The ONDP2024 and the way forward
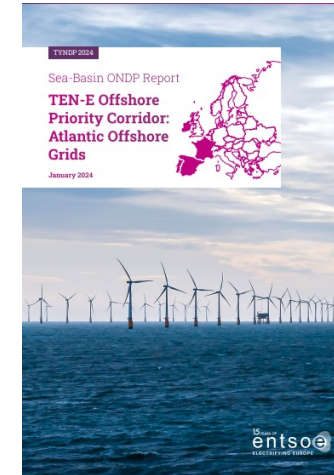
RGI workshop, 25 April 2024
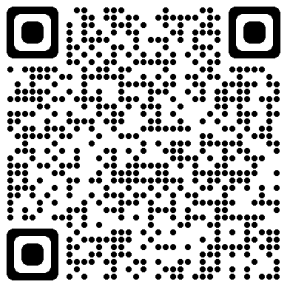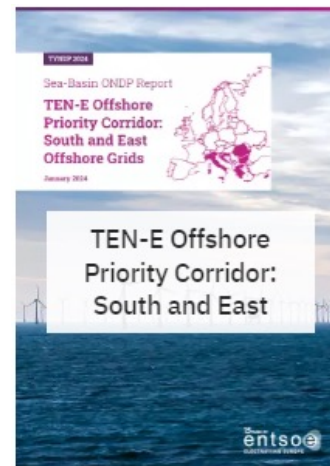
Francesco Celozzi, ONDP Project Manager

The ONDP Package

ONDP Data Visualisation Tool

Overview | Generation | Transmission | Energy Surplus | Energy Mix | CO2 Emissions | Costs & Length

Offshore RES generation will increase up to 496 GW by 2050 (14-fold increase)
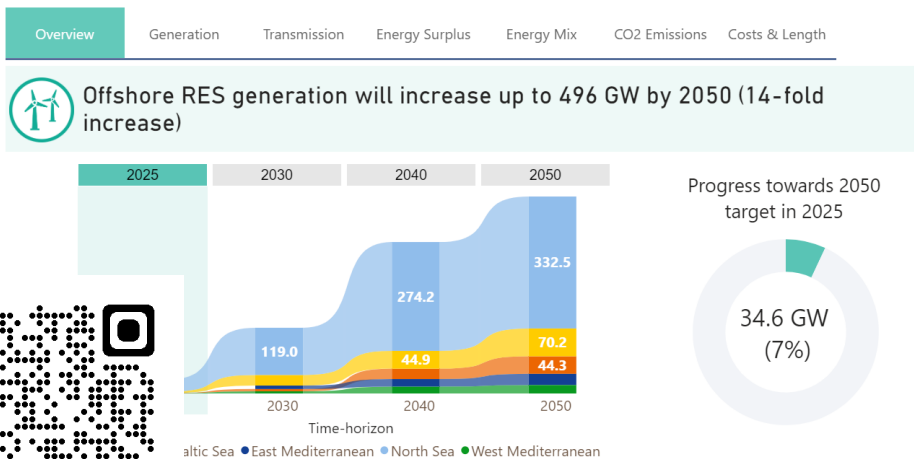
Visit the online ONDP- site to find the reports, the interactive data platform, a film ....

Need for Speed...for Generation and Transmission

Offshore RES Generation capacity [GW]
average annual growth per decade
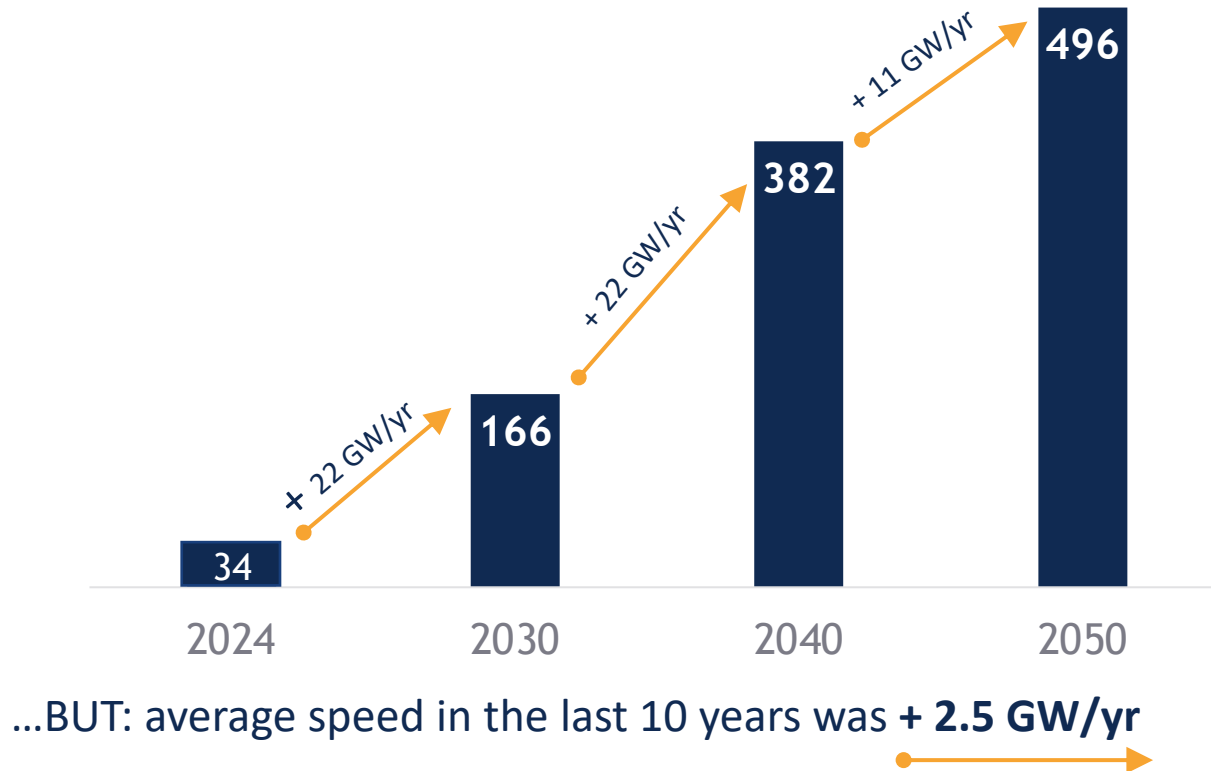
496 (2050)

+ 11 GW/yr

382 (2040)

+ 22 GW/yr

166 (2030)

+ 22 GW/yr

34 (2024)

2024   2030   2040   2050

...BUT: average speed in the last 10 years was **+ 2.5 GW/yr**

Today's offshore RES is only 7% of offshore RES foreseen in 2050

Annual installations of offshore RES and Infrastructure need to accelerate significantly

Requires to be 9 (nine) times faster than during the last decade!

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3

Results: Offshore Transmission Infrastructure Needs

Offshore Transmission Infrastructure [GW]
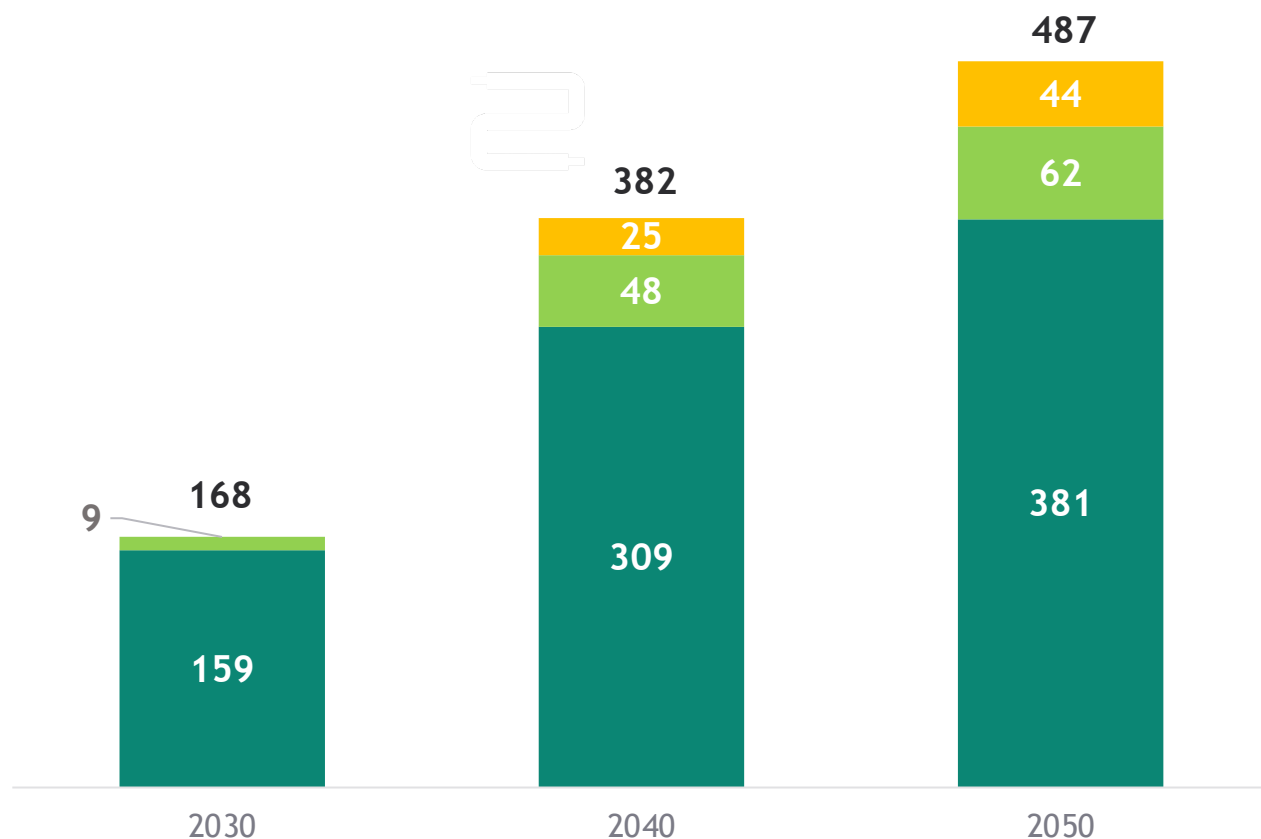
Most offshore RES is expected to be connected via radial connections

The supply chain will be crucial for delivering the needed infrastructure in time

Need to balance the rapid deployment of offshore grid infrastructure with the imperative to preserve and restore our marine environment.

Legend:
- Existing and planned hybrid projects
- Radial projects
- Hybrid needs identified by the ONDP

Chart values:
- 2030: 168 total (159 radial, 9 hybrid)
- 2040: 382 total (309 radial, 48 existing/planned hybrid, 25 hybrid needs)
- 2050: 487 total (381 radial, 62 existing/planned hybrid, 44 hybrid needs)

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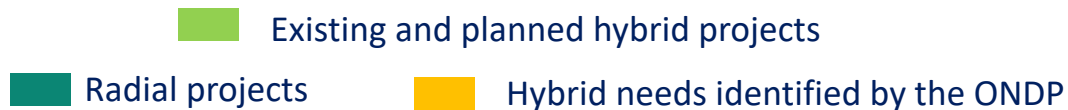
The Shopping List is long…

Route length
Up to 54,000 km

DC converter stations offshore
158…172 units
with .. .w/o DC breakers

AC substations offshore
123..137 units
with .. .w/o DC breakers

403 bn€

DC converter stations onshore
167…176 units
w/o … with

DC circuit breaker sets
Up to 34 sets

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Benefits and challenges of offshore corridor development

Energy Security Increase

Resulting from cross-border interconnections and increased redundancy

Price-convergence

Hybrid corridors would contribute to reduce price difference between market nodes

Better utilisation of offshore RES

Hybrid corridors reduce green energy surplus and help to avoid up to 5 to 8 Mton CO_2

System risk

e.g. comply with reference incident measures as stated in network codes and guidelines

Operational challenges

No experience yet with operation of HVDC systems.
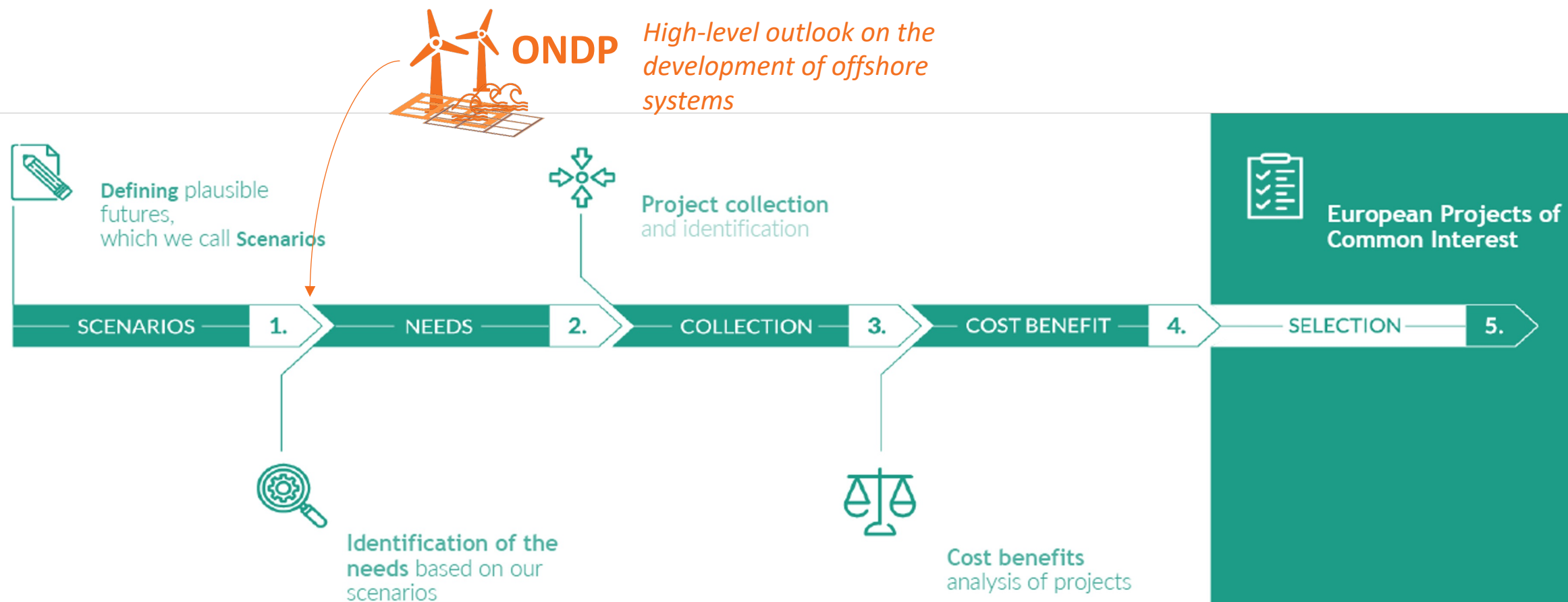
Offshore RES development

is at risk in case coordination across multiple actors fails - complex coordination is decisive

& General challenges with

- Infrastructure supply chain (incl. workforce)
- Ports availability
- Environmental impact
- Flexibility

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6

Offshore Network Development Plans (ONDPs) in the TYNDP

ONDP *High-level outlook on the development of offshore systems*

Defining plausible futures, which we call **Scenarios**

Project collection and identification

European Projects of Common Interest

SCENARIOS — 1. ⟩ NEEDS — 2. ⟩ COLLECTION — 3. ⟩ COST BENEFIT — 4. ⟩ SELECTION — 5. ⟩

Identification of the needs based on our scenarios

Cost benefits analysis of projects

Thank you!

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TYNDP 2024

Offshore Network Development Plans
European offshore network transmission infrastructure needs
Pan-European summary   January 2024

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Let's take a trip ..

Schematic Visualisation:

| 1 Creation of the starting grid * | 2 Identification of expansion candidates | 3 Linear optimisation ** | 4 Post-processing in regional groups |
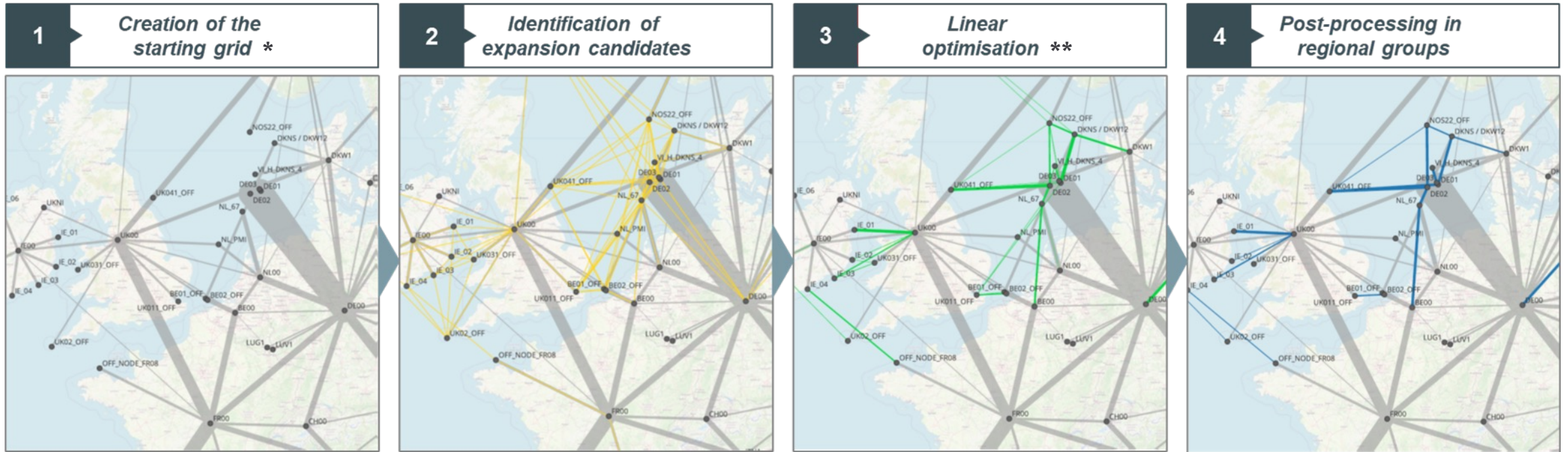
* 2030 for 2040
2040 for 2050

** minimize TOTEX

*** check plausibility and adjust

The TYNDP22 model and Distributed Energy Scenario was used
Investigations focused on offshore infra only. Onshore to follow