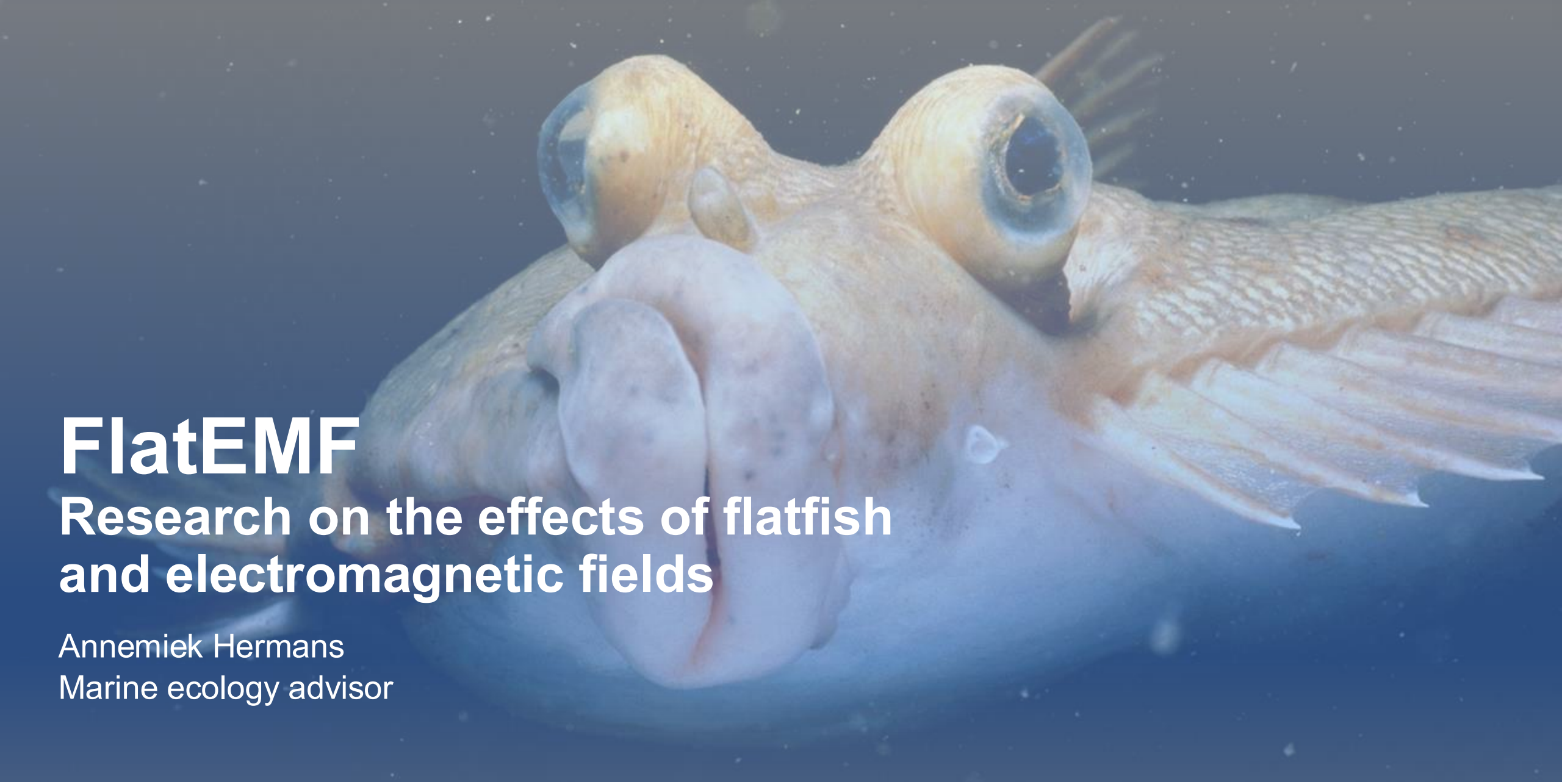


FlatEMF

Research on the effects of flatfish and electromagnetic fields

Annemiek Hermans
Marine ecology advisor

Our **offshore** infrastructure

In the Netherlands, TenneT is the sole national electricity transmission system operator and responsible for the offshore grid.

Offshore grid

Submarine electricity connections with other countries (interconnectors)

700 MW, 580 km
NorNed
(The Netherlands - Norway)

1,000 MW, 260 km
BritNed
(The Netherlands - Great-Britain)

700 MW, 325 km
COBRA-cable
(The Netherlands - Denmark)

2,000 MW
LionLink, under consideration
(The Netherlands - Great-Britain)

Cables
from TenneT platforms to shore
636 km

International connections
(interconnectors)
1,165 km

Platforms
Offshore 'power sockets'
6

Connection capacity offshore wind energy

4.2 GW → **22.3 GW**
Today — 2031

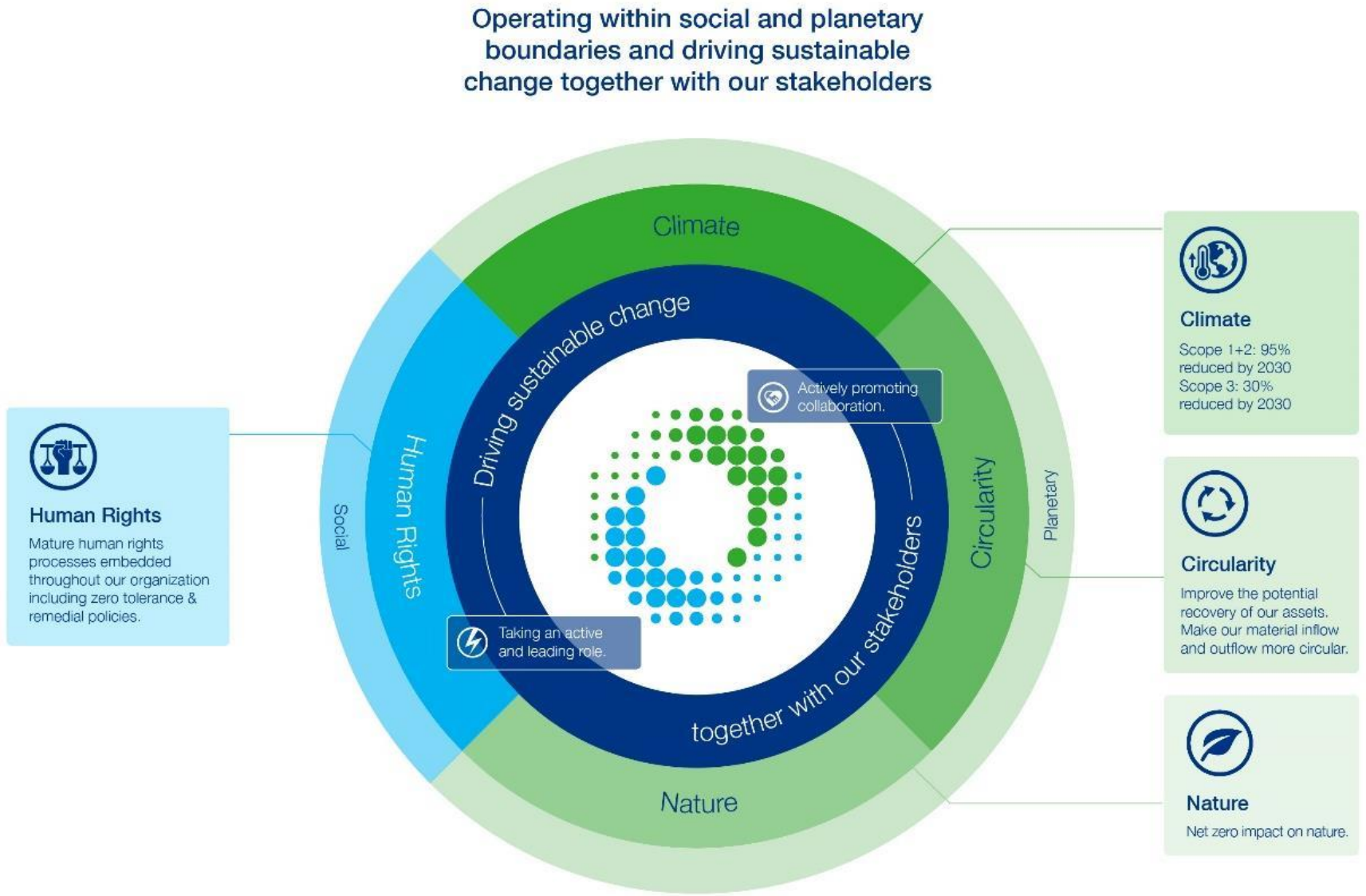
A grid operator’s tasks
Main tasks

Transmission services
Ensure a robust and efficient high-voltage grid

Market facilitation
Facilitate an efficient and stable electricity market

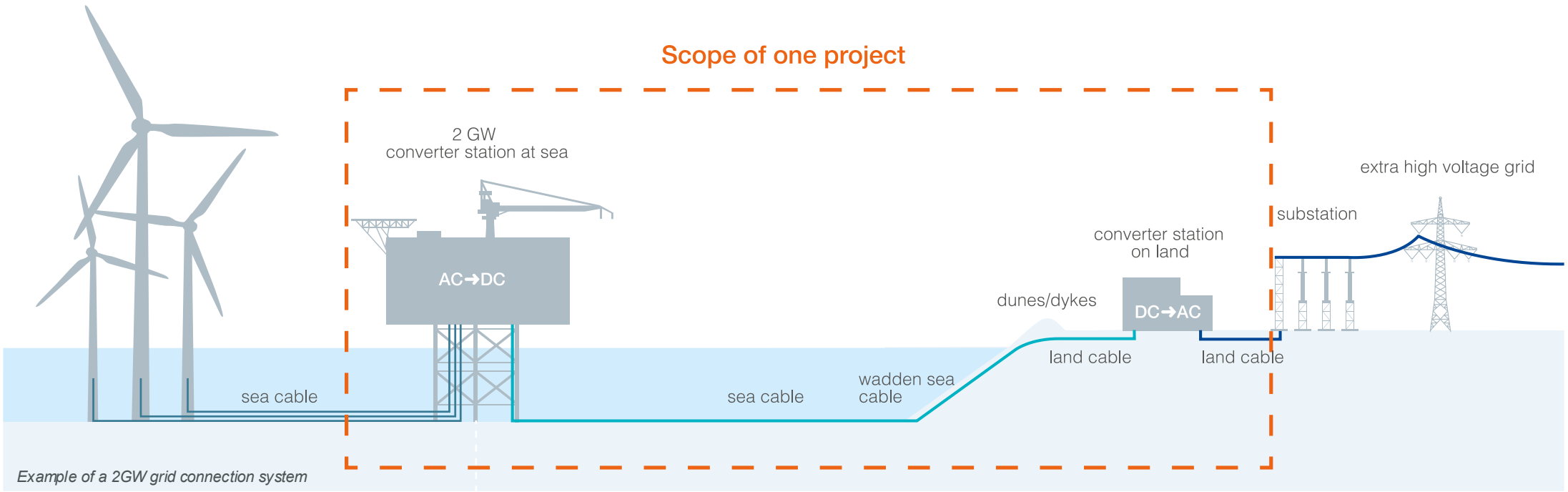
System services
Maintain the balance of electricity, 24/7

Corporate CSR Strategy



2GW Elements of an offshore grid connection system >100KM

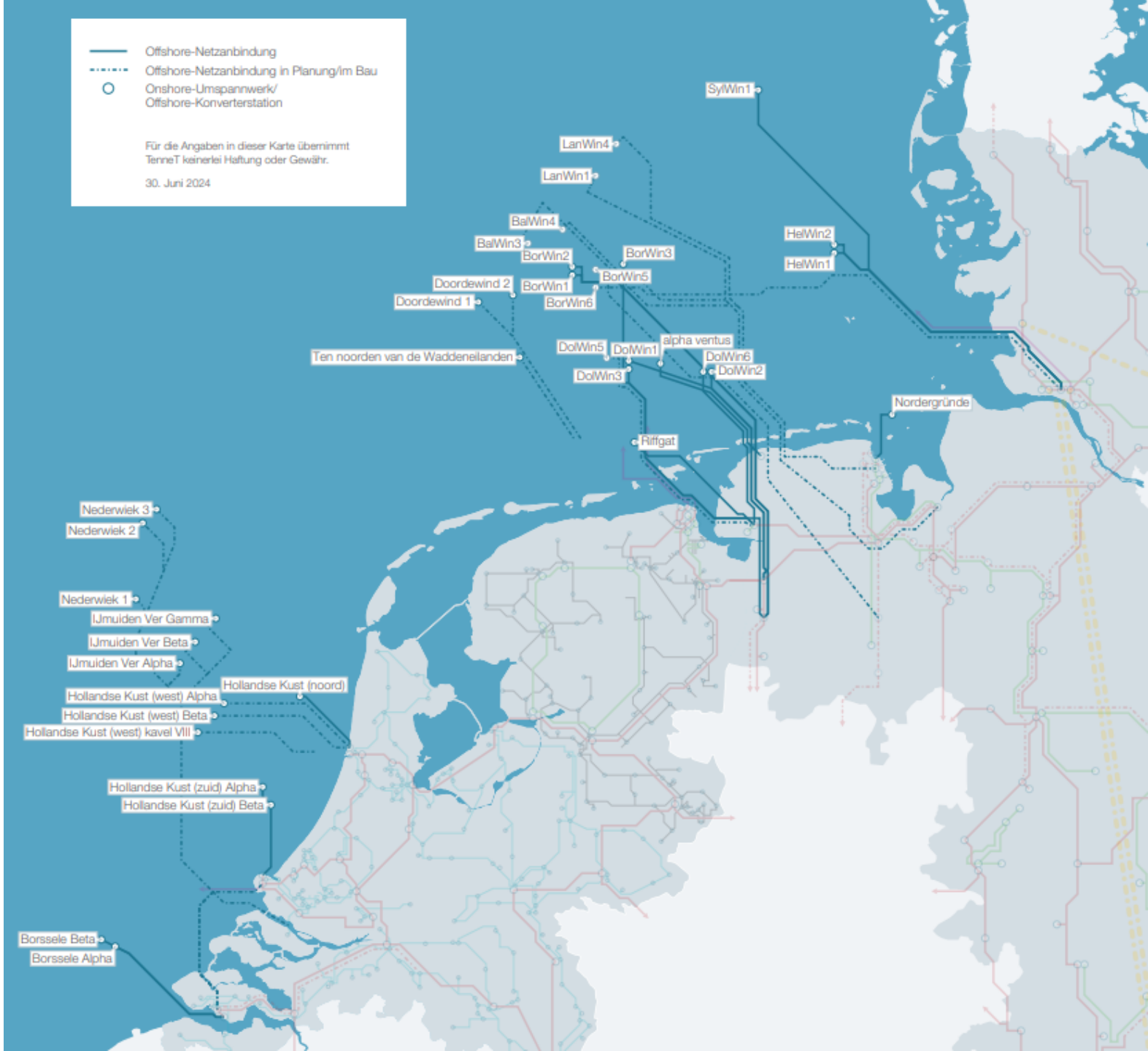
Delivering green wind energy safely from sea to land



Example of a 2GW grid connection system

Offshore grid projects by TenneT

1 October 2025



Context

Europeche (representative body for fishermen in the EU) and **EAPO** (European Association of Fish Producers Organisation):

- ***Fishing communities will be the first ones to suffer*** *from these serious environmental impacts,…*
- *Not to change fishers by windmills, adopt a precautionary approach and* ***halt the current expansion of offshore wind parks*** *until research has come up with answers to the many existing knowledge gaps.*

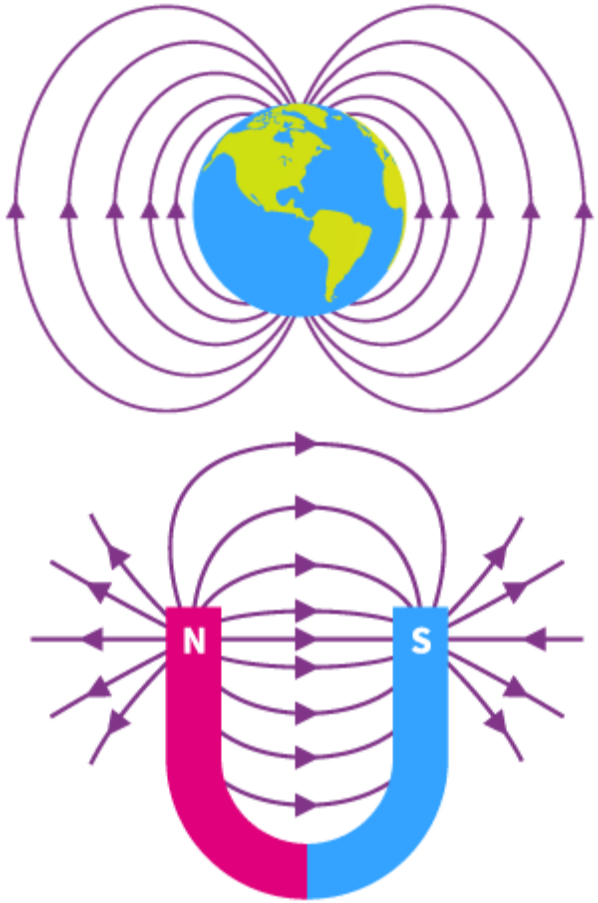
*'**Impacts from permanent continuous electromagnetic fields could change the behaviour of fish.***

***Cable burial does not mitigate strong potential electromagnetic field impacts**, as in general the magnetic field passes through the seabed.'*

Peter Van Dalen, **EPP**

EMF – what is that?

- **EMF = electromagnetic field**

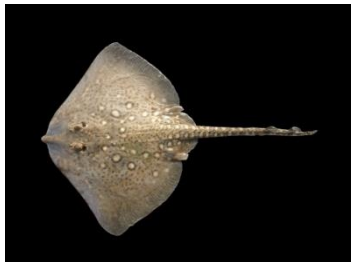


- Electricity and magnetism are essentially two aspects of the same thing – changing electric field generates magnetic field, and a changing magnetic field creates an electric field.
- **Electric current generates magnetic field**

- **Natural and antropogenic fields**

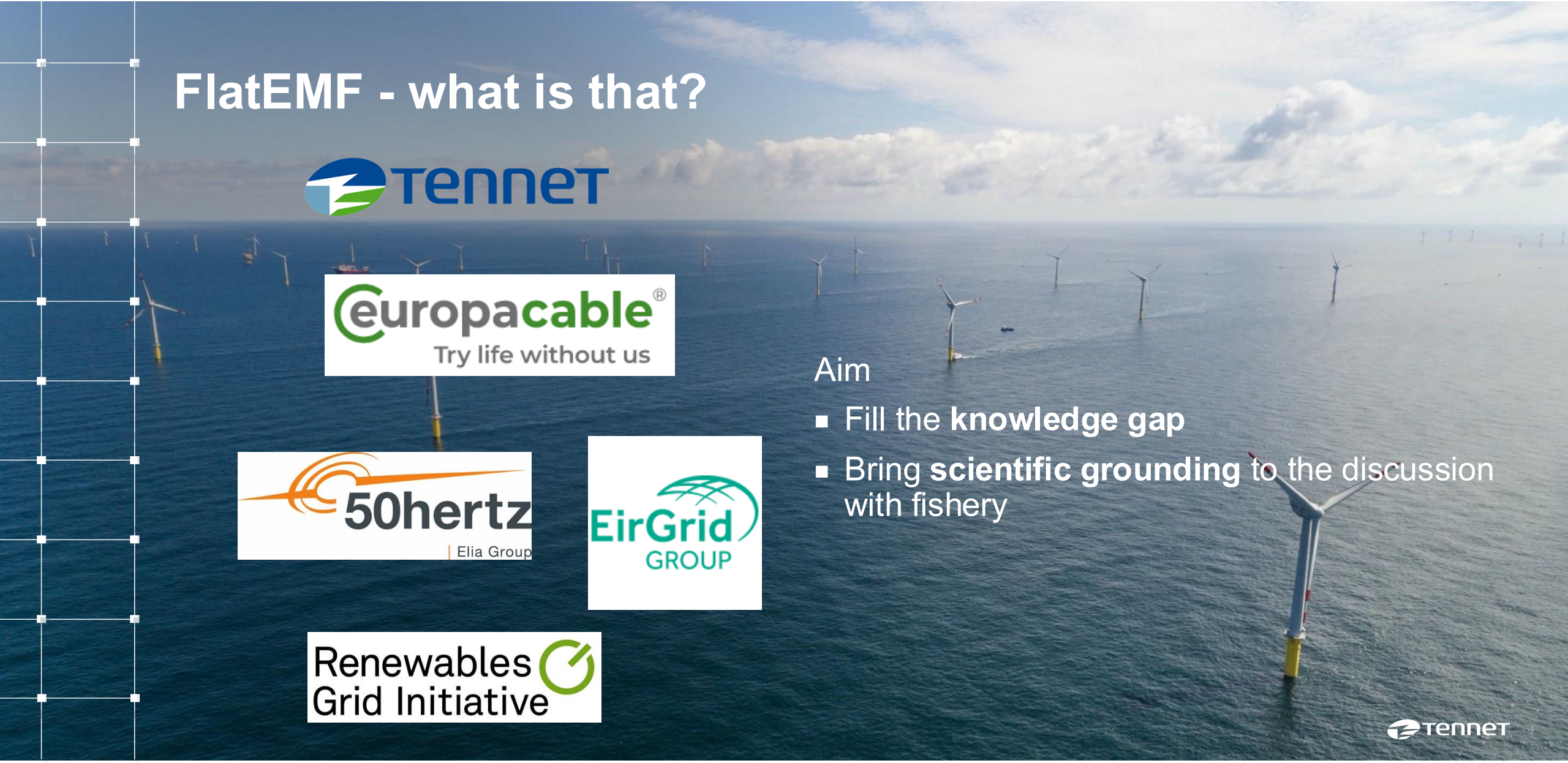
Flatfish and EMF

- **Electro- and/or magneto-sensibility** → navigation, orientation or detection of other organisms



- Flatfish – commercially important for **fishery**!

FlatEMF - what is that?



Aim

- Fill the **knowledge gap**
- Bring **scientific grounding** to the discussion with fishery

Project scope

Ecological research	Technical research	Communication and stakeholder engagement
TenneT + RGI, Europacable	Europacable + TenneT, RGI	RGI + other parties
• Bottom trawl study • Laboratory study	• Magnetic field modelling • EMF monitoring and mitigation options	• Project management • Discussions with NGOs • Knowledge dissemination across EU MS and fishery • Interaction with other TSOs

Erica Chapman
St Abbs Marine
Research Station

Evripidis Karatsivos
NKT - EuropaCable

- More information?
  - Annemiek.hermans@tennet.eu