Challenges for impact assessment in Offshore Wind Energy Development

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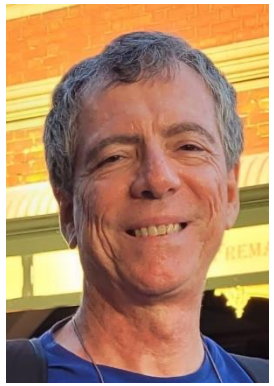
EnvSoOff Project

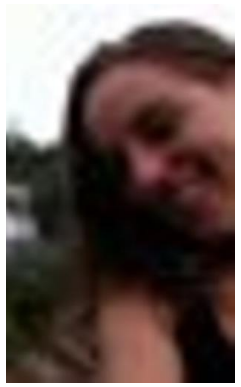


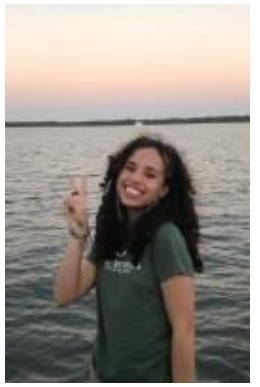
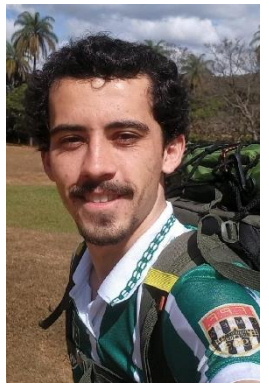
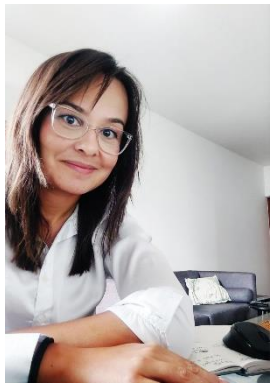










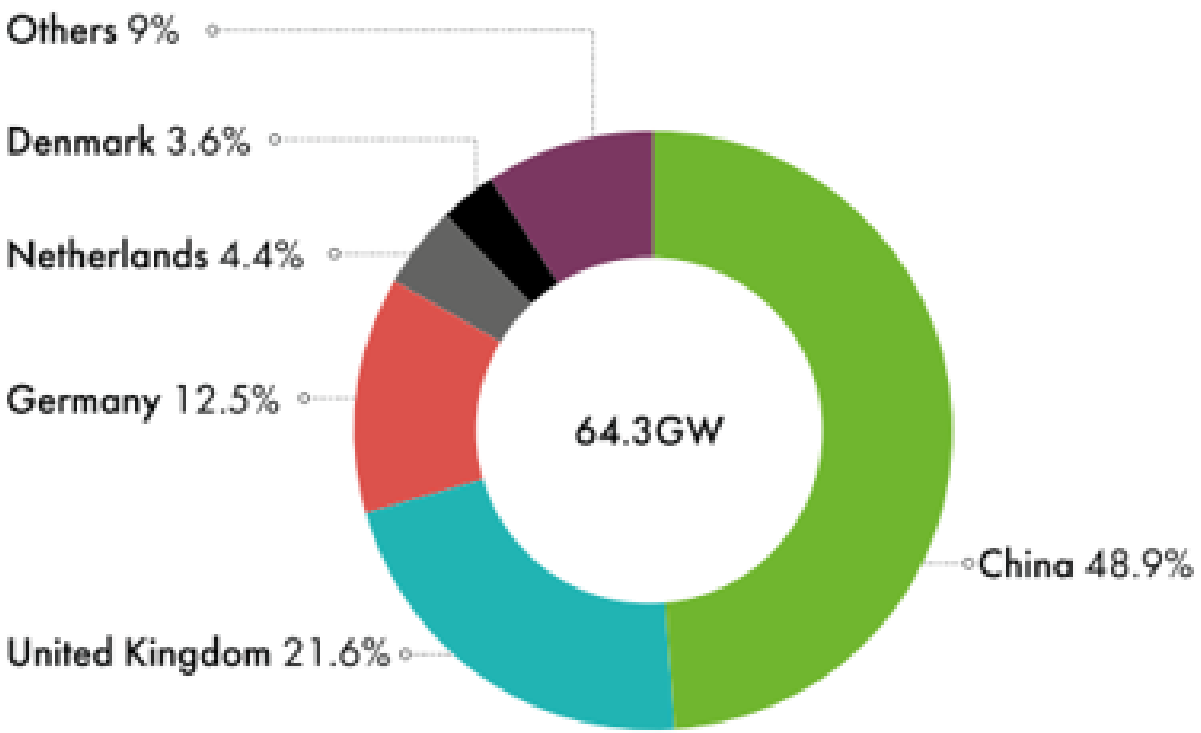




Luis Enrique Sánchez, Alexander Turra, Carla Grigoletto Duarte, Márcia Denadai, Ana Paula Alves Dibo, Luciana Yokoyama Xavier, Allan Yu Iwama, Ivan R. A. Laurino, Juliana Siqueira-Gay, Monique Torres de Queiroz, Alessandra Peil, Misty Rizzo, Monique Fogaça Fernandes, Geovanna P. Paulino, Eddy A. Carvalho Neto, Alessandra Peil

What are the key challenges for Impact Assessment in the offshore wind sector?

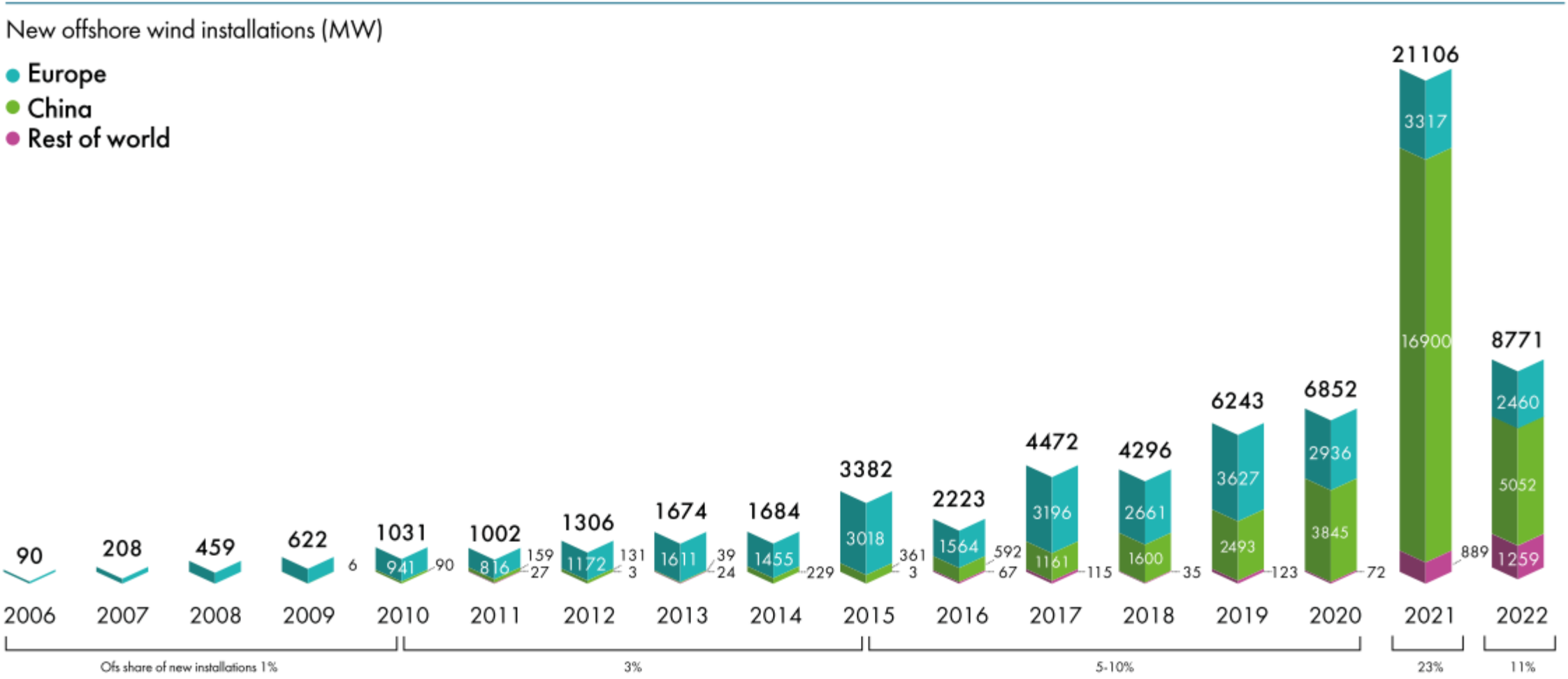
Market Status 2022

Total offshore wind installations by market



Total offshore wind installations by region

offshore wind represents currently 7.1% of global wind power installation



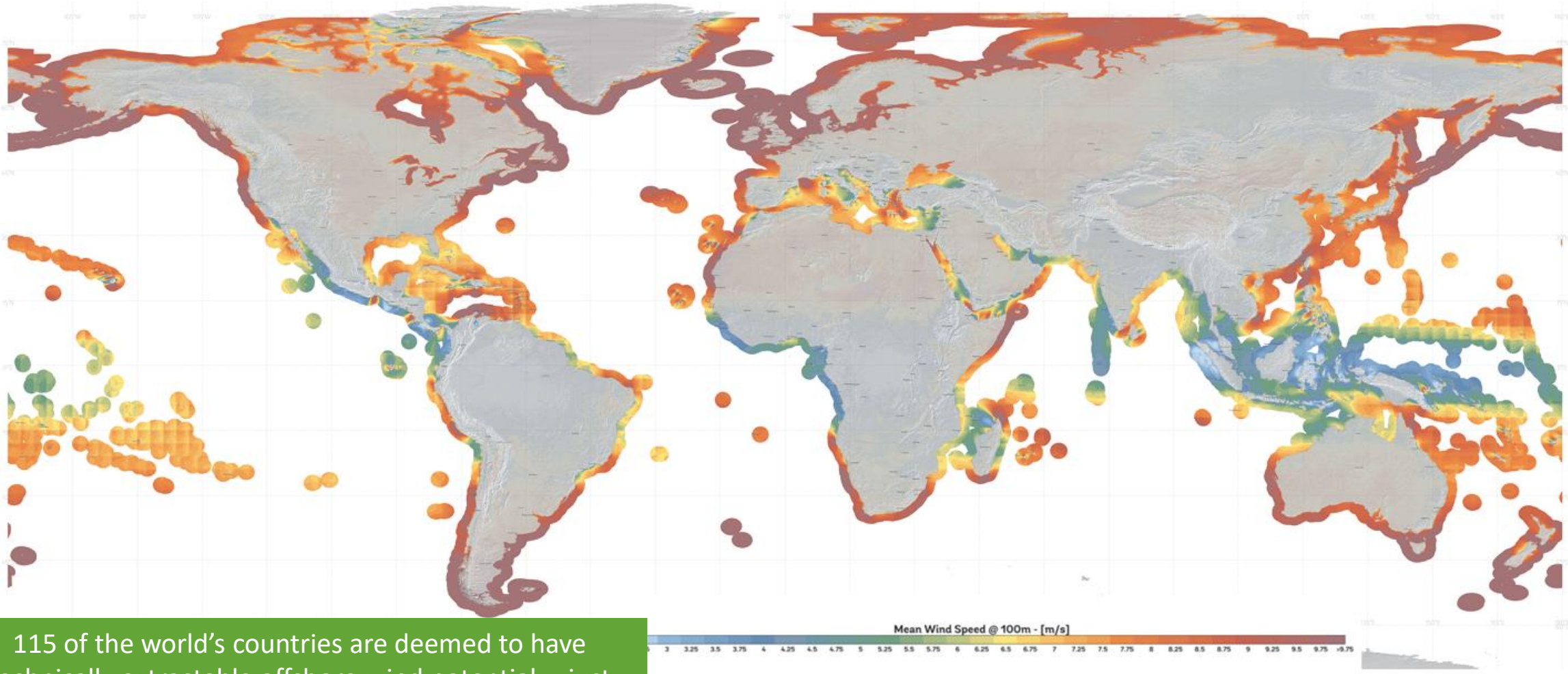
*Compound Annual Growth Rate.
Source: GWEC Market Intelligence

There is a significant expansion in the annual additions of new offshore wind installations

https://gwec.net/gwecs-global-offshore-wind-report-2023

OFFSHORE WIND RESOURCE MAP

MEAN WIND SPEED

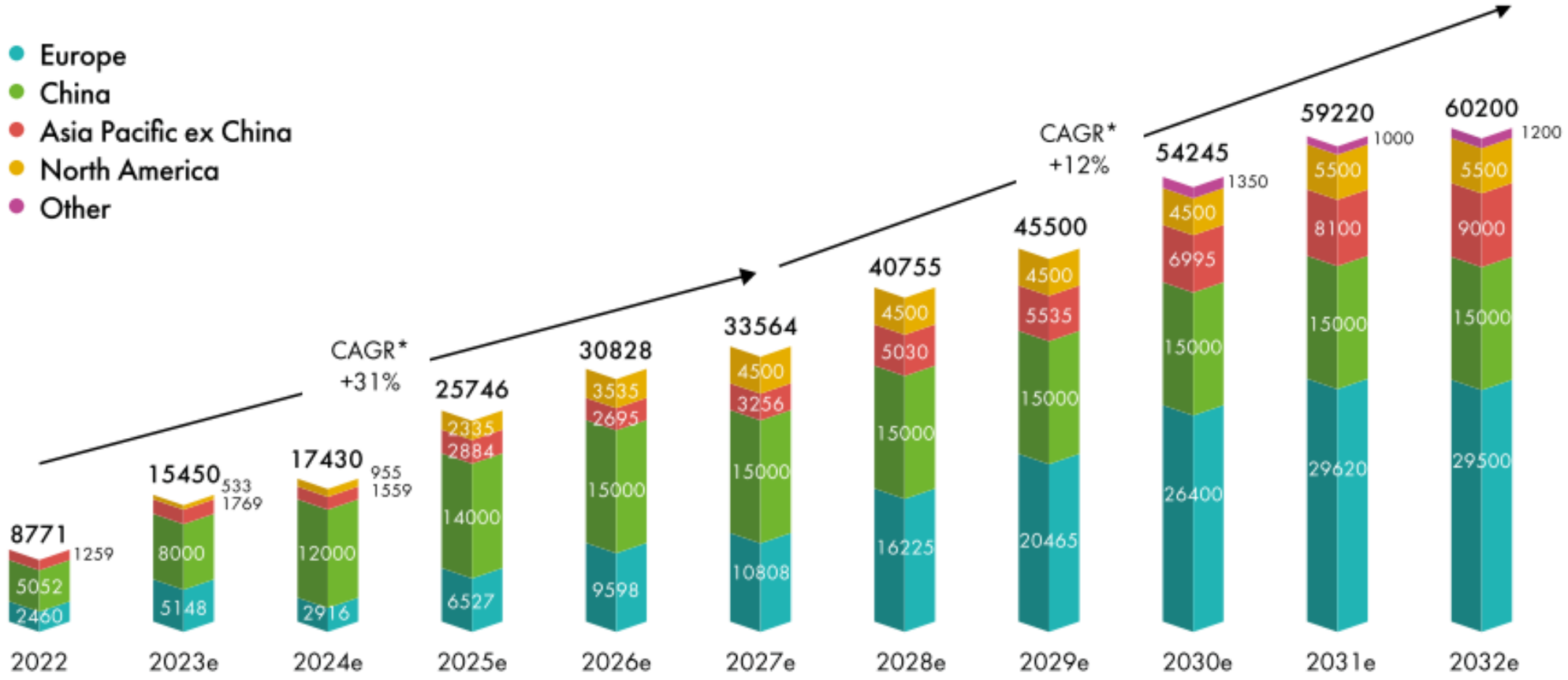


115 of the world's countries are deemed to have technically extractable offshore wind potential -- just over 71,000 GW. Only around 20,000 GW of that total is in shallower waters suited to fixed offshore wind turbines; the rest is suited to floating offshore wind.

https://www.esmap.org/esmap_offshorewind_techpotential_analysis_maps

https://globalwindatlas.info/en

New offshore wind installations, global (MW)

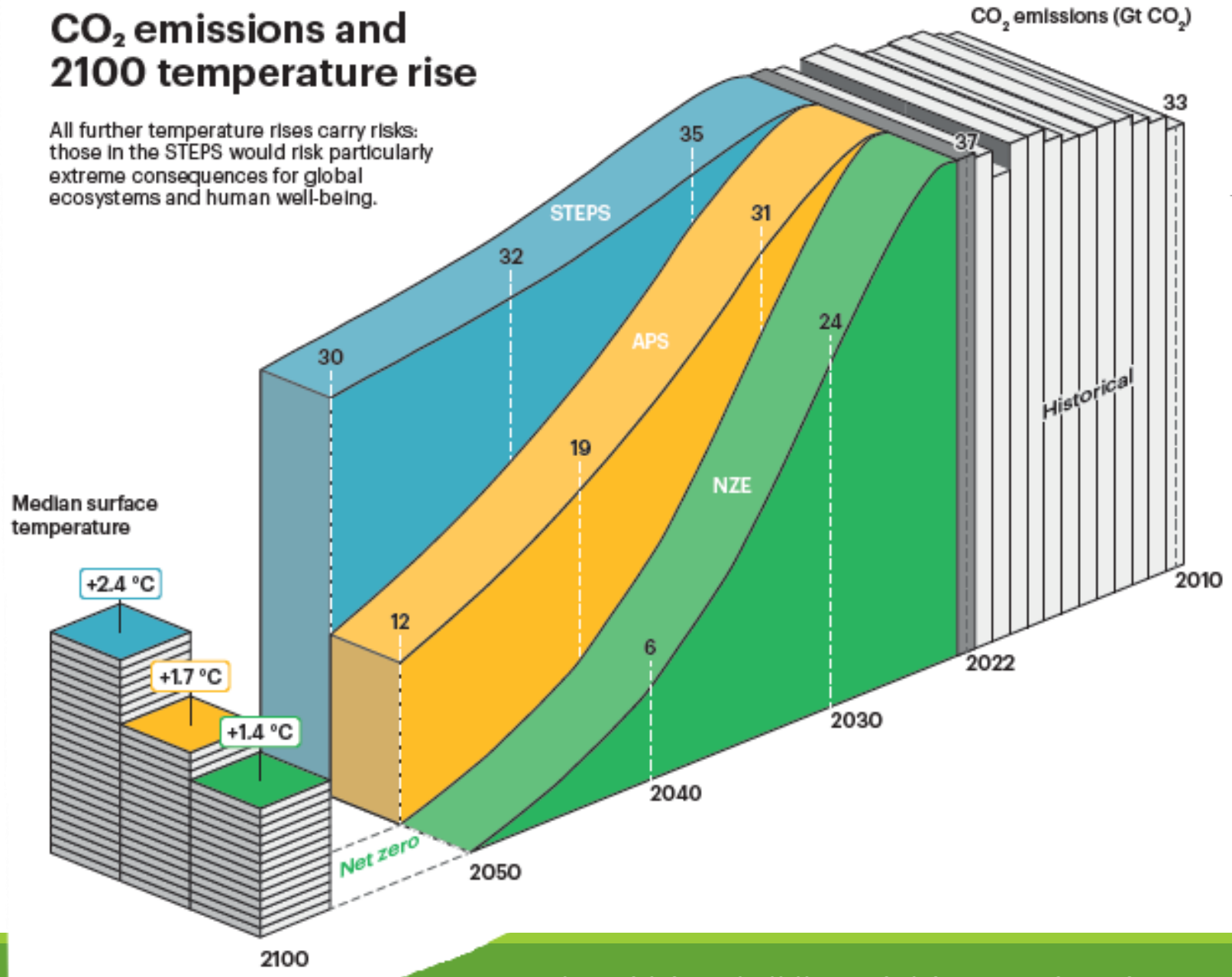


* Compound Annual Growth Rate.
Source: GWEC Market Intelligence, July 2023

Predictions made by GWEC show increasing capacity for OWE

GWEC Market Intelligence expects more than 380 GW of new offshore wind capacity to be added over the next decade

https://gwec.net/gwecs-global-offshore-wind-report-2023



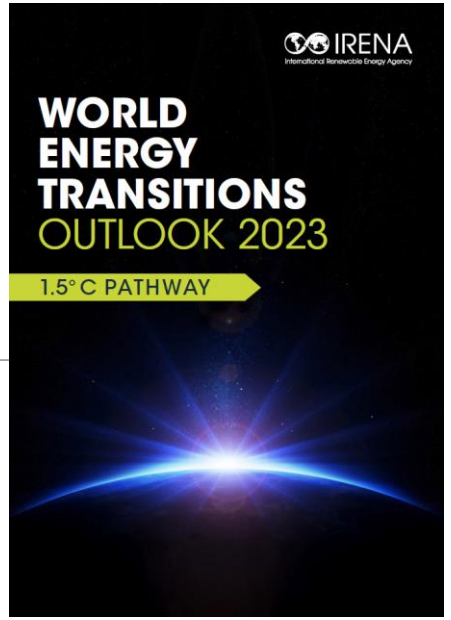
To achieve net zero emissions by 2050, expansion of renewable must be faster

https://www.iea.org/reports/world-energy-outlook-2023

TABLE 2.1 **Key performance indicators for the power sector: Planned Energy Scenario and 1.5°C Scenario in 2030 and 2050**

KPI.01
RENEWABLES (POWER)

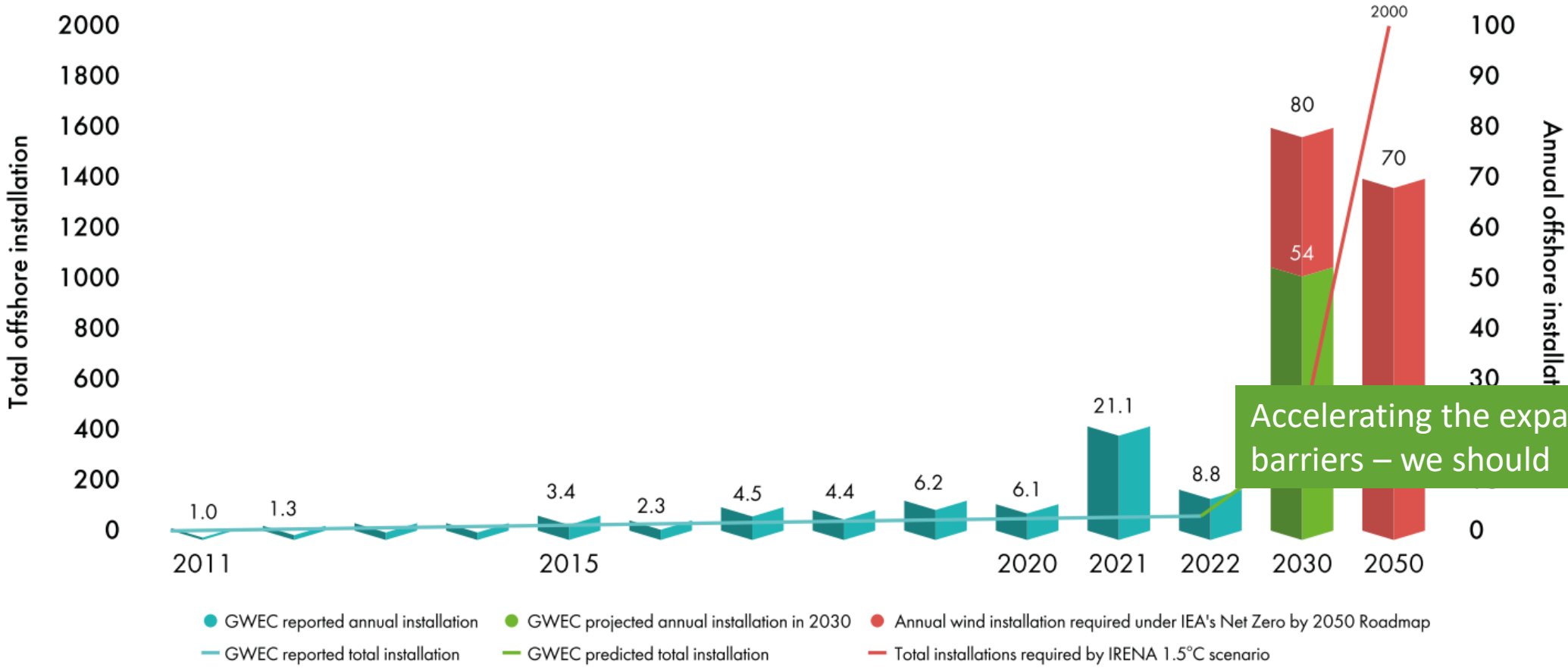
		Historical	2030		2050	
		2020	PES	1.5°C Scenario	PES	1.5°C Scenario
Total generation (TWh)	Global	26 991	36 119	40 140	52 436	89 878
	G20	22 616	29 560	32 408	41 867	66 273
Total installed capacity (GW)	Global	7 694	11 670	14 462	19 748	35 339
	G20	6 495	9 575	11 746	15 734	26 098
RE total installed capacity (GW)	Global	2 813	6 773	11 174	15 835	33 216
	G20	2 435	5 959	9 359	13 144	24 868
RE share in generation (%)	Global	28%	46%	68%	73%	91%
	G20	28%	48%	69%	74%	91%
VRE share in generation (%)	Global	9%	27%	46%	53%	70%
	G20	10%	31%	50%	59%	76%
RE share in installed capacity (%)	Global	37%	58%	77%	80%	94%
	G20	37%	62%	80%	84%	95%



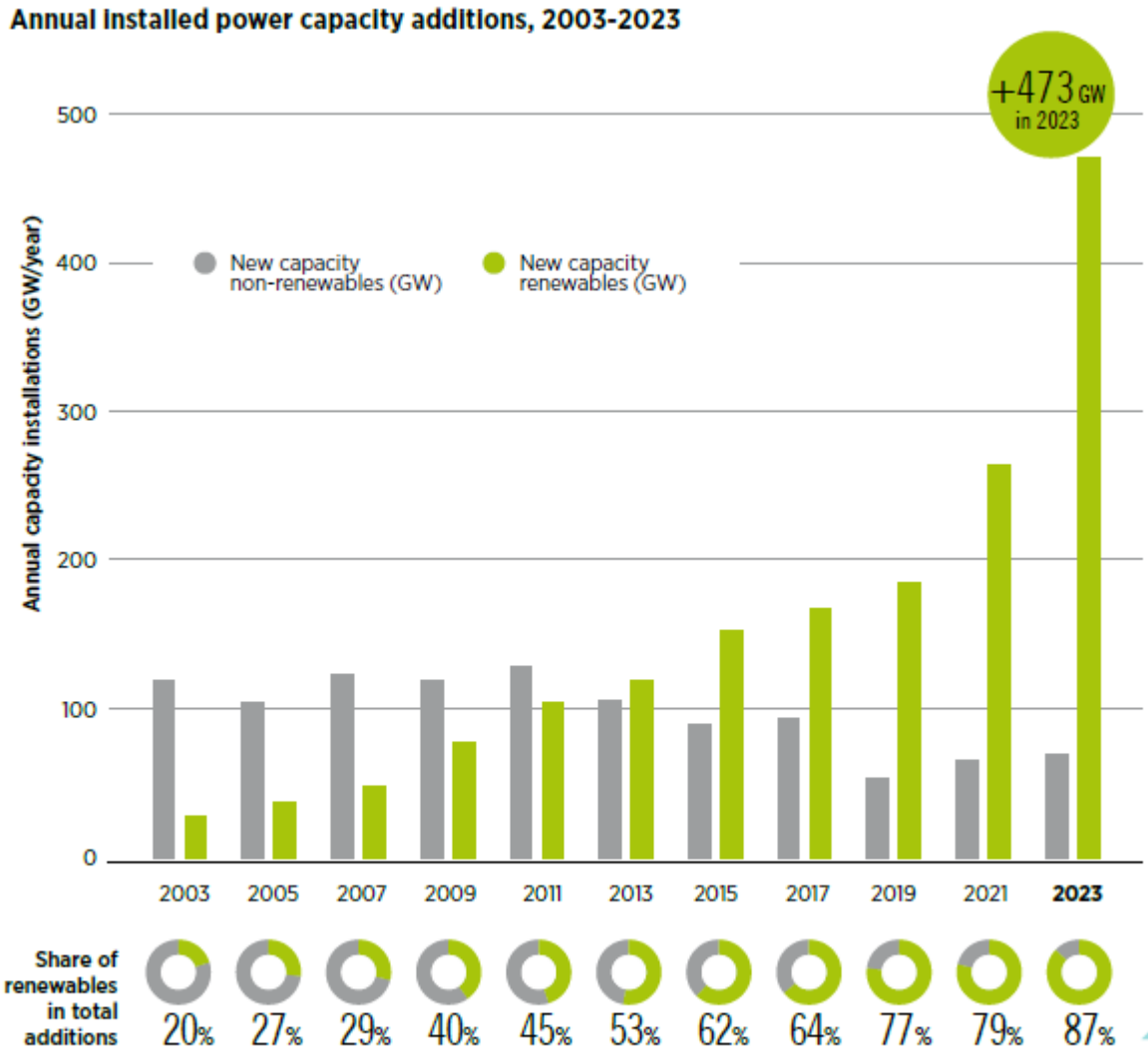
Under the 1.5°C Scenario, the global installed **offshore wind capacity would reach almost 500 GW in 2030**, a fourteen-fold growth over 2020 levels.
(…)
By 2050, offshore power plants of almost 2 500 GW in combined capacity would need to be installed globally.

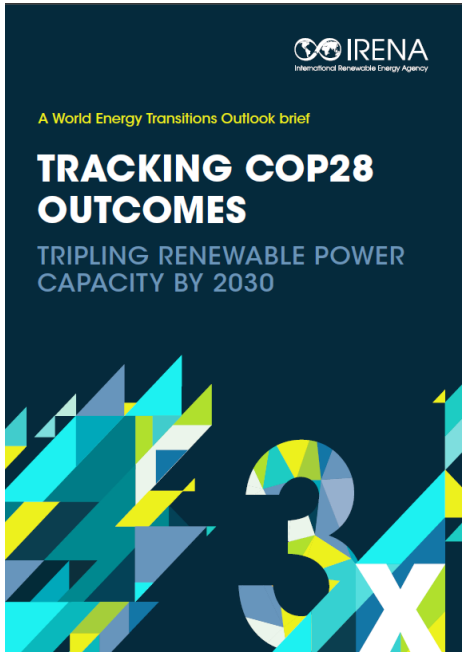
https://www.irena.org/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023

Closing the offshore wind gap by 2050



Accelerating the expansion founds many barriers – we should

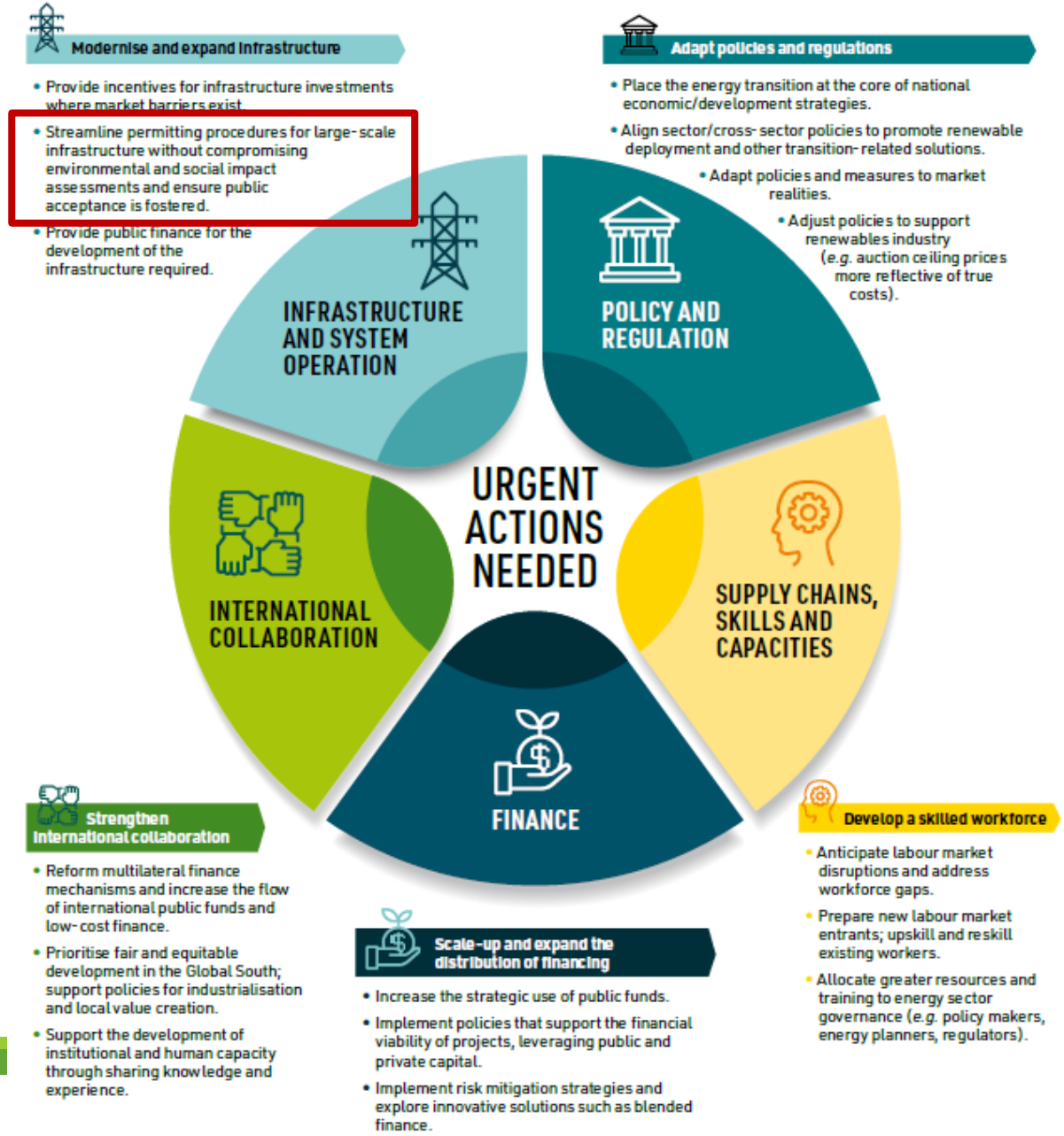


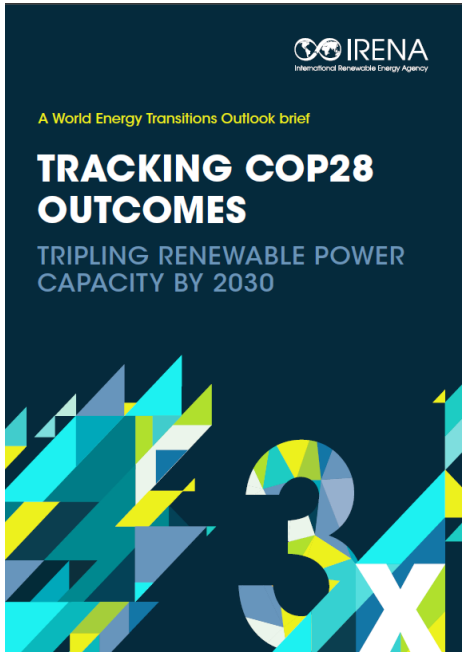


https://www.irena.org/Publications/2024/Mar/Tracking-COP28-outcomes-Tripling-renewable-power-capacity-by-2030?utm_source=akna&utm_medium=email&utm_campaign=22032024-ClimaInfo-Newsletter

The progress is notable - IRENA data indicates that 2023 set a new benchmark in renewable power deployment, adding 473 GW to the global energy mix, 87% of total additions

ENERGY TRANSITION URGENT ACTIONS





https://www.irena.org/Publications/2024/Mar/Tracking-COP28-outcomes-Tripling-renewable-power-capacity-by-2030?utm_source=akna&utm_medium=email&utm_campaign=22032024-ClimaInfo-Newsletter

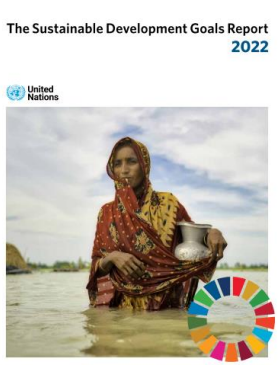
Still, IRENA identifies bottlenecks for renewable energy expansion – all of them relevant for offshore wind energy

One of the identified barriers for accelerating energy transition is related to permitting, including environmental requirements

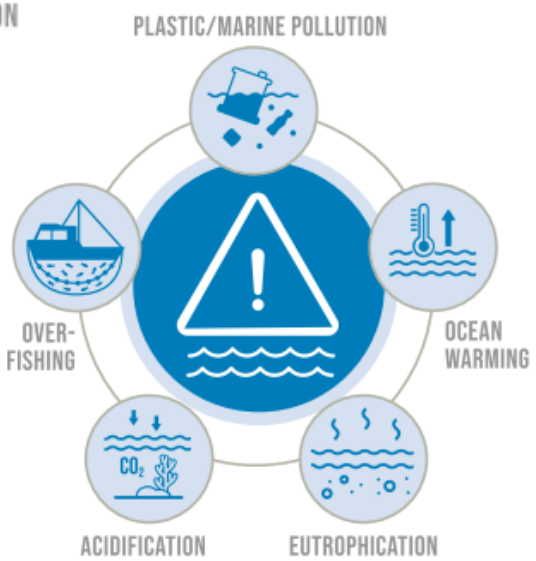
"Globally, offshore wind projects typically take up to **nine years** to move from the early development stage to full commissioning. The bulk of this time is spent in the permitting and consenting stage (...)"

GWEC – Global Wind Energy Council. Global Offshore Wind Report 2023. Brussels, 2023. p.17

Climate change is a threat of the utmost importance, but we have other critical threats to life on Earth

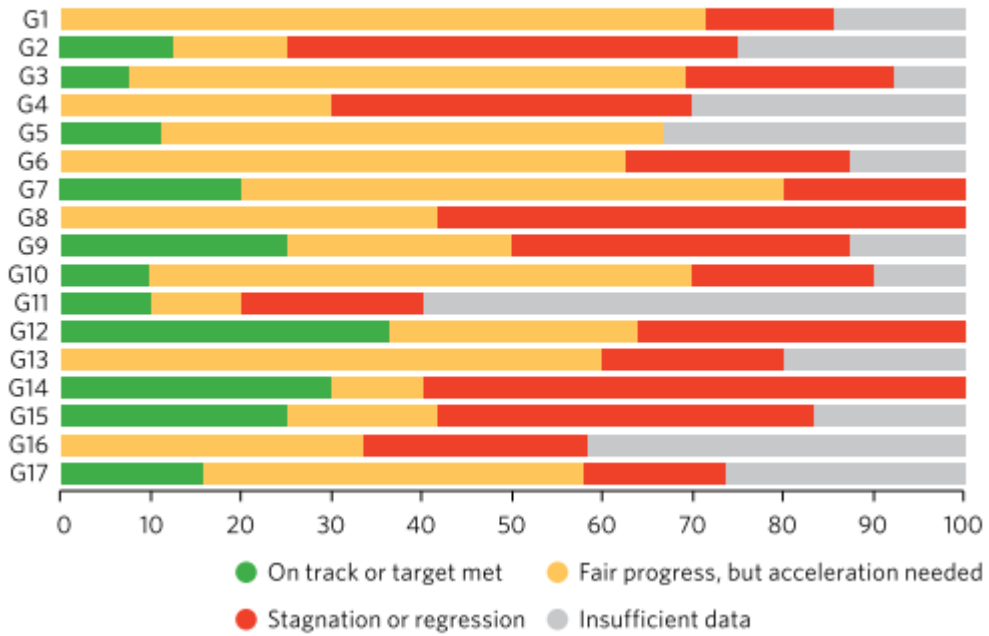


A. Taking stock of SDG progress at the midpoint

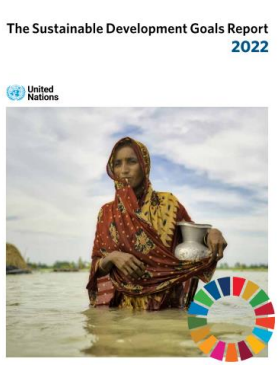


OUR OCEAN
THE PLANET'S LARGEST ECOSYSTEM
IS ENDANGERED

Progress assessment for the 17 Goals based on assessed targets, 2023 or latest data (percentage)



…and Impact Assessment has the purpose of bringing the multiple significant crises for supporting decision-making and actions for a just energy transition



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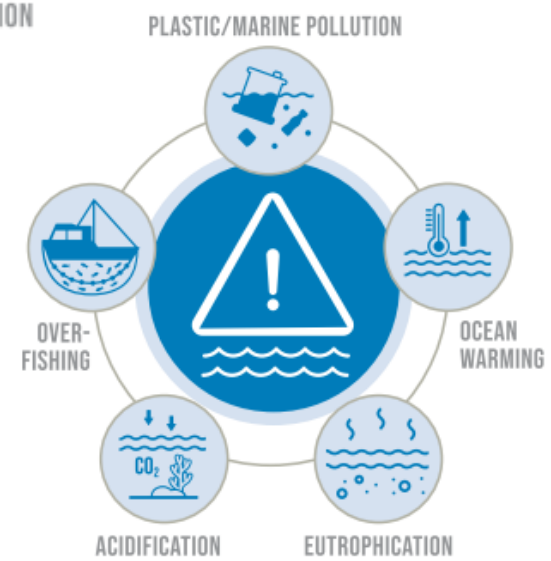

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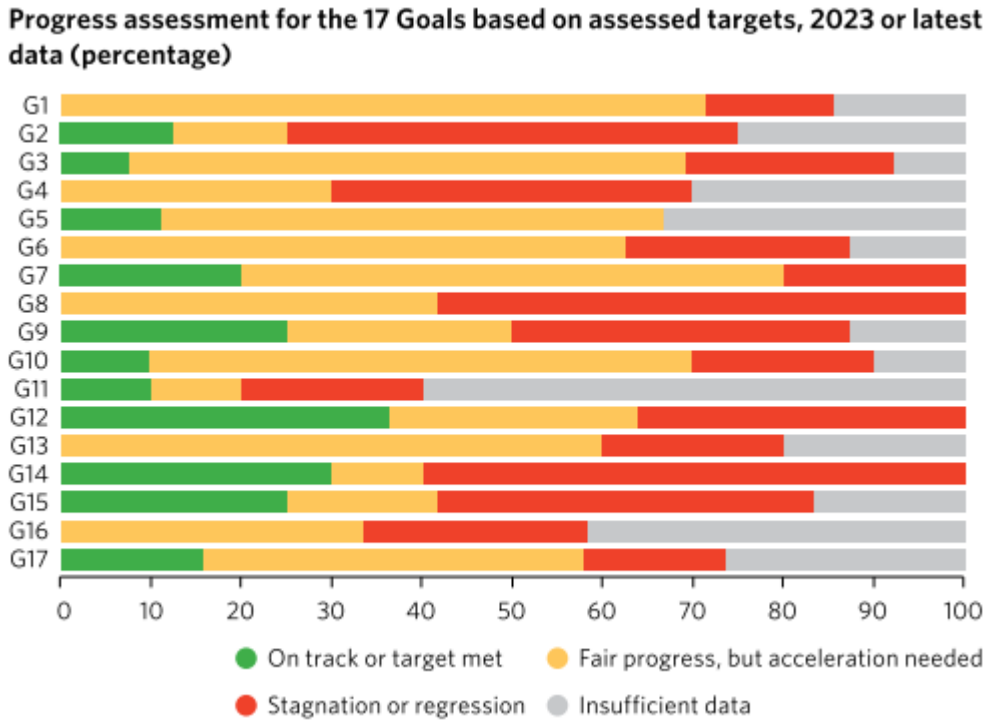


Exploring three IA challenges in OWE

1. **Streamlining EIA**
2. **EIA as part of a sustainability-based planning system**
3. **Cumulative impacts**

1. Streamlining EIA – how to do it?

Problems:

1. Limited public participation

2. Limited baseline
   + extensive monitoring requirements

3. Cumulative impacts not (well) addressed

4. New screening rules and exclusion of IA from decision-making

Fischer TB, Fonseca A, Geißler G, Jha-Thakur U, Retief F, Alberts R, Jiricka-Pürrer A. 2023. Simplification of environmental and other impact assessments–results from an international online survey. Impact Assess Proj Apprais [Internet]. 41(3):181–189. https://doi.org/10.1080/14615517.2023.2198839
González A, Sobrini I. 2023. Environmental assessment simplification in Spain: streamlining or weakening procedures? Impact Assess Proj Apprais [Internet]. 41(3):190–193. https://doi.org/10.1080/14615517.2023.2170094

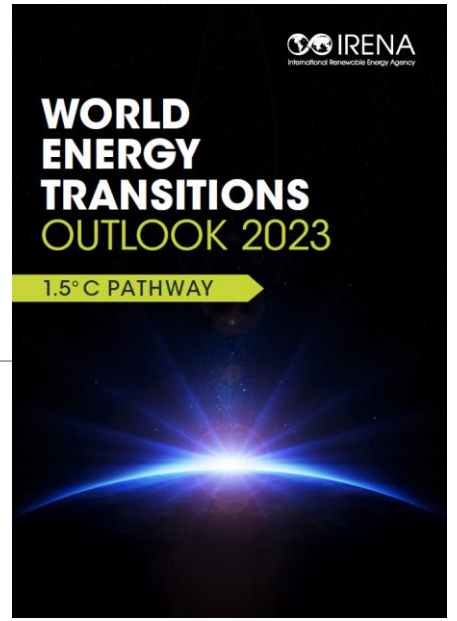
BOX 2.2 Enabling actions to speed up permitting protocols for offshore wind projects

Below is a list of some of the key solutions discussed by the CFOR, IRENA and GWEC to speed up the permitting process for offshore wind:

(1) Having dedicated centralised authorities and single focal points who can work with offshore wind developers to streamline the siting and permitting process. For example, in the Philippines, a 2021 executive order has prompted the creation of a task group to implement the Energy Virtual One-Stop Shop, an online platform to co-ordinate data and information for all renewable energy project applications.

(2) Implementing different channels to promote active dialogue for shared understanding of priorities during the consenting and construction stages of wind projects. An example of this are the offshore wind projects that were being plan
developers organised public-privat
latter's views were considered in t
(Park *et al.*, 2022).

(3) Introducing legislation mandating m
with additional discretionary time a
European Commission has tabled a new legislative proposal on renewables permitting within its REPowerEU plan. The proposal keeps the existing permitting deadlines – two years for normal new projects and one year for repowered projects. The legislation also clarifies which permits and procedures must be delivered within these deadlines (WindEurope, 2022).



Energy sector recommendations:
1. One-Stop Shop
2. Dialogue for shared understanding of priorities
3. Maximum lead times for permitting

https://www.irena.org/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023

2.2 OBSERVATIONS, CHALLENGES AND POTENTIAL SOLUTIONS IN CURRENT PERMITTING PROCEDURES

More recommendations:

Implement an emergency **clearing house mechanism** for legal disputes to prevent extended delays to critical infrastructure projects.

Accelerate energy infrastructure (offshore and onshore grid) permitting and deployment.

Invest in **more staff and digital resources** for the various authorities which make decisions during the permitting process of a renewable energy and infrastructure project.

Build **digitised, searchable databases for land registration** and the siting of renewable energy projects.

Align land and ocean use guidance at national and subnational level, prioritising projects which support energy security, DNSH principles, biodiversity and the green economy

https://www.irena.org/Publications/2023/Sep/Enabling-frameworks-for-offshore-wind-scale-up

(…) The UK has been exerting efforts to shorten the permitting time. Announced in June 2023, the Offshore Wind Environmental Improvement Package (OWEIP) aims to support the accelerated deployment of offshore wind by **reducing consenting time from up to four years to one year**.

The concept of a One-Stop-Shop (OSS) – a single contact point for a smooth and administratively lean process from consenting through to decommissioning – has long been used in mature European markets like Denmark, the UK and the Netherlands. The OSS for project permitting not only speeds up the consenting process, but also reduces uncertainties and delays

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journal homepage: www.elsevier.com/locate/enpol

Environmental licensing for offshore wind farms: Guidelines and policy implications for new markets

Rafael Monteiro de Vasconcelos [a,*], Lara Luana Cirilo Silva [b], Mario Orestes Aguirre González [c], Andressa Medeiros Santiso [b], David Cassimiro de Melo [a]

In Brazil, processes for granting marine areas for OWE are under discussion, but in the opposite direction, the legislative is reviewing EIA regulation proposing concerning issues. The federal environmental agency (IBAMA) is on strike due to the low number of civil servants, poor working conditions, and low salaries.

RESEARCH CASES

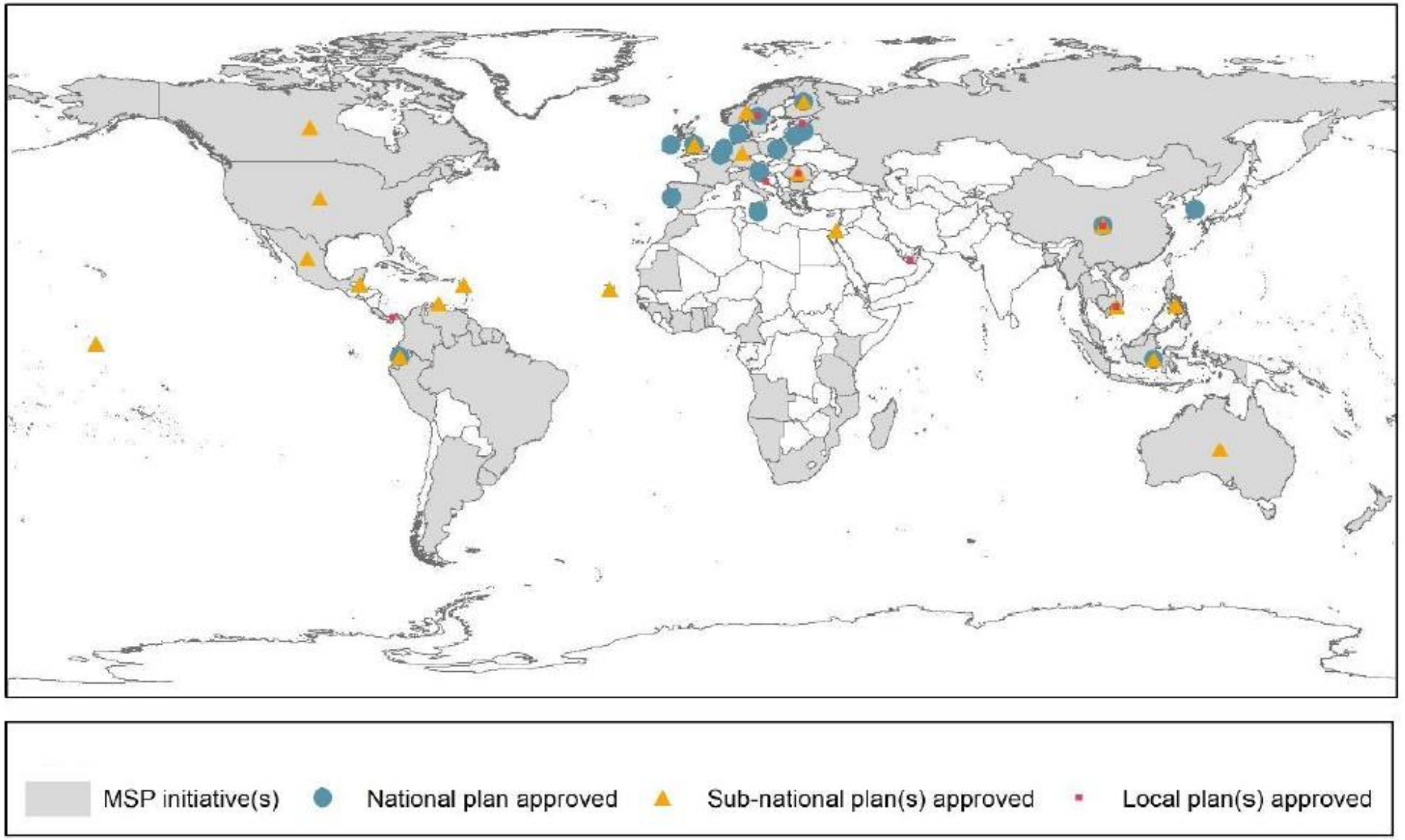
United Kingdom
Germany
Denmark
Taiwan

Guidelines and good practices in environmental licensing for the development of OWP

1. Establishment of a national offshore wind energy production target
2. Mapping of marine offshore wind zones
3. Adoption of a "one-stop-shop" procedure
4. Maritime land concession regimes: Open-doors and Tenders
5. Standard procedure guide in environmental licensing for offshore wind farms
6. Development of Environmental Studies
7. Public, authorities and stakeholders' consultation
8. Supply Chain Development Statement

Fig. 9. Guidelines in environmental licensing for OWP in new and emerging markets.

2. EIA and sustainability-based planning



https://unesdoc.unesco.
ark:/48223/pf000038192

Figure 4.1. MSP status around the world by April 2022. *Source:* IOC-UNESCO and MSP survey, 2022 .

2. EIA and sustainability-based planning

What happens before project-level EIA is essential

1. Marine Spatial Planning can play a crucial role in managing the multiple marine uses and resources
2. Sustainability-based planning can favor better project proposals
3. Early engagement of stakeholders in the MSP can mitigate potential future conflict

But MSP / planning:

1. May not be there
2. May be not mandatory – limited role in management and decision-making

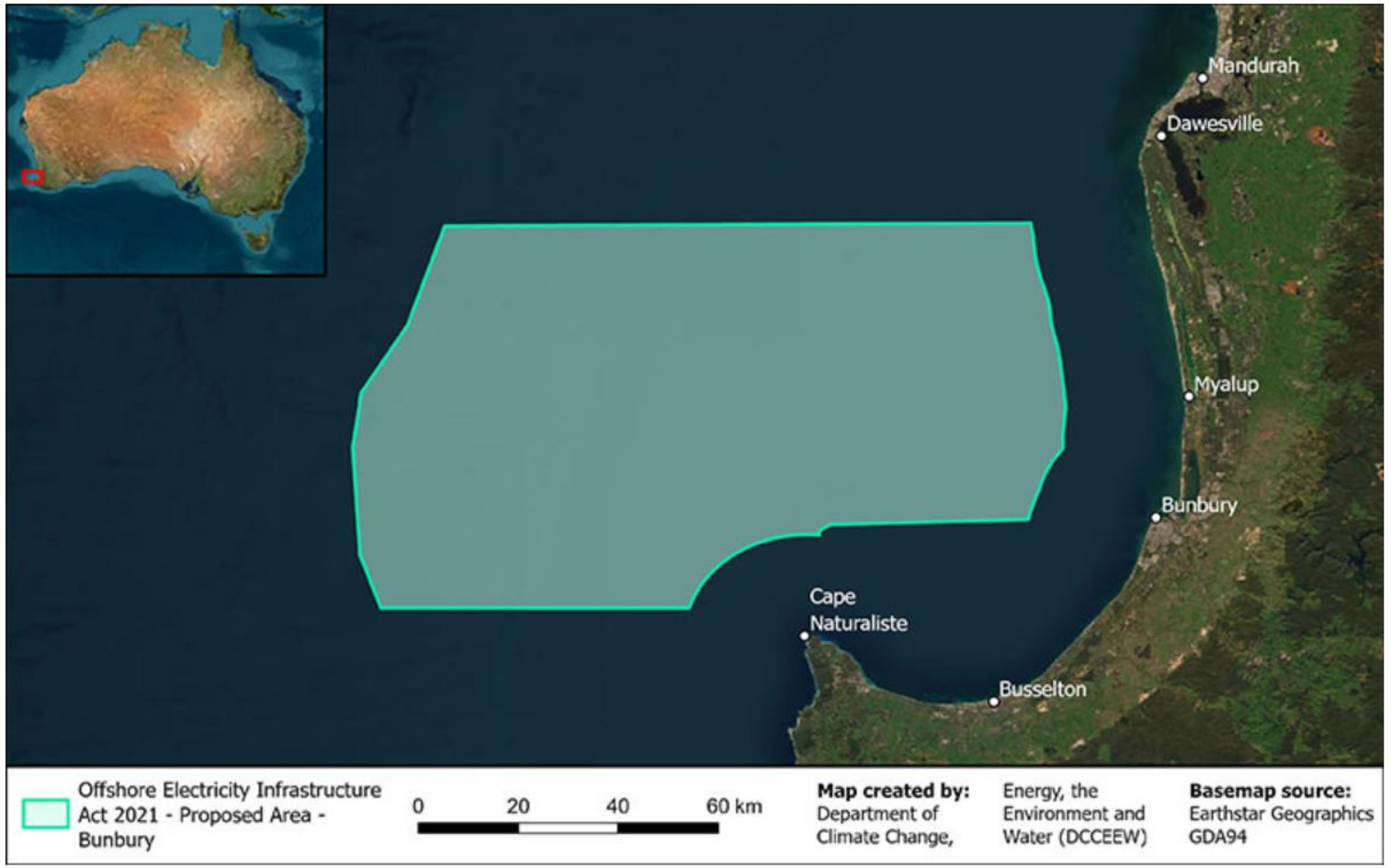
https://unesdoc.unesco.org/ark:/48223/pf0000381921

Australia selection areas beyond winds:

1. Potential low conflict (lower marine uses)
2. Existing infrastructure
3. proximity to areas of high electricity demand
4. skilled workforce
5. known industry interest in developing projects in the area

https://www.dcceew.gov.au/energy/renewable/offshore-wind/areas/bunbury#:~:text=The%20Minister%20for%20Climate%20Change,Dawesville%20and%20Cape%20Naturaliste%2C%20WA

Map of proposed area



Map of proposed area Indian Ocean off the Bunbury region, WA

Australian Government
Department of Climate Change, Energy, the Environment and Water

The Offshore Renewable Energy Process

AT THIS STAGE

- The Government **proposes** an area for future offshore wind development. This area is informed by data and information from government agencies.
- You will be able to make **online submissions** on the suitability of the proposed area. **This is your first opportunity to provide feedback**.
- After considering all feedback, the Minister for Climate Change and Energy may decide to **declare** all or some of the area.
- If an area is **declared**, feasibility studies and further engagement would then begin.

AT THIS STAGE

- Developers apply for **feasibility licenses**, which are assessed against merit criteria.
- Feasibility licence holders develop **specific project proposals** in more detail.
- Developers will seek environmental approvals required to undertake activities over multiple years of a feasibility licence.
- Prior to undertaking activities, developers require a **management plan** approved by the independent Offshore Infrastructure Regulator.
- Developers will consult with persons, organisations, communities, and groups that may be impacted by proposed activities, to develop their **management plans**.
- For approval, management plans must address any feedback from those impacted by activities.

AT THIS STAGE

- Developers who have **completed feasibility studies** and **met other approvals** apply for commercial licences, which are assessed against merit criteria.
- Turbines are **installed**, wind farms are **operated** and **maintained**.
- Developers are responsible for **decommissioning** their projects at the end of their lifespans.

3. Cumulative impacts

The marine ecosystem is highly connected – cumulative impact assessment is even more relevant

Social impacts must be properly addressed

The MSP when informed by the assessment of cumulative impacts derived from multiple pressures of several projects in an area, may influence several tiered decisions, including the permitting process (World Bank Group, 2021)

CIA integrated into MSP is a key approach to support the adoption of an ecosystem approach for sustainable use of the marine environment (Halpern et al. 2008b; Bergström et al. 2019), supporting strategic decision-making based on identifying areas with high and low concerns related to cumulative impacts from pressures on a given area, especially **considering seascape connectivity** (Jonsson et al. 2021), **limiting the additional pressures on specific areas** of concern and providing more **transparency** in planning decisions (Hammar et al. 2020).

3. Cumulative impacts

In UK – Willsteed *et al.* (2018) show relatively low performance of nine EIS from offshore wind farms from round 3.

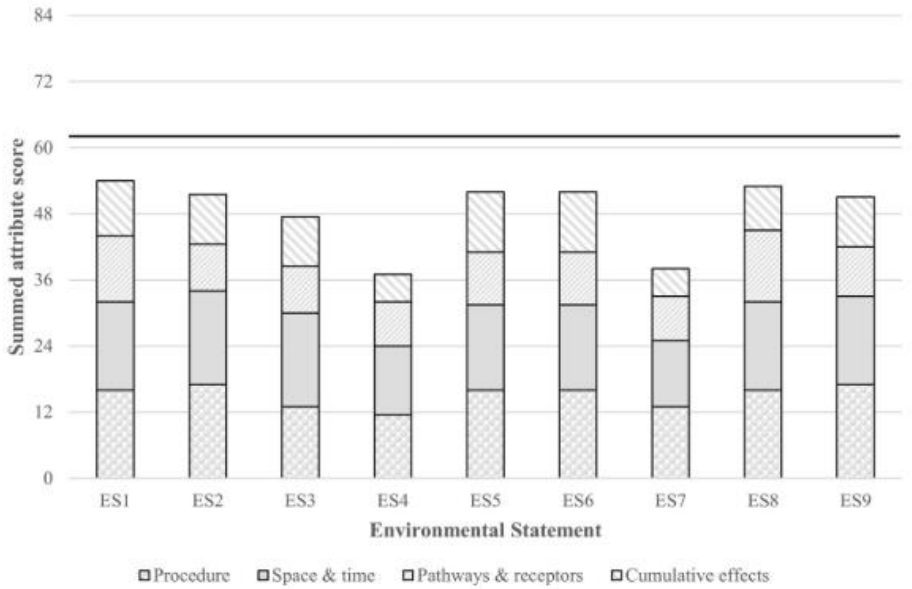
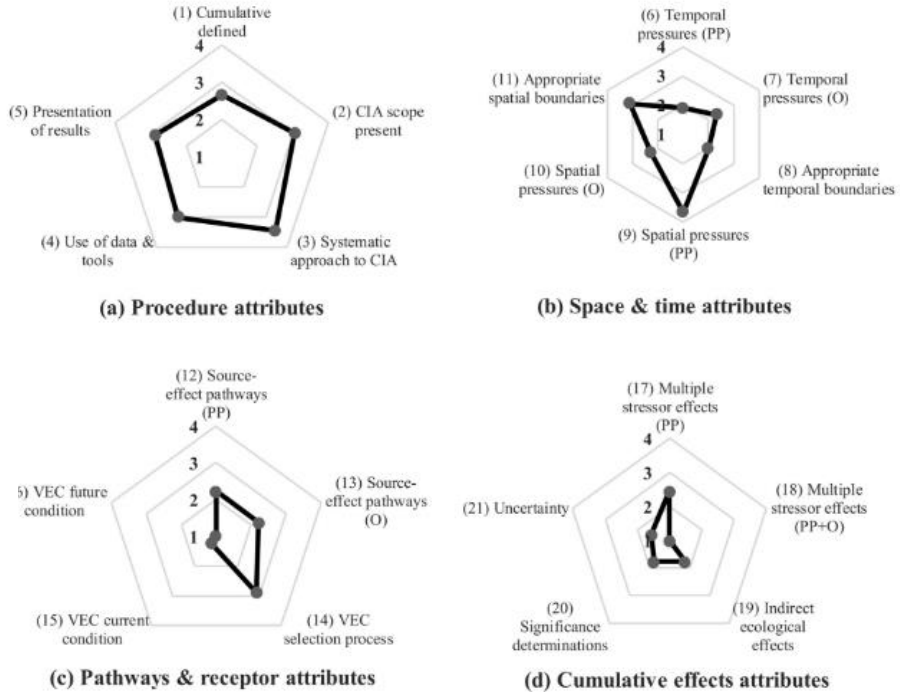


Fig. 5. Variance in scores between Environmental Statements evaluated (n = 9). The four components of each bar correlate with the attribute categories presented in Fig. 4. The horizontal black line indicates the expected height of the bar if an Environmental Statement scored 3 for each attribute ('strong').

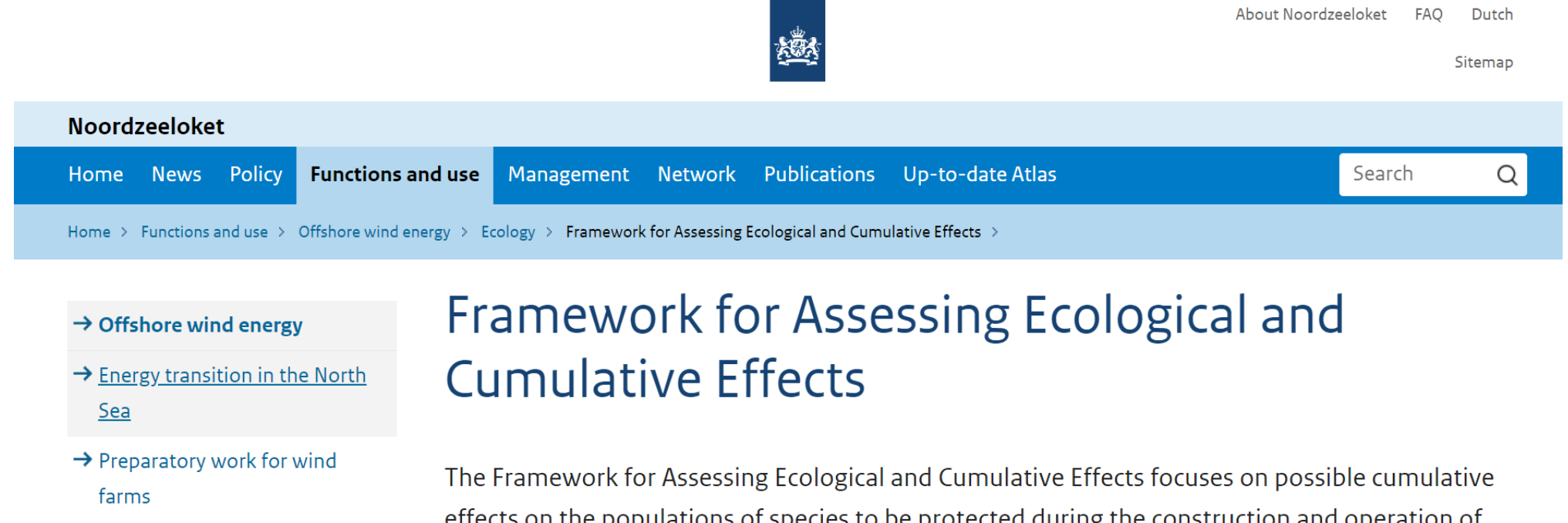


Willsteed, E. A., Jude, S., Gill, A. B., & Birchenough, S. N. R. (2018). Obligations and aspirations: A critical evaluation of offshore wind farm cumulative impact assessments. *Renewable and Sustainable Energy Reviews*, *82*(June 2017), 2332–2345.

Netherlands has a national ongoing Framework for assessing cumulative impacts

- separate from SEA and EIA

https://www.noordzeeloket.nl/en/functions-and-use/offshore-wind-energy/ecology/accumulation-ecological-effects/framework-assessing-ecological-cumulative-effects/



Final reflection

1. EIA streamline, the existing planning system and attention to the overall (cumulative) outcomes are high importance challenges

2. From all this, we can say that **IA needs adequate data, a team, time and timing, and a governance arrangement** capable of accommodating different stakeholder demands.

3. Effective IA depends on the **decision-making system's appetite for technical inputs on broader sustainability concerns** – must go from carbon-centered energy transition to a broader just transformation vision.

4. How prepared is IA for next-Generation renewable energy megaprojects? Political moves shows we must advance in demonstrating IA effectiveness

Acknowledgements

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References

Declerck M, Trifonova N, Hartley J, Scott BE. 2023. Cumulative effects of offshore renewables: From pragmatic policies to holistic marine spatial planning tools. Environ Impact Assess Rev [Internet]. 101(May):107153. https://doi.org/10.1016/j.eiar.2023.107153GWEC -

Degraer S, Carey DA, Coolen JW, Hutchison ZL, Kerckhof F, Rumes B, Vanaverbeke J. 2020. Special Issue on Understanding the Effects of Offshore Wind Energy Development on Fisheries: Offshore Wind Farm Artificial Reefs Affect Ecosystem Structure And Functioning - A Synthesis. Oceanography [Internet]. 33(4):10.

European Commission. 2022. Commission recommendation of 18.5.2022 on speeding up permit-granting procedures for renewable energy projects and facilitating Power Purchase Agreements. C/2022/3219 final. Document C(2022)3219.

Fischer TB, Fonseca A, Geißler G, Jha-Thakur U, Retief F, Alberts R, Jiricka-Pürrer A. 2023. Simplification of environmental and other impact assessments–results from an international online survey. Impact Assess Proj Apprais [Internet]. 41(3):181–189. https://doi.org/10.1080/14615517.2023.2198839

Global Wind Energy Council, Boston Consulting Group. 2023. Mission Critical: Building the global wind energy supply chain for a 1.5°C world.

Global Wind Energy Council. 2023. Global Offshore Wind Report 2023

González A, Sobrini I. 2023. Environmental assessment simplification in Spain: streamlining or weakening procedures? Impact Assess Proj Apprais [Internet]. 41(3):190–193. https://doi.org/10.1080/14615517.2023.2170094

Halpern BS, Walbridge S, Selkoe KA, Kappel C V., Micheli F, D'Agrosa C, Bruno JF, Casey KS, Ebert C, Fox HE, et al. 2008. A Global Map of Human Impact on Marine Ecosystems. Science (80-) [Internet]. 319(5865):948–952 https://www.science.org/doi/10.1126/science.1149345

IRENA. 2023. World energy transitions outlook 2022: 1.5°C Pathway.

Willsteed EA, Jude S, Gill AB, Birchenough SNR. 2018. Obligations and aspirations: A critical evaluation of offshore wind farm cumulative impact assessments. Renew Sustain Energy Rev. 82(June 2017):2332–2345.

Willsteed EA, New L, Ansong JO, Hin V, Searle KR, Cook ASCP. 2023. Advances in cumulative effects assessment and application in marine and coastal management. Cambridge Prism Coast Futur.

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