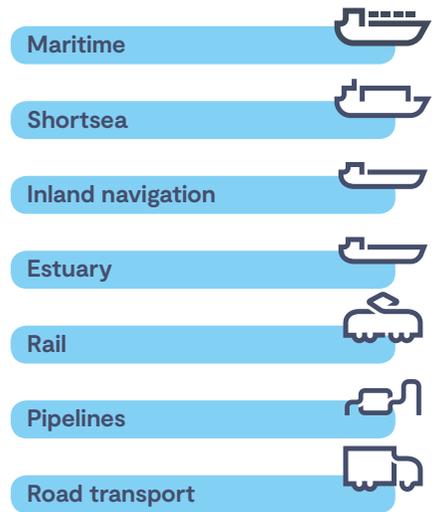


cruise and
ferry passenger
movements

114.000

Port of Antwerp-Bruges strengthens its position as a global player for major flows of goods. The port is home to the largest chemical cluster in Europe, is the world's largest throughput port for vehicles and is the 12th largest container port in the world (in TEU).

The Port of Antwerp-Bruges has an outstanding infrastructure for all types of transport and goods. To guarantee fast and efficient transport, the Port of Antwerp-Bruges will **focus on the sustainable organisation of freight transport to, from and at the port sites.**



In line with the European Green Deal, Port of Antwerp-Bruges wants to be climate-neutral by 2050. To achieve that aim, it is collaborating with various stakeholders on pioneering projects relating to CO₂ capture and storage, circular economy, alternative marine fuels, shore power and green hydrogen. Thus, we anchor ourselves as the **green energy hub of Europe and the future.**



€ 20,817,900,000

direct and indirect added value or 4.4% of the GDP of Belgium

1,400

businesses

164,000

direct and indirect jobs

14,322 ha

or 20,820 football pitches



©Shutterstock

...that reconciles the
economy, people and climate

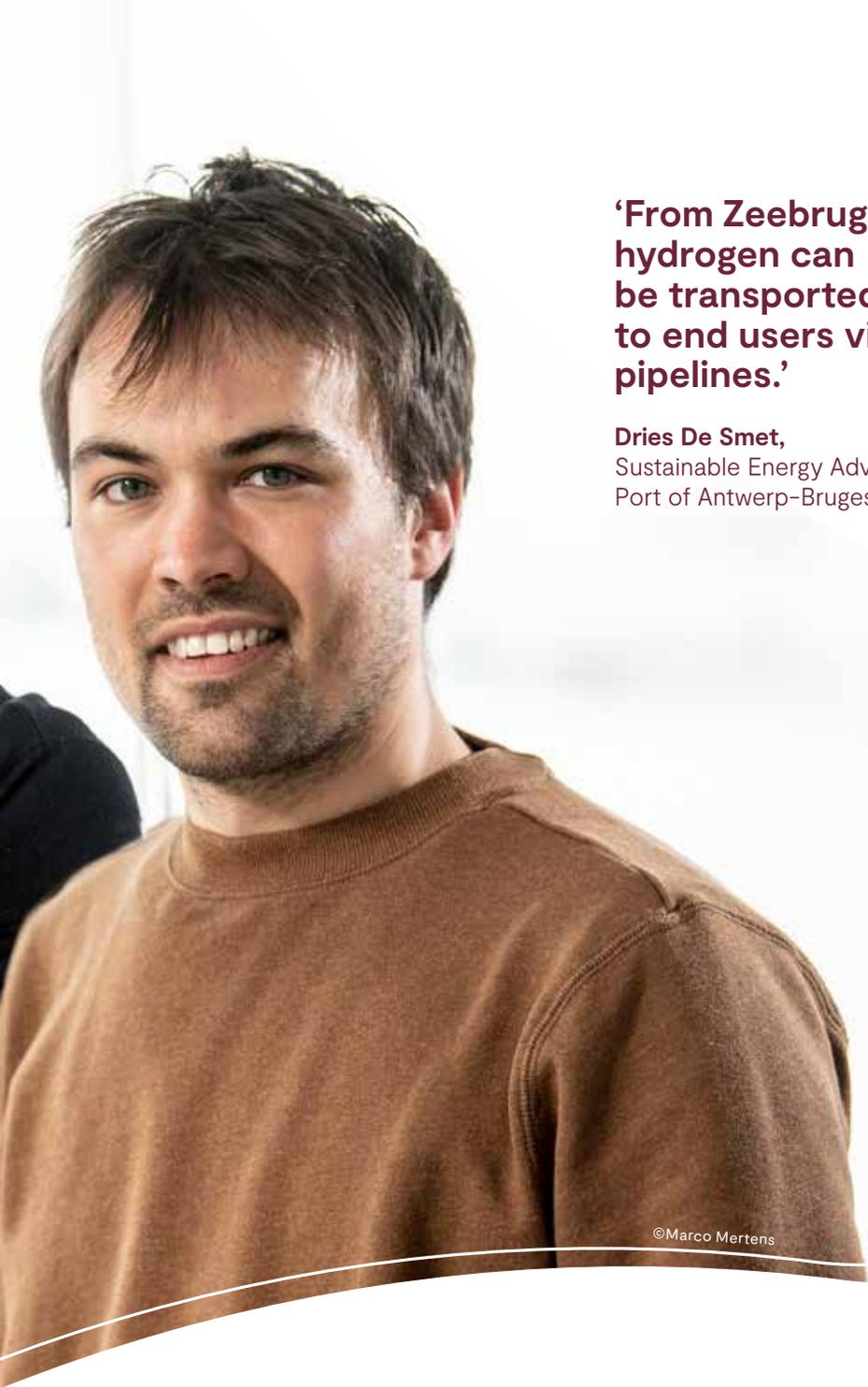
Ecological and strategic ambitions

‘Our goal? To take 17 per cent of the CO₂ in Belgium out of the air’

Every now and then, one plus one is three. Achieving further added value is also the stated ambition of the recently merged Port of Antwerp-Bruges. In the long run, it wants to become the green energy gateway to Western Europe – ‘thanks to the expertise and complementarity of both ports’, said Didier Van Osselaer and Dries De Smet, energy specialists at Port of Antwerp-Bruges.

Didier Van Osselaer
and Dries De Smet
‘The plans that
are currently on
the table are very
ambitious.’





‘From Zeebrugge, hydrogen can be transported to end users via pipelines.’

Dries De Smet,
Sustainable Energy Advisor at
Port of Antwerp-Bruges

©Marco Mertens

The recently merged Port of Antwerp-Bruges has set the goal of becoming Europe’s green energy hub in the long run. Where is the complementarity of the ports that justifies this goal?

DIDIER VAN OSSELAER: ‘In the long run, we need to completely move away from all fossil fuels. It’s the only way we can achieve a climate-neutral society. While we can obviously generate large amounts of green energy here in Europe, for a highly energy-intensive region like ours, the local supply of wind and solar energy will not be enough to complete the transition in time. We thus need to get that green energy from outside Europe also. This is where an energy source such as hydrogen comes into the picture. Our recently merged port has several aces in its hand when it comes to importing large volumes of hydrogen. In Zeebrugge, thanks to its location right by the sea, we can take in very large volumes of hydrogen for shipping to users in neighbouring countries. Antwerp not only has several hydrogen receiving terminals, but also several very large industrial companies operating in the port area which use hydrogen as an energy source.’

Not all hydrogen is green and therefore sustainable. What’s the difference, and how green will the hydrogen be that you intend to import?

DRIES DE SMET: ‘We distinguish between grey, blue and green hydrogen. Based on fossil fuels, production of “grey” hydrogen results in further GHG emissions and is therefore not sustainable. “Blue” hydrogen is already doing a lot better from an ecological perspective, with the CO₂ captured and stored, and therefore no longer released into the atmosphere. While blue hydrogen is already more or less climate-neutral, it cannot yet be termed truly sustainable as fossil energy sources are used for its production. In a transitional phase, we will carry on partly using blue hydrogen, but our goal is to use green hydrogen produced entirely using renewable energy. Whereas Antwerp can immediately receive hydrogen carriers such as ammonia or methanol with its existing terminals, Zeebrugge has the advantage of its direct access to the sea. Large volumes of both gaseous and liquefied hydrogen can be unloaded here with just a few adjustments to the infrastructure. Once they arrive in Zeebrugge, liquefied hydrogen can be reconverted into hydrogen and oxygen, after which the hydrogen can be transported to end users via pipelines.’

DIDIER VAN OSSELAER: ‘If we want to play an important role in the long term as a green energy gateway for Western Europe, we should not just be looking at supplying green energy to industry in and around Antwerp. We intend to import much larger volumes of green energy through our merged port, subsequently making it available to a very large hinterland, >

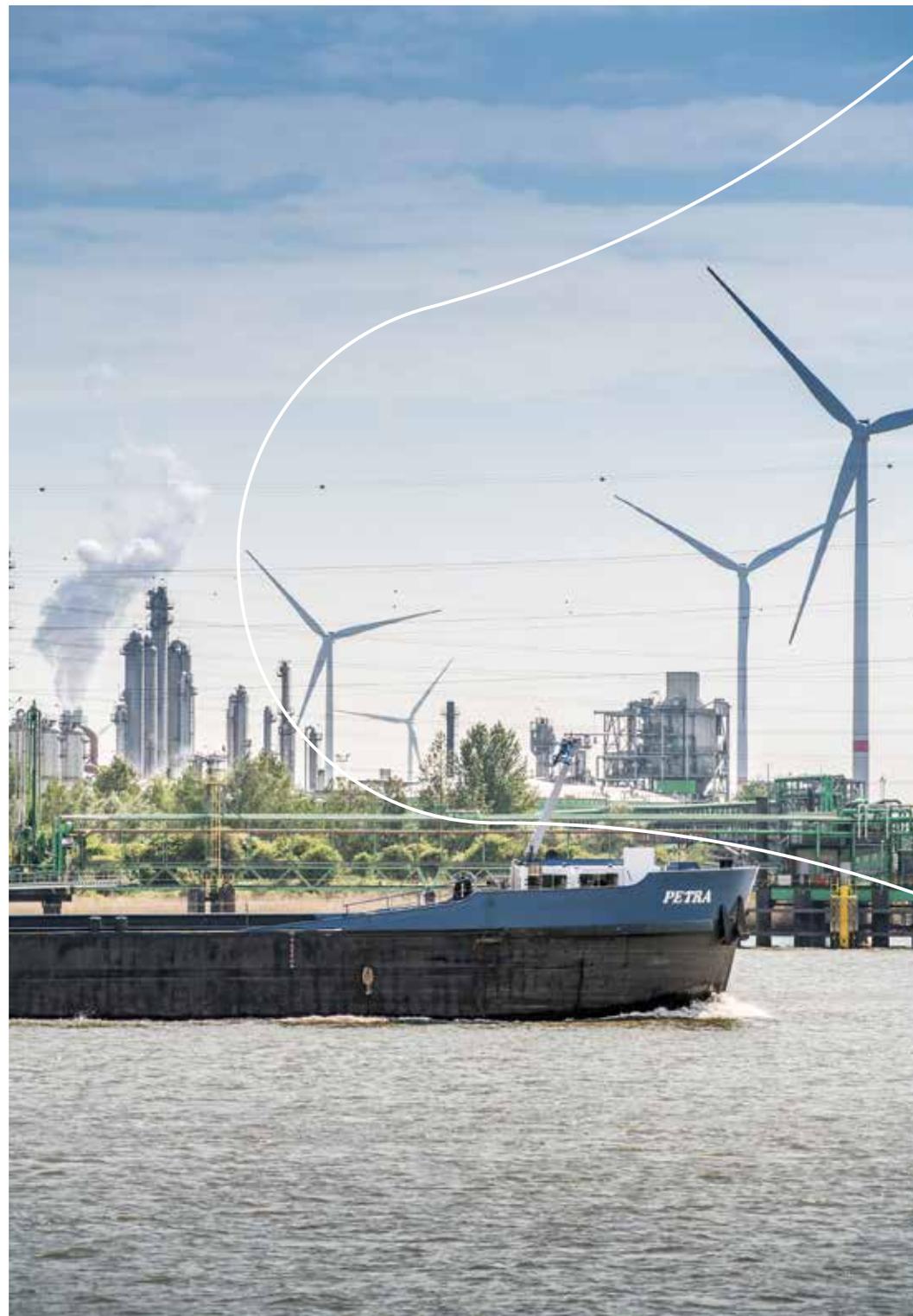
› for instance the German industrial regions. The large volumes required just by Antwerp's chemicals cluster are set to become a lever driving a hydrogen economy outside the port.'

From where will the green hydrogen be imported?

DRIES DE SMET: 'This choice is made on the basis of a whole series of parameters, ranging from the distance to Zeebrugge and Antwerp to the stability of the local political regime and, of course, the widespread presence of sun and wind. Possible countries are Oman, Chile and Namibia. The potential of wind and solar energy is so high in these countries and the production of green hydrogen there is so cheap that it can more than compensate for the cost of transporting it to Belgium.'

What technical obstacles are currently in the way of making these ambitious plans a reality, and what is the timing planned?

DIDIER VAN OSSELAER: 'We hope to take in the first large ships with hydrogen carriers such as ammonia or methanol by 2025. Initially, this will be in Antwerp, where we already have considerable storage capacity for methanol and ammonia. In a first phase, these volumes will be used by large chemical companies operating in the port of Antwerp. By 2025, we intend to have built a hydrogen pipeline servicing the port area. In the longer term, we will need much larger volumes. That's where Zeebrugge comes into the picture. At the moment, we are in the midst of analysing the volumes needed, where additional investment will





Importing **150**
terawatt
hours
of hydrogen: that's
roughly our total
consumption of
natural gas today.

be required, and where the potential bottlenecks are. In the longer run, hydrogen will be transported from Zeebrugge to Antwerp via pipelines, but these have yet to be built. By around 2030, we also hope to be supplying Germany with green hydrogen from Antwerp. That's currently the subject of many discussions.'

DRIES DE SMET: 'In Zeebrugge, we want to develop a site to produce green hydrogen locally by 2024. To this end, the Colruyt Group and Fluxys, among others, have joined forces. They hope to ultimately produce 25 megawatts using green energy. This is set to be a true pioneering project for mainland Europe. This hydrogen will also be transported from Zeebrugge to Antwerp and beyond.'

In the shorter term, you also have ambitious plans to substantially reduce CO₂ emissions in the port of Antwerp through the massive capture and storage of CO₂.

'We need to get green energy from outside Europe also. This is where an energy source such as hydrogen comes into the picture.'

Didier Van Osselaer,
Sustainable Transition Manager
at Port of Antwerp-Bruges

DIDIER VAN OSSELAER: 'That's right. In this respect the establishment of the Antwerp@C consortium was an important step. Several leading industrial companies are committed to capturing and storing half of all CO₂ emissions in the port by 2030, thus obviously taking a major step forward in making the port climate-neutral. Grey hydrogen is already being produced in specialised plants in the port, though currently without the CO₂ being captured. Through linking this hydrogen production to Antwerp@C, blue hydrogen can be produced. But more importantly, we expect to stop 18 million tons of CO₂ – or about 17% of Belgium's total CO₂ emissions – getting into the atmosphere here. The joint Air Liquide and BASF Kairos@C project for the capture and storage of CO₂ is heralding the turnaround. Thanks to multi-million-euro EU subsidies, these companies will be able to equip some of their facilities with CO₂ capture devices. They will then ship the captured CO₂ to empty gas fields at sea or have it reused.

With all the debates about energy and climate, your goal to become Western Europe's green energy gateway is of great importance, ecologically and strategically. How far do these plans go in concrete terms? Can we already express them in figures?

DIDIER VAN OSSELAER: It is difficult to translate this into concrete volumes at the moment, but the Belgian hydrogen strategy reckons on importing some 150 terawatt hours of hydrogen for Belgian industry by 2050. To give you an idea of what this means, it is roughly equivalent to >

‘Our ambition? To import green energy via the unified port for distribution to a very broad hinterland.’

Didier Van Osselaer

› our total natural gas consumption today. In addition, our country could export twice that amount to other countries. Europe, in turn, has set the goal of importing as much as 10 million tons of hydrogen by 2030. The plans now on the table are thus very ambitious. It is currently still too early – with the exception of several large industrial sectors, of course – to predict exactly where these enormous volumes of hydrogen will be used. Nevertheless, it seems fairly certain that aviation, shipping and much of industry, among others, will eventually embrace hydrogen carriers such as methanol, ammonia or hydrogen-based synthetic kerosene. To meet all those needs, we won't have enough locally produced green energy anyway.’

Of course, the energy transition is not just about importing or producing green hydrogen or capturing CO₂. What are you doing to become a lot more sustainable as a port in other areas as well?

DRIES DE SMET: ‘With a view to producing green energy locally, we want to continue investing heavily in wind turbines. In Zeebrugge, thanks to our location right by the sea, we can rely on the best wind yields in the entire country. At the same time, we continue to develop green energy. While some of it goes straight into the grid, the port terminals themselves can also purchase some of that locally produced energy. With our shore-side power concept, we want to have large passenger and container ships that dock in the ports running entirely on locally produced green electricity by 2030, meaning that these ships no longer have to run their auxiliary engines when docked. Such large ships currently generate large amounts of nitrogen and CO₂ emissions. This way we can greatly reduce emissions in the port.’

DIDIER VAN OSSELAER: ‘In recent years we have gathered a great deal of expertise and knowledge about the energy transition in our ports and





'We will not be able to produce enough green energy locally to meet the needs of industry and the aviation and maritime sectors.'

within the industry. We now want to share this in a very accessible way at NextGen Demo, a large 2-hectare demo area within NextGen District. Set up on the former Opel site in Antwerp, it will be equipped with all the necessary infrastructure. In fact, the first two concession agreements have already been signed. In this way as well, we hope to further develop our social role.' ●

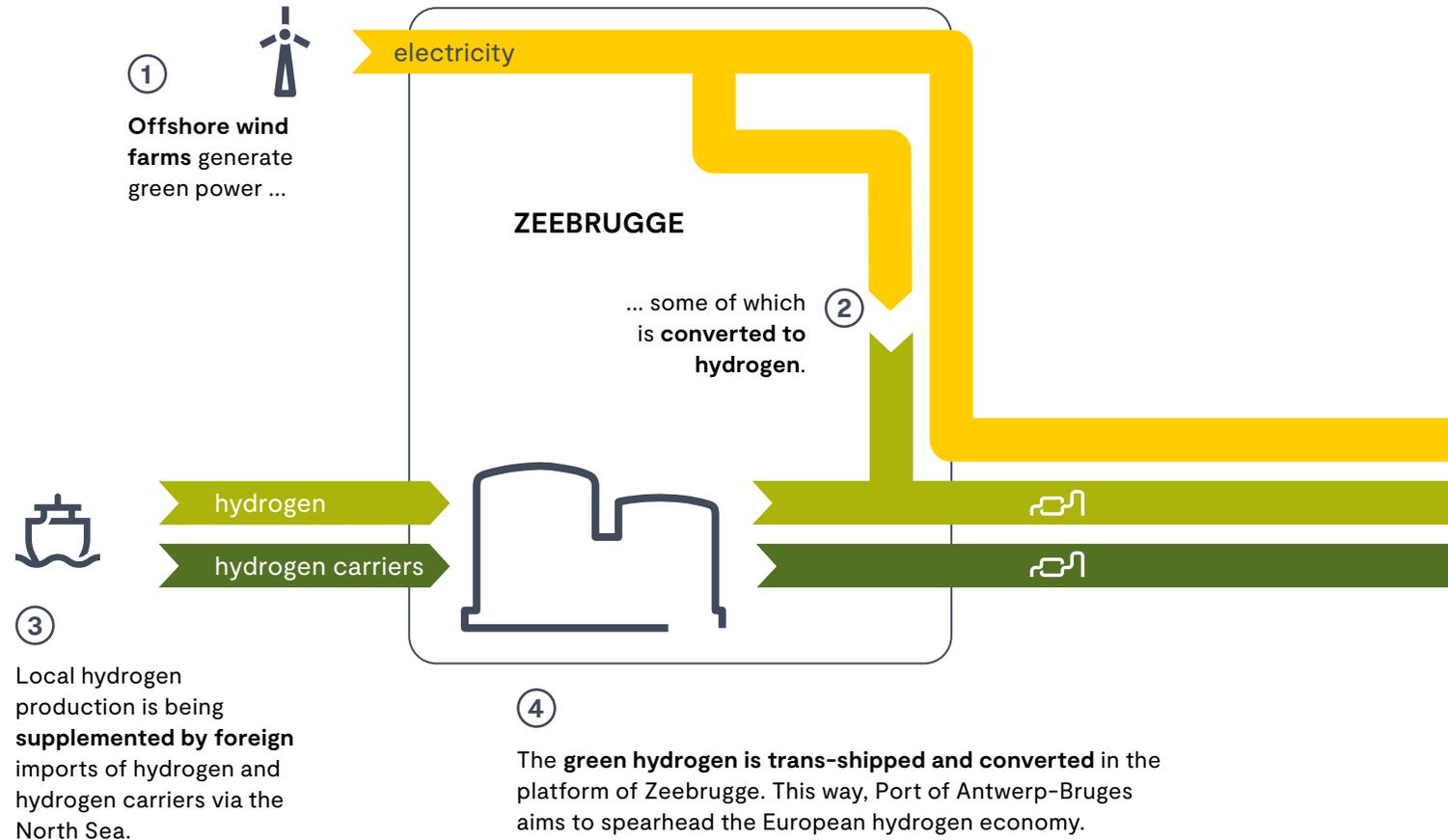
'Wind and solar energy yields are so high in countries like Oman and Chile that they can more than compensate for the cost of transporting green hydrogen to Belgium.'

Dries De Smet

A merger crucial for sustainability

A merger crucial for sustainability

While sustainability was already a key issue in both Antwerp and Zeebrugge, the merged port is now raising the bar. Hydrogen is set to play an important role in energy solutions of the future.



⑤

Via the Scheldt, **hydrogen and hydrogen carriers** are imported.



⑩

Captured **CO₂** is transported **via Rotterdam** and then stored in empty gas fields.

⑪

Via the Eastern Scheldt, captured **CO₂** is transported to be stored in empty North Sea gas fields.

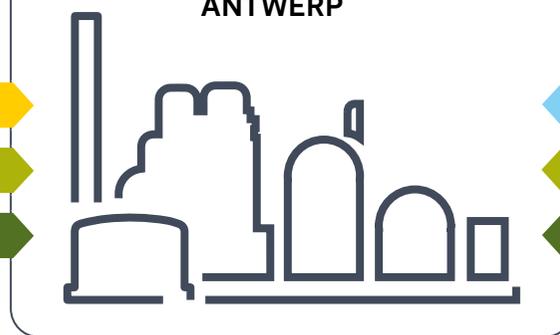
⑨

CO₂ is transported from the hinterland to the port.

⑧

Hydrogen, hydrogen carriers and chemical products are exported to the hinterland.

ANTWERP



⑥

Belgium has an **extensive pipeline network**.

⑦

As a hub, the platform of Antwerp is the place where the **energy transition is taking shape**. Hydrogen and hydrogen carriers are **imported, stored and converted** to building blocks for the chemical sector.

From residual heat to CO₂-free energy

Residual heat saves energy and reduces CO₂ emissions

In the chemical industry, steam is indispensable for production processes. ‘But you always end up with residual heat, up to 100 degrees hot. Companies often can’t do anything with it, so they end up discharging it into the air or water’, Wouter Ducheyne explains. With his company Qpinch, he has developed the technology to generate CO₂-free energy from this residual heat.

A chemical engineer, Wouter Ducheyne started his career at BASF. Like all chemical companies, BASF is a major consumer of energy. ‘As a society, we put such a great focus on electricity that we tend to forget that most of our industrial energy is consumed as heat. In developing a solution set to be the next step in energy efficiency, we were inspired by nature: how do humans, and in fact all organisms, store and release energy?’

Together with UGent, we refined this process for industrial heat recovery. Unlike heat pumps, the patented Qpinch process uses hardly any energy. The result? Up to 30% savings in electricity costs, significantly shortening the technology’s ROI period’, says Ducheyne.

Usable in other sectors

Qpinch has now been in existence for ten years. Its first industrial customer was the international chemical company Borealis (see box). Among other sites in Flanders, Borealis has a plant in Zwijndrecht, in the port of Antwerp. ‘Our technology, in Europe’s largest chemical cluster, has the potential for CO₂ savings of 200 megawatts a year. Does this make us THE solution for the green transition? No, but we are part of the overall picture, alongside solar and wind energy, both of which are not always available. Crucially, we are able to provide industry with constant power’, adds Ducheyne. >





**‘We are part of
the overall energy
transition picture.
And our solution
works 24 hours a day,
a crucial factor for
the manufacturing
industry.’**

**Wouter Ducheyne,
CEO Qpinch**



Wouter Ducheyne,
CEO Qpinch

©Marco Mertens

‘Thanks to Qpinch, we are now able to process huge amounts of residual heat’

The international chemical company Borealis was Qpinch’s first commercial partner. ‘As a start-up, the company was able to attract massive interest after winning the 2015 Emerging Technology award in the British Royal Society of Chemistry’s annual competition. Borealis and Qpinch then teamed up with UGent’s Professor Christian Steven to commercially scale up the technology,’ says Erik Van Praet, Vice President Innovation & Technology at Borealis. ‘Unlike conventional heat pumps, Qpinch’s closed-loop process minimises our operating costs and power consumption. The technology is scalable from 1 to 50 megawatts (MW) and is thus able to process huge amounts of residual heat. The partnership with Qpinch was an important step forward in Borealis’ efforts to reduce its CO₂ emissions and make its operations more energy-efficient and sustainable. We are currently saving some 2,200 tons of CO₂ a year, equivalent to the emissions of 1,500 small family cars per year.’ The heat recovery plant is located next to Borealis’ existing plant in Zwijndrecht. ‘That first commercial-scale installation was not only a milestone for Qpinch, but a beacon for the entire chemical sector’, says Wouter Ducheyne of Qpinch. ‘Our partnership with a leading customer like Borealis will allow us to further upscale our technology, putting us on the road to expanding our business globally’.



**Borealis saves
2,200 tons
of CO₂
per annum which
is equivalent to the
combined annual
emissions of 1500
small family cars.**

> It's no coincidence that Qpinch – which in recent years has grown to a scale-up with some 20 employees – is based in the port of Antwerp. 'We were able to set up our pilot plant in a vacant warehouse in the heart of the port, near to our customers and easily accessible to employees. To make an impact with our facilities, we need to scale up, aiming for large volumes. Here in the port, we have just the right large companies. And they don't have to be chemical companies; for example, we have now entered into partnerships with food companies', says Wouter Ducheyne.

Could Qpinch's technology also be used for residential purposes? 'Using heat to heat homes or offices is not optimal. For such heating, low temperatures are sufficient, and you only need energy for about a third of the day, so it would be wasted. Industry, on the other hand, runs 24 hours a day and often needs heat at high temperatures.'

Multinationals playing a pioneering role in Flanders

In Ducheyne's view, the entire region between Zeebrugge and Antwerp is one big economic zone. 'Especially when you start looking at it from an international perspective. Thus, any upscaling

can only be welcomed. I only see advantages in the Port of Antwerp-Bruges merger. The ecosystem is growing and with it the visibility of what we are doing. Indeed, it's no coincidence that many multinationals are pioneering new technology here. We can also count on Flemish and European subsidies to make the investment for companies more affordable. And they can subsequently export this CO₂-saving innovation to other countries within the group.' ●







Technology

Only a smart port can continue to expand

Smart technology is indispensable for operating a 21st-century port. Digital twins, smart cameras, 5G, drones: all contribute to making work more efficient and safer. And it is becoming increasingly clear that smart ports are the only ports still able to expand.



Erwin Verstraelen, Chief Digital Information & Innovation Officer Port of Antwerp-Bruges: 'If we want to receive more ships, we must work more efficiently.'

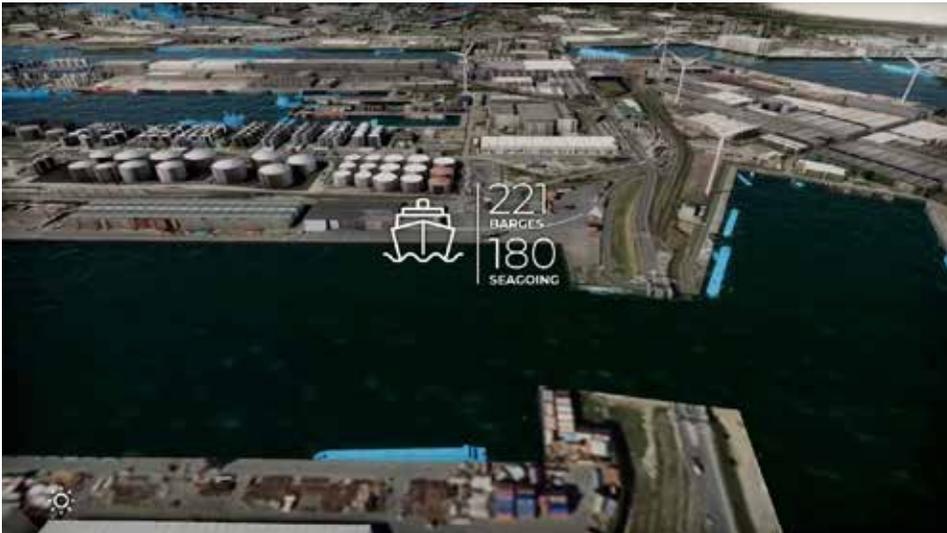
‘Welcome to the Port of Antwerp. I’m Apica, your digital assistant. It’s going to be a sunny day, with a light north-westerly breeze. There are currently 221 barges and 180 ships in the port. 95 new ships are scheduled to dock today, and 73 to depart. At 8:51 a.m., iNose detected 22 potentially harmful substances in the air, possibly caused by the chemical tanker My Fair Lady currently on its way past the Bevrijdingsdok. Want to take an air sample? Select an available drone. The flight path is being calculated. ETA: 1 minute and 23 seconds.’

Merging several data sources, the Digital Twin is a digital image of what is happening in the port area. It makes working in Port of Antwerp-Bruges safer

and more efficient. Part of this prestigious project became operational at the beginning of 2022. As more and more data and applications are added, its possibilities become endless. Drones equipped with smart cameras are already able to detect oil slicks in the port. They can also identify objects in the docks liable to cause damage to a ship’s rudder or propeller faster and more efficiently. Lifebuoy containers are fitted with sensors that send an alarm if they are opened or disconnected from the network.

The system can also already check the status of bridges – open or closed – and locks: opening, water levels, number of ships. In the longer run, sensors will be used to detect such problems as metal fatigue or rust. And the system will be able to call up images from smart cameras nearby.

But that’s not just all: autonomous echo drones and sensors on tugboats continuously check channel depths, allowing dredging requirements to be predicted. This also applies to the maintenance of the port’s bridges, lock gates and quay walls. >



‘The combination of people and technology still always produces the best results.’

Danny Van Dessel,
Digital & analytics manager Port of Antwerp-Bruges

› The Digital Twin is a central nervous system that, like our human senses, allows us to hear, see, smell and feel what is going on in the port area.

One scan per second

The Digital Twin provides one scan of the port per second, presenting a real-time view of what is happening in the port. How? By collecting all potentially relevant data through an Internet of Things (IoT) network of sensors, drones and cameras, connected via a local 5G network and linked to external data such as geographical databases, ship data, meteorological data, radio communications, etc.

The idea stemmed from Computer Vision, a project aimed at upgrading a network of more than 600 cameras in the port to enable them to recognise objects. While keeping an eye on what’s happening in the port, they also inspect the condition of the port’s bridges, locks and quay walls. Over the years, more and more projects have been added. The ultimate goal? To permanently monitor and control the vast port area. Erwin Verstraelen, chief digital and innovation officer: We are talking about a ‘virtual secure port’ where,

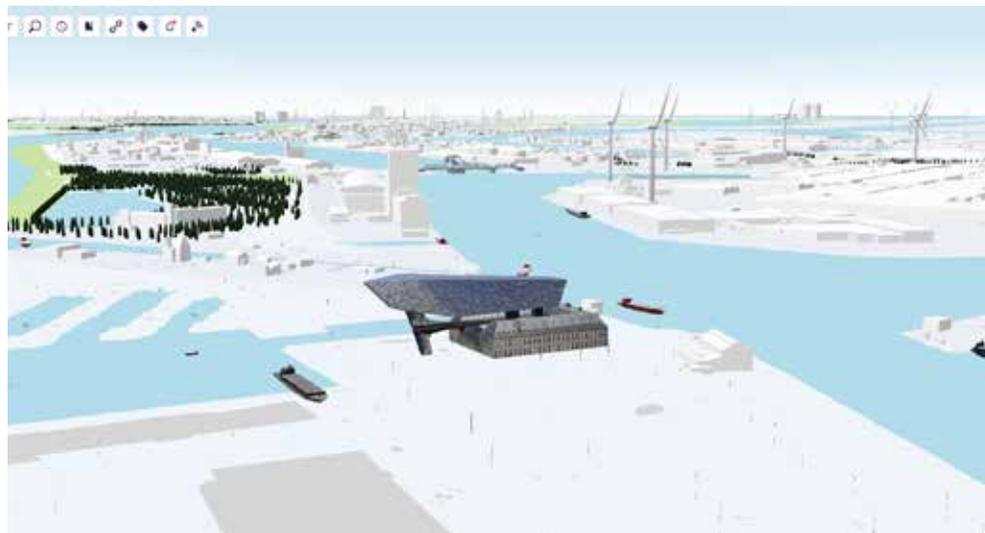
thanks to smart technology, we are upgrading safety and security throughout the port area.

Port of Antwerp–Bruges is also responsible for managing the drones flying over the port area and collecting the data fed into the Digital Twin. A network of drones can conduct daily inspection flights and provide support in the event of an incident. Or a drone with a thermal camera could help firefighters detect a fire in a large pile of smouldering wood and direct their fire extinguishing efforts.

The next step? To have the port infrastructure and drones controlled via an interactive screen in the control room or a VR headset. The bottom line is that the port can always be operated remotely in the event of a disaster or a major staff shortage due for instance to a virus outbreak.

Artificial intelligence

The Digital Twin gets really interesting when big data and artificial intelligence are combined to come up with useful conclusions. Port of Antwerp–Bruges is for example developing algorithms able to detect environmental pollution. Our electronic nose sensors measure twenty volatile organic compounds, such as acetone and butanol, around the clock. Any emission can be linked to wind speed and direction data for the past few hours and days and to a ship's log data to identify the potential source. The system can also detect near collisions between ships at lightning speed and send out an alarm. It is even possible to visually replay a ship's route for an insurance appraisal, or to know the true cause of a collision. ●



Better than a human?

Is there still a place for humans in a 21st-century port? There are some things that technology just does better. Take for instance berth occupancy. Using the Digital Twin, the port can achieve significant efficiency gains there. Erwin Verstraelen: 'Further expanding the port takes a lot of time. In the meantime, if we are to accommodate more ships and barges, utilisation of berths, locks, bridges and time slots needs to be better coordinated. But docking is a complex logistical and maritime operation, requiring tugboats and pilots to be on site at just the right time. Algorithms can be used to predict when and how many tugs and pilots are needed. They do that 30 percent better than a human.'

But there is no intention of having the port operated fully automatically by robots and computers. 'The combination of people and technology still gives the best results', says Danny Van Dessel, digital & analytics manager. 'For example, we have a project that semantically analyses VHF radio calls from ships. Using machine learning, a neural network has learned some 140 signal words, including swear words, in different emotional tonalities in Dutch, as well as in the Antwerp dialect and English, allowing us to automatically detect troubling conversations featuring arguments, panic or aggression. But any resulting interventions will continue to be done by people.'

Three questions for the Aertssen Group, Barry Callebaut, Seafar and Zespri





Sam Aertssen is on the left in the photograph.

Aertssen Group

‘From a polder farmer to an industrial jack-of-all-trades thanks to the port’

‘The merger of the ports of Antwerp and Zeebrugge is strengthening us as an organisation and providing us with a competitive advantage’, said Sam Aertssen from the company of the same name. Having grown to its current size along with the port, the company was recently nominated Company of the Year 2021. ‘It is better to cooperate, join forces and face the challenges of the future together, as we also do with our customers.’

1. What are you working on?

SAM AERTSSEN: ‘My grandfather Marcel was a farmer in Oorderen, a polder village that had to make way for the expanding port of Antwerp. Seeing this expansion as an opportunity, he

About Aertssen

- Antwerp-based construction and logistics group that has grown into a diversified group in earthworks and site remediation, project development and renewable energy.
- Turnover: 300 million euros.
- Workforce: 1,550.
- 100% owned by the Aertssen family.
- Company of the Year 2021.

adapted to it by buying a truck and an excavator and then helping extend the port. In hindsight, the right decision!’

‘The Aertssen Group works nationally and internationally in a range of activities: infrastructure work, lifting, transport and logistics. Over the past decade, we have branched out into the fields of inland shipping, renewable energy, real estate projects and sales of used construction equipment. We currently have 1,550 employees and a turnover of 300 million euros.’

‘Our logistics department has also grown substantially in recent years. Among other things, it stores and assembles agricultural, mining and construction machinery, in addition to transporting heavy freight such as wind turbine components.’

2. What is the added value of Port of Antwerp-Bruges?

SAM AERTSSEN: ‘Port of Antwerp-Bruges plays a crucial role in our operations. In addition to our multimodal terminal, we also have a new 220,000 m² site in Antwerp. Handling more than 15,000 machines a year there, we offer our customers a one-stop shop, performing the assembly, inspection and finishing of machines for end customers. Thanks to the port, we have a well-established base

‘The fact that the port is playing a pioneering role in the energy transition is something we very much applaud, as it will benefit the port and industry in the long run.’

Sam Aertssen,
Aertssen Group

of customers operating worldwide. The frequency in roll-on, roll-off and container transport, combined with connections to all continents, means that we are very well positioned strategically.’

3. What does the future hold in store?

SAM AERTSSEN: ‘The fact that the port is playing a pioneering role in the energy transition is something we very much applaud, as it will benefit the port and industry in the long run. Within the Aertssen Group we similarly attach great importance to sustainable entrepreneurship, measuring and improving our CO₂ footprint day by day. We are experimenting with hydrogen-powered machines and working on making our various sites energy-neutral.’

Barry Callebaut

‘Belgium is a global chocolate hub’

Our country is known for its chocolate – and this is due in part to Barry Callebaut, a company that not only imports cocoa beans via Port of Antwerp-Bruges. ‘We also ship chocolate products to all four corners of the world’, says An Van Assel, Corporate Communications Director EMEA at Barry-Callebaut.



1. What are you working on?

AN VAN ASSEL: ‘An international manufacturer of high-quality chocolate and cocoa products, Barry Callebaut buys and processes cocoa beans to produce chocolate, including chocolate fillings, decorations and composite products. The group has more than 60 production plants worldwide and employs over 12,500 people. Barry Callebaut supplies the whole food industry, from industrial food producers to craft and professional users of chocolate, such as chocolatiers, pastry chefs, bakers, hotels, restaurants and catering companies.’

‘By 2025, we want to make sustainable chocolate the norm, thus ensuring future cocoa supplies and improving farmers’ living conditions.’

An Van Assel,
Barry Callebaut

2. What is the added value of Port of Antwerp-Bruges?

AN VAN ASSEL: 'Firmly rooted in Belgium, we make real Belgian chocolate in our four production plants here. Last October, we opened the world's largest chocolate warehouse in Lokeren. Given the large presence in Belgium of both production and global distribution operations, the Port of Antwerp-Bruges serves as a key hub. Via the port, we export more than 2,500 different chocolate products to 140 countries. Similarly, our imports of cocoa beans mainly come through the Port of Antwerp-Bruges.'

3. What does the future hold in store?

AN VAN ASSEL: 'We are consistently trying to outperform the global chocolate market. Our long-term strategy is based on expansion, innovation, cost leadership and sustainability. By 2025, for example, we want to make sustainable chocolate the norm, thus ensuring future cocoa supplies and improving farmers' living conditions.'

About Barry Callebaut

- The world's largest chocolate maker.
- Founded in 1996 as a result of the merger between French company Cacao Barry and Belgian company Callebaut.
- Barry Callebaut has four factories in Belgium: in Wieze, Halle, Thimister-Clermont and Heule.
- Employs more than 12,500 people in more than 40 countries.



'A port is a strictly regulated environment. Fortunately, we can count on the full support of Port of Antwerp-Bruges. They share our vision of unmanned and automated shipping.'

Louis-Robert Cool,
Seafar

© Marco Mertens

Seafar

When the captain is ashore

While self-driving cars still seem to be a thing of the future, unmanned ships are already ploughing the ocean waves. Captains are similarly no longer needed on Flemish inland waterways, at least not on board, says Seafar's Louis-Robert Cool. 'Thanks to artificial intelligence and machine learning, captains can steer various ships from shore.'

1. What are you working on?

LOUIS-ROBERT COOL: 'The European Union's goal is to increase coastal and inland waterway freight transport by 30 percent by 2030 and by as much as half by 2050. At the same time, we are facing the problem of decreasing numbers of young people opting for maritime careers. They prefer a better work-life balance rather than spending two weeks on board a ship, with the consequent impact on their social lives.' 'After studying law, I started work in the maritime technology sector, seeing how technological solutions could boost traditional

sectors. This led to me founding Seafar in 2018, a company developing software for the maritime industry. Our company currently employs thirty people.'

'Seafar is filling that gap between increased demand for maritime transport and the decreased influx of new people, developing software to completely automate ships. We can capture and visualise everything a captain sees, hears and feels on his ship, much faster than is possible with the naked eye. With our remote Shore Control Centre and the existing navigation systems, we can take control of a ship, >

> though naturally this is done by an official captain working eight hours a day in our control centre and then knocking off to go home. We've got six captains able to steer twenty ships at once.'

2. What is the added value of Port of Antwerp-Bruges?

LOUIS-ROBERT COOL: 'Let's get things clear from the start: Seafar is not a ship owner. All that we do is to equip ships with the necessary technology', says Cool. 'And the maritime sector is a very traditional sector which by definition thinks in the long term. It's not that easy to get a foothold in it. Fortunately, we can count on the full support of the Port of Antwerp-Bruges innovation team. Among other things, they're helping us in the practical implementation of our systems – a port is a strictly regulated environment. Moreover, Port of Antwerp-Bruges has opened up their platform for us. It also provided us with a vessel,

'the Tuimelaar', in 2018 to test our technology in real-life.'

3. What does the future hold in store?

LOUIS-ROBERT COOL: 'Thanks to the collaboration with Port of Antwerp-Bruges, Seafar has also been able to establish the necessary contacts to market its technology. We now have early-adopter shipowners on board. The remaining 90 percent are yet to follow. But we have complete confidence in it. We are the frontrunners. While initiatives similar to ours exist in the rest of Europe, none are commercially active. We owe this to the Flemish and Belgian governments. They believe in us and have made the necessary legislative adjustments. The Walloon government is now following suit. We hope that the Netherlands, Germany, France and the rest of Europe will also follow, allowing us to become active not only in Flanders, but throughout Europe.'



About Seafar

- The young company navigates inland vessels to their destination remotely and with reduced crew.
- Seafar recently opened a brand new Shore Control Center.
- The company is planning to open a second Shore Control Center in Rotterdam.

Zespri

'80 per cent of the kiwis destined for the European market come through Zeebrugge'

If you buy a kiwi, odds are that it will have a Zespri sticker on it. The New Zealand company grows a staggering 2.44 billion kiwis a year. 'The lion's share still comes from New Zealand', says Giorgio Comino, Zespri's chief executive officer for Europe and North America. '80 percent of the kiwis destined for the European market come by ship to Zeebrugge.'

1. What are you working on?

GIORGIO COMINO: 'Zespri is a thriving cooperative of New Zealand growers who also work with growers in other parts of the world. Our mission: to supply fresh, tasty and nutritious kiwis the whole year round.

The company's core is still in "kiwi land" New Zealand, where we are set to produce some 190 million trays this year. By comparison, our

‘In 2018, we renewed our partnership with Belgian New Fruit Wharf (BNFW) for a further ten years. That means we are long-term partners.’

Giorgio Comini,
Zespri

production sites in Southern Europe, Korea and Japan are only responsible for 36 million trays.. This geographical distribution allows us to provide customers with kiwifruit the whole year round.’

‘Zeebrugge is our main European logistics hub. We handle 80 percent of our European imports in our distribution centre there, forwarding the fruit to the Benelux, France, Germany and Scandinavia. To serve southern Europe, we have further hubs in Tarragona in Spain and in Vado in northern Italy. Our environmental footprint would be much too big if it all came here and then got trucked to southern Europe. We are very conscious about that.’

2. What is the added value of Port of Antwerp–Bruges?

GIORGIO COMINO: ‘I looked it up in our archives. Our official cooperation with the port of Zeebrugge started in 1985. But then I was told that we’d been unloading New Zealand ships there earlier than that. Originally, they were all refrigerated ships with just kiwis in their holds. These days we use refrigerated ships mainly at the start of the season and for

supplying Southern Europe. The rest comes in refrigerated containers where the kiwis get “put to sleep” for their month-long journey.’ ‘But obviously we’re not blind to the facts. Importing fruit from the other side of the world does have an impact. Though ocean freight is more environmentally friendly than air freight, here too we are looking at how we can operate our ships in the most sustainable way, for example by reducing speed.’ In recent years, together with Belgian New Fruit Wharf (BNFW), we have developed an enormous expertise in the field of storing, packaging and shipping our kiwis to our European customers, all with a view to guaranteeing the quality of our products.



3. What does the future hold in store?

GIORGIO COMINO: ‘In 2018, we renewed our partnership with BNFW for a further ten years. That means we are long-term partners. At the same time, we invested heavily in a new packaging centre last year. Moreover, kiwi consumption continues to increase. We are aiming to double volumes by 2030. In addition to the familiar green, acidic kiwis, the golden and gloriously sweet SunGold™ variety has a lot of potential. And three years ago, we introduced a new variety: the red kiwi, which we are planning to bring to the European market in the near future. Our future in Zeebrugge thus looks rosy, both literally and figuratively.’

About Zespri

- Zespri is set to distribute 63 million trays of New Zealand kiwifruit in Europe this year, equivalent to 225,000 tons.
- 80 percent of European production goes through Zeebrugge.
- Zespri’s packaging centre in Zeebrugge produced 26 million consumer packs last year.
- Belgian New Fruit Wharf employs between 150 and 265 workers, rising to 300 at peak times. In addition, there are the dockers loading and unloading the ships and containers.

International network puts Belgium on the world map

‘Think global, act local’ as a recipe for success

Strategic partnerships around the world are set to make the newly merged Port of Antwerp-Bruges the European energy hub par excellence. ‘The port is opening doors for our partners worldwide.’

The newly merged Port of Antwerp-Bruges has sky-high ambitions. In the words of Tom Hautekiet, Port of Antwerp-Bruges CCO, ‘we are one of the largest, if not the largest, player in all major segments in Europe. Containers, roll-on/roll-off, conventional breakbulk cargo, liquid bulk – 15 per cent of liquid gas entering Europe passes through us. In addition, we can boast a location right next the sea and the largest chemical cluster in Europe.’

This all creates international opportunities for the merged port. Port of Antwerp-Bruges works with foreign representatives for branding and to attract investors and new flows of goods. As a subsidiary, Port of Antwerp-Bruges International (PAI) offers consultancy in foreign ports and provides management services (see map), while APEC, the Antwerp/Flanders Port Training Center, provides training for an international audience. Moreover, the Port has strong ties with such organisations as the World Economic Forum and the International Association of Ports and Harbors.

That international focus should help the newly merged port to quickly establish itself in growing markets. ‘Furthermore, this strong international positioning is key to achieving the Port’s goal of developing into Europe’s green energy hub’, says Luc Arnouts, Director International Relations & Networks.



Tom Hautekiet and Luc Arnouts.

‘Local points of contact are crucial to maintaining close ties with those markets. Knowing the markets inside out, our representatives there are our best ambassadors.’

Luc Arnouts,
Director International Relations &
Networks Port of Antwerp-Bruges



- Investigating the role the port can play in the hydrogen supply chain.
- An interesting country for hydrogen production, with sufficient wind and solar energy to provide green power for electrolysis.



‘A strong brand and product like Port of Antwerp-Bruges opens doors worldwide for our customers and partners.’

Tom Hautekiet,
Chief Commercial Officer
Port of Antwerp-Bruges

Benefits for the local economy

Expanding Port of Antwerp-Bruges as a green energy hub will require substantial investments. And that’s good news for the local economy. ‘Colruyt Group, for example, will be involved in the local production of green hydrogen’, says Tom Hautekiet. In addition, of course, dredging and construction will need to take place. ‘Contractors’ order books will be full’, says Luc Arnouts. ‘Or think about the transport of hydrogen; for such projects we have, for example, Fluxys and Pipelink with the necessary expertise in pipelines.’

‘With all these major companies in Belgium, we’ve got a lot to offer. And with all that knowledge and expertise at our disposal, we’re putting our country onto the (world) map.’

Column

A home port at one with the environment

In any merger, a common pitfall is to lapse into rationality, numbers and strategy. But attention to corporate culture is essential to the success of a merger. Do employees feel part of the company, do they agree with the unwritten rules, customs and behaviour? We are attaching great importance to these aspects in the context of the Port of Antwerp-Bruges merger, wanting to be a home port for all our employees. At the same time, we are well aware that people need time and space to grow into a new culture and feel at home there. Time that we also want and need to give our staff.

In the run-up to the merger, it quickly became clear that there were differences between the two organisations. However, as the merger developed, it also became clear that we also had a lot in common. To start with, Port of Antwerp is a large organisation, while Zeebrugge is a lot smaller – with all the associated advantages and disadvantages. While there's no getting around the fact that things are going to change, the trick is to match the strengths of both organisations. This meant that we had to come together to create a new culture and a new language.

In the new culture, won't the smaller company automatically be swallowed up by the bigger one?

Certainly not. We are learning from each other. One of our guiding values is 'simplicity'. There's a lot of added value in an outsider taking a critical look at the complex processes of a larger organisation. A small player challenges you: can't it be done simpler? On the other hand, a large organisation works in a structured way with clear processes. Combine the two and you come out really strong.

Change is also not just the job of the CEO and top management. Port of Antwerp-Bruges is giving all team leaders the time, space and training to think about this, away from the hustle and bustle of day-to-day operations. What kind of leadership do we want? On what values is our company based? >

'It is becoming increasingly important for us to learn to be agile in dealing with change. Instead of fighting the waves, we teach people how to surf.'

Christien Van Vaerenberg,
Chief HR Officer Port of
Antwerp-Bruges



‘If there is one thing that already unites us, it is the desire and motivation to aim high together.’

Christien Van Vaerenberg

› As a leader, you don't have to explain these values to your team, you have to act them, living and breathing them day-in, day-out, and incorporating them concretely into your personal and team goals.

Obviously, we are also encountering resistance. That's quite normal. As humans, we tend to resist change. In addition, many people identify themselves with their work and the brand they work for. Working together on building a new culture requires trust – and growing that trust takes time. We have been working on it for over a year now and we'll probably spend several more years building it, through trial and error. And then you notice what a great boost you get from meeting people: bringing people from Zeebrugge and Antwerp together creates intense ties and cooperation. When employees get to know each other, uncertainty decreases. Unknown is unloved.

Many people are also afraid: what will this merger mean for my job? That fear is still alive and kicking and, in my mind, needs to be expressed. Zeebrugge employees are afraid of losing their own culture, while those in Antwerp are seeing yet another change project, with the previous one completed just three years ago.

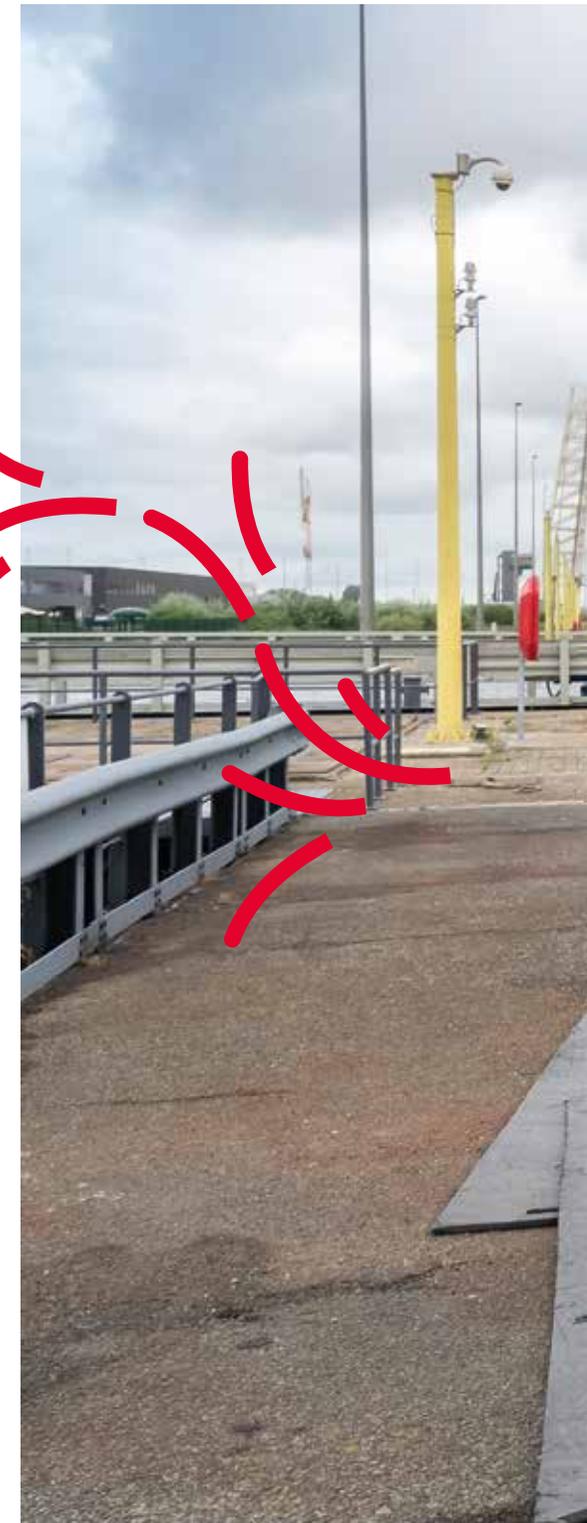
On the one hand, we need to take time to listen to each other's fears and uncertainties. But on the other hand, we need to help employees realise

that change is part and parcel of our daily lives. That's why we want to make people more resilient, getting them to realise that no one but themselves is steering their careers. Instead of fighting the waves, we teach them how to surf. That's what resilience is all about.

Such a cultural shift is something you start internally. But our challenge is to look externally as well. As a company, we are also firmly established in society, the economy, the world. We also need to be engaged with that outside world. How do we ensure that we become a more inclusive organisation, how do we attract talent, how can we respond to societal trends and events, how do we deal with gender, racism, diversity, what about our international approach? These are just some of the questions we are now waking up to.

Because what is our ultimate goal? For everyone to feel at home in our company. For us to be a home port, for our employees, our customers and our environment. We have the ambitious vision of being the first port in the world to reconcile people, climate and the economy. This requires resilient and committed employees. And if there is one thing that already unites us, it's the eagerness and motivation to go for that towering ambition together.

Christien Van Vaerenberg, Chief HR Officer Port of Antwerp-Bruges





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More than the sum of ports



When two ports share the same vision, it broadens their horizons.

We don't know what the future will bring. But we'll rise to the challenge. It's why we decided to join forces: as Port of Antwerp-Bruges, we're ready for whatever's next. Because together we can do more. Think bigger. Innovate faster. With the combined brainpower and willpower of our two ports, **we become greater than the sum of our parts.**



Port of
Antwerp
Bruges

In tune with the world