



WHITEPAPER

Renewable Offshore Energy initiatives & opportunities

UPDATE ON DEVELOPMENTS IN THE ROTTERDAM REGION

The Rotterdam port, region and businesses are playing their part in advancing sustainable offshore energy. Explore key initiatives, innovative projects, and the collaborative ecosystem that makes the region a leader in renewable maritime solutions and a hub for industry transformation.

**ROTTERDAM.
MARITIME CAPITAL OF EUROPE.**

Offshore Energy in and around Rotterdam

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Current developments

The greater Rotterdam area, including the port of Rotterdam, with companies, universities and research institutes in the region, is a pivotal hub for offshore energy, with a focus on sustainable and renewable energy sources.

Major current activities and initiatives are: *Offshore Wind development, Energy transition projects, Hydrogen infrastructure, Floating solar energy and Shore power facilities*

1. OFFSHORE WIND DEVELOPMENT

The [Rotterdam Offshore Wind Coalition](#), formed by leaders in the offshore wind industry, is steering efforts to establish the region as a prime location for offshore wind activities. This initiative is part of a broader ambition to develop sustainable energy sources that contribute to a carbon-neutral port by 2050.

The port of Rotterdam itself is central to the Netherlands' offshore wind expansion, as is the support of the Port of Rotterdam Authority. The [‘Hollandse Kust Zuid’ Offshore Wind Farm](#), connected to Rotterdam's high-voltage grid, is set to generate green power equivalent to the consumption of 1.5 million households annually. Additionally, the port is preparing for future offshore wind farms, enabling related businesses to design, build, store, repair, and even partly recycle, turbines, monopiles and transition pieces.

2. HYDROGEN INFRASTRUCTURE

Rotterdam is developing a large-scale hydrogen network to support the production, import, and distribution of green hydrogen.

The [H2-Fifty project](#), a collaboration between Nobian, BP, and the Port of Rotterdam Authority, aims to develop a 250 MW electrolyser by 2025, supplying around 100,000 to 180,000 tonnes of green hydrogen annually to industry and the transport sector. Significant investments are being made in developing a robust hydrogen infrastructure, facilitating the transition to green hydrogen as a key energy carrier.

3. ENERGY TRANSITION PROJECTS

There are numerous energy transition projects aimed at reducing CO2 emissions and enhancing sustainable energy use all over the region, from small start-ups to major established players.

The [Porthos project](#) is one of these. It's aiming for the development of CO2 storage under the North Sea. Another interesting and scalable technology is that of start-up [SeaO2](#) (participating in the 2024 PortXL accelerator program), which is aimed at extracting CO2 in large quantities from the oceans, thereby restoring their natural CO2 absorption capacity.

4. SHORE POWER FACILITIES

To reduce emissions from moored vessels, bigger and smaller ports in the region are expanding their shore power facilities. This allows ships to connect to the local power grid instead of running diesel engines while docked, significantly cutting down on air pollutants - and noise.

5. FLOATING SOLAR ENERGY

In addition to (offshore) wind energy and hydrogen, Rotterdam is preparing an experiment with an Offshore Floating Photovoltaic platform (engineered and manufactured by [SolarDuck](#)) to be moored *in the city* itself and provide local power.

These initiatives underscore the region's commitment to becoming a central hub for sustainable offshore energy, leveraging its strategic location, advanced infrastructure, and collaborative industry ecosystem. Private and public investments, infrastructure development and experiments in green technologies support this commitment.



Where the whole is greater than the sum of the parts

This is the perfect way to describe the port of Rotterdam's contribution to the offshore energy industry. Why is this? You can put it down to the presence of an effective and efficient cluster of companies, all interacting with each other in a productive and forward-looking mentality.

"We have many links in the offshore energy supply chain active here in Rotterdam" says **Joost Eenhuizen**, Business Manager Offshore at the [Port of Rotterdam Authority](#).

"This includes primary and secondary steel production, a whole range of business services, products and equipment, shipyards and ship suppliers." He's talking about engineering, equipment suppliers and fabrication companies like Sif, Huisman and HSM etc., and the numerous specialist maritime finance and insurance companies located in the Rotterdam region. In addition, the region is home to several logistics and shipping companies and marine contractors in the offshore segment.

"And then, of course, there's the safety, training and education institutions such as STC Next, RelyOn Nutec, Delta Safety, etc. The 'cluster mentality' that we have in Rotterdam ensures that all these players work as optimally as possible together, strengthening each other and the whole offshore energy industry."

SPOTLIGHT ON SOLAR POWER

When looking at the future of offshore energy, offshore wind is by no means the only way to achieve national carbon reduction targets. Offshore solar power (or Offshore Floating Photovoltaic, OFPV) is an up-and-coming technology; still in its relative infancy but nevertheless showing great potential. SolarDuck is a Dutch-Norwegian company that believes in this potential: to provide gigawatt levels of electricity by means of offshore floating solar farms.

The company's CEO Koen Burgers backs this vision up with two crucial points. "The first is that solar power is becoming more efficient," he states. "By the end of the decade, we expect to witness a 50% increase in solar panel efficiency over the previous ten years. If you couple this analysis with the fact that land scarcity – especially in urban areas – is becoming more of a problem, then this is

primetime for offshore solar.” Based in the Rotterdam region, SolarDuck has a global strategy, with active projects in Malaysia, Indonesia, Japan and Taiwan.

A significant aspect of renewable offshore power generation in the North Sea is that different sectors can complement each other. For example, it is possible to utilise the inter-turbine space within an offshore wind farm for the installation of offshore solar platforms. “On the North Sea, the sun and wind are very complimentary. Generally speaking, the wind is not very strong when the sun is shining, and vice versa. The seasons also influence power generation; there is more sun in the summer and more wind in the winter,” explains Koen. “Of course this depends on which region you are working in; this wouldn’t be possible in somewhere like Malaysia where solar power generation will be dominant.”

*SUN AND
WIND ARE VERY
COMPLIMENTARY
TO EACH OTHER.*





**It's about bringing
people in contact**

The Power of Matchmaking

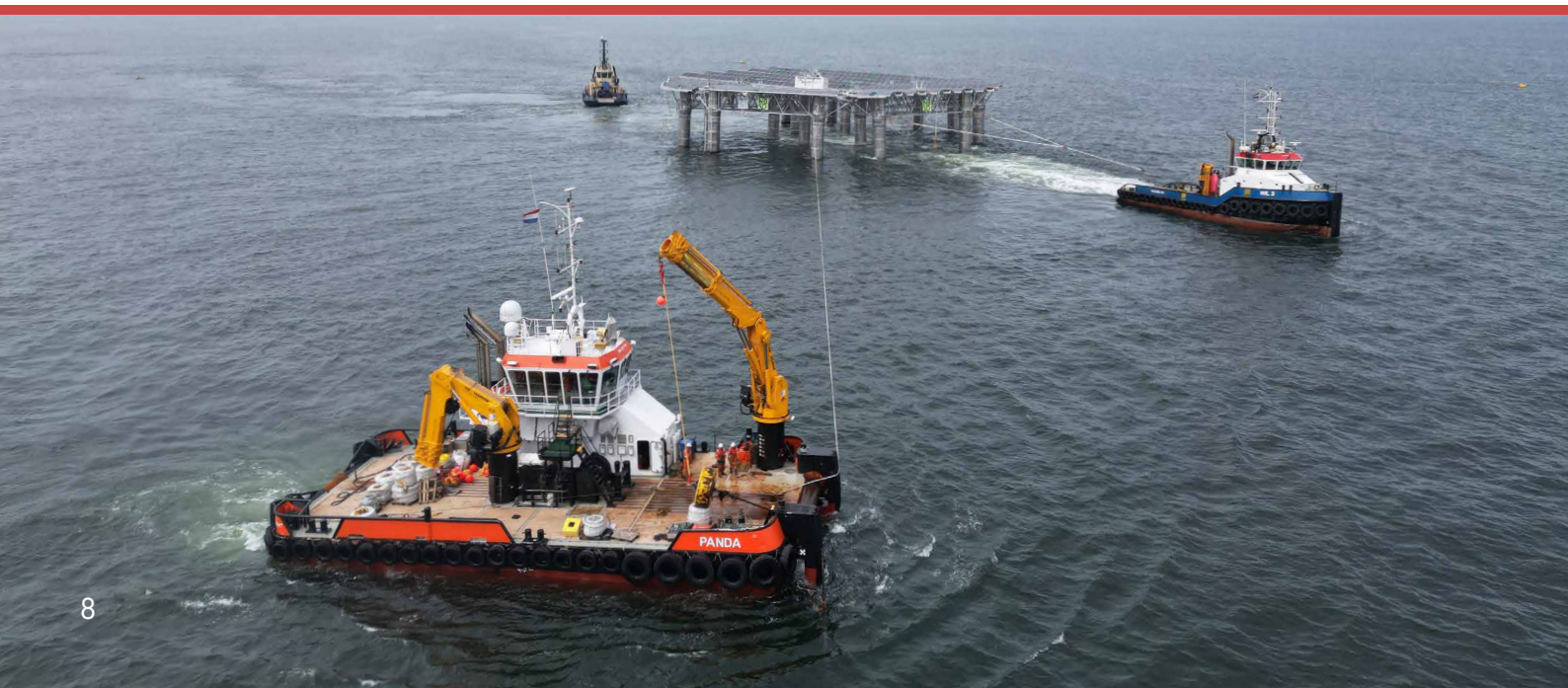
In his job as Business Manager Offshore, part of Joost's role focuses on making connections. "This is the 'matchmaking' part of my job. Although this is about bringing companies in contact with other companies, at the end of the day it is about bringing people in contact with other people."

The matchmaking is successful: **countless multiple-year business relationships exist in Rotterdam's offshore energy cluster.** "The offshore energy sector has been built on the power of cooperation and collaboration: it really is a 'people's business'. This is very powerful and also a good reason for companies to settle here."

What does this mean in practice? The Rotterdam-based companies working in the offshore energy supply chain understand the power of collaboration. 'Industrial Rotterdam' is defined as the area from the coastline, via

Schiedam, Rotterdam, Dordrecht, Krimpen aan den IJssel, Papendrecht, Hardinxveld-Giessendam etc., all the way up to Gorinchem (with its collection of specialist shipyards and offshore suppliers) in the hinterland. **It's both a close-knit regional and a functional cluster.**

Products (whether you are talking about an existing product or an innovation) are very often the result of cooperation between two or more companies. It's for this reason that companies often refer to their competitors as future partners rather than rivals.



Exploring the supply chain: IQIP

Looking at the Rotterdam region, of the multiple companies working in the offshore energy supply chain, there is one company that has a singularly impressive statistic. This is IQIP, the products of which have been used to install 73% of the world's offshore wind foundations.

Primarily active in the offshore wind sector, IQIP is a specialist company that engineers and manufactures foundation installation equipment divided into the three functionalities of lifting, handling and pile driving. Alfred Maas, IQIP's Director Europe, describes the company's position in the supply chain as "a key-supplier to the major parties: Heerema, DEME, Van Oord, Jan de Nul, Seaway7, Boskalis, Allseas and other market players".

Alfred goes on to say that IQIP "has quite a unique and pioneering position in the offshore energy market". How has IQIP secured this position? There are numerous answers.

1. UPTIME GUARANTEE

Offshore vessel charter rates are unquestionably high. Every day, every minute counts. IQIP's response to this is an estimated 99% product uptime.

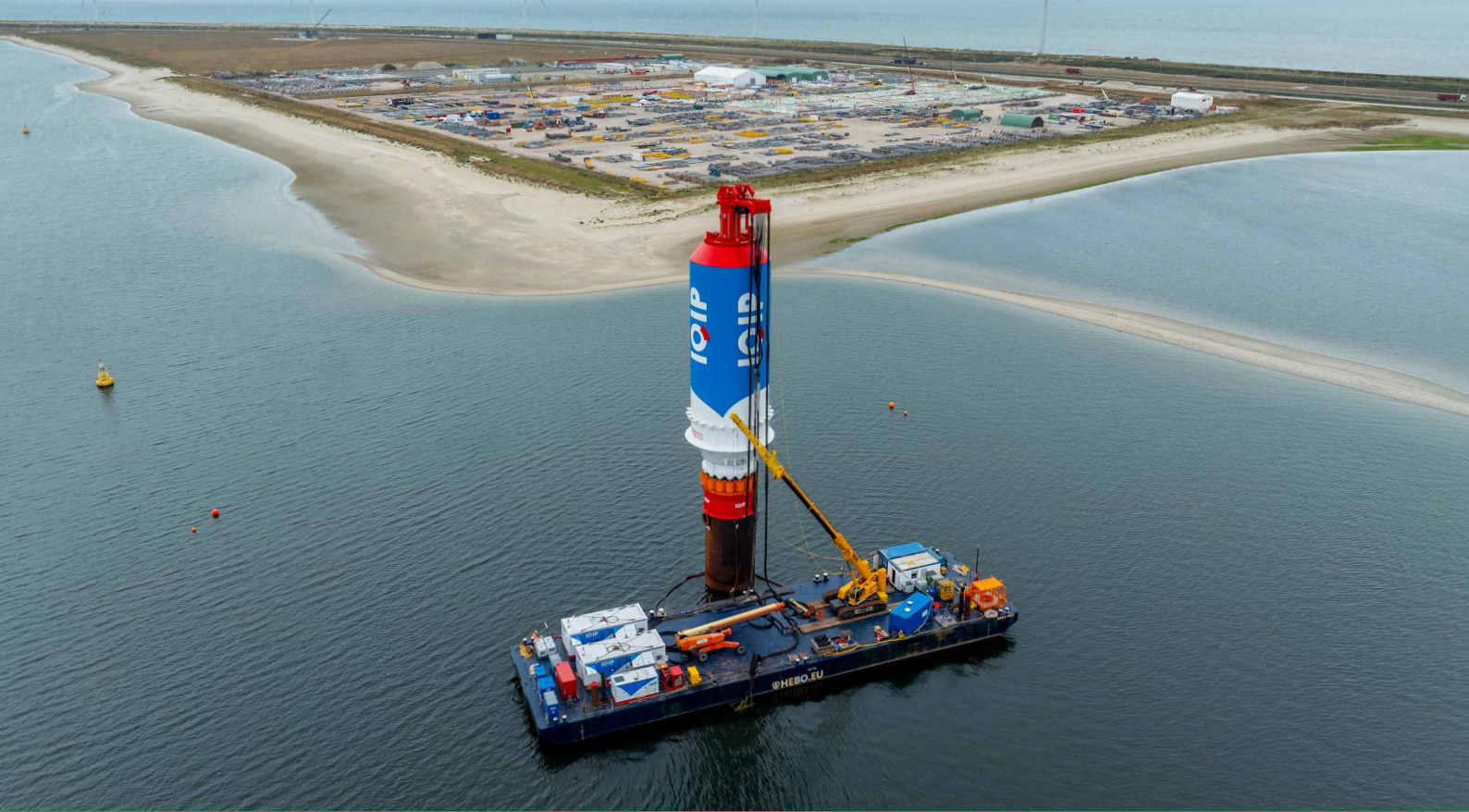
2. KNOWLEDGE

Across all sectors, IQIP has installed over 5.5 million foundation piles around the world, of which 7000+ in the Offshore Wind. "This volume yields a large amount of knowledge. For example, the seabed in the North Sea is very different to that in the Baltic Sea, the USA or Asia. With this knowledge we can advise our clients, and we can maintain our leading position," says Alfred.

3. NOISE MITIGATION

National regulations for the maximum permitted noise levels generated from foundation installation operations are strict. To comply with these regulations, IQIP has developed a variety of both 'near-field' and 'source' noise mitigation measures which can be combined to reduce noise levels by as much as 21 Db.

*EVERY DAY, EVERY
MINUTE COUNTS.*



PROVIDING A HOME FOR INNOVATION

The sense of entrepreneurship and innovation is both strong and tangible in Rotterdam. Companies breaking ground with the development of new and adjusted technologies include Ampelmann, Barge Master, Seaqualize, and IQIP. “There are some very high tech products being developed here,” says Joost. “However, in order to get your product into the market, you need the human connection - you need to build personal relationships. This is what Rotterdam delivers.”

SPACE FOR STARTUPS AND SCALEUPS TOO

Rotterdam doesn't only pay attention to the headlining projects happening at the biggest companies. On the contrary, the primary purpose of organisations like [PortXL](#) and the [Innovation Dock](#) is to support the growth and acceleration of the small start-ups and scale-ups. For example, to date, PortXL has accelerated more than 120 fledgling companies (involving more than 200 collaborative partnerships). This has gone a long way to create the nurturing and inspiring environment in which new startup companies can develop their ideas, find investors, and connect with like-minded companies.

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Sustainability: enabling the energy transition

The port of Rotterdam is where sustainability takes centre stage. This is where all stakeholders are striving to achieve the 2050 goal of operating as a fully sustainable and carbon neutral port and industrial complex. Of course, this is not always a fast or easy process, but there is a broad commitment to this goal.

Crucially, this commitment is supported from national, regional and municipal authorities in the form of subsidies and grants to accelerate the push towards a clean and green port environment (a local example is the [Smart Energy Systems](#) subsidy). The curve of progress is impressively steep, with sustainable initiatives being implemented across the board. “Everything we do is aimed at reducing carbon emissions, increasing the sustainability of operations, and increasing the electrification of processes,” says Joost.

“In fact, we don’t have a single conversation during which the subject of sustainability is not mentioned. And because process optimisation is also a form of sustainability, we are seeing an enormous drive towards increasing efficiency in areas such as production and maintenance. We see it as our responsibility – one that we take very seriously – to implement sustainable milestones throughout the port area.”

PRODUCT DEVELOPMENT AND TESTING SPACE

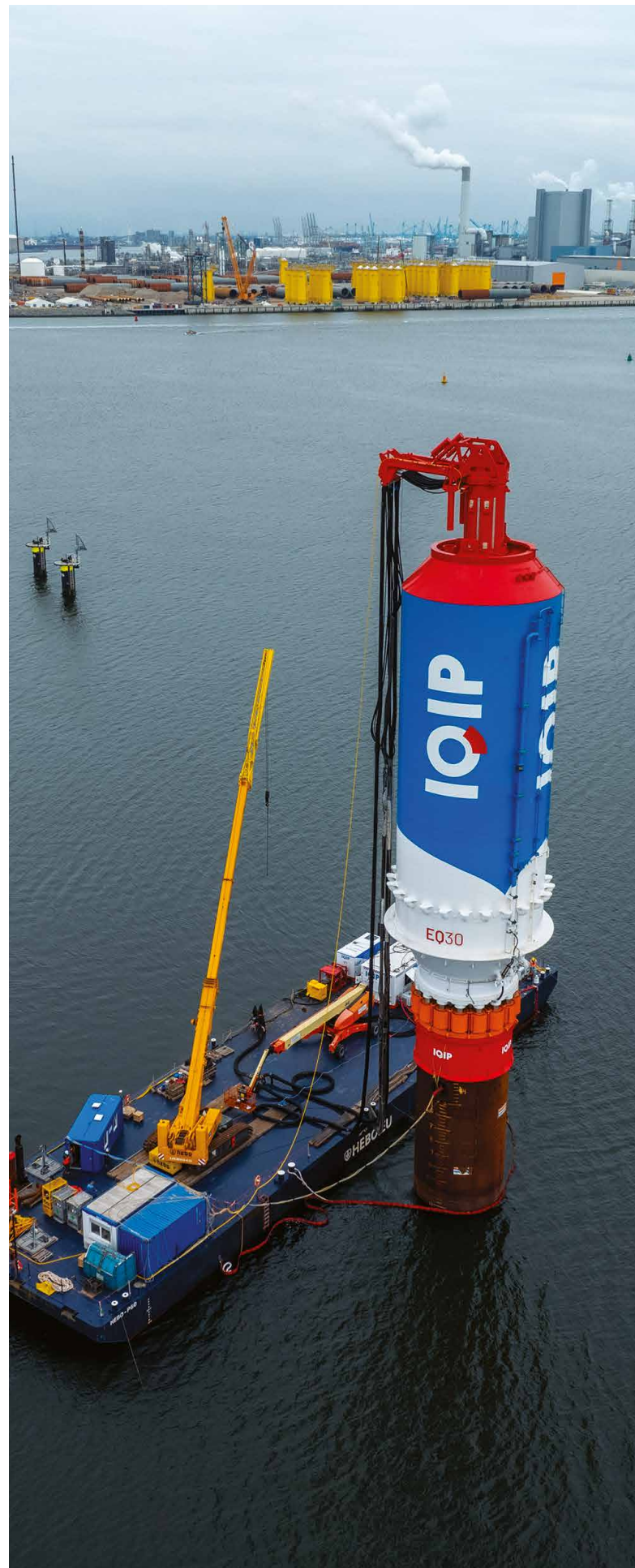
IQIP plays a pioneering role in the offshore energy industry, thereby facilitating the growth and evolution of the sector. In-house product development is an important part of maintaining this position. And, in turn, being located in the Rotterdam region plays a critical role in that development due to the fact that Rotterdam’s Maasvlakte area provides the physical space required for testing.

Alfred: “We invest substantial amounts in developing new technologies. And we have been able to perform **full-scale testing in the Rotterdam port**, attended by contractors, developers and national and international agencies such as the [Netherlands Enterprise Agency \(RVO\)](#), [BSH](#) from Germany and [BOEM](#) from the United States. This is, of course, very important; without these testing areas, we cannot push technologies such as our EQ-Piling.”

*IMPLEMENT SUSTAINABLE MILESTONES
THROUGHOUT THE PORT AREA.*

Perhaps the greatest opportunity that the offshore wind sector has seized in previous years is the continual increase in power generation due to the increasing size of turbines. “For our clients, it is simple: the bigger the wind turbine, the more interesting the business case is. We currently have 15MW turbines, but this will exceed 20MW in the near future,” explains Alfred. **Larger turbines require larger installation equipment:** “In 2015, a typical monopile was 5.5-6.0 metres in top-diameter. This year we finished a project where the monopile was 8 metres in diameter. And we can handle projects where the monopile top will be over 9 metres!”

Although this trend is undoubtedly good for the energy transition, it has raised a challenge for companies like IQIP which consequently have had to **increase the capacity of lifting, handling and pile driving tools**. In 2015, for example, IQIP’s pile driving hammers needed to generate a force of 3,000 kJ. Nine years later, and the company’s Hydrohammer exerts a force of 6,600 kJ. What’s more, as the forces involved with pile driving get bigger, so does the noise generated. Therefore, in order to facilitate the evolution of the offshore wind sector, IQIP continually invests in optimising its noise mitigation technologies.



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Port of Rotterdam Authority



SolarDuck: the status quo

Founded in 2020, SolarDuck has launched numerous projects. 'King Eider' was the first, producing 65kWp of power. Then came 'Teal': a 100kWp project located in Tokyo harbour. Complete and connected to a drone serving micro-grid, the 'Teal' platform has demonstrated its resilience, bearing the brunt of two hurricanes with no adverse effects.

'Merganser' is SolarDuck's most current project. Located 12km off the Dutch coast, this offshore floating plant comprising six interconnected platforms is equipped to produce over 500kWp. "Merganser is a demonstrator project, already fully certified by Bureau Veritas and designed to withstand the full fury of the North Sea, including waves as high as 11.5 metres. It serves as the 'SolarDuck-laboratory', accelerating technology development."

THIS IS A VERY SCALABLE CONCEPT

"Repeatability is very important for us, this is how you reduce the costs in all processes." Koen is talking about the mainstay of SolarDuck's business: triangular solar panels that can be configured into the company's noteworthy hexagonal offshore floating solar platforms. "By using a standard shape, we can **standardise production processes to increase efficiency**. And the modularity of design means that this is a very scalable concept."

EMBEDDED IN THE REGIONAL ECOSYSTEM

SolarDuck's Koen Burgers talks about...

How Rotterdam is inked to SolarDuck's ambitions

"Offshore solar power has similar potential as offshore wind. We want to become a gigawatt player in what will become a very significant industry. To achieve this ambition, Rotterdam's contribution will be valuable."

Access to the employment market

"Recruiting talented people is vital. Hence, you definitely want to be in the same area as where your employees live. Furthermore, as a knowledge-based company, we are looking for well educated professionals, many of whom come from Delft University of Technology or Erasmus University Rotterdam. Without this knowledge – and access to the people who have it – this company wouldn't exist."

Innovation

"The Rotterdam region is home to a diverse range of innovative companies, and much of it even within cycling distance. **If we as**

a society are going to meet our climate targets, then we are going to need this variety of solutions. Rotterdam is definitely an incubation area for this type of ideas.”

Industrial infrastructure

“Many of the major offshore players are based here. This is important because they speak the same language and so we can work together on solving the challenges we face. Regulations regarding power generation, for example. On this subject, we are working towards systemic change, which will be accomplished with close cooperation.”



“If you’re looking at costs and efficiency, offshore solar power is one of the best available and scalable sources of renewable energy. And as the Rotterdam region can be seen as the Silicon Valley of the maritime industry, we feel this is the best place to develop our technology and company to the next level.”

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Why Rotterdam?

Regarded as the Maritime Capital of Europe, the Rotterdam region stretches from Hook of Holland to Gorinchem and from Delft to Dordrecht. The area exudes a strong maritime presence and attitude. All essential services are available along the Maas and Merwede rivers (part of the Rhine delta).

Not only can you find terminals, shipping companies, manufacturers and shipyards, but also any type of service provider, such as marine lawyers, repair facilities, (technical and business) consultants, freight forwarders, insurance companies, investors, universities and more. In addition, the regional cities'

and ports' ambition to provide existing and new companies with the chance to settle and grow has a positive impact on the entire supply chain.

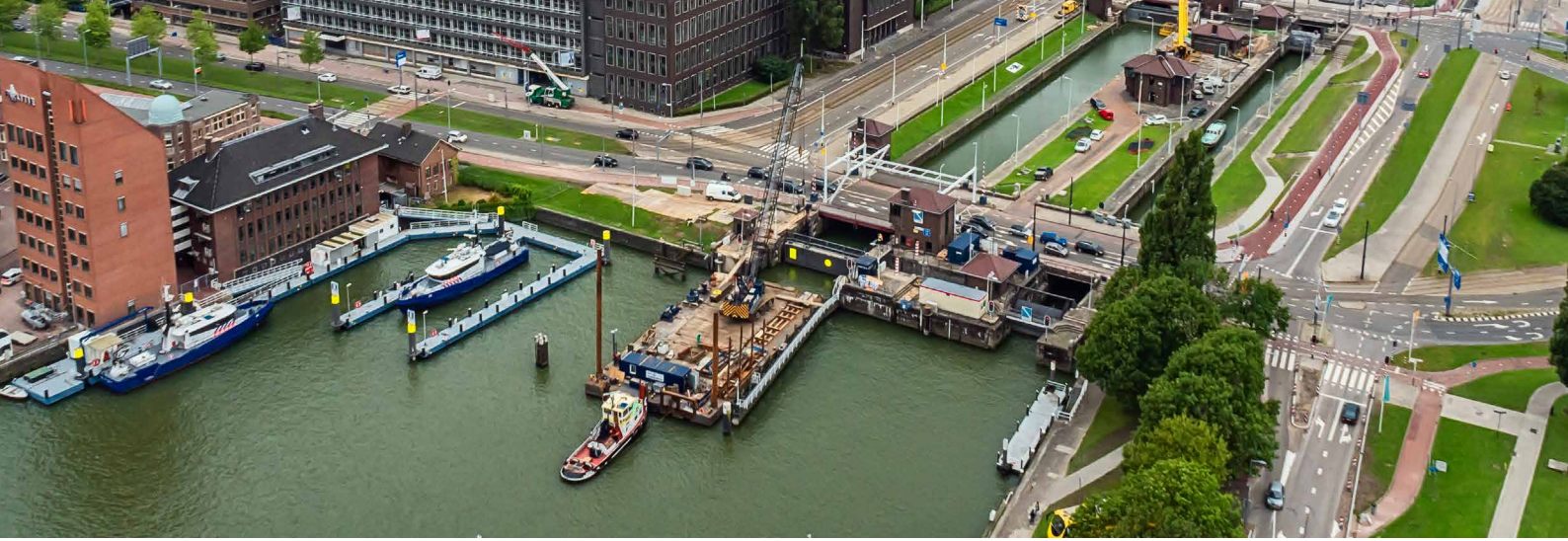
INTERESTED?

Want to be part of the maritime, offshore, port, business, innovation, and/or circular developments in the greater Rotterdam region?

Please reach out to us via maritime@rotterdam.nl or visit www.rotterdammaritimecapital.com.

WE CONNECT YOU TO
RELEVANT SPECIALISTS IN
THE ECOSYSTEM!





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