DOCKETED	
Docket Number:	17-MISC-01
Project Title:	California Offshore Renewable Energy
TN #:	242271
Document Title:	Defenders of Wildlife Comments - AB 525 Workshop on OSW Strategic Plan
Description:	N/A
Filer:	System
Organization:	Defenders of Wildlife
Submitter Role:	Public
Submission Date:	3/11/2022 1:43:47 PM
Docketed Date:	3/11/2022

Comment Received From: Defenders of Wildlife
Submitted On: 3/11/2022
Docket Number: 17-MISC-01

Defenders of Wildlife Comments - AB 525 Workshop on OSW Strategic Plan 17-MISC-01

Additional submitted attachment is included below.

California Program Office
980 Ninth Street, Suite 1730 | Sacramento, California 95814 | tel 916.313.5800
www.defenders.org

March 11, 2022

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Electronically filed to the Docket No. 17-MISC-01

RE: Defenders of Wildlife's Comments – Workshop on Assembly Bill 525 Strategic Plan for Offshore Wind Energy Planning Goals

On behalf of Defenders of Wildlife and our 323,000 members and supporters in California, we submit these comments on the California Energy Commission's (CEC) March 3, 2022 Workshop on the Assembly Bill (AB) 525 strategic plan for Offshore Wind (OSW) energy planning goals. We appreciate the Commissioners and staffs' efforts to organize the workshop and the intensive efforts to meet the AB 525 deadlines. Offshore wind along the California coast offers the potential for a consistent stream of renewable energy that could provide significant energy, climate, and economic benefits for local communities, California, and the western grid. Defenders supports responsibly developed OSW energy as an important part of a clean energy portfolio. OSW energy can and must advance in an environmentally responsible manner to ensure that it plays a reliable role in meeting the ambitious climate and clean energy goals throughout the west coast. At the same time, OSW development must safeguard valuable and vulnerable ocean and terrestrial habitats, fish and wildlife, cultural resources, and communities.

Thus far, a vast majority of California's energy development has been focused on terrestrial utility-scale conventional and renewable energy generation and transmission that evolved within the framework of existing developed land and transmission and, in places, reflect ill-informed choices made decades ago. California has seen that unplanned, opportunistic, and poorly conceived generation and transmission development results in projects that struggle to be viable, are unnecessarily expensive, and cause significant and avoidable impacts to natural resources, cultural resources, and/or communities. Previous lack of planning has resulted in

lost time, increased costs, and a lack of certainty. AB 525 gives California agencies the opportunity to leverage lessons learned from terrestrial renewable energy development to advance OSW energy planning and development that is Smart from the Start.

Utility-scale floating OSW is new to the California coast and this region presents a clean slate for the development of this renewable energy technology. The development of OSW on the California coast represents an unparalleled opportunity to proactively plan utility-scale renewable energy generation and transmission from conception – based on the best available science, public policy, and collaborative stakeholder involvement – to identify the best project locations and rapidly meet our clean energy needs while protecting our world-class natural and cultural resources and providing economic benefits.

Feasibility Analysis and Goal Setting

OSW that is responsibly planned and developed to avoid, minimize, and mitigate potential environmental and economic impacts will benefit California and the west in our urgent transition away from fossil fuels to a clean energy economy. Several decades of offshore wind development in Europe have shown that OSW power can be developed responsibly to protect local wildlife, provided that all siting and permitting decisions are based on sound science and informed by key experts and stakeholders. The European experience shows us that avoiding sensitive habitat areas, requiring strong measures to protect wildlife throughout each stage of the development process, and implementing comprehensive monitoring of wildlife and habitat before, during, and after construction are essential for the responsible development of OSW energy.[1] Smart from the Start principles and practices must be used to seek areas where deployment, generation, transmission, and operations and maintenance (O&M) activities for OSW can avoid or minimize impacts on high-value resources at sea and on land.

Land and Sea

California OSW is expected to include:

- floating offshore wind farm(s)
- port improvements including marine terminals and tower assembly and maintenance areas
- transmission cables within the OSW farm(s) and between shore, port, and marine terminals
- substations
- grid improvements needed to provide energy to end users

[1] O'Brien, Sue. "Lessons learned from the European experience." Presentation at the *State of the Science Workshop on Wildlife and Offshore Wind Energy Development*. Nov. 13-14, 2018.

OSW on the Outer Continental Shelf (OCS) does not exist in a vacuum. Transmission to shore, construction, operations and maintenance activities, and shoreside components are part and parcel of any OSW project and must be considered within the scope of the whole project during planning, environmental review, leasing, and land-use permitting. In fact, both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) require analysis of projects "as a whole" and prohibit piecemealing the environmental review of projects. Therefore, we urge that OSW planning must include the identification and generation of data in both the marine and terrestrial environments.

The geospatial data, research reports, and other resources being used to develop the feasibility study and goals should be organized and posted in an AB 525 specific gallery in California Offshore Wind Energy Gateway (OSW Gateway).[2] The OSW Gateway should be expanded to incorporate natural, cultural, and economic resource data to support the analysis of landside OSW facilities, including marine terminals and transmission infrastructure. Data Basin and the OSW Gateway provide essential platforms for engagement with tribal governments, the environmental justice community, labor/workforce development partners, and economic development interests.

The use of best available science, geospatial analysis, and community engagement will enable California to direct OSW development to least-conflict areas and implement measures to enhance and/or protect high-value resources so that valuable OSW resources can help meet essential climate goals. The California Energy Infrastructure Planning Analyst (CAEIPA)[3] provides a greater level of technical analysis for terrestrial planning of generation and transmission.

The OSW Gateway and the CAEIPA provide the tools to plan for California OSW as a whole, including deployment, port and marine terminal development, power generation, landside O&M, and transmission. Terrestrial energy planning tools must be integrated into the comprehensive planning effort for OSW to provide a seamless planning platform that connects least-conflict marine areas with least-conflict terrestrial areas.

As California engages in planning for Senate Bill 100 implementation and the 20 Year Outlook[4] to identify renewable energy locations and transmission, we urge that the information generated through the OSW planning process is aligned with that effort.

---

[2] https://caoffshorewind.databasin.org/
[3] http://ceipa.databasin.org/
[4] https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/20-Year-transmission-outlook

Resources for AB 525 Analysis

We appreciate the list of resources posted to the docket on March 10, 2022.[5] OSW research is rapidly expanding and a challenge to stay abreast. The March 3rd list should be expanded to provide the comprehensive literature review AB 525 requires. The list relies heavily on governmental reports, which don't always include thorough scientific literature reviews. We recommend the list be refreshed as numerous peer-reviewed publications have emerged recently. We offer additional resources in Attachment A. The CEC should also review the State of the Science Workgroup Reports on Cumulative Impacts to Wildlife and the Environment stemming from the *State of the Science Workshop on Wildlife and Offshore Wind Energy 2020*. (Reports available at https://www.nyetwg.com/2020-workgroups)

Finally, information derived from recovery plans for endangered species for the following species must also be included in the feasibility analysis and strategic plan:

- North Pacific Right Whales[6 and 7]
- Southern Resident Killer Whales[8 and 9]
- Humpback Whales[10 and 11]
- Steller Sea Lion[12 and 13]
- Southern Sea Otter[14]

State Waters

OSW won't exist on the OCS in isolation and the AB 525 process should be used to plan for OSW development on the OCS from sand to steel. Analysis should be conducted within state waters to identify, evaluate, and plan for least-conflict siting for OSW transmission cables and port improvements. This analysis will also allow for comparison of impacts of OSW development in in different regions of the OCS and comparison of state waters vs. OSW development on the OCS.

[5] AB 525 Goals- Resources Considered (as of March 3, 2022)
[6] https://www.fisheries.noaa.gov/resource/document/final-recovery-plan-north-pacific-right-whale-eubalaena-japonica
[7] https://repository.library.noaa.gov/view/noaa/15978
[8] Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*)
[9] https://repository.library.noaa.gov/view/noaa/15975
[10] Final Recovery Plan for the Humpback Whale (*Megaptera novaeangliae*)
[11] https://repository.library.noaa.gov/view/noaa/15993
[12] Recovery Plan for the Steller Sea Lion (Revision) - Eastern and Western Distinct Population Segments
[13] https://repository.library.noaa.gov/view/noaa/15974
[14] https://ecos.fws.gov/docs/recovery_plan/030403.pdf

If locations are proposed and considered for supporting OSW development, we recommend avoidance of Biologically Important Areas for cetaceans, designated national marine sanctuaries, marine protected areas, Audubon Marine Important Bird Areas, ecologically sensitive areas such as migratory corridors, and other ecologically important habitat—including designated critical habitat. Further, numerous species of importance have "nearshore affinity";[15] thus, offshore wind development in state waters would likely have greater impacts on biological resources than alternative sites farther offshore.

Currently, there are two proposed "demonstration" projects near Vandenberg that overlap or border of leatherback sea turtle critical habitat, humpback whale critical habitat, biologically important areas for gray and blue whales, and the Point Conception and Vandenberg State Marine Reserves. In addition, the area around Point Conception is part of an "important ecosystem that supports a diverse array of biological communities" in a 2005 biogeographic assessment by the National Marine Sanctuary Program.[16] This diverse ecosystem includes many species listed as endangered or threatened under the Endangered Species Act.[17]

These projects, located in relatively shallow waters close to the coast, do not provide meaningful information for the development of the gigawatts of utility-scale offshore wind energy that is expected to occur 20 plus miles from the Central and Northern California coasts. Given the Vandenberg projects' proposed siting in such an ecologically important sensitive area, the only thing they demonstrate is how not to site OSW.

Timing of Comprehensive Environmental Review

As the strategic plan and permitting roadmap are developed under AB 525, the appropriate timing and level of environmental review under both CEQA and NEPA must be considered. Comprehensive environmental review at the start of the offshore wind planning process and prior to leasing will provide significant benefits, including:

- Providing the agency with the widest possible range of alternatives;
- Increasing project viability by identifying and addressing environmental issues early in the siting process;
- Allowing for optimal project siting and scope before any commitments, like power purchase agreements, are signed;

[15] https://www.ipcc.ch/srocc/

[16] NOAA National Centers for Coastal Ocean Science (NCCOS). 2005. A Biogeographic Assessment of the Channel Islands National Marine Sanctuary: A Review of Boundary Expansion Concepts for NOAA's National Marine Sanctuary Program. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. NOAA Technical Memorandum NOS NCCOS 21. 215 pp.

[17] https://www.fws.gov/endangered/species/

- Addressing potential resource conflicts upfront and enhancing buy-in from other ocean users; and
- Facilitating efficiency gains later in the process when, as appropriate, project-level analyses can tier off a programmatic environmental impact statement/report.

The Bureau of Ocean Energy Management's current process of deferring comprehensive environmental review until the end of the leasing process when construction and operations plans are approved fails to establish a baseline analysis that examines all critical issues on a broader scope that will help avoid unnecessary delay while protecting natural and cultural resources and other ocean uses. The AB 525 strategic plan and roadmap should clearly address the timing and scope for appropriate CEQA and NEPA review that will allow for consideration of OSW projects as a whole and allow for the avoidance and minimization of impacts to coastal resources.

Conclusion

The AB 525 planning process provides a platform for thoughtful, informed decision-making for the development of California's OSW energy and industry. OSW energy can and must advance in an environmentally responsible manner to ensure that it plays a key role in meeting state and national climate and clean energy goals while safeguarding vulnerable habitat, wildlife, communities, and economies. This is essential for ensuring that OSW energy can scale up to its full potential as a significant clean energy solution. We welcome the opportunity to meet with agency staff at any time to continue discussing planning for ecologically responsible OSW development. Please contact Kate Kelly at (530) 902-1615 or kate@kgconsulting.net with any questions.

Sincerely,

Pamela Flick
California Program Director

Kate Kelly
Consultant

Attachment:
AB 525 Additional Resources

Attachment A

Assembly Bill 525: Evaluating and quantifying maximum feasible capacity of offshore wind and establishing offshore wind megawatt planning goals for 2030 and 2045

Additional Resources

Abido, M. Y., Mahmud, Z., Sánchez-Pérez, P. A., & Kurtz, S. R. (2022). Seasonal challenges for a California renewable- energy-driven grid. *IScience*, *25*(1), 103577. https://doi.org/10.1016/j.isci.2021.103577

Ali, S. W., Sadiq, M., Terriche, Y., Naqvi, S. A. R., Hoang, L. Q. N., Mutarraf, M. U., Hassan, M. A., Yang, G., Su, C.-L., & Guerrero, J. M. (2021). Offshore Wind Farm-Grid Integration: A Review on Infrastructure, Challenges, and Grid Solutions. *IEEE Access*, *9*, 102811–102827. https://doi.org/10.1109/ACCESS.2021.3098705

Baik, E., Siala, K., Hamacher, T., & Benson, S. M. (2022). California's approach to decarbonizing the electricity sector and the role of dispatchable, low-carbon technologies. *International Journal of Greenhouse Gas Control*, *113*, 103527. https://doi.org/10.1016/j.ijggc.2021.103527

Bodini, N., Hu, W., Optis, M., Cervone, G., & Alessandrini, S. (2021). Assessing boundary condition and parametric uncertainty in numerical-weather-prediction-modeled, long-term offshore wind speed through machine learning and analog ensemble. *Wind Energ. Sci.*, *6*(6), 1363–1377. https://doi.org/10.5194/wes-6-1363-2021

Chen, J., & Kim, M.-H. (2022). Review of Recent Offshore Wind Turbine Research and Optimization Methodologies in Their Design. *Journal of Marine Science and Engineering*, *10*(1). https://doi.org/10.3390/jmse10010028

Christiansen, N., Daewel, U., Djath, B., & Schrum, C. (2022). Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. *Frontiers in Marine Science*, *9*. https://www.frontiersin.org/article/10.3389/fmars.2022.818501

Crowle, A., & Thies, P. (2022). Floating offshore wind turbines port requirements for construction. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment*, 14750902221078424. https://doi.org/10.1177/14750902221078425

De Borger, E., Ivanov, E., Capet, A., Braeckman, U., Vanaverbeke, J., Grégoire, M., & Soetaert, K. (2021). Offshore Windfarm Footprint of Sediment Organic Matter Mineralization Processes. *Frontiers in Marine Science*, *8*. https://www.frontiersin.org/article/10.3389/fmars.2021.632243

Díaz, H., Loughney, S., Wang, J., & Guedes Soares, C. (2022). Comparison of multicriteria analysis techniques for decision making on floating offshore wind farms site selection. *Ocean Engineering*, *248*, 110751. https://doi.org/10.1016/j.oceaneng.2022.110751

Farr, H., Ruttenberg, B., Walter, R. K., Wang, Y.-H., & White, C. (2021). Potential environmental effects of deepwater floating offshore wind energy facilities. *Ocean & Coastal Management*, *207*, 105611. https://doi.org/10.1016/j.ocecoaman.2021.105611

Garcia-Teruel, A., Rinaldi, G., Thies, P. R., Johanning, L., & Jeffrey, H. (2022). Life cycle assessment of floating offshore wind farms: An evaluation of operation and maintenance. *Applied Energy*, *307*, 118067. https://doi.org/10.1016/j.apenergy.2021.118067

Gideon, R. A., & Bou-Zeid, E. (2021). Collocating offshore wind and wave generators to reduce power output variability: A Multi-site analysis. *Renewable Energy*, *163*, 1548–1559. https://doi.org/10.1016/j.renene.2020.09.047

Gonyo, S. B., Fleming, C. S., Freitag, A., & Goedeke, T. L. (2021). Resident perceptions of local offshore wind energy development: Modeling efforts to improve participatory processes. *Energy Policy*, *149*, 112068. https://doi.org/10.1016/j.enpol.2020.112068

Halvorsen-Weare, E. E., Fonn, E., Johannessen, K., Kisialiou, Y., Nonås, L. M., Rialland, A., & Thun, K. (2021). A computer tool for optimisation and simulation of marine operations for offshore wind farm installation. *Journal of Physics: Conference Series*, *2018*(1), 012021. https://doi.org/10.1088/1742-6596/2018/1/012021

Kulkarni, S. S., & Edwards, D. J. (2022). A bibliometric review on the implications of renewable offshore marine energy development on marine species. *SI : Emerging and Disruptive Technologies for Aquaculture*, *7*(2), 211–222. https://doi.org/10.1016/j.aaf.2021.10.005

Macrander, A. M., Brzuzy, L., Raghukumar, K., Preziosi, D., & Jones, C. (2021). Convergence of emerging technologies: Development of a risk-based paradigm for marine mammal monitoring for offshore wind energy operations. *Integrated Environmental Assessment and Management*, *n/a*(n/a). https://doi.org/10.1002/ieam.4532

Maxwell, S. M., Kershaw, F., Locke, C. C., Conners, M. G., Dawson, C., Aylesworth, S., Loomis, R., & Johnson, A. F. (2022). Potential impacts of floating wind turbine technology for marine species and habitats. *Journal of Environmental Management*, *307*, 114577. https://doi.org/10.1016/j.jenvman.2022.114577

Musial, W., Duffy, P., Heimiller, D., & Beiter, P. (ORCID:0000000293397398). (2021). *Updated Oregon Floating Offshore Wind Cost Modeling*. https://doi.org/10.2172/1825061

Optis, M., Bodini, N., Debnath, M., & Doubrawa, P. (2021). New methods to improve the vertical extrapolation of near-surface offshore wind speeds. *Wind Energ. Sci.*, *6*(3), 935–948. https://doi.org/10.5194/wes-6-935-2021

Parkison, S. B., & Kempton, W. (2022). Marshaling ports required to meet US policy targets for offshore wind power. *Energy Policy*, *163*, 112817. https://doi.org/10.1016/j.enpol.2022.112817

Powers, T., Sajadi, A., & Hodge, B.-M. (2022). The current opportunities and challenges for offshore wind in the United States. *The Electricity Journal*, 107061. https://doi.org/10.1016/j.tej.2021.107061

R. Krishnamurthy, G. Garcia-Medina, B. Gaudet, A. Mahon, R. Newsom, W. Shaw, & L. Sheridan. (2021). Potential of Offshore Wind Energy off the Coast of California. *OCEANS 2021: San Diego – Porto*, 1–6. https://doi.org/10.23919/OCEANS44145.2021.9705976

Ren, Z., Verma, A. S., Li, Y., Teuwen, J. J. E., & Jiang, Z. (2021). Offshore wind turbine operations and maintenance: A state-of-the-art review. *Renewable and Sustainable Energy Reviews*, *144*, 110886. https://doi.org/10.1016/j.rser.2021.110886

Rinaldi, K. Z., Dowling, J. A., Ruggles, T. H., Caldeira, K., & Lewis, N. S. (2021). Wind and Solar Resource Droughts in California Highlight the Benefits of Long-Term Storage and Integration with the Western Interconnect. *Environmental Science & Technology*, *55*(9), 6214–6226. https://doi.org/10.1021/acs.est.0c07848

Rose, A., Wei, D., & Einbinder, A. (2021). *California's Offshore Wind Electricity Opportunity*. Schwarzenegger Institute for State and Global Policy. http://schwarzeneggerinstitute.com/images/files/OSW_Report.pdf

Rybchuk, A., Optis, M., Lundquist, J. K., Rossol, M., & Musial, W. (2021). A Twenty-Year Analysis of Winds in California for Offshore Wind Energy Production Using WRF v4.1.2. *Geosci. Model Dev. Discuss.*, *2021*, 1–41. https://doi.org/10.5194/gmd-2021-50

Salas, N., Cheli, M., Garcia, T., Severy, M. & Jacobson, A. (2021). Federal, State, and Local Environmental Permitting Processes for Offshore Wind Development on California's North Coast. In M. Severy, Z. Alva, G. Chapman, M. Cheli, T. Garcia, C. Ortega, N. Salas, A. Younes, J. Zoellick, & A. Jacobson (Eds.) California North Coast Offshore Wind Studies. Humboldt, CA: Schatz Energy Research Center. http://schatzcenter.org/pubs/2020-OSW-R15.pdf

Severy, M., Overhus, D. M., Tugade, L. G., & Copping, A. E. (2022). *Environmental Effects Assessment for Proposed Offshore Wind Farm off the Coast of Grays Harbor, Washington*. https://doi.org/10.2172/1811304

Shafiee, M., & Adedipe, T. (2022). Offshore wind decommissioning: An assessment of the risk of operations. *International Journal of Sustainable Energy*, 1–27. https://doi.org/10.1080/14786451.2021.2024830

Singhal, G., Connolly, A., Laranjinha, M., McKinnon, C., & Mortimer, A. (2021). *Independent Assessment of Current Floater Concepts for Floating Wind Application*. D011S001R001. https://doi.org/10.5957/TOS-2021-04

Smythe, T., Bidwell, D., & Tyler, G. (2021). Optimistic with reservations: The impacts of the United States' first offshore wind farm on the recreational fishing experience. *Marine Policy*, *127*, 104440. https://doi.org/10.1016/j.marpol.2021.104440

Solick, D. I., & Newman, C. M. (2021). Oceanic records of North American bats and implications for offshore wind energy development in the United States. *Ecology and Evolution*, *11*(21), 14433–14447. https://doi.org/10.1002/ece3.8175

Spielmann, V., Brey, T., Dannheim, J., Vajhøj, J., Ebojie, M., Klein, J., & Eckardt, S. (2021). Integration of sustainability, stakeholder and process approaches for sustainable offshore wind farm decommissioning. *Renewable and Sustainable Energy Reviews*, *147*, 111222. https://doi.org/10.1016/j.rser.2021.111222

Tackaberry, J., Dobson, E., Flynn, K., Cheeseman, T., & Calambokidis, J. (2022). Low Resighting Rate of Entangled Humpback Whales Within the California, Oregon, and Washington Region Based on Photo-Identification and Long-Term Life History Data. *Frontiers in Marine Science*, *8*. https://www.frontiersin.org/article/10.3389/fmars.2021.779448

Tajalli Bakhsh, T., Simpson, K., LaPierre, T., Monim, M., Dahl, J., Spaulding, M., Rowe, J., Miller, J., & O'Connell, D. (2021, February 16). Potential Geo-Hazards to Floating Offshore Wind Farms in the US Pacific. *IOWTC2021*. https://doi.org/10.1115/IOWTC2021-3564

ten Brink, T., Dalton, T., & Livermore, J. (2021). Integrating Social and Ecological Research on the Impacts of Offshore Wind Farms in North America. In M. Gustavsson, C. S. White, J. Phillipson, & K. Ounanian (Eds.), *Researching People and the Sea: Methodologies and Traditions* (pp. 239–258). Springer International Publishing. https://doi.org/10.1007/978-3-030-59601-9_11

van der Loos, A., Langeveld, R., Hekkert, M., Negro, S., & Truffer, B. (2022). Developing local industries and global value chains: The case of offshore wind. *Technological Forecasting and Social Change*, *174*, 121248. https://doi.org/10.1016/j.techfore.2021.121248

van der Loos, A., Normann, H. E., Hanson, J., & Hekkert, M. P. (2021). The co-evolution of innovation systems and context: Offshore wind in Norway and the Netherlands. *Renewable and Sustainable Energy Reviews*, *138*, 110513. https://doi.org/10.1016/j.rser.2020.110513

Wang, Y.-H., Walter, R. K., White, C., Kehrli, M. D., & Ruttenberg, B. (2022). Scenarios for offshore wind power production for Central California Call Areas. *Wind Energy*, *25*(1), 23–33. https://doi.org/10.1002/we.2646

Xiu, P., Chai, F., Curchitser, E. N., & Castruccio, F. S. (2018). Future changes in coastal upwelling ecosystems with global warming: The case of the California Current System. *Scientific Reports*, *8*(1), 2866. https://doi.org/10.1038/s41598-018-21247-7

Younes, A. M. (2021). *Exploring renewable energy futures in Humboldt County consistent with the goals of California's renewable portfolio standard*. Master's Thesis. Cal Poly Humboldt. https://digitalcommons.humboldt.edu/etd/463

Yu, Z., Zheng, X., Hao, H., Yan, S., & Ma, Q. (2022). Numerical Simulation of a Floating Offshore Wind Turbine in Waves Using qaleFOAM. *International Journal of Offshore and Polar Engineering*, *32*(01), 39–48. https://doi.org/10.17736/ijope.2022.jc841

Zhang, H., Wang, H., Cai, X., Xie, J., Wang, Y., & Zhang, N. (2022). Research on the Dynamic Performance of a Novel Floating Offshore Wind Turbine Considering the Fully-Coupled-Effect of the System. *Journal of Marine Science and Engineering*, *10*(3). https://doi.org/10.3390/jmse10030341