

# Assessing the Climate “Footprint” in Ocean-related Policies:

A Comparative Study between China and Germany

2022.03

## G:HUB 2022

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## About G:HUB

Greenovation Hub (GHub) is an independent environmental think tank with a global outlook, registered with the Beijing Municipal Civil Affairs Bureau. GHub advances the policy development and dialogues in cutting-edge areas of sustainable development, seeks innovative solutions to quality growth, climate resilience and carbon neutrality in China and beyond, contributing to a net-zero and nature-positive future.

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# Executive Summary

The ocean-climate nexus has received increasing attention in the last decade. The impacts of changes in greenhouse gas concentrations and temperatures on the physics, chemistry, and biological resources of the oceans; the buffering function of the oceans to climate change, and the importance of action in the sea for climate change mitigation and adaptation are increasingly discussed in academic papers, scientific reports and policy documents. The Glasgow Climate Pact, adopted at the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), calls for its Subsidiary Body for Scientific and Technological Advice (SBSTA) to conduct an annual "Oceans and Climate Dialogue" and invites relevant work programmes and constituent bodies under the UNFCCC to consider how they can integrate the oceans into their existing mandates and work plans, and to report on these activities in existing reporting processes, as appropriate. A number of sectoral international marine organizations have also begun to explore the integration of climate change-related considerations into their work.

Introducing additional considerations of climate change in these international organisations, which are already occupied with their mandate, is undoubtedly difficult. At the same time, differences between the ideas, approaches, and standards of ocean management in different countries may also contribute to the difficulties of policy cooperation in international processes. Although climate policy has come a long way in many countries, there is still a lack of systematic synergy for climate adaptation and mitigation in domestic ocean policy. Domestic policy development may be relatively simple compared to negotiations within international organisations. However, it is also facing the challenges of compartmentalised administrative structures and a lack of relevant knowledge and capacity.

These challenges are common to all countries, and therefore responding to them requires dialogue and cooperation among countries at different levels. In July 2018, China and the EU officially signed the Declaration on the Blue Partnership for the Oceans: towards better ocean governance, sustainable fisheries and a thriving maritime economy (the China-EU Blue Partnership Declaration), which provides a platform for such dialogue and cooperation. To call the attention of the China-EU Blue Partnership to ocean-climate policy synergies and to provide an informative basis for discussion in the relevant official and private dialogues, with the support of the Heinrich Böll Foundation, Greenovation Hub conducted this review and comparison of the linkages between climate and ocean policy in China and Germany. Through interviews and a workshop, we have collected the thoughts and opinions from Chinese and foreign experts and identified initial priority areas for future bilateral cooperation.

The report first compares the marine-related content of Sino-German climate law and policy documents, then compares the ocean-related sectoral policies of both countries in fisheries, shipping, nature conservation, and offshore renewable energy, examining the mitigation of climate change and adaptation aspects of these. Finally, experts were invited to contribute to the discussion section based on their expertise, guided by a few questions.

Through a review of policy and legal documents, this report makes the following observations:

## Similarities:

- Both countries' high-level climate policy documents recognise the risks posed by climate to the oceans and the opportunities for action to address climate change in the oceans. Both countries recognise the importance of international cooperation in climate change and ocean governance and the key role of scientific research in addressing climate risks.

- Mitigation policies and planning in the oceans in both countries are more straightforward than adaptation; responses to short-term, immediate risks are more explicit than responses to medium and long-term risks in policies related to adaptation.
- Although there is more research and discussion in Germany on the integration of climate and ocean policies, in terms of existing policies, this integration is still limited in substance in both countries.

#### Differences:

- Germany has been aware of climate issues earlier in its maritime strategy. China's approach to building a "strong maritime power" emphasises the integration of land and sea and has long prioritised regional environmental protection, though with limited attention to climate risks.
- On the importance of international cooperation in climate change and ocean governance. The German Sustainable Development Strategy has a more straightforward plan for bilateral and multilateral cooperation than the documents issued by China. The Chinese policy documents referenced in this report are shorter in terms of both diplomacy and global governance. German and EU foreign policy links climate change and biodiversity more explicitly than domestic policy.
- In diplomacy, the EU and Germany actively promote discussions on climate change in international negotiations related to biodiversity. On the other hand, China has actively promoted 'nature-based solutions' in its climate diplomacy.
- Differences in development stages have led to different priorities in addressing the environmental challenges of fisheries sustainability and shipping facilities. Therefore the environmental objectives in existing sectoral policies are different between the two countries.

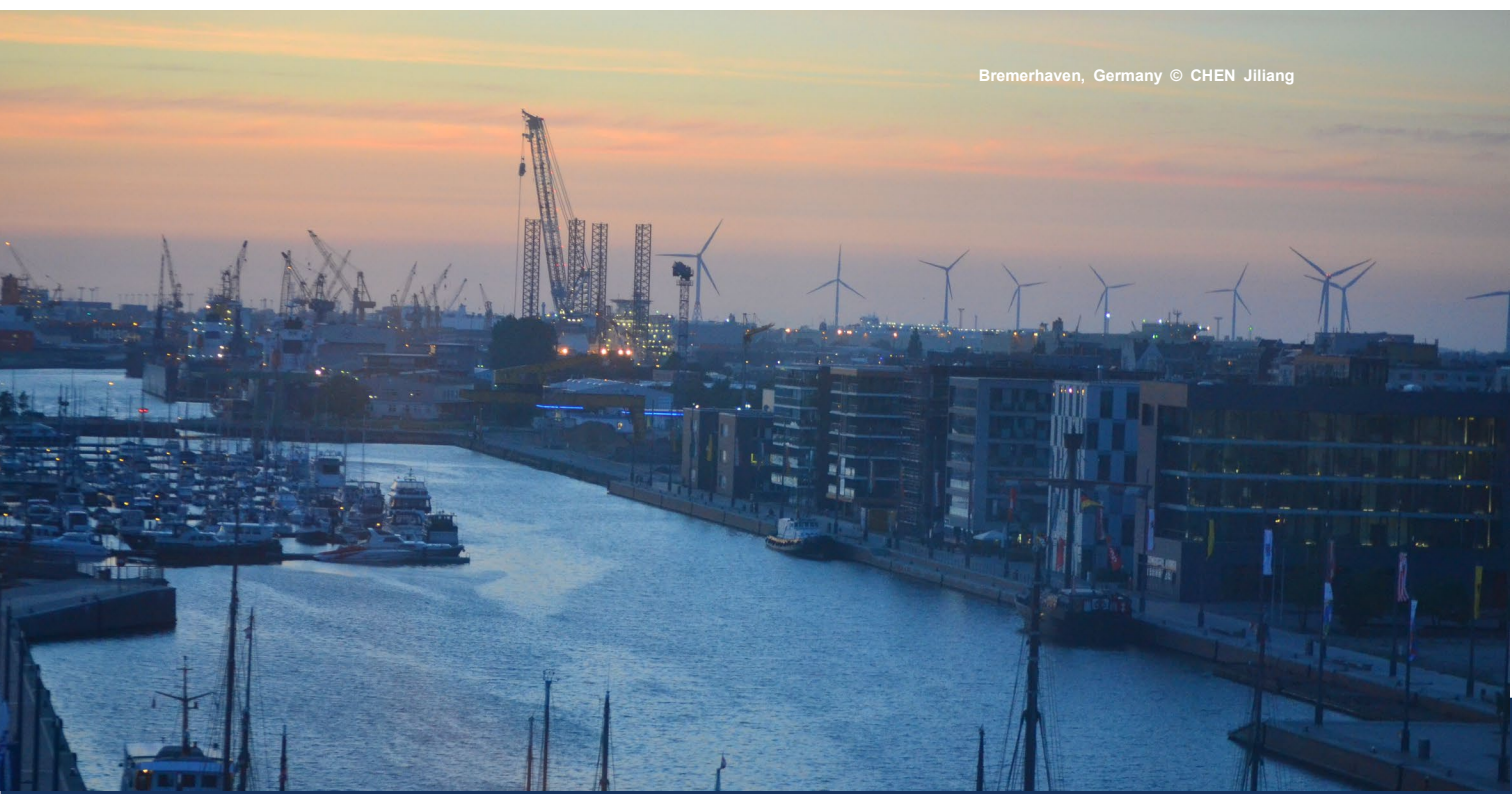
In their answers to the leading questions, several experts felt that China and Germany are not doing enough to address climate change in their ocean policies. Despite more active and cutting-edge research and discussions in Germany, there are no significant differences between the two countries regarding the policies developed. For future bilateral cooperation, experts suggested that priorities worthy of consideration in the future include, but are not limited to:

- Significantly strengthening scientific and technological support, increasing international cooperation, and actively promoting research on the processes and mechanisms of global and sensitive regional ocean-climate interactions, particularly German research on the relationship between climate and marine biodiversity in Europe and the Arctic, and Chinese research on the mechanisms of climate and physical ocean relationships in the Western Pacific and Northern Indian Ocean.
- Encourage bridging gaps between sea-air interactions and climate-ocean policy-making, especially the gap between natural science and policy research and development.
- Integrate sea-land climate response strategies, realise the three-dimensional synergy of management of land-sea-air-sky. Conduct multi-dimensional synergistic research on the sustainable development needs of land, air-sky climate awareness and response, and marine ecosystem protection and restoration.
- Improve sectoral coordination and strengthen the top-level design for integrating science, technology, industry and planning.

- Systematically consider integrating ocean responses to climate change into national and international climate change governance systems and providing actionable and implementable solutions.
- Providing opportunities to enhance the integration of ocean and climate policies through improved marine spatial planning.
- Capitalising China's institutional strengths to explore approaches to long-term planning.

This report argues that the lack of integration of ocean and climate policies is highlighted by the lack of climate adaptation policies involving the ocean, especially in identifying and responding to medium and long-term risks. Responding to this dilemma requires advancing scientific understanding and finding tools and methods to make decisions to manage risks with limited information. Both China and Germany have well-established ocean policy frameworks, and these tools and methods could assist in developing ocean policy objectives and approaches at different levels. While Germany is slightly ahead in research, the geography and climate of China's waters are more complex. The exchange and cooperation between the two countries will benefit each other and provide useful examples for global marine policy. The priority areas of cooperation identified in the discussion section suggested that Sino-German environmental cooperation and the Sino-EU Blue Partnership dialogue could build on this to identify further projects that could spearhead. As a non-governmental think-tank in China, Greenovation Hub is willing to support relevant dialogue and cooperation. We are convinced that such exchange and cooperation will benefit domestic policy development and policy collaboration at the global level.

Bremerhaven, Germany © CHEN Jiliang









**Background**

The climate and ocean crises used to be addressed through separate international processes and domestic mechanisms. States agreed to climate actions in the UNFCCC process and implemented these actions primarily through land-based activities. Though the UNFCCC process has been discussing issues relating to the ocean, such as bunker fuel, it had not systematically considered the ocean actions until recent years.

The governance of the ocean is even more fragmented. Various sectoral and regional organizations negotiate joint actions within their specific mandates, but these organizations do not typically include addressing climate change as part of their scope of work.

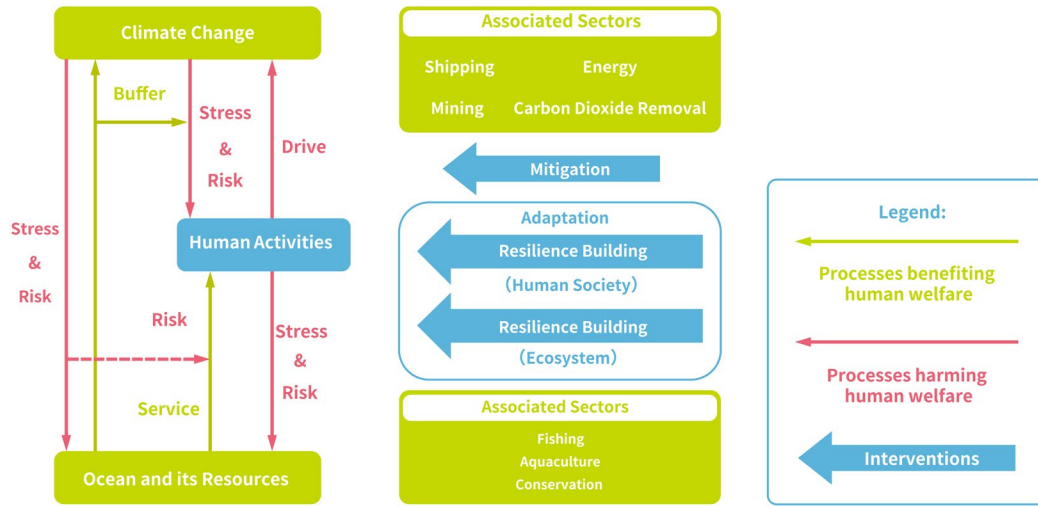
However, awareness of the complex linkages between the ocean and climate change in the last decade has risen. After mentioning the ocean occasionally in its previous assessment reports, in 2019, the Intergovernmental Panel on Climate Change (IPCC) published the *Special Report on the Ocean and Cryosphere* (SROCC), which comprehensively summarized the current knowledge of the “ocean-climate nexus.”

### IPCC on the Ocean-Climate Nexus

- **Ocean’s importance to human society:** “All people on Earth depend directly or indirectly on the ocean and cryosphere.... The low-lying coastal zone is currently home to around 680 million people (nearly 10% of the 2010 global population), projected to reach more than one billion by 2050. SIDS are home to 65 million people.” Besides these populations directly dependent on the ocean, people live in land needs the service from the ocean such as the “food and water supply, renewable energy, and benefits for health and well-being, cultural values, tourism, trade, and transport.” “The state of the ocean and cryosphere interacts with each aspect of sustainability reflected in the United Nations Sustainable Development Goals (SDGs).”
- **Impacts of climate change on the Ocean:** “It is virtually certain that the global ocean has warmed unabated since 1970.... Since 1993, the rate of ocean warming has more than doubled (likely). Marine heatwaves have very likely doubled in frequency since 1982 and are increasing in intensity (very high confidence). By absorbing more CO<sub>2</sub>, the ocean has undergone increasing surface acidification (virtually certain). A loss of oxygen has occurred from the surface to 1000 m (medium confidence).” “Datasets spanning 1970–2010 show that the open ocean has lost oxygen by a very likely range of 0.5–3.3% over the upper 1000 m, alongside a likely expansion of the volume of oxygen minimum zones by 3–8% (medium confidence). Oxygen loss is primarily due to increasing ocean stratification, changing ventilation and biogeochemistry (high confidence).” “Global mean sea level (GMSL) is rising, with acceleration in recent decades due to increasing rates of ice loss from the Greenland and Antarctic ice sheets (very high confidence), as well as continued glacier mass loss and ocean thermal expansion.”
- **Ocean’s function of buffering climate change:** The ocean “has taken up more than 90% of the excess heat in the climate system (high confidence).” “The ocean has taken up between 20–30% (very likely) of total anthropogenic CO<sub>2</sub> emissions since the 1980s.”

From the Summary for Policy Makers, IPCC SROCC, 2018

**Figure 1 Linkages between Climate Change and Ocean**



Created by the author

As the feedback effects between climate change and the condition of the ocean become better known, the case for law and policy that concurrently deal with both climate change and marine environmental protection grows more compelling.<sup>1</sup> The figure above includes the human factors in the ocean-climate nexus. While human ocean-related activities contribute to climate change and put stress and risk on the ocean, interventions relating to those activities could help mitigate climate change, which would build the capacities of both the ocean ecosystem and human society to adapt to climate change.

Such interventions could reach their full potential only when climate change is systematically addressed when making policies relating to the ocean. The following are examples of some of the questions that need to be answered during the ocean policy decision-making process:

- 1) What are the additional stressors and risks posed by climate change?
- 2) What are the options for mitigating climate change?
- 3) What are the options for building ocean resilience to climate change?
- 4) How to conciliate conflicts between sectoral objectives and climate objectives?

There have been efforts to strengthen the policymaking linkages between climate change and the ocean through several international processes. First, ocean issues have been formally entered into the UNFCCC negotiation process. The 2018 COP introduced an “Ocean Pathway” into its negotiation, and COP25 in 2019 was organized as the “Blue COP” to highlight the importance of the ocean in addressing climate change. The Glasgow Climate Pact, adopted at COP26 in 2021, invites the Chair of the SBSTA to hold an annual dialogue<sup>2</sup> and also invites the relevant work

<sup>1</sup> Stephen Minas. 2019. The Ocean-Climate Nexus in the Unfolding Anthropocene: Addressing Environmental Challenges Through International Law and Cooperation. [M]. Charting Environmental Law Futures in the Anthropocene, pp 83–94 [https://link.springer.com/chapter/10.1007/978-981-13-9065-4\\_7](https://link.springer.com/chapter/10.1007/978-981-13-9065-4_7).

<sup>2</sup> Glasgow Climate Pact, Article 61

programmes and constituted bodies under the UNFCCC to consider how to integrate and strengthen ocean-based action in their existing mandates and work plans and to report on these activities within the existing reporting processes, as appropriate.<sup>3</sup> All the above ocean-related efforts further mainstream ocean-based actions in the UNFCCC process.

Second, both formal and informal ocean-related policy decision-making processes have started to address climate change. The Our Ocean Conference has been collecting international ocean-based commitments to address climate change since 2014. In 2018, the International Maritime Organization (IMO) adopted an initial strategy to reduce greenhouse gas emissions from ships, with a vision that aims to phase them out as soon as possible within this century.<sup>4</sup> The World Trade Organization (WTO) is negotiating a deal to end harmful fishery subsidies, including subsidies for the fossil fuels burnt and emitted by fishing vessels.

However, a systematic approach to addressing ocean-based climate impacts is rarely taken by such organizations. For example, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), a leading regional ocean management organization, has spent years discussing addressing climate change in its management. Building resilience to climate change and better understanding the impact of climate change on marine ecosystems were explicitly stated as objectives in the proposals for the marine protected area (MPA)s in the west Antarctic Peninsula<sup>5</sup> and the Weddell Sea.<sup>6</sup> Yet, CCAMLR was not able to agree to the proposal as part of a comprehensive Climate Change Response Work Program<sup>7</sup>.

In the context of climate change, management needs to become more flexible, better at anticipating and responding to uncertainty, and facilitate policy changes where they are most needed.<sup>8</sup> Domestic policymaking may be more flexible as it avoids the complexity of international politics. However, it is also challenging due to a lack of knowledge and capacity to implement decisions. For example, although most fisheries in the world are managed at the national or local scale, most existing approaches to assessing climate impacts on fisheries have been developed on a global scale.<sup>9</sup> Further, without higher-level leadership, the competent ocean authorities struggle to make informed decisions when climate objectives contradict their mandated sectoral management objective.

To achieve SDGs 13 and 14 simultaneously, it is critical for all major economies and leading ocean users to systematically integrate climate concerns into their ocean-related decision-making. This kind of integration is an emerging issue of ocean management at all scales. A review of the practice landscape in different countries may accelerate the learning curve. The report contributes to this discussion by comparing the progress of Chinese and German work in this area. China and Germany are selected because the two countries share several strong similarities: 1) both countries are actively committed and are taking active actions to tackle climate change, and both are committed to developing their capacity for ocean development; 2) both countries are land powers and land-sea countries and are defined as “geographically disadvantaged States” in Article 70 of the United Nations Convention on the Law of the Sea (UNCLOS). These similarities indicate that both countries may face similar challenges in their maritime strategies.

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<sup>3</sup> Glasgow Climate Pact, Article 60

<sup>4</sup> Initial IMO strategy on the reduction of GHG emissions from ships, available at:

<https://www.imo.org/en/MediaCentre/PressBriefings/Pages/06GHGInitialstrategy.aspx>

<sup>5</sup> Delegations of Argentina and Chile. 2018. CCAMLR-XXXVII/31: Proposal on a conservation measure establishing a marine protected area in the Domain 1 (Western Antarctic Peninsula and South Scotia Arc). [R]. <https://meetings.ccamlr.org/en/ccamlr-xxxvii/31>

<sup>6</sup> Delegation of the European Union and its member States. 2018. CCAMLR-XXXVII/29: EU proposal to establish the Weddell Sea MPA (WSMPA). [R]. <https://meetings.ccamlr.org/en/ccamlr-xxxvii/29>

<sup>7</sup> Delegations of Australia and Norway on behalf the Climate Change Intersessional Correspondence Group. 2018. CCAMLR-XXXVII/23: Proposal for a Climate Change Response Work Program for CCAMLR. [R] <https://meetings.ccamlr.org/en/ccamlr-xxxvii/23>

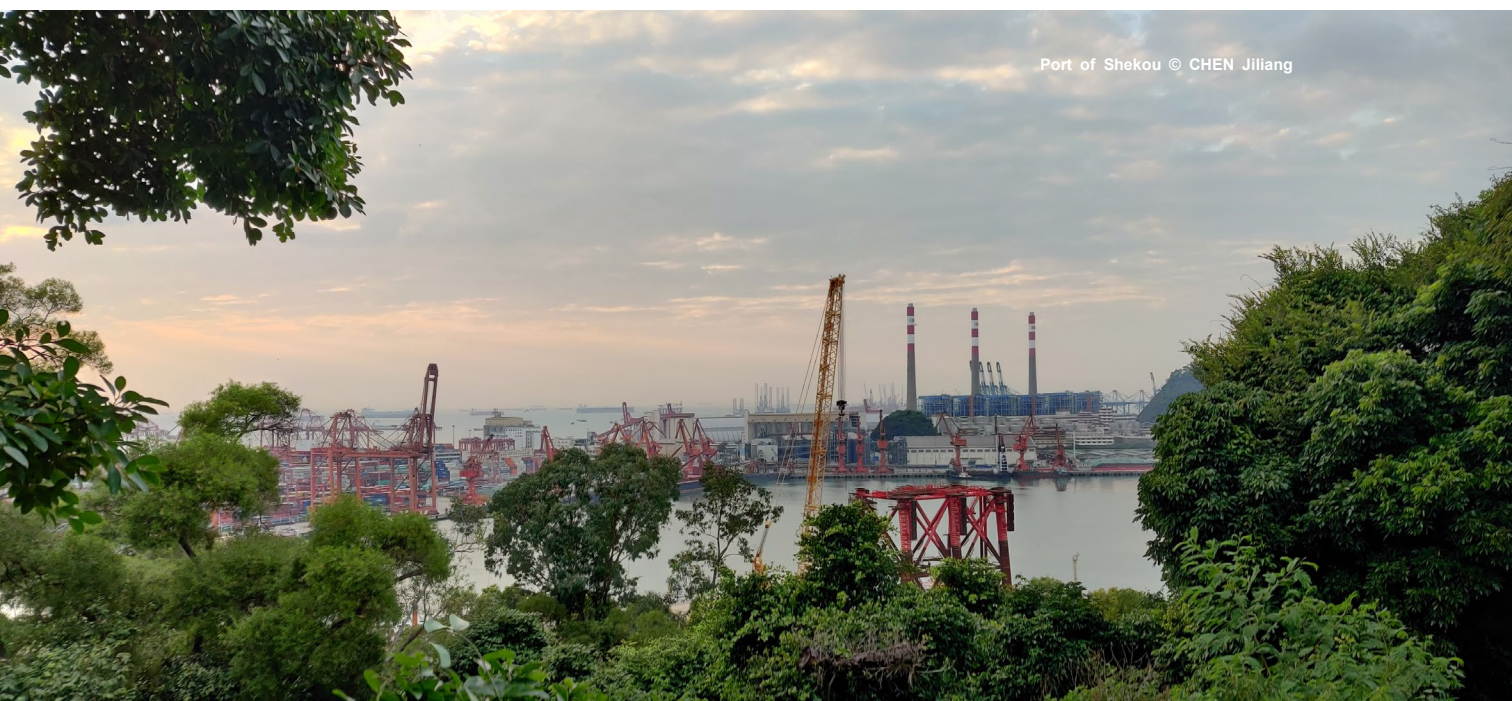
<sup>8</sup> Peter J. Mumby, James N. Sanchirico, Kenneth Broad, et al. 2017. Avoiding a crisis of motivation for ocean management under global environmental change. [J]. *Global Change Biology*, 23(11): 4483-4496. <https://doi.org/10.1111/gcb.13698>

<sup>9</sup> Miguel Angel Cisneros-Mata, Tracey Mangin, Jennifer Bone, et al. 2019. Fisheries governance in the face of climate change: Assessment of policy reform implications for Mexican fisheries. [J]. *PLoS ONE*, 14(10): e0222317. <https://doi.org/10.1371/journal.pone.0222317>

This research reviews the strategic and legal documents, policies, and practices in China and Germany, two countries that claim to be leading the fight to protect the climate, assess the current progress of such integration, and identify areas for cooperation based on questionnaires collected and discussions in seminars.

Research topics:

- 1) What ocean-related elements are integrated into China and Germany's climate-related national plans, strategies, laws, and sectoral policies?
- 2) What climate-related elements are integrated into China and Germany's ocean-related national plans, strategies, laws, and sectoral policies?
- 3) What are the areas for future cooperation between China and Germany in integrating ocean and climate policies?





# **Part I**

## **Strategies, Plans and Laws on Climate and Ocean**

## On Climate

### Germany

As a member of the European Union, Germany issued climate and ocean policies consistent with EU strategies. The EU's current environment-related priorities are listed in the Green Deal<sup>10</sup>, which has the climate goal at the core and other elements, including biodiversity and Ocean, as branches/supportive goals. Under the Green Deal, while making a climate law, the EU has updated its climate change mitigation target for 2030<sup>11</sup> and published a strategy for adaptation to climate change<sup>12</sup>. The strategy for adaptation is centered on seeking better support from science and a more systematic approach to adaptation. The oceans were highlighted in the sections on the knowledge gap, nature-based solutions, and global engagement. The cross-cutting nature of ocean and climate is recognized by the strategy for adaptation when it emphasizes, *"We need to better understand the interdependencies between climate change, ecosystems, and the services they deliver."*

At the national level, Germany's current long-term emission reduction goals and climate action priorities are defined by the Climate Action Programme 2020 (2014), the Climate Action Plan 2050 (2016), and the Federal Climate Change Act (2019).<sup>13</sup> All of the documents are intensively focused on mitigation actions. Additionally, although fuel for ships and offshore energy is related to the ocean, they are included in these reports' fuel and energy section.

Germany released its national strategy for adaptation to climate change in 2008. It points out that *"The aim of adaptation is to facilitate achieving the objectives in various fields, even in the face of the new conditions created by climate change. This also includes implementing the policy guidelines and objectives approved by the Federal Government in its Sustainability Strategy Perspectives for Germany<sup>14</sup> and reconciling the economic, environmental, and social dimensions of sustainability."* Requested by the Strategy for Adaptation (DAS), the first Adaptation Action Plan of the German Strategy for Adaptation to Climate Change (APA) was adopted by the Federal Government of Germany in August 2011 and then updated in 2015 (as APA II)<sup>15</sup>.

The Water cluster in the APA II is the most ocean-relevant part. It covers water management, coastal and marine protection, and fisheries. According to the Climate Scoreboard in 2018, all 16 states of Germany, also known as the Bundesländer, have developed adaptation strategies and measures. Some were developed as part of an integrated climate change strategy or program. Nevertheless, only two of them have adopted an action plan for adaptation<sup>16,17</sup>. This demonstrates the gap in awareness of climate adaptation in the ocean.

Integrated coastal management is an acknowledged instrument to protect coastal zones and address coastal risks related to climate change and its impacts, such as storm surges and coastal erosions. In 2002, the EU's Recommendation on Integrated Coastal Zone Management (ICZM) referred to the threat to coastal zones posed by climate change as the basis for a strategic approach to coastal

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<sup>10</sup> Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040&uri=CELEX:52019DC0640>

<sup>11</sup> Available at: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1599](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1599)

<sup>12</sup> Available at: [https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/eu\\_strategy\\_2021.pdf](https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/eu_strategy_2021.pdf)

<sup>13</sup> Case Study on Multi-level climate governance: Germany, Climate Change Association & Adelphi, 2021 Available at: <https://www.climate-change.org/en/card/germany-climate-multi-level-governance/>

<sup>14</sup> Germany's National Sustainability Strategy has been regularly updated. The 2021 version is available at: <https://www.bundesregierung.de/breg-en/issues/sustainability/sustainable-development-strategy-2021-1875228>

<sup>15</sup> Adaptation Action Plan, Umweltbundesamt, 2019, available at: <https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-at-the-federal-level/adaptation-action-plan>

<sup>16</sup> Commission Staff Working Document SWD(2018)460: Adaptation preparedness scoreboard: Germany, European Commission, 2018, summary available at: [https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/summary\\_fiche\\_de\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/summary_fiche_de_en.pdf)

<sup>17</sup> More to read about Germany's actions on climate change adaptation, available at: <https://climate-adapt.eea.europa.eu/countries-regions/countries/germany>



management.<sup>18,19</sup> The EU Commission launched a new joint initiative in 2013 on integrated coastal management, which aimed to establish a framework for integrated coastal management in the EU Member States<sup>20</sup>. These integrated coastal managements employ approaches to identifying risks related to climate change and natural hazards to which coastal areas are extremely vulnerable<sup>21</sup>. Integrated coastal management initiatives such as KüstenKlima investigated how climate change considerations should be incorporated into integrated coastal management strategies<sup>22</sup>.

## China

The key political document on climate change in China is the 14th Five-Year Plan (FYP), which is currently being drafted. From 2014 to 2020, China's actions addressing climate change were governed by the National Climate Change Program (NCCP)<sup>23</sup> released in 2014. The content of the NCCP is consistent with China's first National Determined Contribution (NDC)<sup>24</sup> submitted to the UNFCCC.

Though offshore wind power, tide energy, and coastal carbon sink were mentioned in the mitigation sections of the NCCP, the ocean was mainly mentioned as an adaptation issue in these two documents. China has a specific National Strategy for Climate Change Adaptation (NSCCA) to be updated<sup>25</sup>.

The 2014 version of the NSCCA identified ocean and coastal management as a priority for climate change adaptation. It elaborated the key actions as below:

*Rational planning of sea-related development activities. A climate change impact assessment system covering the coastal zone and sea islands has been built, and marine disaster risk assessment and zoning work have been carried out. When newly compiling or revising various sea-related plans, fully consider climate change factors and guide the orderly development of various coastal development activities.*

*Strengthen coastal ecological restoration and vegetation protection. Select and build marine protected areas, and implement restoration projects for typical islands, coastal zones, and offshore ecosystems. Protect existing coastal forests, strengthen coastal greening and island vegetation restoration, and increase efforts to create coastal protection forests.*

*Strengthen marine disaster monitoring and early warning. Relying on existing marine environmental protection projects, improve the sea-level change and marine disaster monitoring system covering the national coastal zone and related sea areas, focusing on strengthening the three-dimensional monitoring and forecasting and early warning capabilities of marine disasters such as storm surges, waves, sea ice, red tides, salty tides, and coastal zone erosion, and strengthening emergency response service capabilities.*

In the Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035, it is required to strengthen the capabilities to deal with marine natural disasters and environmental emergencies<sup>26</sup>. Given that climate change largely and

<sup>18</sup> Available at: [https://ec.europa.eu/environment/iczm/rec\\_imp.htm](https://ec.europa.eu/environment/iczm/rec_imp.htm)

<sup>19</sup> Available at: [https://ec.europa.eu/environment/iczm/prop\\_iczm.htm](https://ec.europa.eu/environment/iczm/prop_iczm.htm)

<sup>20</sup> Available at: [https://ec.europa.eu/environment/iczm/index\\_en.htm](https://ec.europa.eu/environment/iczm/index_en.htm)

<sup>21</sup> Available at: [https://ec.europa.eu/environment/iczm/prop\\_iczm.htm](https://ec.europa.eu/environment/iczm/prop_iczm.htm)

<sup>22</sup> Available at: <https://www.boschalumni.org/wp-content/uploads/2016/03/Waldmann.pdf>

<sup>23</sup> Available at: <https://zfxgk.ndrc.gov.cn/web/iteminfo.jsp?id=298>

<sup>24</sup> Available at: <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=CHN>

<sup>25</sup> See in Annual Report on China's Policies and Actions Addressing Climate Change (2020), Section 3.4, P37, available at: [https://www.mee.gov.cn/ywgz/ycqhbh/syqhbh/202107/t20210713\\_846491.shtml](https://www.mee.gov.cn/ywgz/ycqhbh/syqhbh/202107/t20210713_846491.shtml)

<sup>26</sup> Available at: [https://cset.georgetown.edu/wp-content/uploads/t0284\\_14th\\_Five\\_Year\\_Plan\\_EN.pdf](https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf)

consecutively contributes to marine natural disasters and environmental emergencies, this requirement implies the necessity of addressing climate change in ocean governance and management planning processes. Examples of such actions include coastline protections, such as a receding line system for coastal buildings, maintaining the retention rate of natural shoreline at no less than 35% by 2020, etc.,<sup>27,28</sup>. It has also been pointed out in the National Overall Plan for Major Projects of Protection and Restoration of Key Ecosystems (2021-2035)<sup>29</sup> to enhance ecosystem service functions of coastal zone and its disaster prevention and mitigation capabilities. For instance, coastal protection forests form an integrated disaster prevention and mitigation system at coastline, for they play an irreplaceable role in defending against natural disasters such as tsunamis and storm surges to protect coastal areas, as well as function as carbon sinks.<sup>30,31</sup>

## On Ocean

### Germany

Before adopting the Green Deal, in 2018, the EU had already listed “*Promote a sustainable bio-economy, diversify agriculture, animal farming, aquaculture and forestry production, further increasing productivity while also adapting to climate change itself, preserve and restore ecosystems, and ensure sustainable use and management of natural land and aquatic and marine resources*” as one of the priorities in its strategic long-term vision for its climate neutrality by 2050.<sup>32</sup>

As of October 2021, there are two initiatives under the EU Green Deal relating to overall ocean management: the Sustainable Blue Economy and the Biodiversity Strategy for 2030. (The sectoral initiatives will be discussed later.)

The origin of the Sustainable Blue Economy is in the Integrated Maritime Policy (IMP)<sup>33</sup> of the European Union published in 2007. Sustainability was the core of the IMP, while its intimate connections to climate change were recognized. Adaptation to climate change in the coastal regions was prioritized by the IMP.

Under the Green Deal adopted in 2019, the Sustainable Blue Economy is more climate-related. Its goal is “*a strong sustainable, resilient and climate-neutral model blue economy.*” There are six agendas in the Sustainable Blue Economy initiative:

- *Achieve the objectives of climate neutrality and zero pollution, notably by developing offshore renewable energy, by decarbonizing maritime transport and by greening ports. (links to the EU Strategy on Offshore Renewable Energy)*
- *Switch to a circular economy and reduce pollution. (links to the Circular Economy Action Plan)*
- *Preserve biodiversity and invest in nature. (links to the Biodiversity Strategy for 2030)*

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<sup>27</sup> Available at: [https://cset.georgetown.edu/wp-content/uploads/t0284\\_14th\\_Five\\_Year\\_Plan\\_EN.pdf](https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf)

<sup>28</sup> Available at: <http://www.scio.gov.cn/m/xwfbh/gbwxfbh/xwfbh/hyj/Document/1547620/1547620.htm>

<sup>29</sup> Available at: <https://www.ndrc.gov.cn/xxgk/zcfb/tz/202006/P020200611354032680531.pdf>

<sup>30</sup> Available at: <http://www.fcwfwz.gov.cn/e/action/ShowInfo.php?classid=19&id=54810>

<sup>31</sup> Available at: <https://www.ndrc.gov.cn/xxgk/zcfb/tz/202006/P020200611354032680531.pdf>

<sup>32</sup> Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2018%3A773%3AFIN>

<sup>33</sup> Available at: [https://www.europarl.europa.eu/RegData/docs\\_autres\\_institutions/commission\\_europeenne/com/2007/0575/COM\\_COM\(2007\)0575\\_EN.pdf](https://www.europarl.europa.eu/RegData/docs_autres_institutions/commission_europeenne/com/2007/0575/COM_COM(2007)0575_EN.pdf)

- *Support climate adaptation and coastal resilience. (links to the EU strategy on adaptation to climate change)*
- *Ensure sustainable food production. (links to the Farm to Fork Strategy)*
- *Improve management of space at sea. (links to the Biodiversity Strategy for 2030)*

The Sustainable Blue Economy's role of complementing other initiatives under the Green Deal is clarified on its frontage<sup>34</sup>.

The EU Biodiversity Strategy for 2030<sup>35</sup> aims to put Europe's biodiversity on a path to recovery by 2030. With this objective, it sets out new ways to implement existing legislation more effectively, new commitments, measures, targets, and governance mechanisms. These include:

- *Transforming at least 30% of Europe's lands and seas into effectively managed protected areas. (build upon existing Natura 2000 areas)*
- *An EU Nature Restoration Plan to restore degraded ecosystems across the EU that are in a poor state, as well as reducing pressures on biodiversity.*
- *Introducing measures to enable the necessary transformative changes.*
- *Introducing measures to tackle the global biodiversity challenge*

Both protection and restoration plans have included climate mitigation and adaptation as one of their main objectives.

The EU approach toward global biodiversity governance also has a strong climate focus. This has been demonstrated in the EU's engagement in international negotiations such as the Convention on Biological Diversity (CBD), Biodiversity Beyond National Jurisdictions (BBNJ), and CCAMLR.

In 2011, about ten years before the EU Green Deal was adopted, Germany published the Maritime Development Plan–Strategy for an integrated German maritime policy<sup>36</sup>. Two of the three objectives listed in the plan are environment-related, and the role of the ocean in combating climate change was highlighted:

*Objective 1: Enhanced competitiveness of German industry and exploit the potential for job creation;*

*Objective 2: Achieve a good environmental status in the North Sea and Baltic Sea by 2020, thereby making them the cleanest and safest seas;*

*Objective 3: Assume a share of the responsibility for global ecological in developments and support efforts to tackle climate change.*

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<sup>34</sup> Available at: [https://ec.europa.eu/oceans-and-fisheries/ocean/blue-economy/sustainable-blue-economy\\_en#ecl-inpage-726](https://ec.europa.eu/oceans-and-fisheries/ocean/blue-economy/sustainable-blue-economy_en#ecl-inpage-726)

<sup>35</sup> Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380>

<sup>36</sup> Frontpage and index, available at: <http://www.gbv.de/dms/zbw/723876576.pdf>

The plan is no longer available on the official website. It seems that Germany has stopped making overall ocean plans. The main approach Germany is taking is making sectoral plans based on the EU Green Deal and the German Strategy for Sustainability.

## China

The top-level narratives relating to ocean management are: 1) Building a Strong Maritime Country/Power (SMC) and 2) building the Ecological Civilization (EC).

The SMC narrative is about China's ambition to become more competitive in the global ocean economy and governance. Protecting the marine environment has always been a key element of the narrative<sup>37</sup>. President Xi's speech at the eighth collective study on building a strong maritime country of the Political Bureau of the Central Committee of the Communist Party of China (CPC) on July 30, 2013, marked the four main pillars of SMC: 1) promoting the marine economy; 2) protecting the marine environment; 3) developing marine science and technology; 4) safeguarding national maritime rights and interest. In the 13th FYP<sup>38</sup>, the science and technology pillar was not included. In the 2019 Annual Report of the Government of China<sup>39</sup>, only blue economy and environment protection were referred to when SMC was mentioned. The 13th FYP's text about marine environmental protection writes as:

*We will further implement integrated management based on marine ecosystems, promote the establishment of marine functional zones, optimize the spatial layout of near-shore waters and scientifically control development intensity. Strictly control the scale of reclamation, strengthen the protection and restoration of coastal zones, and maintain the natural shoreline at no less than 35%. Strictly control the intensity of fishing and implement a fishing moratorium system. Strengthen the exploration and development of marine resources, and carry out in-depth scientific research in the polar regions and oceans. Implement a system to meet standards for the discharge of pollutants from land-based sources to the sea and control the total amount of emissions, and establish an **early warning mechanism** for the carrying capacity of marine resources and the environment. Establish a system of marine ecological red lines, implement the "Southern Red and Northern Willow" wetland restoration project and the "Ecological Island Reef" project, and strengthen the protection of rare marine species. **Strengthen research on marine climate change, improve marine disaster monitoring, risk assessment and disaster prevention and mitigation capabilities, enhance maritime disaster relief strategies and improve emergency response capabilities for environmental emergencies at sea. Implement the marine inspection system and carry out regular marine inspections.***

The text in bold about climate change in the 13th FYP echoes the text about the ocean in the NSCCA: disaster response is the priority. The 14th FYP<sup>40</sup> mentioned less about climate change but maintained attention to disaster warnings and response. Another priority for oceans listed in the 14th FYP is the "In-depth Engagement in Global Ocean Governance". Since the connections between ocean and climate are being recognized by multiple international organizations, China might find a strategy addressing these connections would be helpful.

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<sup>37</sup> Available at: <http://www.banyuetan.org/chcontent/zx/yw/201381/63645.shtml>

<sup>38</sup> Chapter41, available at: <https://www.cma.org.cn/attachment/2016322/1458614099605.pdf>

<sup>39</sup> Available at: <http://www.gov.cn/zhuanti/2019qglh/2019zfzgbgdzs/img/2019e-book.pdf>

<sup>40</sup> Available at: [http://www.gov.cn/xinwen/2021-03/13/content\\_5592681.htm](http://www.gov.cn/xinwen/2021-03/13/content_5592681.htm)

## On Sustainable Development

### Germany

Since 2015, Germany has started to update its Sustainable Development Strategy to be compatible with the UN Sustainable Development Goals. The latest version<sup>41</sup> was published on March 10, 2021. In Chapter C, 'Germany's Contribution to Achieving the SDGs', there is a section exclusively dedicated to SDG 14: Conserve and sustainably use the oceans, seas, and marine resources<sup>42</sup>. This section clarifies the German government's view on this issue and the measures and indicators Germany is using. When elaborating on Germany's understanding of the challenge, the document says:

*These ecological services that the oceans provide have to be safeguarded. The critical loads that the marine environment can bear, e.g., in terms of ocean acidification, must not be exceeded.*

*Given the social, economic and ecological functions of the oceans, the challenge for international climate and environment policy is to conserve them as a global public good and use them in a sustainable manner.*

Among the six areas of transformation identified by the Sustainable Development Strategy, three have been linked to the climate goal. The ocean goal was associated with the area of pollution reduction. In the indicator system, the strategy used in 2019, two of the three indicators relating to SDG14 are about Nitrogen control. Only one is about the overall health of fisheries.

**Table 1.5.1 Indicators in the Sustainable Development Strategy relating to SDG14**

SDG 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development			
14.1.aa	<b>Protecting the oceans</b> <i>Protecting and sustainably using oceans and marine resources</i>	Nitrogen input in coastal and marine waters – nitrogen input via the inflows into the Baltic Sea	Adherence to good quality in accordance with the Ordinance on the Protection of Surface Waters (annual averages for total nitrogen in rivers flowing into the Baltic Sea may not exceed 2.6 mg/l)
14.1.ab		Nitrogen input in coastal and marine waters – nitrogen input via the inflows into the North Sea	Adherence to good quality in accordance with the Ordinance on the Protection of Surface Waters (annual averages for total nitrogen in rivers flowing into the North Sea may not exceed 2.8 mg/l)
14.1.b		Share of sustainably fished stocks of fish in the North and Baltic Seas	All fish stocks used for commercial purposes to be sustainably managed in accordance with the Maximum Sustainable Yield (MSY) approach by 2020

The sustainability strategy also lists the instruments for strengthening policy coherence: 1) sustainability impact assessment; 2) finance and budgeting as level; 3) continuous education. These instruments work across sectors to ensure the actions taken complement each other.

In summary, Germany's top-level political document on climate change adaptation is more relevant to ocean management. The Sustainable Development Strategy, which includes both the climate goal

<sup>41</sup> Available at: <https://www.bundesregierung.de/breg-en/issues/sustainability/sustainable-development-strategy-2021-1875228>

<sup>42</sup> Available at: <https://www.un.org/sustainabledevelopment/zh/oceans/>

and the ocean goal, explains the official views of the connections between those two issues. While the Sustainable Development Strategy still takes a sectoral approach to the ocean issues, it provided tools to make ocean policies and climate policies coherent. The Sustainable Development Strategy also recognized that the importance of the global ocean and the role of international cooperation.

## China

The Ecological Civilization (EC) can be understood as the adapted version of sustainable development. In the Opinions of the Central Committee of the Communist Party of China and the State Council on Accelerating the Construction of Ecological Civilization<sup>43</sup> published in April 2015, an ocean management paragraph was included in the spatial planning, while a climate change paragraph was included in the ecosystem and environmental protection section. Climate change and global biological security were mentioned as the overall goals. Climate change was barely mentioned in the Overall Programme for the Reform of the Ecological Civilization System<sup>44</sup> published by the State Council in September 2015. Energy and Ocean were mentioned as parallel issues to be addressed. In 2019, the State Council published the National Ecological Civilization Pilot Zone (Hainan) Implementation Plan<sup>45</sup>. Because Hainan is an island province, there was a section dedicated to ocean protection and use. Marine carbon sink was mentioned in that section, while climate change was only briefly mentioned. It seems the current priority regarding the Ecological Civilization is mainly about improving spatial management of ecosystems and establishing innovative mechanisms to finance those spatial protection measures. Climate change appears to be a sectoral issue in the EC framework.

In 2016, China published its National Plan on Implementation of the 2030 Agenda for Sustainable Development<sup>46</sup>. Ocean and climate were mentioned together only when elaborating on China's action addressing SDG14.3, which is about mitigating and addressing ocean acidification. Adaptation of coastal areas was mentioned when elaborating on climate change adaptation.

In the climate change section of China's latest National Report on the Progress of Implementing SDG (2021)<sup>47</sup>, one of the next steps is: *“accelerate the top-level design of carbon compliance and carbon neutrality, and **improve climate risk management and adaptation capabilities**. Firmly unswervingly implement the new development concept and follow a high-quality development path that prioritizes ecology and is green and low-carbon. **Tighten the decomposition of targets tasks, guiding and supervising localities and key sectors, industries and enterprises to scientifically set targets and formulate action plans**. The government should also ensure that the pace of work is scientifically controlled, and promote the construction of an economic system with green, low-carbon and cyclical development.”* The attention to addressing the environmental risks is consistent with other political documents mentioned above. However, the risk here seems to only refer to short-term risks that lead to emergencies. Climate change was never mentioned in that report when discussing marine living resources.

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<sup>43</sup> Available at: [http://www.gov.cn/xinwen/2015-05/05/content\\_2857363.htm](http://www.gov.cn/xinwen/2015-05/05/content_2857363.htm)

<sup>44</sup> Available at: [http://www.gov.cn/guowuyuan/2015-09/21/content\\_2936327.htm](http://www.gov.cn/guowuyuan/2015-09/21/content_2936327.htm)

<sup>45</sup> Available at: [http://www.gov.cn/zhengce/2019-05/12/content\\_5390904.htm](http://www.gov.cn/zhengce/2019-05/12/content_5390904.htm)

<sup>46</sup> Available at: [http://www.gov.cn/xinwen/2016-10/13/content\\_5118514.htm](http://www.gov.cn/xinwen/2016-10/13/content_5118514.htm)

<sup>47</sup> Available at: [http://infogate.fmprc.gov.cn/web/ziliao\\_674904/zt\\_674979/dnzt\\_674981/qtzt/2030kcxzfzyc\\_686343/](http://infogate.fmprc.gov.cn/web/ziliao_674904/zt_674979/dnzt_674981/qtzt/2030kcxzfzyc_686343/)

## Summary

- According to the top-level political documents on climate change and ocean management, both Germany and China are aware that climate change poses risks to the ocean.
- In the climate action plans of both countries, offshore renewable energy in mitigation actions represents the most straightforward connection between climate and the ocean. More complicated links are dealt with through the framework of climate change adaptation.
- When elaborating on the climate risk management for the ocean, China's current focus is the early-warning and responding system to climate/environment disasters, while Germany is taking a more integrated approach that looks at both long-term and short-term risks.
- Both countries recognize that climate change adaptation is a cross-sectoral issue and highlight the role of nature conservation.
- Germany has demonstrated earlier awareness of the climate issue in its ocean strategy. China's approach to building a strong maritime country has a long-standing priority of environmental protection without a specific focus on climate change. The links between ocean and climate have always been addressed through scientific research rather than through policy or strategy.
- Both countries acknowledged the importance of international cooperation in climate change and ocean governance. Compared to China, Germany is more explicit in its bilateral and multilateral cooperation plan in its Sustainability Strategy. All of China's policy documents reviewed are very brief when talking about diplomacy and global governance. This difference may be caused by the special role of Germany in the EU's internal coordination and external outreach.
- Germany and the EU seem to have a more explicit priority of linking climate change and biodiversity in their diplomacy than in their domestic policy. This study will find more about this in the following part.
- It seems the two countries are at different stages in terms of institution building. China is still building the institutions for the Ecological Civilization, while Germany and the EU are just making strategies and plans within the current institutional arrangement. Such difference might explain why the current Chinese policy documents have an extreme domestic focus. Additionally, more robust social participation in domestic governance may have allowed western countries to input more resources in its diplomacy.





# **Part II**

## **Climate Change in Sectoral Ocean Policies**

## Fisheries Management

Globally, sustainability has been the core objective of fishery management. The impact of climate change on fisheries has not gained significant attention until recently. In 2018, FAO published the report *Impacts of Climate Change on Fisheries and Aquaculture: Synthesis of Current Knowledge, Adaptation and Mitigation Options*<sup>48</sup> which summarized the latest knowledge and thinking regarding this issue. The report summarized that “In marine regions, model projections suggest decreases in maximum catch potential in the world’s exclusive economic zones of between 2.8 percent and 5.3 percent by 2050 according to greenhouse gas emission scenario RCP2.6, and between 7.0 percent and 12.1 percent according to greenhouse gas emission scenario RCP8.5, also by 2050.” But the difference in impacts among regions could be significant. This section is going to assess the fishery management policies in Germany and China to see how much these countries are doing to address the risks posed by climate change.

### Germany

Germany is a member of the European Union (EU). Regarding structural and conservation policy, the German policy is directed by the Common Fisheries Policy (CFP) of the EU. The strategies and measures governing the enforcement of European marine fishery policy are of national competence.

The general objectives for the coastal marine fisheries are those of the German fishery policy in the Common Fisheries Policy<sup>49</sup>:

- 1) *the fishery should **sustain** the natural resources and secure the existence of an **efficient** fishery economy;*
- 2) *the management of the fishery resources in the EU waters should be under the principles of **precaution**;*
- 3) *management objectives should help the commercial fish stocks **recover and reach a level above biological minimum**.*

The specific objectives for coastal marine fisheries are:

- 1) *Sustain family oriented business structure;*
- 2) *Protect local coastal fishery from competitors;*
- 3) *Reduce discards.*

Though climate change was not mentioned in those objectives, the precautionary principle requires the EU decision-makers to be vigilant to risks in both domestic fishery and distant water fishery. The German Federal Environment Agency (UBA) website has a page<sup>50</sup> dedicated to the state-level actions

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<sup>48</sup> Available at: <https://www.fao.org/3/CA0356EN/ca0356en.pdf>

<sup>49</sup> Available at: [https://ec.europa.eu/oceans-and-fisheries/policy/common-fisheries-policy-cfp\\_en](https://ec.europa.eu/oceans-and-fisheries/policy/common-fisheries-policy-cfp_en)

<sup>50</sup> Available at: <https://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/anpassung-an-den-klimawandel/anpassung-auf-laenderebene/handlungsfeld-fischerei>

of adaptation of fishery. That page states that by enhancing sustainable fishery management and marine spatial protection, “There is a chance of securing the future of fishing in the long term”. The page also highlighted the importance of scientific research to inform the implementation of both tools. The awareness of this issue within the government is clearly rising. This rise is also demonstrated by multiple knowledge products available that could inform the public and the decision-maker.<sup>51</sup>

However, the 5-year Review (2014-2019) of the EU Common Fisheries Policy<sup>52</sup> published by the German Federal Agency for Nature Conservation (BfN) concluded that “Some of the annually set total allowable catch limits still deviate greatly from scientific recommendations”, which means the available scientific advice has not been properly applied.

In 2019, the German Fishery Association published the Resolution on Climate Change and Fishery: Impacts, risks, opportunities and fields of action for the German fisheries<sup>53</sup>, which demanded five fields of action:

- 1) *strengthen scientific research on adaptation strategies and develop tools for existing farm structures as well as aquatic habitats.*
- 2) *support investment in adaptation to changes in temperature and hydrological regimes.*
- 3) *adaptation of management decisions in natural resource management.*
- 4) *active conceptual work to exploit emerging opportunities, e.g., in the marine sector.*
- 5) *intensify communication on the favourable carbon footprint of fisheries and aquaculture products compared to other sources of animal protein for human consumption.*

These five priorities can be seen as a blueprint of a comprehensive plan of integrating climate change into fishery management policies. They highlight both scientific research and decision-making. The resolution also encourages experimenting with new tools and public engagement. How these priorities will turn into actions is still to be seen.

## China

The Implementation Plan for the Construction of Marine Ecological Civilization<sup>54</sup> published by the State Oceanic Administration (SOA) in 2015 is a sectoral strategy for Ecological Civilization. According to its ten priorities, building a robust management system from science, and decision-making to monitoring and enforcement seemed to be the key goal at the time. Fishery was not mentioned in the plan, maybe because it is not the competence of the SOA. Though the plan highlighted the role of science and regulation, it is unclear how it interacted with fishery management policies, which is the competency of the Ministry of Agriculture and Rural Areas (MARA).

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<sup>51</sup> Such as the briefing Climate Change: What does it mean for the Fisheries, available at: [https://www.klimafakten.de/sites/default/files/klimawandel\\_-\\_was\\_er\\_fuer\\_die\\_fischereiwirtschaft\\_bedeutet.pdf](https://www.klimafakten.de/sites/default/files/klimawandel_-_was_er_fuer_die_fischereiwirtschaft_bedeutet.pdf) And the German Climate Information Portal: [https://www.deutschesklimaportal.de/DE/Service/Fischerei/Fischerei\\_home\\_node.html](https://www.deutschesklimaportal.de/DE/Service/Fischerei/Fischerei_home_node.html)

<sup>52</sup> Summary available at: <https://www.bfn.de/fileadmin/BfN/meeresundkuestenschutz/Dokumente/5-Jahresbilanz-Fischereipolitik-DUH/5-year-review-2014-2019-of-the-EU-Common-Fisheries-Policy-summary.pdf>

<sup>53</sup> Available at: [https://www.deutscher-fischerei-verband.de/downloads/Resolution\\_Magdeburg\\_2019.pdf](https://www.deutscher-fischerei-verband.de/downloads/Resolution_Magdeburg_2019.pdf)

<sup>54</sup> Summary available at: [http://www.gov.cn/xinwen/2015-07/16/content\\_2898332.htm](http://www.gov.cn/xinwen/2015-07/16/content_2898332.htm)

The 13<sup>th</sup> and the 14<sup>th</sup> FYP of China demonstrate a strong ambition to smoothly transform the ocean-related industries, including the fishing industry, for high-quality and sustainable growth. The reform of the fishing industry depends on a careful balance between fishing capacity control and sustaining fisherman's livelihood. The Highlights of Fisheries management and Enforcement work in 2020 published by MARA in 2020 stressed that the main objective for domestic water catch fishery is its sustainability. For distant water fishery, only krill fishing in the Southern Ocean, which is one of the few underdeveloped fisheries on earth, was encouraged to grow. The Notice on the Implementation of Fisheries Development Support Policy to Promote High-Quality Fisheries Development<sup>55</sup> published by MARA and the Ministry of Finance in 2021 stated the goals of reducing capacity and supporting livelihood but also stressed the importance of a gradual and stable transition.

Climate change has never been mentioned in the document cited above. It seems that the current dominant threat to the sustainability of domestic and distant water fishery is over-capacity. Its overwhelming priority might have diminished the risk posed by climate change.

Nevertheless, as the links between climate change and fish stocks have been recognized by FAO and some RFMOs, China's distant water is paying more attention to this issue. The chapter Promoting Sustainable Use in China's White Paper on Distant Water Fishery Compliance<sup>56</sup> dedicated a paragraph to climate change. It stated that:

*China has always attached great importance to the issue of climate change and has made actively responding to climate change a major task related to the overall economic and social development. China focuses on and advocate for the development of assessments of fisheries responses to climate change, and conduct relevant precautionary studies. In 2019, it supported the adoption of the proposal for climate change research by the Western and Central Pacific Fisheries Commission, which puts on the agenda the consideration of the potential impacts of climate change on highly migratory fish stocks and the economies and food security of the countries concerned, especially developing members. China is willing to actively carry out cooperative research work on the relationship between climate change and the sustainability of fisheries resources and their ecosystems.*

Another fishery issue relating to climate change is the fuel subsidy. China recognized that part of the fishery subsidy subsidizes fossil fuels in the US-China Fossil Fuel Subsidy Peer Review<sup>57</sup>. The 13<sup>th</sup> FYP of Ocean Economy Development<sup>58</sup> (2016-2020) also called for adjustment and reform of fisheries fuel price subsidy. China started to reduce its fuel subsidy for fishing vessels in 2015. Compared to the data declared in the peer review in 2015, the fishery subsidy estimated in an external estimation in 2021<sup>59</sup> shows that China's fishery fuel subsidy has decreased by about 80%. However, the link to the climate has never been acknowledged by the policies for fishery subsidy reform, such as the Notice on the Adjustment of Oil Price Subsidy Policy for Domestic Fisheries Fishing and Aquaculture to Promote Sustainable and Healthy Development of Fisheries (2015), and the Notice on the Implementation of Fisheries Development Support Policy to Promote High-Quality Fisheries Development (2021) mentioned above.

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<sup>55</sup> Available at: [http://www.gov.cn/zhengce/zhengceku/2021-07/05/content\\_5622531.htm](http://www.gov.cn/zhengce/zhengceku/2021-07/05/content_5622531.htm)

<sup>56</sup> Available at: [http://www.yyj.moa.gov.cn/gzdt/202011/t20201120\\_6356632.htm](http://www.yyj.moa.gov.cn/gzdt/202011/t20201120_6356632.htm)

<sup>57</sup> Available at: [https://www.oecd.org/fossil-fuels/publication/G20%20China%20Self%20Review%20on%20Fossil%20Fuel%20Subsidies-China%20Self-report-20160902\\_English.pdf](https://www.oecd.org/fossil-fuels/publication/G20%20China%20Self%20Review%20on%20Fossil%20Fuel%20Subsidies-China%20Self-report-20160902_English.pdf)

<sup>58</sup> See in Part 3, available at: [https://www.askci.com/news/finance/20170519/11384298471\\_5.shtml](https://www.askci.com/news/finance/20170519/11384298471_5.shtml)

<sup>59</sup> Daniel J. Skerriit and U. Rashid Sumaila. 2021. Assessing the spatial burden of harmful fisheries subsidies. [R]. Fisheries Economics Research Unit. [https://oceana.org/wp-content/uploads/sites/18/OceanaDWF\\_FinalReport.pdf](https://oceana.org/wp-content/uploads/sites/18/OceanaDWF_FinalReport.pdf)

## Summary

- Both countries are still in the early stages of integrating climate change considerations into their fishery management policies.
- Both countries attach great importance to the role of science in supporting decision-making on fishery policies.
- Sustainability is the top priority of the fishery management policies in both countries. However, Germany already has a total allowable catch (TAC) based management system in place, while China is still implementing pilot TAC projects.
- Germany, because of the International Council for the Exploration of the Sea (ICES) framework, is supposed to have achieved openness and sharing of fisheries data, whereas China has not yet done so in terms of fisheries surveys and statistics. This has become a constraint for the monitoring and assessment of the resources as well as their sustainable use.
- In addition to capture fisheries, the carbon footprint of farming is a major challenge that has not yet received high-level policy attention. Impacts take the form of high pollution or emissions, as well as encroachment on coastal wetlands (an important carbon sink). New farming models such as offshore deep-water farming, land-based recirculating water farming, and carbon sink fisheries are still in the exploration stage.
- China has introduced an autonomous seasonal high seas fishing moratorium, a landmark event in the management of distant water fisheries, but climate change considerations need to be incorporated into the policy.
- Regarding coastal water fishery, only Germany recognizes climate change as a risk. A structure for a comprehensive plan to address the issue already exists.
- Germany is also leading in information availability to the public and the decision-makers.
- Both countries support RFMOs to implement climate-smart management, but neither of them is a leader.

## Shipping

The reduction of greenhouse gas (GHG) emitted from international shipping is within the competence of the International Maritime Organization (IMO). According to IMO's fourth GHG Study<sup>60</sup>, the greenhouse gas (GHG) emissions - including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), expressed in CO<sub>2</sub>e - of total shipping (international, domestic, and fishing) have reached to 1,076 million tonnes in 2018, of which 1,056 million tonnes are CO<sub>2</sub> emissions. The shipping emissions accounted for 2.89% of the global anthropogenic emissions in 2018.

IMO has adopted mandatory measures to reduce emissions of greenhouse gases from international shipping, under IMO's pollution prevention treaty (MARPOL) - the Energy Efficiency Design Index (EEDI)

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<sup>60</sup> Available at: <https://www.imo.org/en/OurWork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx>

mandatory for new ships, and the Ship Energy Efficiency Management Plan (SEEMP).

In 2018, IMO adopted an initial strategy<sup>61</sup> on the reduction of GHG emissions from ships. This is a policy framework that sets key ambitions. The main goals are:

*Cut annual greenhouse gas emissions from international shipping by at least half by 2050, compared with their level in 2008, and work towards phasing out GHG emissions from shipping entirely as soon as possible in this century.*

*The Initial GHG Strategy envisages a reduction in carbon intensity of international shipping (to reduce CO<sub>2</sub> emissions per transport work), as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008.*

States are expected to cooperate within the IMO framework to make and implement policies to reach these goals. Germany and China are significant players in global trade and shipping. This part assesses the climate consideration in their shipping-related strategies and policies.

While shipping is mainly considered an area to act to mitigate climate change, the adaptation of the shipping infrastructures has started to be recognized. Austin Becker from the University of Rhode Island has produced several publications on this issue. In 2021, the United Nations Conference on Trade and Development (UNCTAD) produced the meeting memo “Climate change adaptation for seaports in support of the 2030 Agenda for Sustainable Development”<sup>62</sup>. That paper provided a brief overview of the main climate change-related impacts in the light of observed trends and projections and of the key considerations with regard to adaptation and resilience-building.

### IMO Legislative Processes on GHG Reduction

The issue of controlling air pollution from ships - in particular, noxious gases from ships' exhausts was discussed at IMO as early as the 1970s, but drew more attention in 1988 when the Marine Environment Protection Committee (MEPC) agreed to include the issue of air pollution in its work programme. In 1991, IMO adopted Assembly Resolution A.719 (17) on Prevention of Air Pollution from Ships. The Resolution called on the MEPC to prepare a new draft Annex to MARPOL on the prevention of air pollution.

The Kyoto Protocol, which was adopted in December 1997, was a major step in the fight against climate change. It operationalized the UNFCCC by committing industrialized countries and economies in transition to limit and reduce GHG emissions in accordance with agreed individual targets.

In response, in the same year at the 1997 MARPOL Conference, IMO adopted MARPOL Annex VI on regulations for the prevention of air pollution from ships. This resolution invited the MEPC to consider what CO<sub>2</sub> reduction strategies might be feasible in light of the relationship between CO<sub>2</sub> and other atmospheric and marine pollutants. The resolution also invited IMO, in cooperation with the UNFCCC, to undertake a study of CO<sub>2</sub> emissions from ships for the purpose of establishing the amount and relative percentage of CO<sub>2</sub> emissions from ships as part of the global inventory of CO<sub>2</sub> emissions. The MEPC developed operational and technical measures, and IMO agreed to include a new chapter on “energy efficiency” in MARPOL Annex VI.

<sup>61</sup> Available at: <https://www.imo.org/en/MediaCentre/PressBriefings/Pages/06GHGinitialstrategy.aspx>

<sup>62</sup> Available at: [https://unctad.org/system/files/official-document/cimem7d23\\_en.pdf](https://unctad.org/system/files/official-document/cimem7d23_en.pdf)

## IMO Legislative Processes on GHG Reduction

On 15 July 2011, MARPOL Annex VI Parties adopted mandatory energy efficiency regulations for ships – Energy Efficiency Design Index (EEDI) for new ships, Ship Energy Efficiency Management Plan (SEEMP) for all ships. This represented the first set of mandatory energy efficiency measures for any transport sector. Since their adoption, further amendments have been adopted to strengthen the EEDI requirements, particularly for certain ship types.

In 2016, IMO adopted the mandatory IMO Data Collection System (DCS) for ships to collect and report fuel oil consumption data from ships over 5,000 GT. The first calendar year data collection was completed in 2019.

In April 2018, IMO adopted the Initial Strategy on the reduction of GHG emissions from shipping, a policy framework which sets key ambitions, including annual GHG emissions from international shipping by at least half by 2050, compared with their level in 2008, and working towards phasing out GHG emissions from shipping entirely as soon as possible in this century and reducing the carbon intensity of international shipping (to reduce CO<sub>2</sub> emissions per transport work), as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008. The Initial Strategy includes a commitment to assess the impacts on States (particularly Least Developed Countries (LDCs) and Small Island Developing States (SIDS)) of any measure proposed for adoption, and it will be revised by 2023.

In June 2021, IMO adopted key short-term measures aimed at cutting the carbon intensity of all ships by at least 40% by 2030, in line with the ambitions set out in the IMO Initial Strategy. These measures combine technical and operational approaches to improve the energy efficiency of ships. All ships will have to calculate their Energy Efficiency Existing Ship Index (EEXI), and ships over 5,000 GT will establish their annual operational carbon intensity indicator (CII) and CII rating. In other words, ships will get a rating of their energy efficiency - A, B, C, D, E - where A is the best. This is the first time IMO has established a formal rating system for ships, which sends a strong signal to the market: Administrations, port authorities, and other stakeholders as appropriate, are encouraged to provide incentives to ships rated as A or B. A ship rated D for three consecutive years, or E, is required to submit a corrective action plan, to show how the required index (C or above) would be achieved.

## Germany

Germany listed 8.2 million tonnes of CO<sub>2</sub> emissions in 2016 for international shipping, a little less than 1 percent of its total greenhouse gas emissions reported that year.<sup>63</sup> In 2013, the Federal Ministry of Transport, Building, and Urban Development (BMVBS) published the Mobility and Fuels Strategy<sup>64</sup> of the German Government. In the strategy, maritime shipping is discussed separately from inland shipping because the governance is different and the main fuel is different. Germany's inland shipping uses gasoline or diesel, which are much cleaner than the heavy oil fuel (HFO) used in maritime shipping. The strategy stressed the role of Liquefied Natural Gas (LNG) as the alternative fuel to bridge the current status and the fully renewable scenario (likely more hydrogen from renewable electricity rather than biofuel) of shipping.

<sup>63</sup> Paul Hockenos and Julian Wettengel. 2018. Germany's maritime freight emissions. [EB/OL]. Clean Energy Wire. <https://www.cleanenergywire.org/factsheets/germanys-maritime-freight-emissions>

<sup>64</sup> Available at: [https://www.bmvi.de/SharedDocs/EN/Documents/MKS/mfs-strategy-final-en.pdf?\\_\\_blob=publicationFile](https://www.bmvi.de/SharedDocs/EN/Documents/MKS/mfs-strategy-final-en.pdf?__blob=publicationFile)

The Maritime Agenda 2025, released in 2017 by the Federal Ministry for Economic Affairs and Energy (BMWi), is a strategy for the development of the maritime industry. The area of action 4 (Shape maritime transport sustainability—strengthen climate and environmental protection and nature conservation) is directly addressing the environmental aspects of shipping. It identified the government's objectives in this area as:

- *(For international maritime shipping) : To commit to the development and consequent harmonized implementation of international climate, environmental and nature conservation standards in order to protect the marine environment and reach international climate protection goals; to coordinate viable concepts at international level; (For inland domestic shipping) to set incentives to create a utility supply infrastructure for the use of alternative ship fuels at national level and for retrofitting/equipping ships with the engine technology that is necessary for this; to support the Länder and port cities in establishing harmonized approval standards;*
- *Considering climate and environmental protection, to set incentives for a modal shift of freight traffic from the roads to the seas, in particular to short sea shipping.*

The European Union has been the driver of the IMO climate change agreement since 2002. For several times the EU has taken unilateral actions, such as including international shipping in the EU Emission Trading Scheme (EU-ETS), to put pressure on the IMO to reach a deal. Germany contributed to the IMO negotiation on the Energy Efficiency Design Index (EEDI), the binding Ship Energy Efficiency Management Plan (SEEMP), and an initial GHG strategy. Germany also supports IMO's capacity-building project<sup>65</sup> for developing countries.<sup>66</sup>

On climate change adaptation, from 2008 to 2014, the Federal Environment Agency funded the KLIMZUG program<sup>67</sup> to support climate adaptation researches with a regional focus. There were three KLIMZUG projects "RADOST", "nordwest2050" and "KLIMZUG-NORD" specifically focusing on adaptation strategies for harbors and the shipping industry in the coastal regions. Those projects demonstrate a systematic approach toward adaptation. For example, the RADOST project has included 5 modules, including: Networking and regional dialogue; Natural science and engineering research; Socio-economic research; National, European and international integration; Communication and dissemination of results.<sup>68</sup>

In 2016, under the leitmotif "Knowledge–Ability–Action", seven departmental research institutes and specialist authorities within the portfolio of the Federal Ministry of Transport and Digital Infrastructure (BMVI) joined forces by forming the BMVI Network of Experts. The network's objective is to address pressing and future-oriented questions in the field of transportation and - by means of innovations - to enable a resilient and environmentally sound organization of the transport modes. Climate change impacts and adaptation is its first topic area. Among the outcomes of its first period of work (2016-2019):

- *Availability restrictions of the transport infrastructure resulting from climate changes and associated extreme weather events were investigated in a model case study focusing on a section of the important European "Rhine-Alpine" transport corridor.*

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<sup>65</sup> IMO-Germany Asia Maritime Transport Emissions project (known as the Blue Solutions Project) to cut maritime transport emissions in Asia, available at: <https://www.imo.org/en/MediaCentre/PressBriefings/pages/IMO-Germany-project.aspx>.

<sup>66</sup> Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). 2017. Germany's Seventh National Communication on Climate Change. [R] [https://unfccc.int/sites/default/files/resource/26795831\\_Germany-NC7-1-171220\\_7%20NatCom%20to%20UNFCCC.pdf](https://unfccc.int/sites/default/files/resource/26795831_Germany-NC7-1-171220_7%20NatCom%20to%20UNFCCC.pdf)

<sup>67</sup> The list of the KLIMZUG projects can be found here: <https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/project-catalog/klimzug-making-climate-change-sustainable-in>

<sup>68</sup> The introduction of the RADOST project is available at: <https://klimzug-radost.de/>



- *Adaptation options were conceptually prepared for the transport sector and specific adaptation measures were identified and assessed.*
- *Planning and implementation of adaptation measures are lengthy processes and many infrastructures are planned and constructed for a long service life.*

The expert network concluded that the transfer of knowledge into action is not a task for the future, but needs to start today.<sup>69</sup>

To summarize, Germany recognizes the need for both climate change and adaptation in the shipping industry. There is a policy road map roughly charted for mitigation. However, adaptation actions relating to urgent issues such as extreme climate events are more straightforward than the actions addressing long-term risks.

## China

China does not have a specific strategy for GHG reduction or climate change adaptation of the shipping industry. In 2013, the Ministry of Transport issued the “Guidance on Accelerating the Development of Green, Circular and Low-carbon Transport”<sup>70</sup>, which is regarded as an overall deployment of energy conservation and emission reduction in the transport industry, including the shipping industry. In 2017, the Ministry of Transport released the “Opinions on Promoting Green Transport Development on all Fronts”<sup>71</sup>, which proposed the concept of “green ports, green waterways, and green shipping”.

The current priority of “green shipping” for China is the reduction of local pollutants. In the Comprehensive Work Programme for Energy Conservation and Emission Reduction in the 13th Five-Year Plan<sup>72</sup>, there is a paragraph addressing the emission reduction of mobile sources. The actions relating to shipping included:

*Accelerate the reduction of pollutant emissions from ships and ports; set up ship emission control zones in the Pearl River Delta, Yangtze River Delta and Beijing-Tianjin-Hebei waters of the Bohai Rim; use shore power for 90% of harbor craft and official ships in major ports; 50% of container, ro-ro and cruise specialized terminals have the capacity to supply shore power to ships; build windproof and dust suppression facilities or enclose coal and ore in large coal and ore docks in major ports. ... expedite the release and implementation of the sixth stage of national (National VI) standard for motor gasoline and diesel, and achieve the convergence of motor diesel, ordinary diesel and some marine oil in 2020, and the convergence of diesel vehicles, non-road mobile machinery, inland waterways and direct river and sea transportation. The same standard of diesel will be used for diesel vehicles, non-road mobile machinery, inland waterways and direct river and sea vessels. (led by: Ministry of Environmental Protection, Ministry of Public Security, Ministry of Transport, Ministry of Agriculture, General Administration of Quality Supervision, Inspection and Quarantine, National Energy Administration, participating units: National Development and Reform Commission, Ministry of Finance, State Administration for Industry and Commerce, etc.)*

<sup>69</sup> The expert’s networks work on climate change adaptation can be found at: [https://www.bmvi-expertennetzwerk.de/EN/Topics/Topic1/Topics\\_node.html](https://www.bmvi-expertennetzwerk.de/EN/Topics/Topic1/Topics_node.html)

<sup>70</sup> Available at: [http://www.gov.cn/gongbao/content/2013/content\\_2466586.htm](http://www.gov.cn/gongbao/content/2013/content_2466586.htm)

<sup>71</sup> Available at: [https://xxgk.mot.gov.cn/2020/jigou/zcyjs/202006/t20200623\\_3307286.html](https://xxgk.mot.gov.cn/2020/jigou/zcyjs/202006/t20200623_3307286.html)

<sup>72</sup> Available at: [http://www.gov.cn/zhengce/content/2017-01/05/content\\_5156789.htm](http://www.gov.cn/zhengce/content/2017-01/05/content_5156789.htm)

In China, the amended Law of the People's Republic of China on the Prevention and Control of Air Pollution in 2015 mandated the Ministry of Transport to "designate emission control zones for air pollutants from ships in coastal waters, and ships entering the emission control zones shall comply with the relevant emission requirements for ships". In the same year, the Ministry of Transport designated emission control zones for ships in the waters of the Pearl River Delta, Yangtze River Delta, and Bohai Sea (Beijing, Tianjin, and Hebei), and gradually made it mandatory for ships operating in the emission control zones to use fuel oil with a sulfur content much lower than that required by the International Maritime Organization. Enhancing energy efficiency and many actions reducing local air pollutants can also reduce GHG emissions. The vessel emission control zone policy has been extended to all coastal regions.<sup>73</sup> The inland shipping section of the National Climate Change Program (NCCP) (2014-2020)<sup>74</sup> echoes the actions listed above when saying:

*Waterway transport: Promote the development of transport vessels in the direction of large-scale and professionalization. Accelerate the standardization of inland waterway vessel types. Improve the system of compulsory scrapping of old ships. Promote the development and application of hybrid and alternative energy technologies for ships, as well as solar energy, wind energy, natural gas, heat pumps and other energy technologies for ship life support. Gradually promote the use of liquefied natural gas and new energy in ports where conditions exist, and actively promote the use of shore power by ships at ports. By 2020, CO2 emissions per unit of passenger and freight turnover will be 13% lower than in 2010.*

Electricity and LNG is expected to play a bigger role in cleaning the fuel of the vessels. No further plan (after LNG) exists yet. However, as China has announced the carbon-neutral target, the public debate on GHG reduction in the shipping industry is emerging, so is the road map to zero-carbon shipping. According to the policies relating to Green Port, China does not distinguish between inland ports and seaports in terms of pollution control.

The 14th Five-Year Plan period (2021-2025) is critical for China to accelerate the development of integrated multidimensional transportation networks to build China with great transport strength. At the Second United Nations Global Sustainable Transport Conference, President Xi Jinping proposed a five-point initiative on advancing global transport cooperation to promote sustainable development, including strengthening soft connectivity of institutions and rules, developing smart transport and smart logistics, and fostering a green and low-carbon way of transport. President Xi's initiative can serve as the fundamental guideline for the transport sector in the 14th Five-Year Plan. In addition, the Program of Building National Strength in Transportation<sup>75</sup> calls for accelerating the development of a standard system that adapts to high-quality transport development and sets requirements in fields including infrastructure, transport equipment, transport services, safety and emergency preparedness, energy conservation and environmental protection, intelligent transport, and international cooperation and exchange.

As a big player in international shipping, China also engaged in the IMO negotiations on climate change mitigation. China has been elected as one of the 10 A-class members of the IMO for 16 consecutive terms and has played an important role in major issues such as greenhouse gas emission reduction in international shipping and energy efficiency of ships. When the 72nd session of the IMO Marine Environment Protection Committee (MEPC) in 2018 adopted an initial GHG strategy that incorporated a Chinese proposal<sup>76</sup>, China's proposal "Encouragement of Member States to Develop and Submit Voluntary National Action Plans to address GHG Emissions from Ships" was

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<sup>73</sup> Ministry of Transport of the People's Republic of China. 2018. Implementation Plan for Air Pollutant Emission Control Zones for Ships. [EB/OL] [http://www.gov.cn/zhengce/zhengceku/2018-12/31/content\\_5444672.htm](http://www.gov.cn/zhengce/zhengceku/2018-12/31/content_5444672.htm)

<sup>74</sup> Available at: <https://zfxgk.ndrc.gov.cn/web/iteminfo.jsp?id=298>

<sup>75</sup> Available at: [http://www.gov.cn/zhengce/2019-09/19/content\\_5431432.htm](http://www.gov.cn/zhengce/2019-09/19/content_5431432.htm)

<sup>76</sup> Economic Daily. 2021. China's solution" to reduce emissions in the global shipping industry. [EB/OL] [http://www.gov.cn/xinwen/2021-06/03/content\\_5615100.htm](http://www.gov.cn/xinwen/2021-06/03/content_5615100.htm)

unanimously adopted as resolution<sup>77</sup>. China proposed the operational energy efficiency rating measures for GHG emission reduction from ships, which is the first time a developing country has proposed a set of system design for GHG emission reduction from shipping, and after difficult negotiations and intensive consultations with all parties, won the support of most developing countries and industry organizations. The proposal was unanimously supported by the IMO Environmental Council and has been incorporated into the draft amendments to the MARPOL Convention.

The National Adaptation Strategy for Climate Change identified that early warning and responding to extreme climate events or disasters is the priority for the adaptation in coastal areas. There is no specific policy or plan on the adaptation to climate change in the shipping infrastructures, e.g., the ports.

## Summary

- The needs for mitigation of climate change in the shipping industry are much clearer than adaptation.
- Both countries distinguish climate change mitigation actions between inland shipping and international shipping.
- Both countries have actively engaged in the negotiations on climate change mitigation in the IMO. The EU takes a proactive approach while China takes a pragmatic approach. Both countries have not yet submitted a national action plan on GHG reduction to the IMO.
- Both countries recognize the importance of LNG and electricity in the greening of the shipping industry. However, Germany has already aimed for a zero-carbon vision while China's current priority is reducing local air pollutants. Thus LNG is only seen as a middle step in the transition by Germany.
- Both countries highlight the importance of addressing climate disasters in the coastal area in their climate change adaptation plan.
- Both countries are seeking more information to support decision-making on the adaptation of the ports. Germany's approach seems more systematic because it acknowledged that both short-term and long-term risks need to be addressed and is on track to a plan of adaptation for the ports. China's current priority is still addressing the short-term risks.

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<sup>77</sup> RESOLUTION MEPC.327(75), available at:  
[https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Air%20pollution/Resolution%20MEPC.327\(75\).pdf](https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Air%20pollution/Resolution%20MEPC.327(75).pdf)

## Marine Conservation

The Aichi Biodiversity Target 15 has highlighted the contributions of conservation to climate change mitigation and adaptation<sup>78</sup>. Healthy and resilient marine ecosystems can make a great contribution to both mitigation and adaptation to climate change. There are ecological processes in the marine and coastal ecosystem, such as the biological pump could serve as great carbon sinks. Seagrass beds, mudflats, salt marshes, and coral reefs can stabilize sediments and reduce erosion, serving as natural defense mechanisms, thereby mitigating the impact of tidal surges, storms, waves, and floods<sup>79</sup>. Science-based conservation policies are needed to conserve the marine ecosystem, and its ability to provide various ecosystem services. Climate change, as an additional stressor, requires more precaution in marine conservation policies. Marine protected area (MPA) is a policy tool that provides comprehensive protection to marine ecosystems. Its role in marine conservation in the context of climate change is getting more recognized.

### Germany

The EU's plan of establishing marine protected areas, in particular for areas of high climate value, has implications for climate change adaptation in the German coastal area. According to the EU's Biodiversity Strategy for 2030<sup>80</sup>, the EU commits to protecting 30% of its seas by 2030, including 10% under strict protection for areas of high biodiversity value. The plan is to expand the existing protected areas of the Natura 2000 program, which aims to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive.

NATURA2000 is a network of protected areas covering Europe's most valuable and threatened species and habitats, with strict protection for areas of very high biodiversity value<sup>81</sup>. The Federal Nature Conservation Act<sup>82</sup> assigns responsibility to Federal Agency for Nature Conservation (BfN) for selecting Natura 2000 sites in Germany's EEZ in the North and Baltic seas. Designation of these protected areas is performed by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB)<sup>83</sup>. Coastal states can also designate Natura 2000 sites.

Climate change is getting more attention in the Natura 2000 program. The Guidelines for the establishment of the Natura 2000 network in the marine environment<sup>84</sup> published in 2007 by the European Commission noted that: *"In general terms, climate change related impacts may be important for the evolution of marine protected areas. This could be a relevant issue from long term management issues. Environmental changes related to climate change will need to be monitored and management decisions taken with an adaptive approach."* In 2010, the International Academy for Nature Conservation of the German BfN hosted a workshop "Natura 2000 and Climate Change - a Challenge". In 2013, the European Commission published the

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<sup>78</sup> Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. Available at: <https://www.cbd.int/sp/targets/>

<sup>79</sup> Daniela Russi, Mia Pantzar, Marianne Kettunen, et al. 2016. Socio-Economic Benefits of the EU Marine Protected Areas. [R] Institute for European Environmental Policy (IEEP). <https://ec.europa.eu/environment/nature/natura2000/marine/docs/Socio%20Economic%20Benefits%20of%20EU%20MPAs.pdf>

<sup>80</sup> Available at: [https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030\\_en#the-business-case-for-biodiversity](https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en#the-business-case-for-biodiversity)

<sup>81</sup> Available at: <https://www.eea.europa.eu/themes/biodiversity/natura-2000>

<sup>82</sup> Available at: [https://www.bmu.de/fileadmin/Daten\\_BMU/Download\\_PDF/Naturschutz/bnatschg\\_en\\_bf.pdf](https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Naturschutz/bnatschg_en_bf.pdf)

<sup>83</sup> After the 2021 election, its name has been changed to the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV)

<sup>84</sup> Available at: [https://ec.europa.eu/environment/nature/natura2000/marine/docs/marine\\_guidelines.pdf](https://ec.europa.eu/environment/nature/natura2000/marine/docs/marine_guidelines.pdf)

“Guidelines on Climate Change and Natura 2000”<sup>85</sup>, which provides systematic guidance for the designation and management of Natura 2000 sites.

Section 3 of the Green Deal “The EU as a global leader” elaborates on the EU’s ambition to lead the environmental discussion in multiple international processes. The EU tends to connect climate and ocean issues in its diplomatic efforts. For example, at the 2018 Our Ocean conference in Bali, the EU committed to a total of EUR 300 million on initiatives related to marine protection and climate change impacts. Also, in 2018, the EU Commission committed EUR 10 million to the action in the coral triangle focusing on combining activities addressing the expansion and management reinforcement of the marine protected areas network and ecosystem management for climate change adaptation.<sup>86</sup>

Marine protected area (MPA) is important to EU and Germany’s diplomatic efforts, in which climate change is often used as a rationale to justify its necessity. For example, based on the work mainly done by Germany, the EU proposed the Weddell Sea MPA in the Commission for the Conservation of Marine Living Resources (CCAMLR). The proposal mentioned climate change in four of its objectives<sup>87</sup>. Climate was also mentioned 6 times in a motion passed by the German Bundestag on the Weddell Sea MPA. In the negotiation for an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (BBNJ), the EU has been the driving force of the element such as area-based management tools (ABMT), including marine protected area (MPA)s’ in the package. The EU’s submission to the BBNJ negotiation on ABMT<sup>88</sup> also mentioned addressing climate change in its scope.

## China

The potential of climate change mitigation in the protection of marine and coastal ecosystems such as mangroves, seaweed beds, etc. is gaining more interest in China’s conservation policy. The National Ecological Protection and Building Plan (2013-2020)<sup>89</sup> points out that marine ecosystems make a significant contribution to maintaining the carbon balance of the biosphere. It highlights the focus on the protection and restoration of nearshore and offshore ecological zones including islands, coastal zones, coastal wetlands and typical marine ecosystems (e.g., mangrove, seaweed bed), for instance, the construction of coastal wetland carbon sequestration demonstration area. Strengthening mangrove and wetland protection and restoration projects have been required for coastal regions such as Zhejiang province by the Thirteenth Five-Year (2016-2020) Plan of National Marine Economic Development<sup>90</sup>. The plan further stated to improve marine climate mitigation capacities by making the most of ocean carbon sequestrations. The Implementation Plan for the Marine Ecological Protection and Restoration Funds in 2020 supports the protection of ecosystems of coastal zones, mangroves, and sea areas<sup>91</sup>. It also supports restorations of mangroves, coastlines, coastal zones, sea areas, and islands to enhance the ecological functions of sea areas and shorelines of islands<sup>92</sup>.

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<sup>85</sup> Available at: <https://op.europa.eu/en/publication-detail/-/publication/59c03f44-f672-4f61-bbf7-5422479cf6bb>

<sup>86</sup> European Commission. 2019. Joint staff working document accompanying the document-joint report to the European Parliament and the Council: Improving International Ocean Governance-Two years of progress. [R]. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019SC0104&from=EN>

<sup>87</sup> Delegation of the European Union and its Member States. 2016. CCAMLR-XXXV/18: Proposal on a conservation measure establishing the Weddell Sea Marine Protected Area (WSMPA). [R]. <https://meetings.ccamlr.org/en/ccamlr-xxxv/18>

<sup>88</sup> Available at: [https://www.un.org/depts/los/biodiversity/prepcom\\_files/rolling\\_comp/European\\_Union-area-based\\_management\\_tools.pdf](https://www.un.org/depts/los/biodiversity/prepcom_files/rolling_comp/European_Union-area-based_management_tools.pdf)

<sup>89</sup> Available at: [https://www.ndrc.gov.cn/tzggw/jgsj/njs/sjdt/201411/t20141119\\_1194736.html](https://www.ndrc.gov.cn/tzggw/jgsj/njs/sjdt/201411/t20141119_1194736.html)

<sup>90</sup> Available at: <http://www.cpnn.com.cn/zdyw/201705/W020170515555677125630.pdf>

<sup>91</sup> Available at: <https://aoc.ouc.edu.cn/2020/0527/c13996a288485/page.htm>

<sup>92</sup> Available at: <https://aoc.ouc.edu.cn/2020/0527/c13996a288485/page.htm>

For nearly four decades, China has been working on the establishment of MPAs. A new top-down design became possible when China introduced a unified jurisdiction for MPAs after the institutional reform in 2018<sup>93</sup>. To achieve sustainable development of China's marine protected areas, an appropriate classification consisting of fully protected and multipurpose marine protected areas, a balanced system combining top-down and bottom-up approaches, and a flexible and adaptable network of marine protected areas is proposed. Vulnerability to Climate change is not specifically mentioned in the current technical standards for MPAs in China.

However, adaptation and mitigation to climate change are listed among the ecosystem service expected from the Ecological Protection Redlines (EPRs) zones.<sup>94</sup> The Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035 stated that various marine area protection lines should be delineated and implemented, such as EPRs for the ocean<sup>95</sup>. China is drawing EPRs to provide legal protection to at least 25% of the country's land and sea area<sup>96</sup>. In 2016, the State Oceanic Administration issued the Opinions on the Full Establishment and Implementation of the Marine Ecological Redline System<sup>97</sup> and supported the issuance of the Technical Guide for Marine Ecological Redline Delineation<sup>98</sup>, marking the full launch of the national marine EPR delineation work. The Opinions required that the marine EPR area accounts for no less than 30% of the total sea area managed by coastal provinces. The selections and decisions of EPRs are based on technical assessments of the benefits to both nature and people, which are based on criteria including disaster risk reduction such as coastal defenses against marine natural disasters with large contributions from climate change<sup>99</sup>. China recognized EPRs' role in carbon sequestration in its submission of Nature-based Solutions (NbS) for Climate to the UNEP<sup>100</sup>.

Regarding diplomacy, China has been actively engaging in the United Nations' climate change process and ocean-related processes. China and New Zealand led the discussions on NbS in the run-up to the UN Summit for Climate Actions. Since then, China has been promoting the debate on NbS in various fora. Nevertheless, in its participation in the negotiations relating to biodiversity, China is reluctant to make the connection to climate change. In the fishery negotiations, China supports climate research that could inform decision-making rather than developing a framework to integrate climate change into decision-making.<sup>101</sup>

## Summary

- Marine ecosystems' value to climate change mitigation and adaptation has just started to gain importance in both countries' conservation policies. Germany and the EU are more explicit about this issue in their open policies.

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<sup>93</sup> Wenjia Hu, Jie Liu, Zhiyuan Ma, et al. 2020. China's marine protected area system: Evolution, challenges, and new prospects. [J]. *Marine Policy*, 115: 103780. <https://www.sciencedirect.com/science/article/abs/pii/S0308597X19303987>

<sup>94</sup> Yijia Yang, Ge Song, Shuai Lu. 2020. Study on the ecological protection redline (EPR) demarcation process and the ecosystem service value (ESV) of the EPR zone: A case study on the city of Qiqihaer in China. [J]. *Ecological Indicators*, 109: 105754. <https://www.sciencedirect.com/science/article/abs/pii/S1470160X19307472>

<sup>95</sup> Available at: [https://cset.georgetown.edu/wp-content/uploads/t0284\\_14th\\_Five\\_Year\\_Plan\\_EN.pdf](https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf)

<sup>96</sup> Jixi Gao, Changxin Zou, Dimitri De Boer, Guido Schmidt-Traub, Arthur Hanson, Li Lin, How China's ecological redlines could boost it to carbon neutrality, *Chinadialogue*, December 11, 2020, available at: <https://chinadialogue.net/en/nature/how-chinas-ecological-redlines-could-boost-it-to-carbon-neutrality/>

<sup>97</sup> State Oceanic Administration. 2016. State Oceanic Administration fully establishes and implements marine ecological red line system: Firmly guard the fundamental bottom line of marine ecological security. [EB/OL]. [http://www.gov.cn/xinwen/2016-06/16/content\\_5082772.htm](http://www.gov.cn/xinwen/2016-06/16/content_5082772.htm)

<sup>98</sup> Available at: <https://cnbc.mee.gov.cn/tzgg/201506/P020150618500420265454.pdf>

<sup>99</sup> Ibis. Jixi GAO, et al.,

<sup>100</sup> Available at: [https://wedocs.unep.org/bitstream/handle/20.500.11822/28899/Drawing\\_Ecological.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/28899/Drawing_Ecological.pdf?sequence=1&isAllowed=y)

<sup>101</sup> Report of the CCAMLR-XXXVII, available at: <https://www.ccamlr.org/en/ccamlr-xxxvii>

- The EU and Germany are active in promoting climate change issues in international biodiversity-related negotiations. China is active in making such connections in climate diplomacy.
- The role of NbS in climate change mitigation is straightforward. In China, its role in adaptation was mainly viewed as a way to mitigate urgent threats. The elaboration of its role in climate change adaptation concerning mid-term and long-term risks could enrich China's marine conservation policy.

## Offshore Renewable Energy

Renewable energy is the key to decarbonizing our economy and an important weapon in the fight against climate change. While the transition to renewable energies could intensify the competition for land, the role of ocean-based renewable energies is getting more attention. Covering 70% of the world's surface, the ocean has abundant sources of renewable energy, including the wind, the tide, the wave, and natural differences in seawater temperatures and salinity. Offshore renewable energy can be transformed into clean electricity potentially to power the world twice over<sup>102</sup>. However, the technologies for harvesting those energy sources are at different stages of maturity. Thus differentiated supporting policies are needed. Adaptation and ocean resilience also needs to be considered. For example, fixed offshore wind power, though the technology is able to protect the facility during extreme winds, its productivity could still be challenged<sup>103</sup>. How would the massive installation of the less mature technologies impact marine biodiversity is still largely unknown.

### Germany

In 2020, the EU Commission published a strategy<sup>104</sup> to harness the potential of offshore renewable energy for a climate-neutral future. The EU's strategy has outlined the contribution offshore renewable energy will make to the EU's goals to achieve its carbon emission reduction targets for 2030 and to be climate neutral by 2050, making offshore renewable energy a core component of Europe's energy system. It estimates that Europe will need to have 300 GW of offshore wind capacity and 40 GW of ocean energy by 2050, with 60 GW and 1 GW of the respective capacities to be installed by 2030. Ocean energy is identified in the EU strategy as wave and tidal energy, floating photovoltaic systems, and the use of algae to produce biofuels.

The EU Strategy on offshore renewable energies highlights the importance of harmonizing the development of such energies with other environment and development goals as the first item of its "How to Scale Up" section. As the development of such energies is required to comply with the EU environmental legislation and the integrated maritime policy, the main instrument for coordinating the use of the marine space is maritime spatial planning (MSP). The Maritime Spatial Planning

<sup>102</sup> International Renewable Energy Agency. 2020. Innovation outlook: Ocean energy technologies. [R]. [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Dec/IRENA\\_Innovation\\_Outlook\\_Ocean\\_Energy\\_2020.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Dec/IRENA_Innovation_Outlook_Ocean_Energy_2020.pdf)

<sup>103</sup> Nicolaos Antonio Cutululis, Marisciel Litong-Palima, Poul Ejnar Sørensen. 2012. Offshore Wind Power Production in Critical Weather Conditions. [J]. Proceedings of EWEA 2012 – European Wind Energy Conference & Exhibition. [https://backend.orbit.dtu.dk/ws/portalfiles/portal/7894079/Offshore\\_Wind\\_Power\\_Production.pdf](https://backend.orbit.dtu.dk/ws/portalfiles/portal/7894079/Offshore_Wind_Power_Production.pdf)

<sup>104</sup> European Commission. 2020. An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future. [R]. [https://ec.europa.eu/energy/sites/ener/files/offshore\\_renewable\\_energy\\_strategy.pdf](https://ec.europa.eu/energy/sites/ener/files/offshore_renewable_energy_strategy.pdf)

Directive<sup>105</sup> provides a framework for member states to integrate different interests in assigning management objectives, including biodiversity conservation, for their ocean spaces.

In line with the EU's strategy, Germany has also raised its goals of offshore renewable energy generation. In 2020, the German Parliament (Bundestag) passed an amendment to the *Development and Promotion of Offshore Wind Energy Act (Offshore Wind Act, Windenergie-auf-See-Gesetz, "WindSeeG")*<sup>106</sup> with higher expansion targets introduced. The first version of the law was passed in 2017. It is specifically legislated to support offshore wind energy as it is the first commercialized offshore renewable energy with special challenges such as grid connection.

In March 2021, with the EU Commission's approval and under EU State aid rules, a German operating aid scheme to further develop offshore wind energy generation in the country was implemented. It is a support scheme applicable until 2026. It is based on a centralized auction model wherein the state pre-selects and awards specific sites for offshore wind in competitive tenders. Payments are granted for 20 years in the form of a premium on top of the market price that will be set on the basis of the lowest bid in open and transparent competitive tenders.

Germany has also implemented many international collaborations to promote developing offshore renewable energy. The German government has been one of the Contracting Parties to the Technology Collaboration Programme on Ocean Energy Systems (OES) within the International Energy Agency (IEA) since 2007<sup>107</sup>. In 2020, Germany held the presidency of the North Seas Energy Cooperation (NSEC), which currently comprises nine European States and the European Commission as its members. The NSEC focuses on the expansion of offshore wind energy and offshore grid infrastructure. Germany's presidency in 2020 focused on the promotion of joint and hybrid projects, where offshore wind farms are linked through an interconnector to at least two member states<sup>108</sup>. Since 2020, Germany has presided cooperation among 10 European countries which will focus on developing hybrid offshore projects<sup>109</sup>.

Regarding the ocean energies such as tide and wave, Europe represents the main hub for R&D on these ocean energy technologies. A number of policies and mechanisms have been put in place to support the development of ocean energy, both at EU and member state level.

From a policy standpoint, since 2014, the publication of the EU Blue Energy Communication and the launch of the Ocean Energy Forum and the European Technology and Innovation Platform for Ocean Energy has provided a framework for the sector to address common issues and identify common solutions towards the commercialization of its technologies.

On the other hand, the slow technological progress combined with difficulties in attracting funds and financing for the first-of-a-kind array demonstration project is hindering investors' confidence in the sector. The high risk associated with projects coupled with delays in market formation has forced key developers and OEMs to either downsize or withdraw their interest in developing ocean energy technologies.<sup>110</sup>

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<sup>105</sup> European Commission. 2014. Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning. [EB/OL]. Official Journal of the European Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0089>

<sup>106</sup> Available at: <https://climate-laws.org/geographies/germany/laws/offshore-wind-energy-act-windseeg-2017>

<sup>107</sup> The list of contracting parties is available at: <https://www.ocean-energy-systems.org/about-us/members/contracting-parties/>

<sup>108</sup> Ocean Energy Systems. 2021. OES Annual Report 2020. [R]. <https://www.ocean-energy-systems.org/publications/oes-annual-reports/document/oes-annual-report-2020/>

<sup>109</sup> Kate Freeman, Ciaran Frost, Giles Hundleby, et al. 2019. Our Energy, Our Future: How offshore wind will help Europe go carbon-neutral. [R]. Wind Europe. <https://windeurope.org/about-wind/reports/our-energy-our-future/>

<sup>110</sup> Davide Magagna and Andreas Uihlein. 2015. Ocean energy development in Europe: Current status and future perspectives. [J]. International Journal of Marine Energy, 11: 84-104. <https://www.sciencedirect.com/science/article/pii/S2214166915000181>



The Maritime Agenda 2025 published by Germany highlights the importance of climate protection. However, ocean energy (or marine energy) was only mentioned in the background. The Area of action 5: Contribute to the energy transition using maritime technologies is mostly about offshore wind power. The last point, *“To use cross-programme research initiatives to increase the strategic multiplier effect of research funding in energy, industrial and technology policy”* might have some connection to ocean energy.

## China

Offshore renewable energy in China can play a significant role in achieving China’s goal of having CO<sub>2</sub> emissions peak before 2030 and achieving carbon neutrality before 2060. Given that China looks to further improve its energy structure by tapping the potential of various types of renewable energy, clean offshore renewable energy resources will play an important role in meeting China’s future energy needs, thus taking up a significant portion of its future energy consumption and reducing related carbon emissions<sup>111</sup>.

China’s offshore wind energy has reached a level of maturity with an enabling environment of technological advances, cost reductions and policy support. Offshore wind energy in China has developed rapidly since the 13th Five-Year Plan, especially after 2018<sup>112</sup>. As of the end of 2019, the cumulative installed capacity of 5.93 GW was connected to the grid, completing the 13th Five-Year Plan<sup>113</sup> target of 5 GW one year ahead of schedule. China has now become the largest country in the world in terms of cumulative installed capacity of offshore wind energy, which is 11.13 GW as of June 2021.

China's offshore wind energy has been enjoying a relatively stable tariff and subsidy policy since 2014, which in recent years has steadily begun to undergo significant adjustments. China set its first tariff for offshore wind energy in 2014 at 0.85 CNY per kilowatt-hour far higher than the average of 0.42 CNY paid for coal-fired energy to boost the sector.<sup>114</sup> In 2016, China published a FYP for the development of wind power and a capacity target for offshore wind power is included.

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<sup>111</sup> Yong-liang Zhang, Zheng Lin, Qiu-lin Liu. 2014. Marine Renewable Energy in China: Current Status and Perspectives. [J]. Water Science and Engineering, 7(3): 288-305. <https://doi.org/10.3882/j.issn.1674-2370.2014.03.005>

<sup>112</sup> Zhiyong Shi, Caixia Wang, Qionghui Li. 2020. Key Issues in the Development of Offshore Wind Power in China in the 14th Five-Year Plan. [J]. Electric Power, 53(7): 8-17. <http://www.csee.org.cn/pic/u/cms/www/202101/2116573143jo.pdf>

<sup>113</sup> Available at: [http://www.nea.gov.cn/135867633\\_14804706797341n.pdf](http://www.nea.gov.cn/135867633_14804706797341n.pdf)

<sup>114</sup> National Development and Reform Commission. 2014. Notice on the Feed-in Tariff Policy for Offshore Wind Power, National Development and Reform Commission. [EB/OL]. [https://www.ndrc.gov.cn/xxgk/zcfb/tz/201406/t20140619\\_964151.html?code=&state=123](https://www.ndrc.gov.cn/xxgk/zcfb/tz/201406/t20140619_964151.html?code=&state=123)

**Table 2.4.1 China's offshore wind energy development stages and key policies**

Stage	Time	Policy	Milestones
Demonstrative Projects	Before 2010	2006, The Renewable Energy Law; In 2009, the National Energy Administration issued the Working Outline of Offshore Wind Farm Engineering Planning	Shanghai Donghai Bridge Offshore Wind Farm became the first domestic demonstration of a large offshore wind power project.
Concession Project Bidding	2010-2014	In 2010, the National Energy Administration and the State Oceanic Administration issued the Interim Measures for the Management of Offshore Wind Power Development and Construction	From May to September 2010, the National Energy Administration organized the first round of domestic offshore wind power concession project bidding.
Fixed Feed-in Tariff	2014-2018	In June 2014, the National Development and Reform Commission issued the Notice on the Policy on Feed-in Tariffs of Offshore Wind Power	Stipulate that the intertidal offshore wind power and offshore wind power projects that entered service in 2017 have a feed-in tariff of 0.75 RMB/kWh and 0.85 RMB/kWh, respectively.
Competitive Allocation	Since 2019	In May 2018, the National Development and Reform Commission issued the Notice on the Requirements Relating to the Construction of Wind Power in 2018 and the Guidance Program for Competitive Allocation of Wind Power Projects. In May 2019, the National Development and Reform Commission issued the Notice on Improving the Wind Power Feed-in Tariff Policy	Since 2019, the feed-in tariff of newly approved offshore wind power projects should all be competitively allocated and determined; the benchmark feed-in tariffs of both onshore and offshore wind power have been changed to guiding prices, which shall not be exceeded by the feed-in tariff of the newly approved projects within the resource areas determined through competitive methods.

Source: Offshore Wind Power Review and Outlook 2020<sup>115</sup>

In 2016, the State Oceanic Administration (SOA) issued the Opinions on Further Regulating the Management of Offshore Wind Power Use of the Sea<sup>116</sup>. The documents specified the rules for the site selection of the offshore wind farms. Marine spatial planning, Environmental Impact Assessment

<sup>115</sup> Available at: <http://www.eastwp.net/news/show.php?itemid=60111>

<sup>116</sup> State Oceanic Administration. 2016. Opinion on Further Regulating the Management of Offshore Wind Power Use of the Sea, State Oceanic Administration. [EB/OL]. <https://www.waizi.org.cn/law/14735.html>

(EIA), and local approval procedures are the instruments for managing the projects' environmental impacts. In 2017, The SOA published the Management Measures for Offshore Wind Power Development and Construction, which includes an environmental protection section that specifies the role of EIA. To address the risks posed by the extreme weather events in the site selection, in 2018, the National Committee for Climate Change Technology Standardization published the Technical Specifications for Evaluation of the Effect of Tropical Cyclone on Offshore Wind Farm.

Ocean energy such as tide and wave has been widely tested and piloted in China. The *Jiangxia tidal pilot power station* with an installed capacity of 4.1 MW has been operating stably for more than 30 years. Wanshan Wave Energy Demonstration Project is China's first MWs level wave energy demonstration project which has been started with the support of the Ministry of Finance and the Ministry of Natural Resources (MNR) in 2017<sup>117</sup>.

Though the ocean energies are not yet commercialized, they have received special attention from the government. In 2016, the SOA published the Thirteenth Five-Year Plan for the Development of Marine Renewable Energy<sup>118</sup> which is specifically dedicated to tide and wave energy. The plan demonstrated China's ambition to become a leader in this emerging industry. China established the Special Funds for Marine Renewable Energy (SFMRE) for tapping ocean energy in 2010. This funding program is to comprehensively promote the research, application, and demonstration of marine energy development and utilization technologies, laying a solid foundation for the cultivation and development of marine energy industrialization<sup>119</sup>. As of 2020, this funding program has invested above 1.3 billion CNY since 2010 to support more than 116 projects, such as the LHD Tidal Current Energy Demonstration Project, the Zhoushan Tidal Current Energy Demonstration Project, and the Weihai Test Site<sup>120</sup>.

China has also implemented many international collaborations to promote developments of offshore renewable energy. The *Marine Renewable Energy Research, Development and Administration Center* designated by the government of China has been one of the Contracting Parties to the Technology Collaboration Programme on *Ocean Energy Systems (OES)* within the *International Energy Agency (IEA)* since 2011. A bilateral cooperation project (2018-2023) between the Republic of Korea and China has been promoting the exchange of information on the technology and the utilization of ocean energy systems. China has led the estimation of Ocean Thermal Energy Conversion (OTEC) potential around the globe. A 3-year, \$3.5 million Australia-China Joint Research Centre on offshore wind and wave energy were launched in 2020<sup>121</sup>.

## Summary

- Both countries have great ambition in developing ocean-based renewable energies.
- Both countries apply environmental management framework to the construction of offshore wind energy. The effectiveness needs further study.
- Germany has a more advanced environmental management framework. For example, Germany's marine spatial planning covers all maritime areas under its jurisdiction, whereas

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<sup>117</sup> Ibis., Ocean Energy Systems.

<sup>118</sup> Available at: <http://www.gepresearch.com/76/view-745996-1.html>

<sup>119</sup> Ji Wang, Haifeng Wang, Yuxin Liu, et al. 2018. The development of marine renewable energy in China: prospects, challenges and recommendations. [J]. IOP Conference Series: Earth Environmental Science, 121(5): 052079. <https://iopscience.iop.org/article/10.1088/1755-1315/121/5/052079>

<sup>120</sup> Ibis., Ocean Energy Systems

<sup>121</sup> Ibis., Ocean Energy Systems

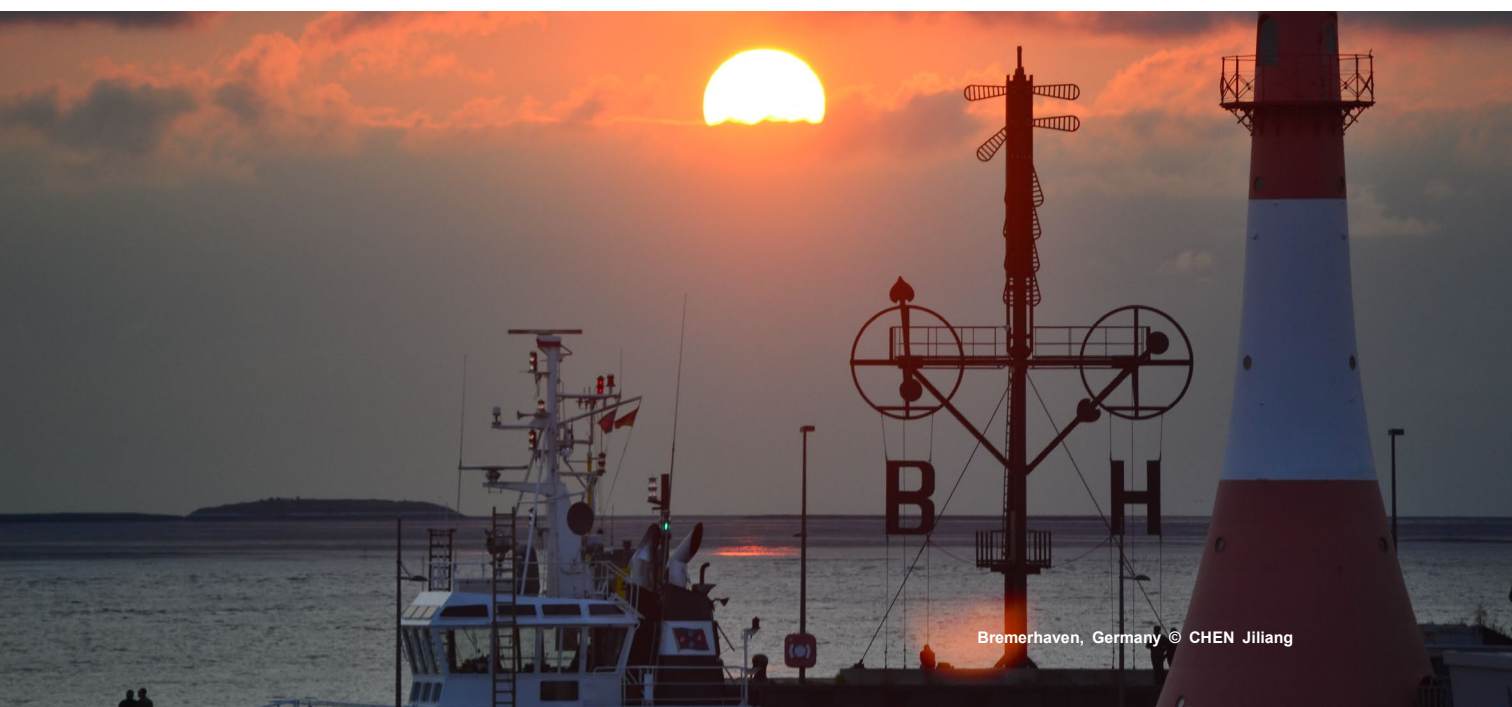
China's marine spatial planning does not yet cover the exclusive economic zone for a number of reasons, and there is still much room for development.

- Stronger wind is the main concern in terms of adapting to climate change. China is in the typhoon region, where more caution is needed.
- Compared to Germany, China seems to have a clearer plan for the development of tide and wave energy.

**Table 2.4.2 Support schemes for offshore wind markets in Germany and China**

	Former Schemes		Current Schemes		Upcoming Schemes
Germany	Obligation/Quota with fixed rate	Competitive bidding at fixed rate	Competitive bidding at fixed premium	Competitive auctions without subsidy	
Chinese Mainland	Obligation/Quota with fixed rate		Competitive bidding at fixed premium		Competitive auctions without subsidy

Source: Global Offshore Wind Report 2021<sup>122</sup>



Bremerhaven, Germany © CHEN Jiliang

<sup>122</sup> Available at: <https://gwec.net/global-offshore-wind-report-2021/>

# **Part III**

## **Discussion**

To write this part, the research team invited a number of experts in the field of ocean policy to comment on the guiding questions based on the comparison above. The following is a summary of the experts' written comments.

## Reasons for the Differences in Domestic and International Policies

Based on the above, we can see that the ocean and climate nexus is more debated at the international processes than in domestic policies. Some experts suggested the reasons may be as follows:

- Most studies on the ocean and climate nexus were first carried out at a global scale. Research at the local or industry level started much later; therefore, the latter provides less reference for policymaking.
- As oceans circulate globally, international cooperation is supposed to play a more critical role.
- International regimes may enjoy more freedom to conduct cross-topic and cross-sector discussions. In contrast, the domestic cross-sector coordination is only possible if the mechanism is established at a higher political level, such as China's National Leading Group on Climate Change set up by the State Council and the Central Leading Group on Maritime Rights and Interests. However, currently, the ocean and climate nexus issue has not caught the attention of these high-level coordination mechanisms.
- The geography may also lead to a higher priority for climate policies on land rather than in the ocean in domestic policies.

## Priority Areas for Policy Integration

In terms of integrating climate change into domestic ocean policy, some experts suggested that the ministries with the mandate of top-level design of national environment and resource policies, in China or in Germany, need to work out a comprehensive plan to break the institutional barriers to the climate and ocean policy synergies. Moreover, some experts believe that there is a need for specialized climate change planning for different ocean-related industries and sectors, which include, but are not limited to:

- **Marine disaster prediction and forecasting and emergency preparedness departments;**
- **Development of new ocean energy sources** (wind, wave, and tide);
- **The low-carbon and green transition in the shipping industry needs to be combined with climate change response policies:** Because the shipping industry is of global nature, the IMO has carried out a lot of work in this area and has laid a good foundation;
- **Shipbuilding and offshore equipment manufacturing:** green shipbuilding is the foundation and pillar for green shipping.

- **Coastal zone and offshore protected area management:** As the ocean plays a primary role in carbon capture and sequestration, it is necessary to maintain and restore the marine ecosystem services. One of the effective means is the designation and management of marine protected areas (MPA) s;
- **Seafood production (aquaculture, fishing):** Despite the controversy over whether the fishery is more of a carbon emitter or a carbon sink, research and development of low carbon fisheries and blue carbon technologies, and response to climate change do require integrated planning for climate change;
- Other ocean-dependent industries and sectors such as offshore oil and gas and coastal tourism.

As China's decarbonization goals will be broken down to individual industries, marine-related industries have to develop their own plans related to climate mitigation. However, regarding climate change adaptation, more efforts are needed to change the current situation of lack of adaptation-related medium- and long-term planning caused by insufficient research.

## Lessons Learned

In their answers to the leading questions, several experts expressed that China and Germany are not doing enough to address climate change in their ocean policies. Despite more active and cutting-edge research and discussions in Germany, there are no significant differences between the two countries regarding the policies developed. For future bilateral cooperation, experts suggested that priorities worthy of consideration in the future include, but are not limited to:

- The scientific and technological support to policy-making needs to be further strengthened. Marine scientific research requires more international cooperation. The researches on the processes and mechanisms of ocean-climate interactions at the global and regional levels need to be prioritized. Such research could include the German research on the relationship between climate and marine biodiversity in Europe and the Arctic, and Chinese research on the mechanisms of climate and physical ocean relationships in the Western Pacific and Northern Indian Ocean. Both Germany and China need to bridge the gaps between natural science and policy research and development.
- Integrated sea-land climate response strategies are needed to achieve and-sea-air synergy in management. Such strategies need support from multi-dimensional research on the synergies of sustainable development needs of the land, air-sky climate awareness and response, and marine ecosystem protection and restoration.
- Improving sectoral coordination and strengthening the top-level design for integrating science, technology, industry, and planning.
- China should learn from the concept and experiences of fisheries resource assessment and management from the EU and Germany.
- Both countries need to Systematically consider integrating ocean actions to fight climate change into national and international climate change governance systems and provide workable solutions.

- Efforts in Germany to improve its marine spatial planning could provide opportunities to enhance the integration of ocean and climate policies. Offshore wind power is seen by some experts as an important growth area for ocean climate action, but other experts are concerned about the impact of unregulated development on the marine ecosystem. Therefore, marine spatial planning can guide the allocation of ocean use rights by setting reasonable management targets.
- China's institutional strengths may be capitalized to explore more approaches to long-term planning.

## Opportunities for Further Sino-Germany Cooperation

One of the important reasons for the lack of ocean climate action in most countries, including China and Germany, is that major decision-makers do not have a full picture of the climate-ocean nexus, nor the impacts of major ocean changes on economy, politics, and society. Therefore, it is particularly important to bridge the information gap to obtain support from decision-makers. Experts believe that China and Germany can enhance climate action in the marine sector through cooperation in knowledge sharing, case studies, methodology design, and platform building. The priority areas for future cooperation include:

- Joint research on the processes and mechanisms of ocean-climate interactions at global and regional levels and their policy implications (North Atlantic Ocean, the Arctic, North Pacific, etc.);
- Marine conservation and restoration measures for increasing the stability and resilience of marine systems, technology R&D in marine carbon storage enhancement, including blue carbon;
- International cooperation demonstration projects of green and low-carbon shipping technology, marine new energy technologies, and industrialization;
- Feasibility study on the climate change response and spatial planning of the Bohai Bay-Yellow Sea and Bohai Sea region, and the Baltic Sea-North Sea region;
- International policy formulation and technical cooperation in offshore energy, marine transportation, and seabed carbon capture, utilization, and storage (CCUS) technologies;
- Dialogue and cooperation on blue carbon, adaptation, and fisheries.

## Future Focuses

The experts also provided recommendations for priority topics for research and discussions following this study:

- The role of scientific and technological innovation in supporting policy formulation and implementation;
- The impact of climate change on coastal resources and economy;



- Comparative study of the overall energy strategy adjustment and adaptation in China and Germany;
- Environmental impact analysis of the China-German shipping network;
- Experience of China and Germany in coastal zones protection and development;
- Assessment of the laying and operation project of the Nordstream natural gas pipelines and its reference to China;
- Germany's scientific and technological policy on climate change adaptation in coastal areas and marine response to climate change.



RV Heincke, Germany © CHEN Jiliang

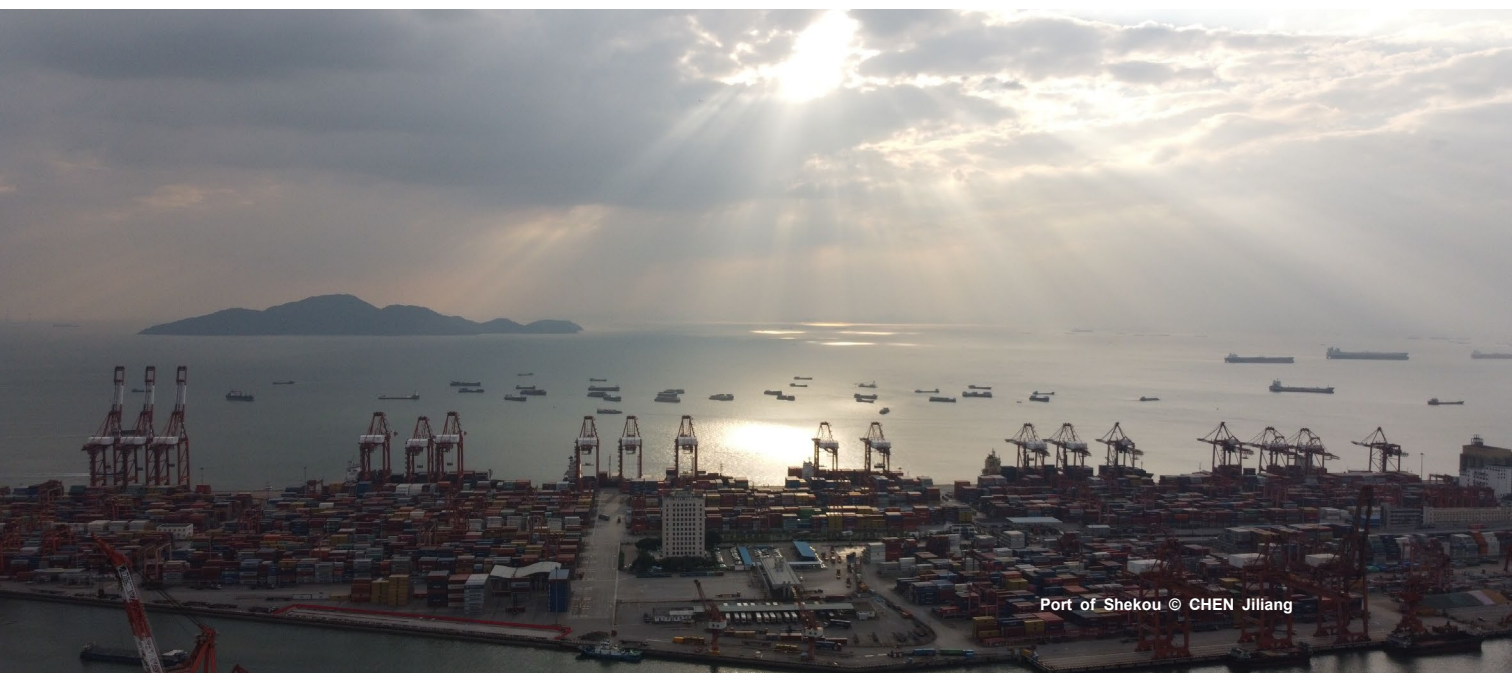




## **Closing Remarks**

The completion of this report coincides with the release of Working Group II Contribution to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), Climate Change 2022: Impacts, Adaptation, and Vulnerability. As a summary of the latest scientific advances since the release of the Fifth Assessment Report (AR5), the AR6 elaborates on the impact and risks of current and future climate change, adaptation measures, and climate resilience development, and reveals the interdependence of climate, ecosystems, and biodiversity, and human societies. It pays close attention to terrestrial, marine, coastal, and freshwater ecosystems, urban areas, rural areas and infrastructure, as well as the importance and urgency of transforming industrial and social systems. The AR6 provides a strong rationale for changing the inadequate integration of ocean-climate policies presented by this study.


This report argues that such lack of integration is highlighted by the lack of climate adaptation policies involving the ocean, especially in identifying and responding to medium and long-term risks. Responding to this dilemma requires advancing scientific understanding and finding tools and methods to make decisions to manage risks with limited information. Both China and Germany have well-established ocean policy frameworks, and these tools and methods could assist in developing ocean policy objectives and approaches at different levels. While Germany is slightly ahead in research, the geography and climate of China's waters are more complex. The exchange and cooperation between the two countries will benefit each other and provide useful examples for marine policy globally. The priority areas of cooperation identified in the discussion section suggested that Sino-German environmental cooperation and the Sino-EU Blue Partnership dialogue could build on this to identify further projects that could spearhead. As a non-governmental think-tank in China, Greenovation Hub stands ready to support relevant dialogue and cooperation. We are convinced that such exchange and cooperation will benefit domestic policy development and policy collaboration.



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