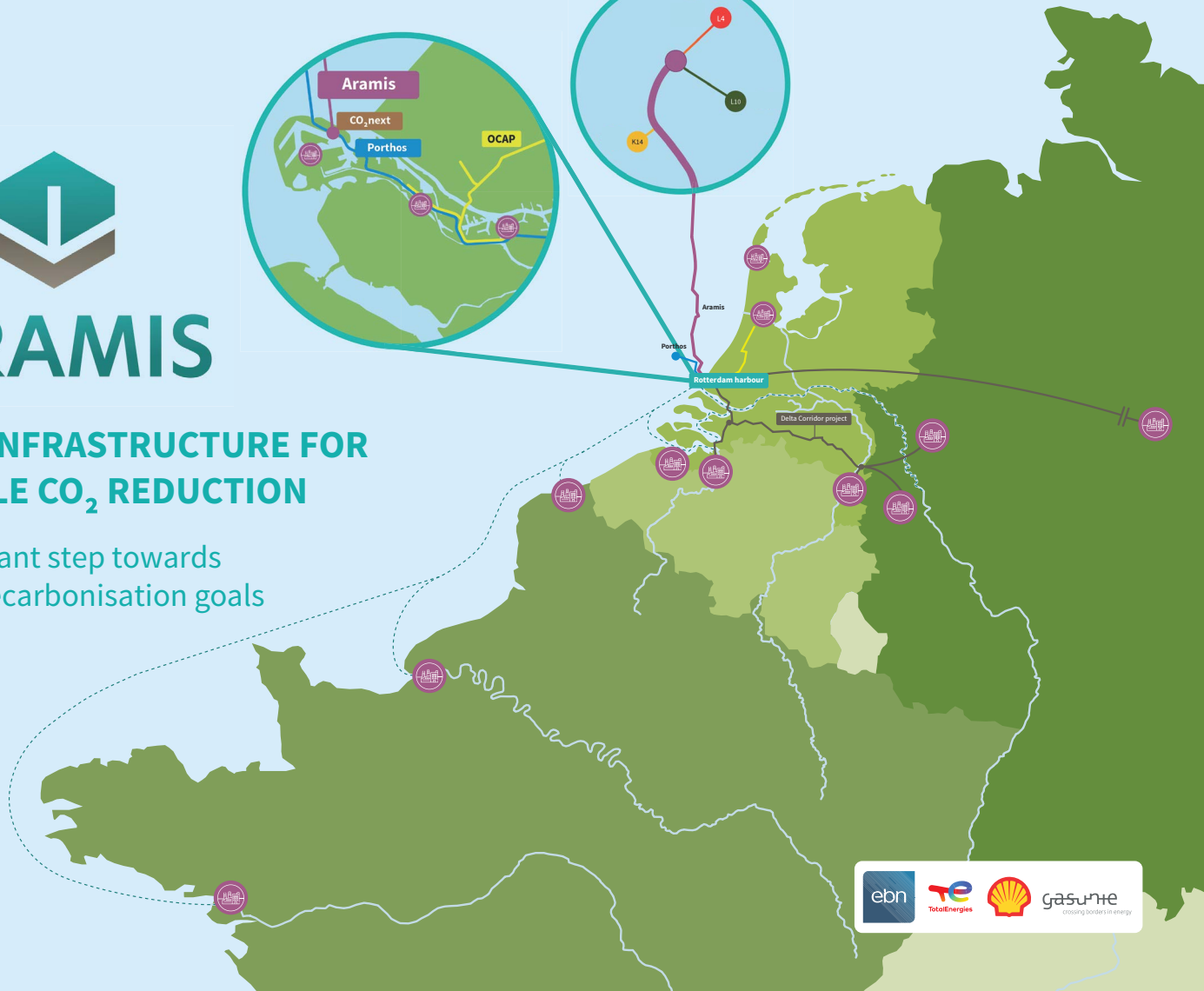
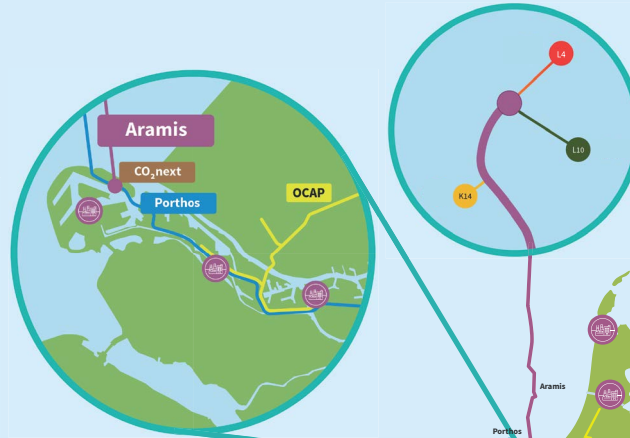




ARAMIS

A TRANSPORT INFRASTRUCTURE FOR LARGE-SCALE CO₂ REDUCTION

A significant step towards
achieving decarbonisation goals





CCS NECESSARY TO ACHIEVE CLIMATE GOALS

The rapid growth in atmospheric CO₂ emissions has caused the planet's temperature to rise, negatively impacting the climate. Countries across the world have realised that there is no time to waste in trying to slow down and stop global warming. National and international agreements have been reached and steps are being taken to bring about large-scale reductions in CO₂ emissions.

Carbon capture and storage (CCS) is a key solution. The technology for capturing CO₂ and storing it deep underground has been around for decades. A demonstrably safe approach, CCS is employed in countries such as Norway, Canada and the USA. Building on this success, the decarbonisation of Dutch and European industry can benefit significantly from CCS. In effect, CCS can remove a huge amount of CO₂ from the atmosphere; it can be realised swiftly and offers a decarbonisation solution for hard-to-abate industries at short notice.

THE EUROPEAN GREEN DEAL

The EU acknowledges the importance of CCS for realising its CO₂ reduction targets. In its strategic vision 'A Clean Planet for All', the EU states that CCS is one of the main measures, and for some industries, the only possible measure, to reduce CO₂ emissions for the foreseeable future.

THE DUTCH CLIMATE AGREEMENT

The Dutch government also regards CCS as a pivotal technology for making Dutch industry emission free. CCS will be used to achieve half of the emission reductions for industry required by the Dutch Climate Agreement by 2030. The government considers to raise the 2030 CO₂ reduction target from 55% to 60%.

These national and international targets demand an ambitious approach. Major steps are required to meet the targets of the EU Green Deal and the Dutch National Climate Agreement. This is where Aramis comes in: the Aramis project will develop a CCS infrastructure that will enable large-scale industrial decarbonisation.



Offshore platforms

Onshore CO₂ collection hub



ABOUT ARAMIS

The Aramis project is a collaboration between TotalEnergies, Shell, Energie Beheer Nederland (EBN) and Gasunie. Aramis aims to contribute to the reduction of CO₂ emissions from hard-to-abate industries by developing a large-scale CO₂ transport infrastructure plan. This will allow industry to transport CO₂ and store it securely in depleted gas fields under the North Sea. The infrastructure will be designed in such a way that new CO₂ suppliers (industries that capture CO₂) and new storage facilities can be connected as needed. As a result, the Aramis CCS infrastructure can continue to grow.

THE DISTINCTIVE CHARACTER OF THE ARAMIS PROJECT

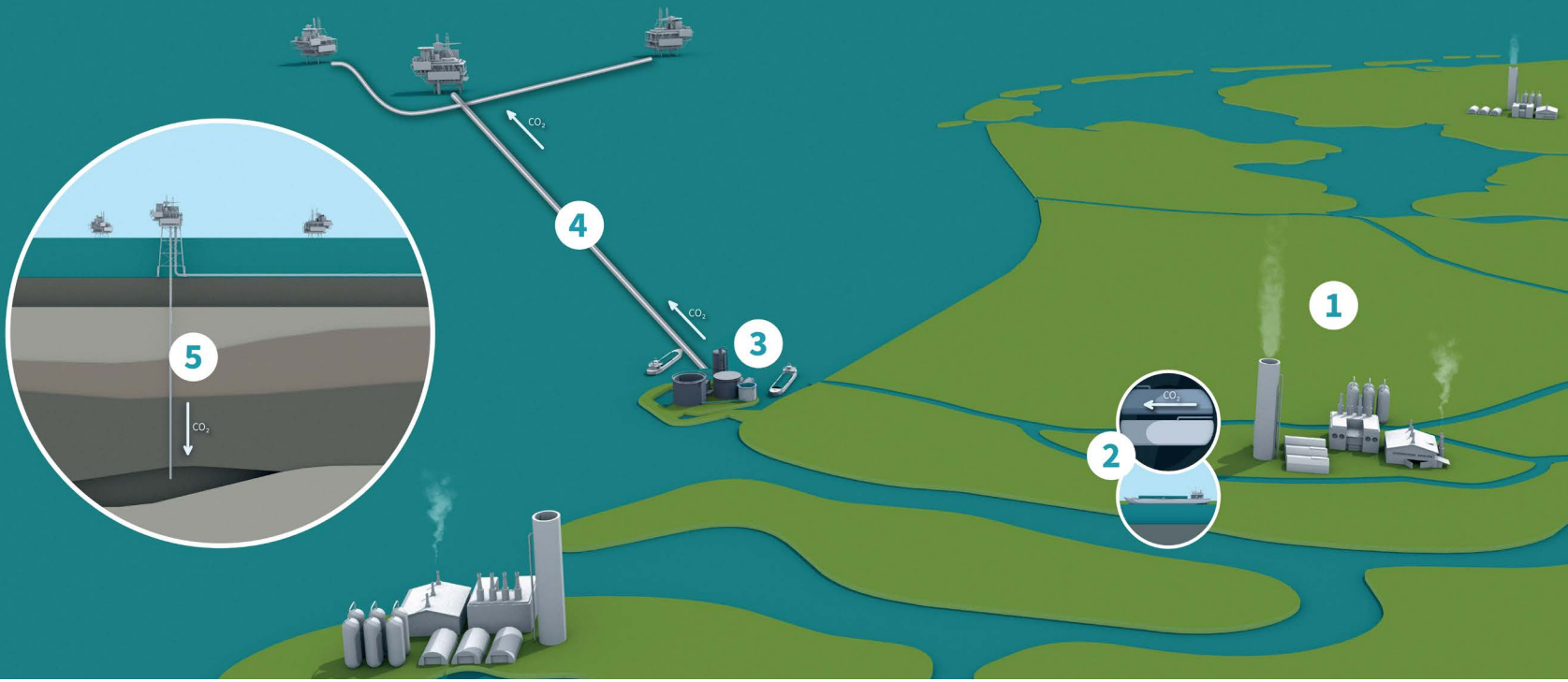
The Aramis project in the Netherlands provides unique benefits for industry and the environment:

- Several options for transporting CO₂ (by ship and onshore pipelines)
- Open access: the transport infrastructure provides opportunities for connecting new storage facilities and new CO₂ suppliers
- The proposed onshore collection hub on the Maasvlakte within the Port of Rotterdam is easily accessible to large industrial clusters
- The Aramis project is a collaboration of reliable partners with financial means and expert knowledge

- The European Commission has designated Aramis as a 'Project of Common Interest' (PCI)
- The Dutch government considers CCS, and therefore the Aramis project, as a pivotal technology for making Dutch industry emission free and has designated Aramis as a 'MIEK project' (project of national importance)

HOW DOES ARAMIS OPERATE?

The Aramis project is an essential link in the CCS chain, as illustrated on the next page:



1

CO₂ capture

CO₂ is captured by industry.

2

CO₂ transport

Industry transports CO₂ from the capture facilities to the collection hub either via onshore pipelines or by ship.

3

CO₂ collection hub

CO₂next receives ships at the terminal, temporarily stores the CO₂ and constructs a pumping station. Aramis aims to use compression services from Porthos.

4

CO₂ offshore pipeline

Aramis transports the CO₂ via an offshore pipeline to offshore platforms.

5

CO₂ storage

CO₂ is injected by the storage parties via wells into depleted gas fields where it can be stored 3-4 km under the seabed.



COOPERATION WITH OTHER CCS PROJECTS

There are several CCS projects underway in the Netherlands. To develop the Aramis transport infrastructure, the Aramis project partners work with:

- CO₂next, a joint project by Gasunie and Vopak, which aims to develop an open-access storage terminal for liquid CO₂ in the Port of Rotterdam
- Porthos, a project for CO₂ transport and storage in the Port of Rotterdam, which is a partnership between EBN, Gasunie and the Port of Rotterdam Authority

LOCATION: MAASVLAKTE

The Aramis partners investigated several locations for a central onshore collection hub. The Port of Rotterdam and the Maasvlakte are easily accessible to large Dutch industrial clusters with substantial CO₂ emissions, such as those in Limburg and the port areas of Zeeland, as well as prospective foreign clusters.

CAPACITY OF THE CO₂ PIPELINE

The trunkline is designed to transport up to 22 Mtpa (million tonnes per annum) to the various storage facilities in the North Sea. This will deliver the CO₂ efficiently, avoiding the need for expensive, power-consuming offshore pumps.

CONNECTION POINTS

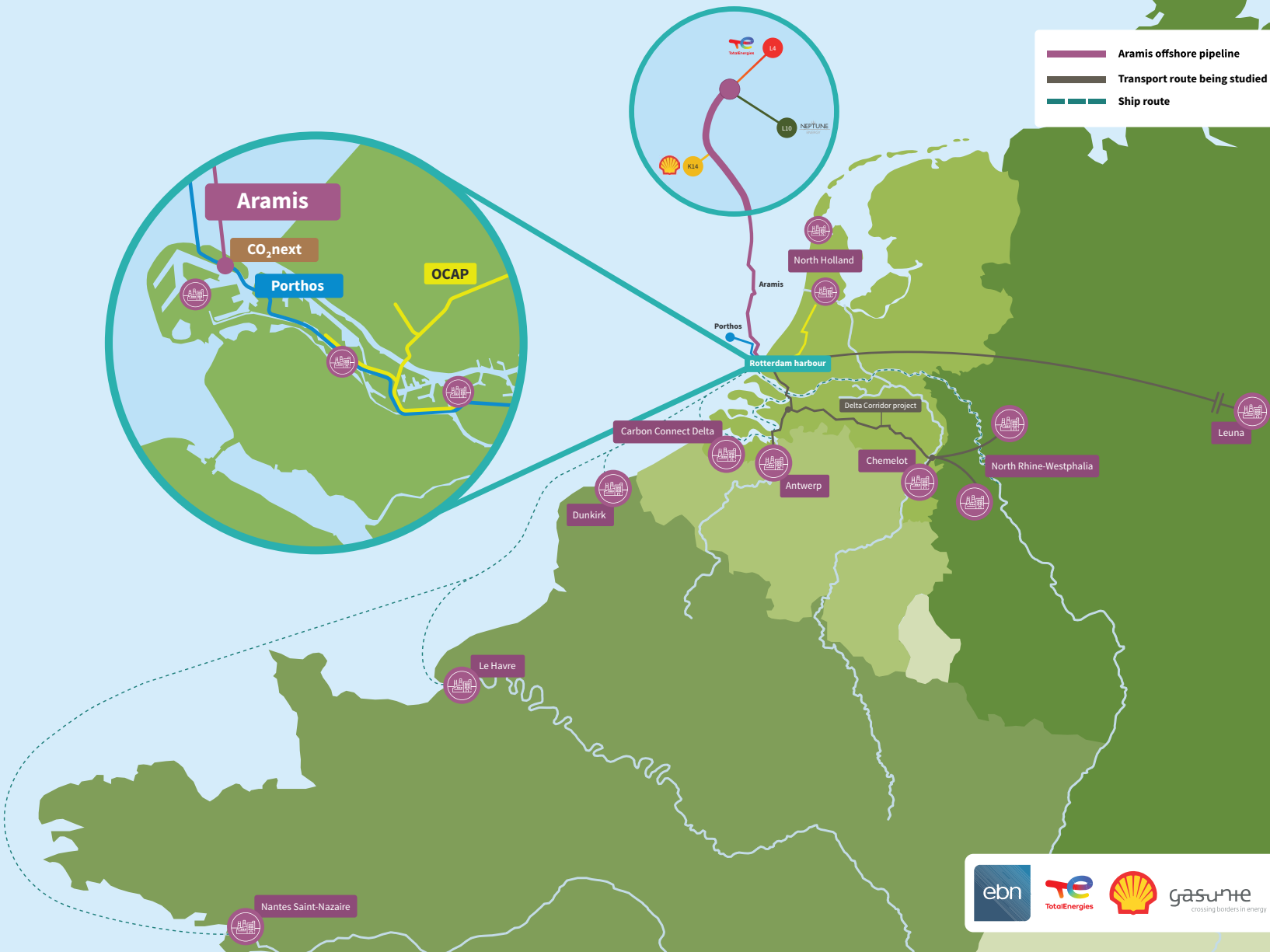
Aramis intends to construct an offshore distribution platform in the north, close to facilities with large storage capacities. These facilities will connect to this distribution platform to receive CO₂. Additional tie-in points are foreseen to connect offshore storage facilities in the south.

TECHNICAL SPECIFICATIONS

All technical specifications can be found on our website:



www.aramis-ccs.com.



-  Aramis offshore pipeline
-  Transport route being studied
-  Ship route



CAPACITY

To be able to launch the project, we aim to transport a minimum of 7.5 Mtpa of CO₂. This is based on current reservoir capacity developed by various storage operators. Increased demand for CO₂ transport from CO₂ suppliers is expected in the near future. The maximum capacity of the Aramis project is 22 Mtpa CO₂.

FRAMEWORKS AND DECISION MAKING

GOVERNMENT COORDINATION SCHEME

Aramis falls under the Government Coordination Scheme (*Rijkscoördinatierегeling*), which is coordinated by the Ministry of Economic Affairs and Climate Policy (MEAC). The procedure incorporates several opportunities for formal and informal consultations and advice. There will also be opportunities to submit responses to documents at set times during the procedure. In collaboration with the MEAC, Aramis will arrange various information meetings. The MEAC and the Ministry of Internal Affairs are jointly responsible for the spatial integration of pipelines and storage facilities.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

An environmental impact assessment is required for the Aramis project. The purpose of this assessment is to support decision makers with major projects and operations by giving full weight to environmental concerns.

The procedure assesses the potential environmental impacts of a plan and reports these in the Environmental Impact Assessment Report. The report provides a coherent, objective and systematic description and assessment of the environmental impacts. The document is used by public authorities, stakeholders and the general public to enable informed decision making and voice opinions.



As part of the Environmental Impact Assessment Aramis will assess the following aspects:

Soil
Water
Air quality
Noise
Safety

Nature
Health
Archaeology
Visual aspects
Traffic

Land use
Available technologies
Energy
CO₂ emissions
Waste



PARTICIPATION

Aramis strongly believes that it is important to involve stakeholders and interested parties. This can be achieved, for instance, by:

- Publishing information in the Government Gazette and free local newspapers
- Providing information on the project websites of Aramis, CO₂next and Bureau Energieprojecten
- Arranging formal and informal gatherings, including online and face-to-face information meetings, seminars and knowledge events
- Publishing digital newsletters
- Organising individual or clustered discussions
- Holding official and unofficial consultations at both regional and national levels
- Inviting parties to submit views and responses

PLANNING

A planning of the Aramis project can be found on our website:



www.aramis-ccs.com.



ARAMIS IS A PROJECT OF COMMON INTEREST (PCI)

The Aramis project has been designated as a Project of Common Interest (PCI) by the European Commission (EC). The EC therefore acknowledges that Aramis is a high-priority initiative for achieving an interconnected energy system infrastructure in the EU. The Aramis project will be ideally placed to transport CO₂ from nearby countries such as Belgium, Germany and France.

ARAMIS IS A MIEK PROJECT

The Dutch government has added the Aramis project to its multi-year energy and climate infrastructure programme (*Meerjarenprogramma Infrastructuur Energie en Klimaat, MIEK*). This means that Aramis is a designated project of national importance.



Scan the QR code
to watch the
animation on the
Aramis project



LINKS AND CONTACT DETAILS

www.aramis-ccs.com

www.porthosco2.nl

www.co2next.nl

www.rvo.nl/aramis

For information about the Government Coordination Scheme that covers Aramis.

https://energy.ec.europa.eu/topics/infrastructure_en

Website of the European Commission with information on Projects of Common Interest.

If you have any questions or comments, feel free to send an email to: info@aramis-ccs.com



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The Aramis project is a collaboration between TotalEnergies, Shell, Energie Beheer Nederland (EBN) and Gasunie and is subject to regulatory approvals. No rights can be derived from the content of this brochure.

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