



Multi-source energy parks– potential, risks and policy requirements

8th February 2022

Welcome to the webinar

- Attendees, please mute your microphones and turn off your cameras during the presentation.
- After the presentation there will be time for interaction during the Q&A Session.
- Questions can be formulated in the Q&A window at any time, and they will be addressed during the Q&A session, or afterwards if necessary.
- The event will be recorded, and the slides will be shared on the OPIN website.

Agenda (GMT)

10:00 - 10:05 - Introduction to webinar and the OPIN project

Daphne Linzell – Dutch Marine Energy Centre

10:05 - 10:25 - Regulatory, technical, financial and policy requirements

Benjamin Lehner– Dutch Marine Energy Centre

10:25 - 10:45- The permitting process of offshore renewables

Tom Baur– POM West-Vlaanderen

10:45 - 11:00 - Q&A

What is OPIN ?

Ocean Power Innovation Network (OPIN) is a **European collaborative network**

OPIN Aim:

- Develop both cross-regional and cross-sectoral **collaboration**

OPIN Target:

- In-depth support to over 100 companies
- Develop a self-sustaining network (>200 members)



From 2019 to 2022.



2.6M€ total project budget
1.5M€ in financial support from Interreg North West Europe



[Join the network \(free\)](#)

Who are OPIN ?

7 partners from Ireland, UK, Belgium, France, the Netherlands and Germany



driving industry by technology

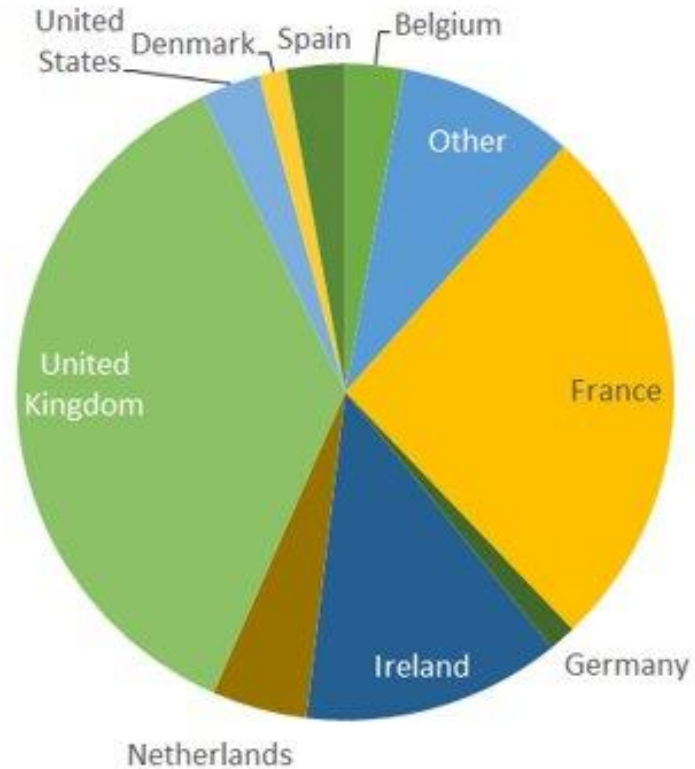


Project Partners	Countries/Regions
Sustainable Energy Authority of Ireland (SEAI)	Ireland
Scottish Enterprise (SE)	Scotland
Offshore Renewable Energy Catapult (OREC)	United Kingdom
Sirris, het collectief centrum van de technologische industrie (SIRRIS)	Belgium
West Atlantic Marine Energy Community, École Centrale de Nantes (WEAMEC)	France Pays de la Loire
Dutch Marine Energy Centre (DMEC)	Netherlands
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer IEE)	Germany

OPIN Members



504 members from 35 countries
(as of January 2022)



Target Group	Target value	Current value
<i>enterprise, excluding SME</i>	20	65
<i>SME</i>	200	337
<i>sectoral agency</i>	10	18
<i>higher education and research</i>	10	74
<i>business support organisation</i>	6	7
<i>International organisation, EEIG under national law</i>	3	3

Other countries (5 members or less):

Australia, Canada, Chile, Colombia, Finland, Hong Kong, India, Indonesia, Italy, Malaysia, Norway, Poland, Portugal, Russia, Slovakia, South Korea, Sweden, Switzerland, Taiwan, Thailand, Vietnam

What can OPIN do for you (1/2)

Access **free events**: learning and networking opportunities.

- OPIN Masterclass: Dynamic cables (15th March)

2022 Annual Symposium - Spring: Side event at [*All Energy*](#), Glasgow

Have a look at our [Events page](#) and register today !

What can OPIN do for you (2/2)

Access expert advice on your technology (TAPs)

- ✓ Independent expert opinion – e.g., on the route to market, on reducing development risks and costs, etc.
- ✓ Advice on next steps, funding and collaboration opportunities



Support collaborative projects (CIGs)

- ✓ Preparatory step to National and EU research calls
- ✓ Find ways to solve technical or financial problems you are facing
- ✓ Expand your network nationally and internationally
- ✓ Benefit from the experience of those in other industries



Receive **travel support**

- ✓ Enabling Irish and Scottish Enterprise SMEs to travel abroad for OPIN events

OPIN Resources



[OPIN Members list](#) & [OPIN website](#)



[OPIN Library:](#)

- Workshops/masterclasses presentations
- Value chain study - summary report
- Ocean energy challenges and recommendations: Desktop analysis of studies and reports



OPIN [Twitter](#) and [LinkedIn](#) groups. Join us for the latest updates!



Email us at: OPIN@seai.ie

Multi-source energy parks: potential, risks and preparation

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DMEC an accelerator for marine energy



Innovation

Advance technologies and products

>85

International Partners



Capital

Mobilise investments

>125

Technology Companies



Policy

Shape policies

€ 128 M

Public & Private Investments



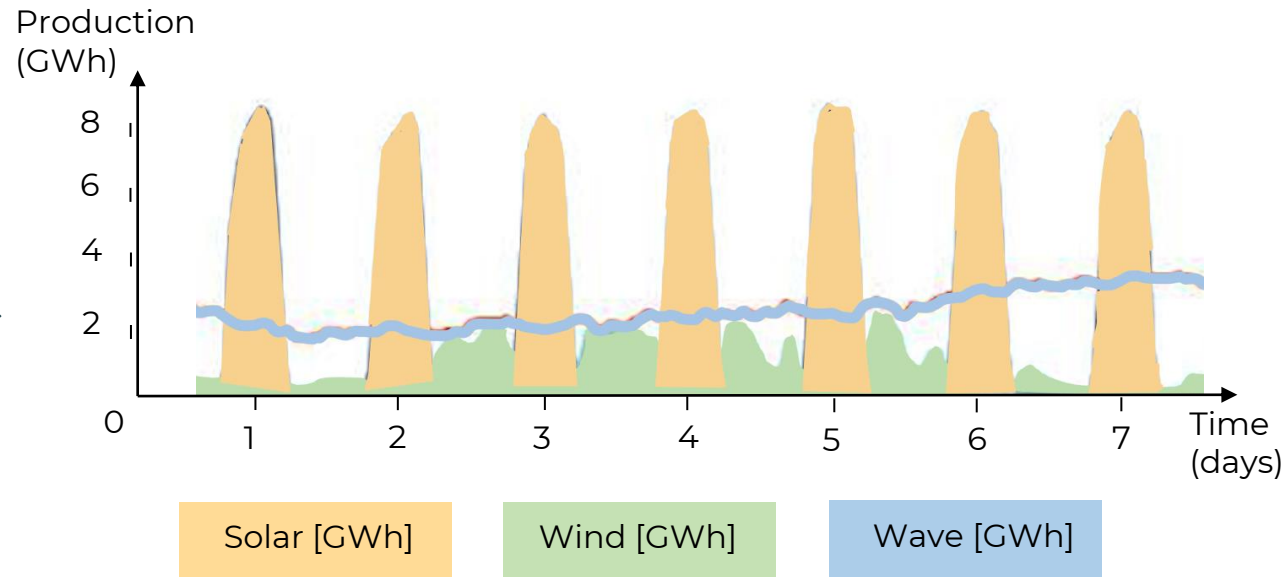
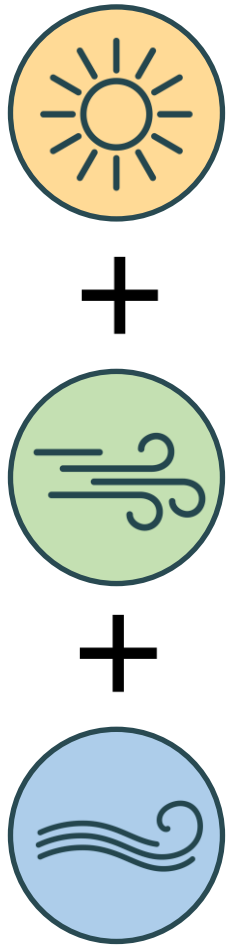
Markets

Commercialise solutions



The reasoning: More reliable and low-cost energy system

Source diversification



Grid balancing

Lowest cost zero-carbon system

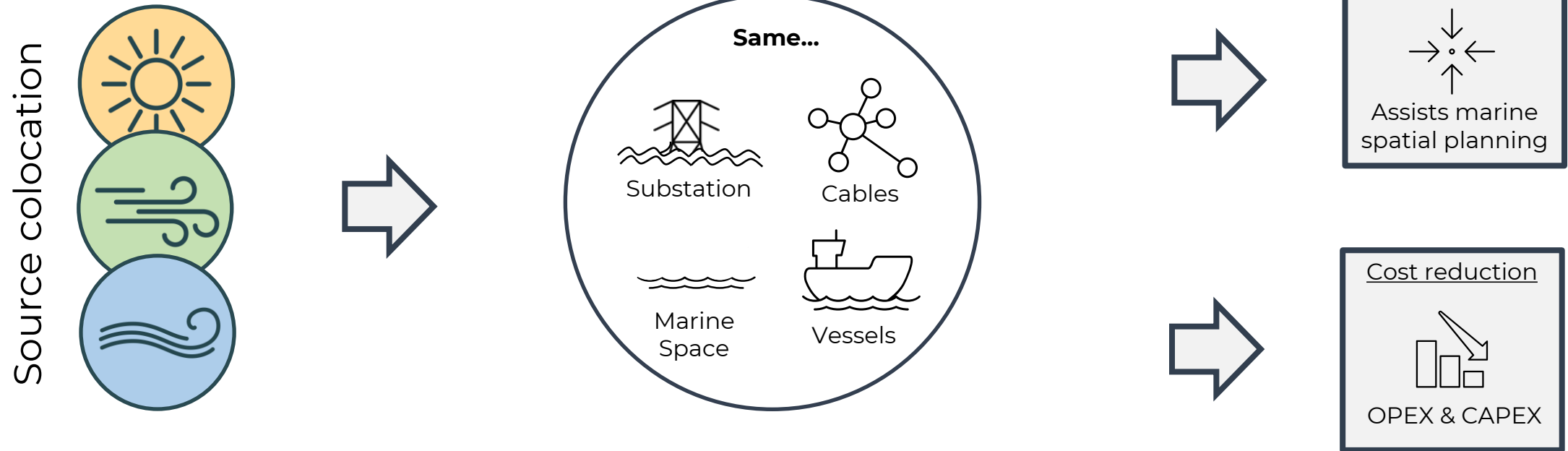


Increased revenues

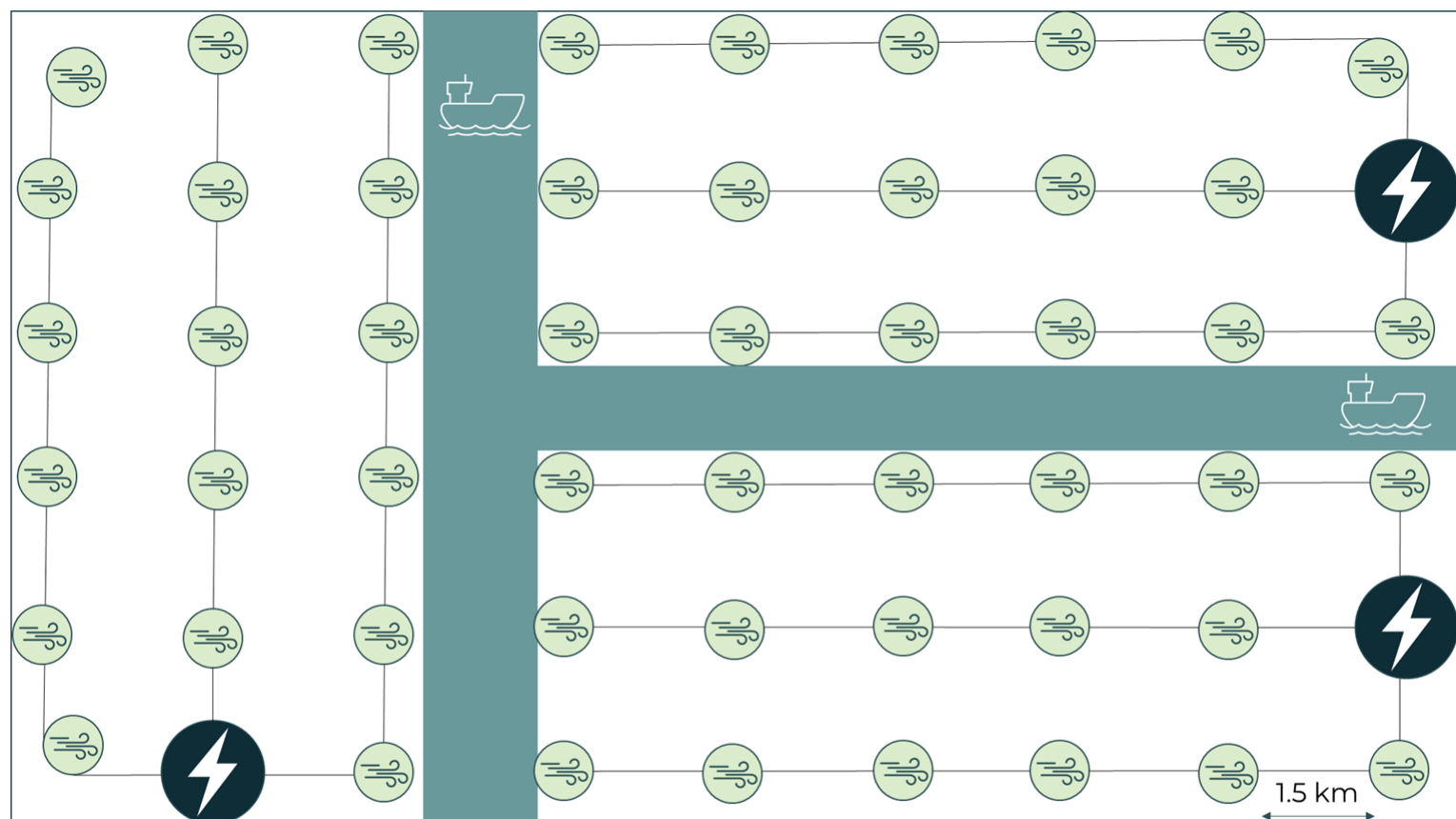
Continuous electricity sales



The reasoning: More cost- and space-efficient utilization of offshore area



The potential: a 2030 wind park



Wind turbine
(15 MW)



Transformer/
Substation

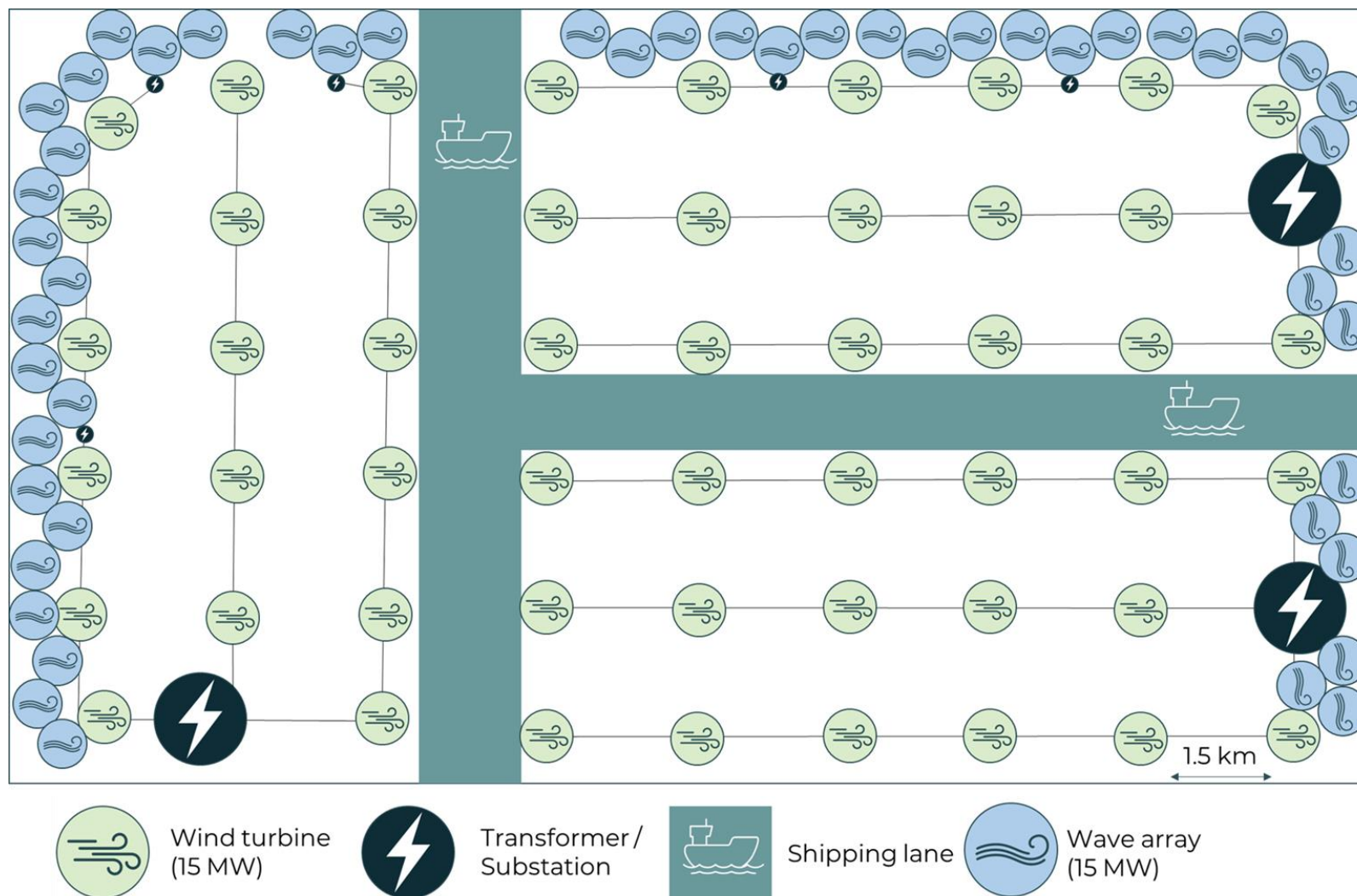


Shipping lane

Basic data:

- ~ 8 MW/km²
- Business as usual

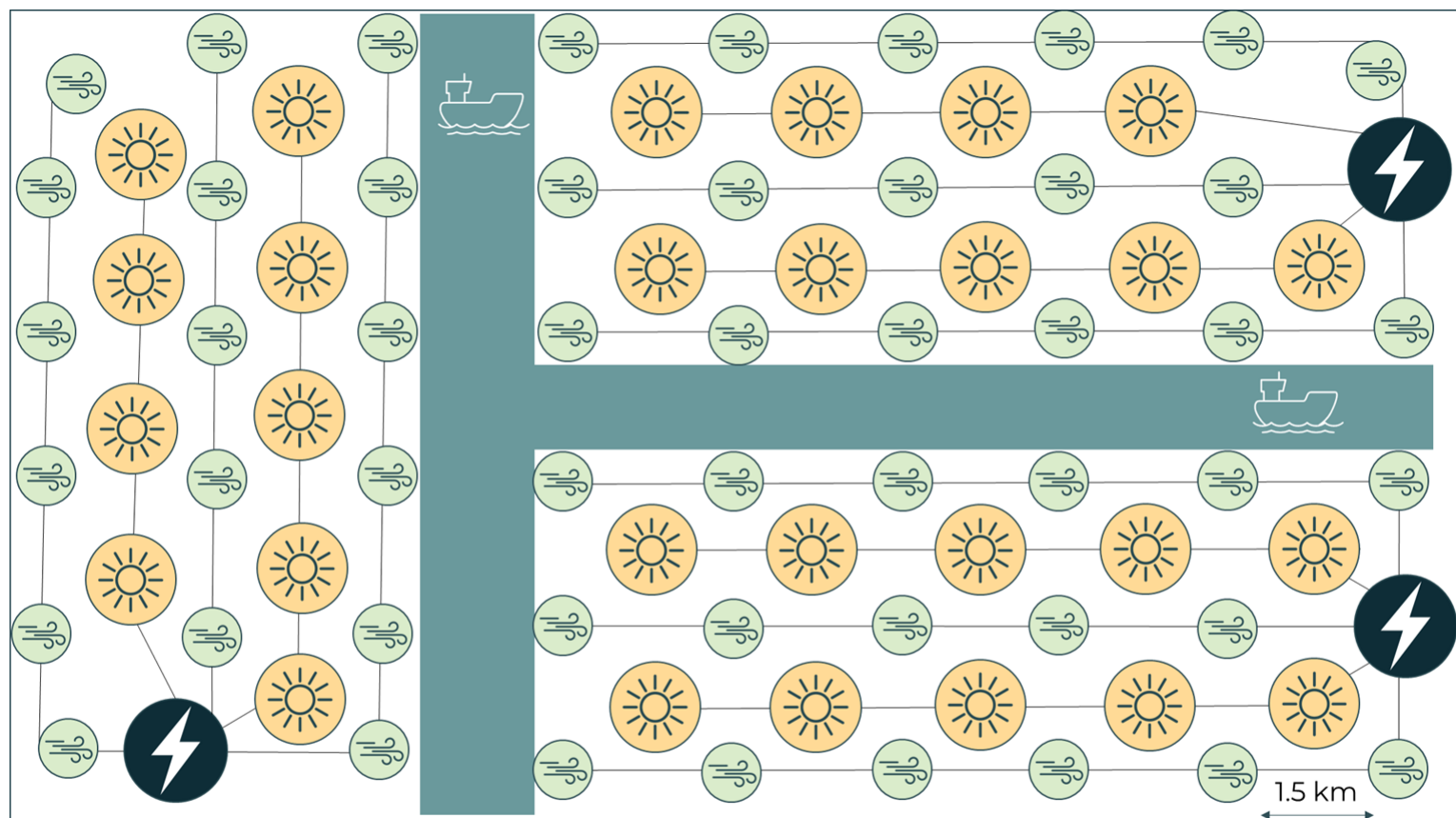
The potential: a wind / wave park



Basic data:

- ~ 11 MW/km²
- Reduced load & increased weather windows

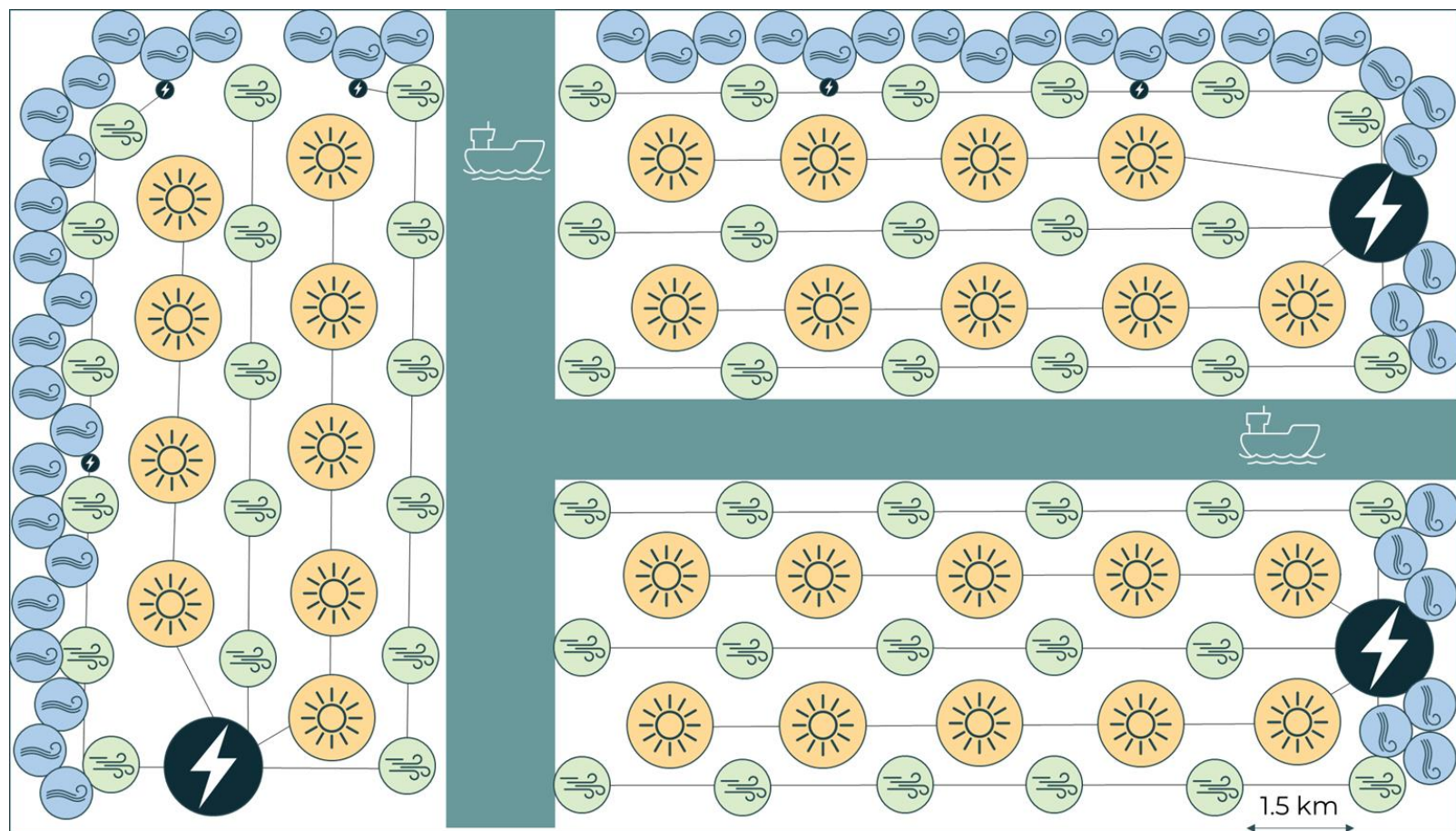
The potential: a wind / solar park



Basic data:

- ~ 44 MW/km²
- Longer O&M routes
2.5x TWh / year

The potential: a wind / wave / solar park



Basic data:

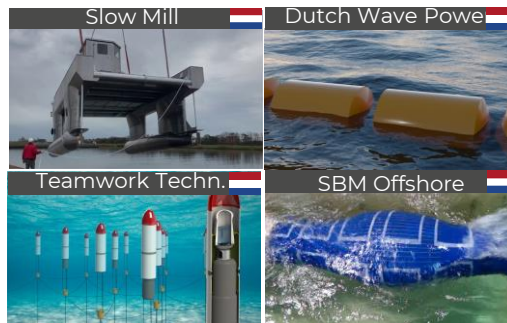
- ~ 48 MW / km²
- Reduced load & increased weather windows
- Longer O&M routes but 3x more TWh / year

The potential: of wave & tidal in the Netherlands

With a technical & economic feasible potential of **2.8 – 5 TWh/y** of integrated **wave** (& eventually tidal kite energy) in wind farms in the Netherlands by 2050!



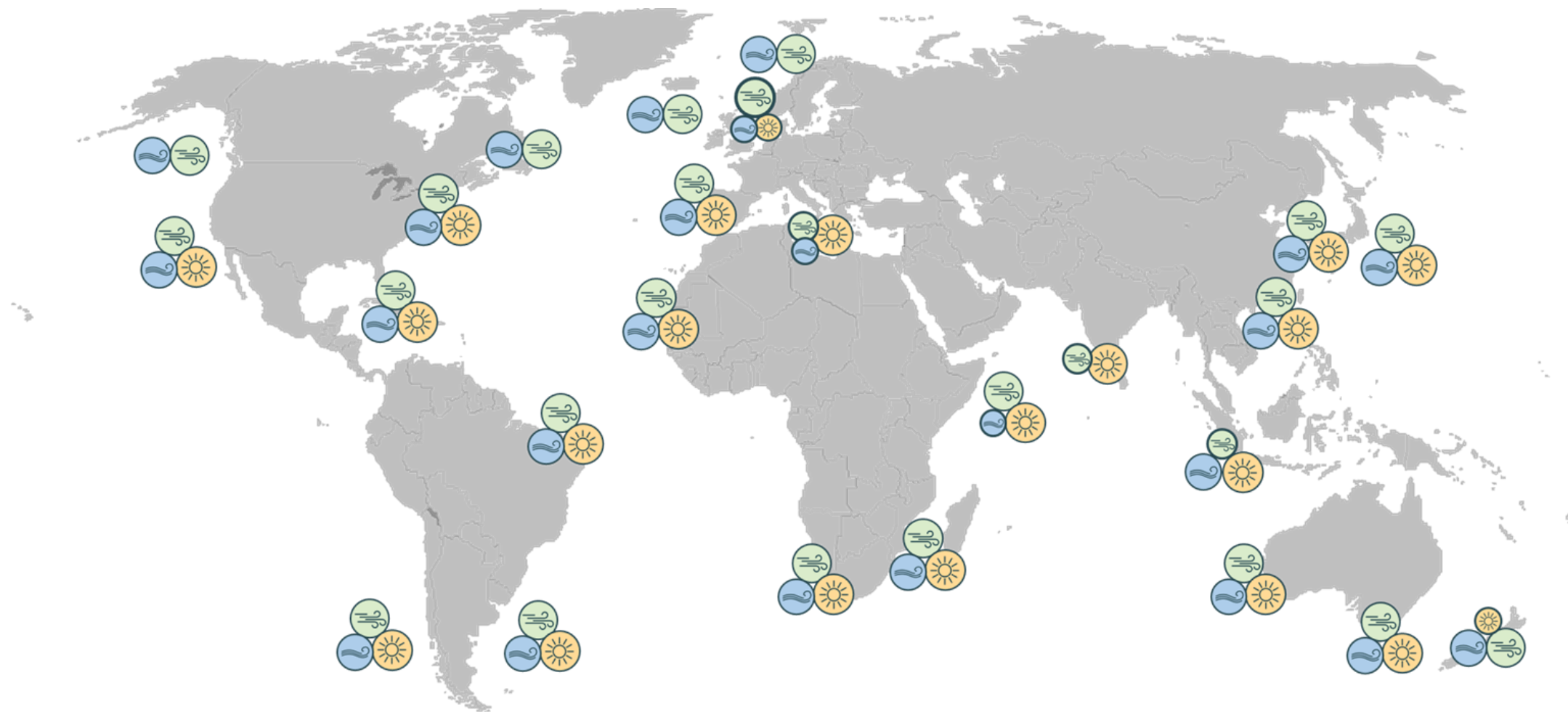
Tidal kites



Dutch wave developers

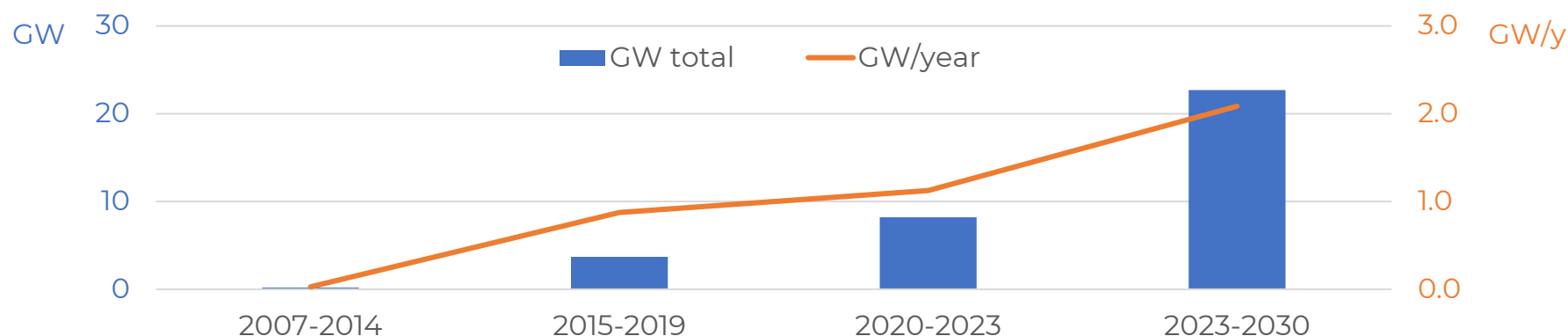


The potential: multi-use offshore farms around the world








Use-case: installation inside offshore wind parks in the Netherlands

The plans for **offshore wind tendered** until 2030 is 22.7 GW:



- The **wind search areas** are defined, pre-developed (metocean, geophysical & geological measurements) and tendered via the Dutch government (RVO)
- All the needed **infrastructure** is built by TenneT and financed by the government (0.7 GW HVAC and 2.0 GW HVDC; export cable at 525 kV DC; inter-array cables at 66 kV AC)
- New tenders include **financial bids, innovation actions** and **system integration**, with the latter two well suited for co-location with other sources.

Technical challenges:

-  Missing long-term performance, reliability and survivability proof for solar, wave & tidal
-  Where to transform the voltage? Two-step or one-step transformation
-  Exclusion zone for floating devices need to be carefully evaluated
-  Maneuvering space & time needed in the wind park for service & installation vessels
-  (Eventual) using of the monopiles for mooring etc.

Financial challenges:



Ownership and impact on curtailment (business case)



Impact on the operation and maintenance routes (business case)



Cost reduction of not mature technologies (learning rates etc.)








Impact on existing risk assessment and insurability (+ associated costs)

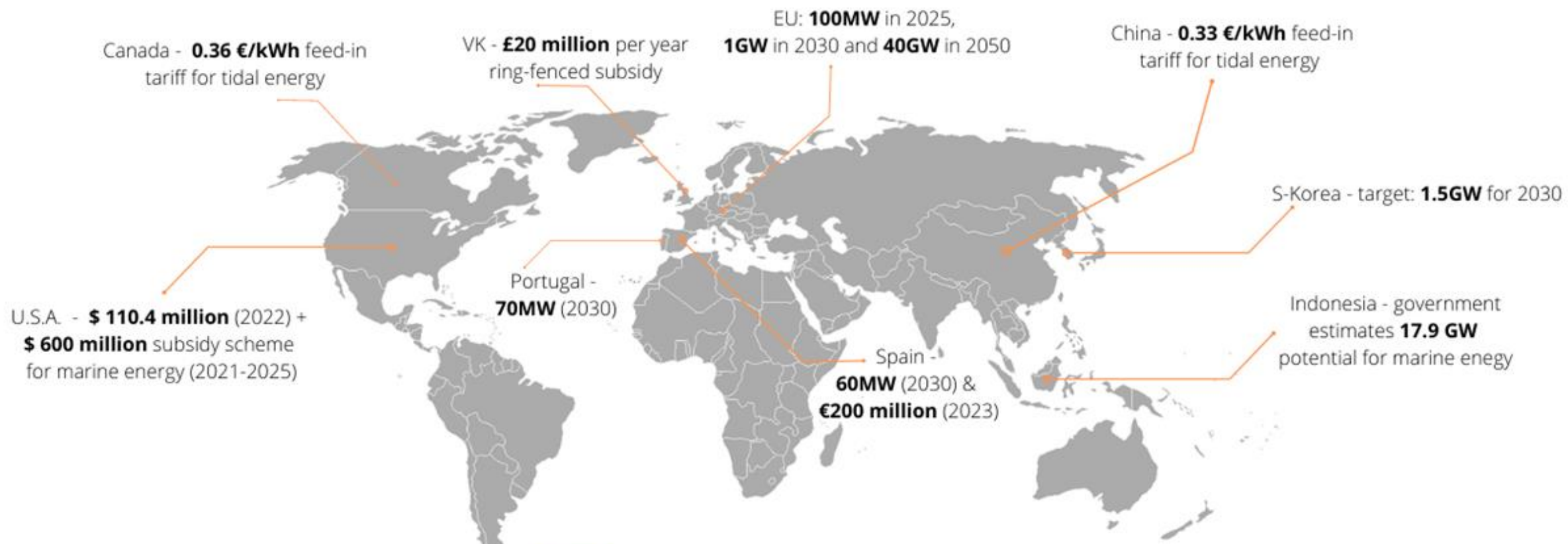


Risk of bankruptcy of not mature technologies and SMEs

Regulatory challenges:

-  Cable and infrastructure sharing as a question of ownership and preparedness (e.g. offshore substations for the next decade are in construction without taking other sources into consideration)
-  Permitting procedures (offshore & environmental permit, landfall permit, feed-in permit, etc.) not yet fully in place for offshore renewables. → Offshore wind far spread; countries like Portugal and Spain have already OE in place
-  (Ring-fenced) Feed-in tariffs and subsidies to overcome financial challenges → The UK just added one for tidal energy
-  Marine spatial planning / wind-search-areas needs to include other offshore sources
-  Tenders need to actively focus on the integration of promising technologies → The Netherlands have system integration and innovation activities in their tender

The targets: and support around the world

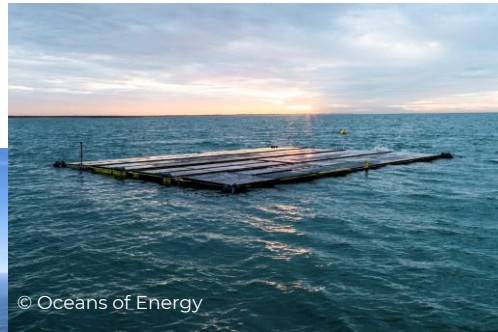


G20 recommends to "include, as appropriate, offshore renewables in national energy and climate policies"



EU-SCORES

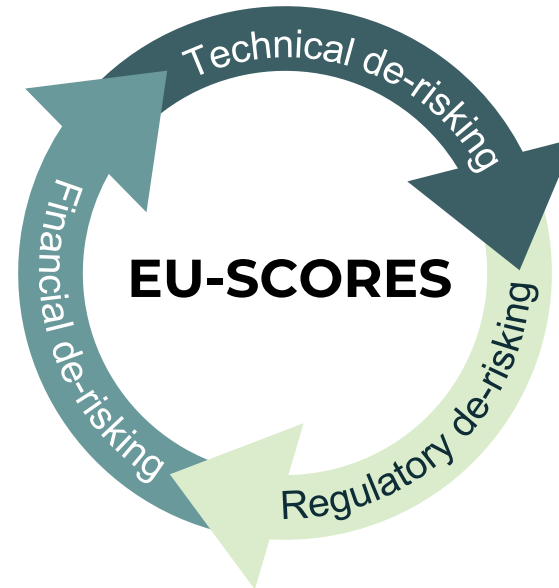
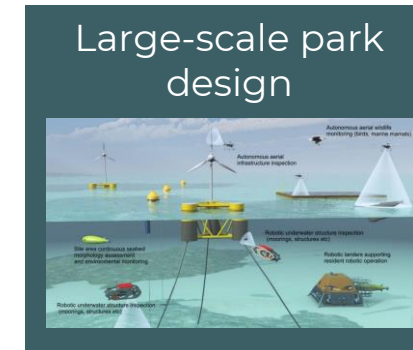
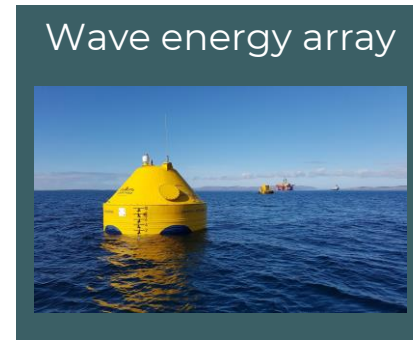
European Scalable Offshore Renewable Energy Sources



Enable the **large-scale rollout** of **offshore solar PV** and **wave energy converters** in **offshore wind farms**.



Technical de-risking:





The Planning: Financial de-risking

Learning rate & cost reduction in varying scenarios

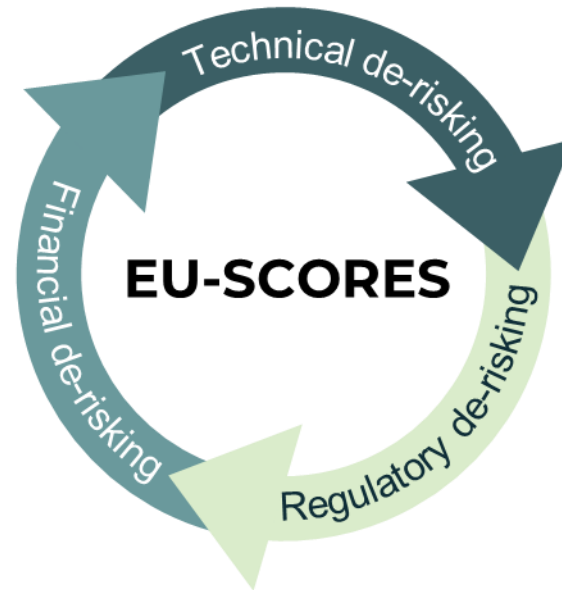


Business cases for specific regions in the EU



Green hydrogen production with multi-source parks

H_2





The Planning: Regulatory de-risking



Stakeholder gathering events (incl. public)



Resource & Energy system assessment

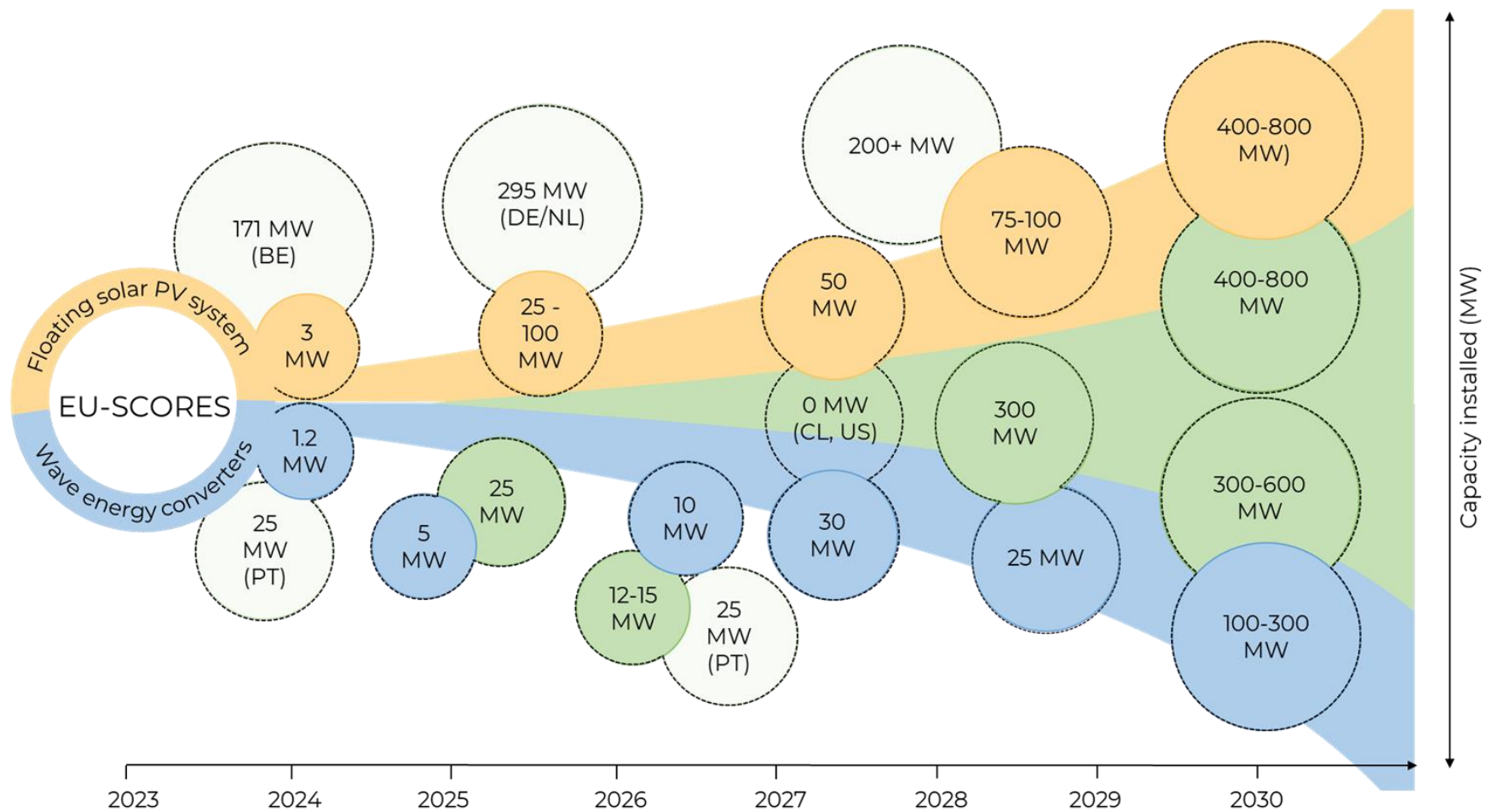


Policy & regulation advice documents





The ambition: Rapid scale-up



New offshore wind in multi-source parks

Existing offshore wind parks an addition

Wave energy converters in multi-source parks

Offshore solar PV in multi-source parks

What is needed to accelerate multi-source farms in your country?

- Clear national targets & inclusion in marine spatial planning ...
- (Ringfenced) feed-in tariffs for a quick start ...
- Attractive tenders for project developers ...

... of offshore floating solar, tidal and wave energy

What can you as a developer do to join the multi-source field?

- Have reliability and performance data from real sea deployments available
- Team up with well known players in the field to join in on tenders
(e.g. innovation actions inside a wind parks)
- Make your electrical design easily integrateable with offshore wind standards.
- Supply the technical design of needed supporting infrastructure (inter-array cable, collection hub, transformers etc)

Q & A

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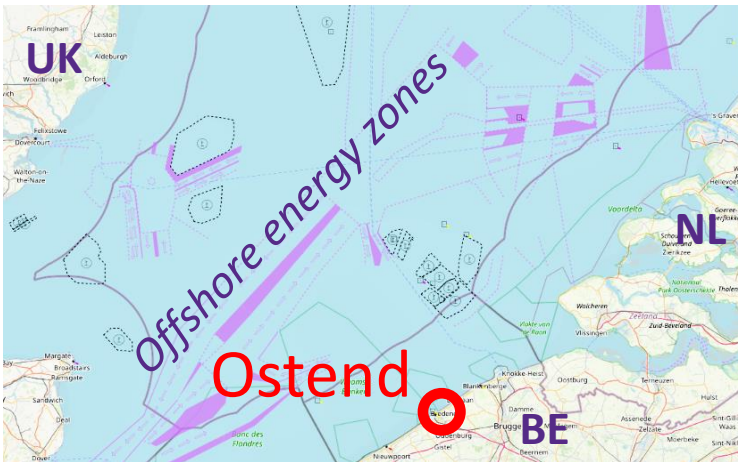
POM WVL and Blue Accelerator

Tom Baur - POM West-Vlaanderen

POM WVL and Blue Accelerator



POM WVL and Blue Accelerator



Bringing blue energy innovation to the market, including technology readiness guidance

Developing the blue energy sector, over full value chain

Supporting technical formation in the blue energy sector

Policy development and advocacy: regional, international

Blue Accelerator as offshore test facility, located near the port of Ostend (Belgium)

(Blue Accelerator is owned and operated by POM-WVL, an outcome of the Blue Accelerator project with UGent, TUA West, Vives, Vito, VLIZ)

Blue Accelerator – offshore test platform



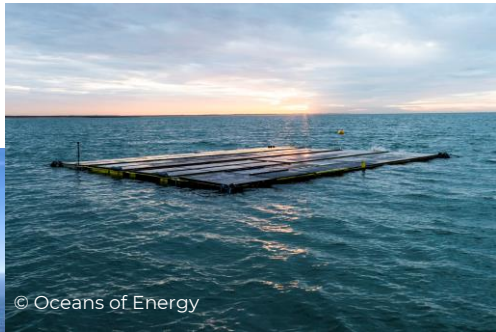
Open for **industry, large and small SMEs, developers, project consortia, knowledge centres**

- TRLs 4-7, with focus on:
- (Scaled) device & array testing and demo in floating solar and multi-use applications w/o aquaculture and multi-source energy solutions (floating solar PV, wind, wave, etc.)
- Corrosion & biofouling, new materials/sensor testing
- Drone solutions (air, surface, submerged) for O&M in windfarm, aquaculture, other offshore applications
- Offshore test exclusion zone, near O&M harbour Ostend (BE)



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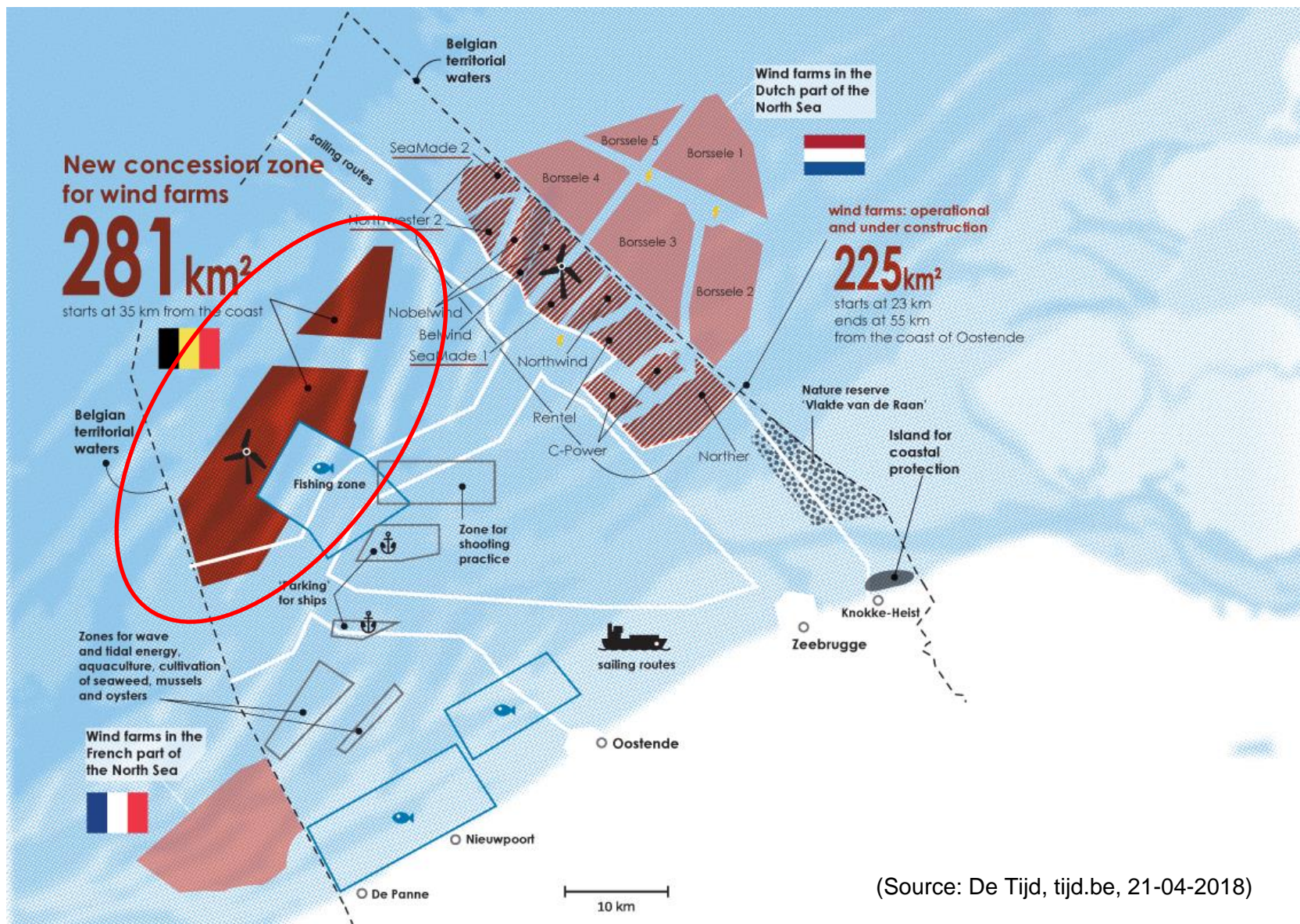
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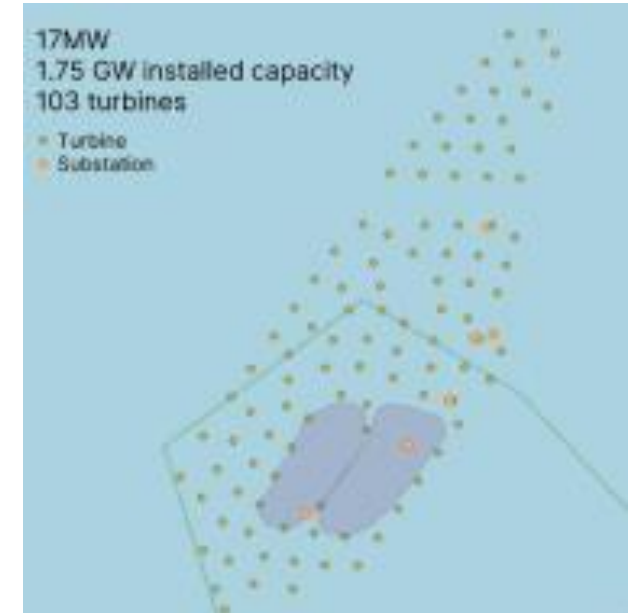
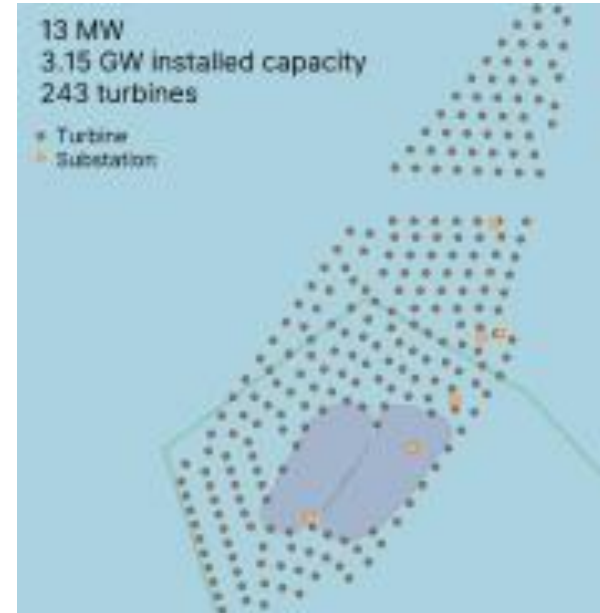
North Sea context - Southern Bight





New concession zone BE

Stylised scenarios with different # turbines



EU SCORES demo site I
(Blue Accelerator)
with floating solar PV demo
of Oceans of Energy

Source of maps: 3E, LCOE offshore wind in the Princess Elisabeth zone, Sep 2021

Technical, financial and regulatory de-risking

Experience in various projects *so far* at generic level

- Technical challenges
 - LT performance, reliability and survivability
 - Broader and deeper blue energy supply chain development
- Financial challenges
 - Adequate innovation support mechanisms, allowing for maturing cost reduction (competitive LCOEs)
 - Adequate tender pre-qualifications, selection criteria and support mechanisms
 - Current world market material costs and delivery period increases
- Regulatory challenges
 - Domain concession & support mechanism (in specific (transitional) pot)
 - Environmental permitting (offshore, cable route, Habitat zone, landfall/land site – all where applicable)
 - Export cable permit (to land-side / OSS / energy island)
 - Energy production permit
 - Energy contract
 - Inclusion in national offshore renewable energy strategy
 - Inclusion in marine spatial plan, with specific targets

Contact details EU-SCORES, visit: <https://euscores.eu/>



Contact details POM WVL – Blue Accelerator:
Email: info@blueaccelerator.be or visit www.blueaccelerator.be
Tom Baur, Business Developer & Finance/investment
Ben de Pauw, Operations & Science Engineer



Q&A Session