The People's Republic of China

Project Performance Evaluation

Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project

Approach Paper

Independent Evaluation Office
31 March 2025

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Abbreviations and acronyms

FiT	feed-in tariff
GDP	gross domestic product
GW	gigawatt
GYG	Guangdong Yudean Group Co. Ltd.
IEO	Independent Evaluation Office
MoF	Ministry of Finance
MW	megawatt
NDB	New Development Bank
O&M	operations and maintenance
PDB	project document to the Board
PIA	project implementation agency
PIU	project implementation unit
PCR	project completion report
PPR	project progress report
WTG	wind turbine generator

I. Background

A. Evaluation context

1. In accordance with the Evaluation Policy of the New Development Bank (NDB) and the NDB Evaluation Strategy 2024-2026, the Independent Evaluation Office (IEO) of NDB conducts project performance evaluations (PPEs) for selected NDB-financed projects across its member countries.

2. The primary objectives of PPEs are to: (i) assess the results of NDB-financed projects; and (ii) generate recommendations and lessons to enhance the implementation of ongoing projects and the design of future operations.

3. As approved by the Board of Directors of NDB in December 2024, IEO will undertake an independent PPE of the Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project.[1] This approach paper outlines the design of the evaluation, detailing its scope, methodology, key evaluation questions, process and timeframe. The findings and recommendations from this evaluation will also contribute to the first country portfolio evaluation to be conducted by IEO in China in 2025.

B. Country context

4. The People's Republic of China has made remarkable progress on social and economic development through the comprehensive market economy reforms and the opening-up policy adopted by the government in the late 1970s. By leveraging its vast labour force and natural resources, as well as promoting trade liberalisation and foreign investment – particularly in the manufacturing and infrastructure sectors – China's gross domestic product (GDP) grew from RMB 368.48 billion in 1978 to RMB 129.43 trillion in 2023. This translates to an annual average growth rate of 8.9%, significantly surpassing the global average of 3% over the same period.[2]

Table 1. Selected economic indicators of China (2018-2024)

Indicators	2018	2019	2020	2021	2022	2023	2024
GDP (RMB billion)	93,601	100,587	103,487	117,382	123,403	129,427	134,908
Real GDP growth (%)	6.7	6.0	2.2	8.4	3.0	5.2	N/A
GDP per capita (RMB)	66,726	71,453	73,338	83,111	87,385	91,746	95,749
Total energy production*	3,788.59	3,973.17	4,072.95	4,271.15	4,638.08	4,830.00	N/A
Elasticity ratio of electricity production (-)	1.27	0.78	1.68	1.15	1.23	1.33	N/A
Elasticity ratio of electricity consumption (-)	1.27	0.78	1.68	1.17	1.23	1.29	N/A

* In million tonnes of coal equivalent.

Source: China National Bureau of Statistics here.

[1] The IEO selection criteria for project performance evaluations include: (i) information gaps in the project completion report (PCR) found by IEO; (ii) innovative approaches (sectoral, cross-cutting considerations or institutional arrangements) that can be scaled up elsewhere; (iii) disconnect between the ratings contained in the PCR and those reflected from review of documents and management information system data; (iv) public-private mix in project evaluation; (v) a geographical balance of the IEO evaluation portfolio; (vi) contribution to other IEO deliverables (e.g. an evaluation synthesis); and (vii) IEO have the resources (financial and human) to conduct this evaluation.

[2] Data retrieved from the National Statistics Bureau of China, here; and the State Council of China, here.

5. China's sustained economic growth has been driven by substantial investments in energy resources, particularly fossil fuels, and an export-oriented manufacturing sector. To address environmental challenges and enhance the sustainability of energy production, the country has been actively seeking to reduce its dependence on resource-intensive manufacturing while expanding its renewable energy generation capacity as an alternative to traditional fuel consumption.

6. In October 2021, China submitted its updated Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC), committing to peak CO_2 emissions by 2030 and achieve carbon neutrality by 2060. To meet these targets, China aims to increase the share of non-fossil fuels in primary energy consumption to 25% and expand its total installed wind and solar power capacity to over 1.2 billion kilowatts by 2030.[3]

C. Sectoral context

7. Since the installation of the first wind farm at Crotched Mountain in New Hampshire, United States, in 1980, wind energy has been recognised as a growing source of clean power worldwide. Over the past four decades, advancements in technology and innovation, coupled with the limitations of onshore space, have driven the exploration of offshore wind energy. In the late 20th century, experiments in offshore wind development began to harness the vast energy potential of the sea and ocean.

8. In 1991, the world's first offshore wind farm, Vindeby, was constructed off the coast of Denmark. The project consisted of 11 turbines with a total capacity of 5 megawatts (MW). Since then, several countries, particularly in Europe—such as the United Kingdom, Germany, and the Netherlands—have emerged as leaders in offshore wind development. These nations have deployed increasingly larger and more powerful wind turbines, advanced offshore wind technology, and expanded renewable energy capacity.

Table 2. Comparison of onshore and offshore wind power

Location	Topographic features	Wind energy resources
Onshore	Plains	• Lower surface roughness • Stable wind speed and direction
	Mountainous areas/hilly areas	• Affected by the topography, wind energy resources more complex
Offshore	Intertidal and subtidal mudflats	• Lower sea surface roughness • Higher average wind speed
	Near-shore, offshore	• Lower sea surface roughness • Higher average wind speed • Lower wind shear • Smaller turbulence

[3] Information available from UNFCCC here.

Evolution of the wind power sector in China

9. The evolution of the wind power sector development in China could be summarised in five phases, namely early exploration stage (1980s-2000); rapid expansion (2001-2010); market consolidation and technological innovations (2011-2015); continued development & commercialisation (2016-2020); and high-quality development and internationalisation (2021 onwards). More information about these phases can be found in the following paragraphs.

Phase I: Early exploration (1980s-2000)

10. In the 1980s, China started to explore the development of wind power technology, primarily through small-scale demonstration projects and pilot wind farms (e.g. Rongcheng Wind Farm in Shandong province and Dabancheng Wind Farm in Xinjiang). During this period, China accumulated valuable experience in the preliminary site selection for wind farms, wind farm design, and equipment operation and maintenance. The government also introduced policies to support the development of renewable energy development, including in the wind power sector, at relatively small scale.

Phase II: Rapid expansion (2001-2010)

11. In 2006, the Government of China promulgated the Renewable Energy Law, which set out the legal and institutional framework for the development of wind power, clarifying development targets and subsidy policies for renewable energy. The wind power installed capacity increased rapidly, making China one of the fastest-growing wind power markets in the world. By 2010, China's wind power installed capacity reached approximately 44.7 gigawatts (GW), ranking it first globally. At the same time, the domestic wind power equipment manufacturing industry developed rapidly, with companies such as Goldwind, Sinovel and Mingyang Smart Energy emerging as leaders in the field. This led to the gradual onshoring of wind turbine production in China itself, reducing costs. On the other hand, challenges such as difficulties in grid integration and wind power generation curtailment also emerged.

Phase III: Market consolidation and technological innovations (2011-2015)

12. In respond to the challenges that emerged, the Government of China introduced a series of policies to address issues such as wind curtailment and grid restrictions, optimising the layout of wind power development and focusing on regions with favourable resource conditions and strong power absorption capabilities. During this period, wind power development transitioned from pursuing installed capacity to emphasising project quality and efficiency, with a focus on technological advancements and optimised resource allocation.

13. Large offshore wind power projects were launched during this period which set up the foundation for subsequent large-scale development. For instance, the Jiangsu Rudong Offshore Wind Farm was launched in 2012, which was the first intertidal offshore demonstration wind farm with an installed capacity of 150 MW. Feed-in tariffs (FiTs) also provided strong incentives, reaching RMB 0.85 per kWh in 2014 for offshore wind.

Phase IV: Continued development and commercialisation (2016-2020)

14. China's wind power installed capacity continued to grow, making it the largest wind power market in the world. By 2020, the cumulative installed capacity of wind power exceeded 280 GW. In terms of technology, wind turbine technology continued to be advanced, with increased single-unit capacity. Onshore wind power gradually expanded

to low-wind-speed regions in China (e.g. Henan, Anhui, Jiangxi and Hunan). By introducing subsidies, electricity pricing policies, and green certificate trading, the government continued to further facilitate the development of the wind power sector and promote grid parity for renewable energy. In addition, Chinese wind power enterprises began to expand globally by participating in international market competition, exporting wind turbine equipment, and providing wind power project development services.

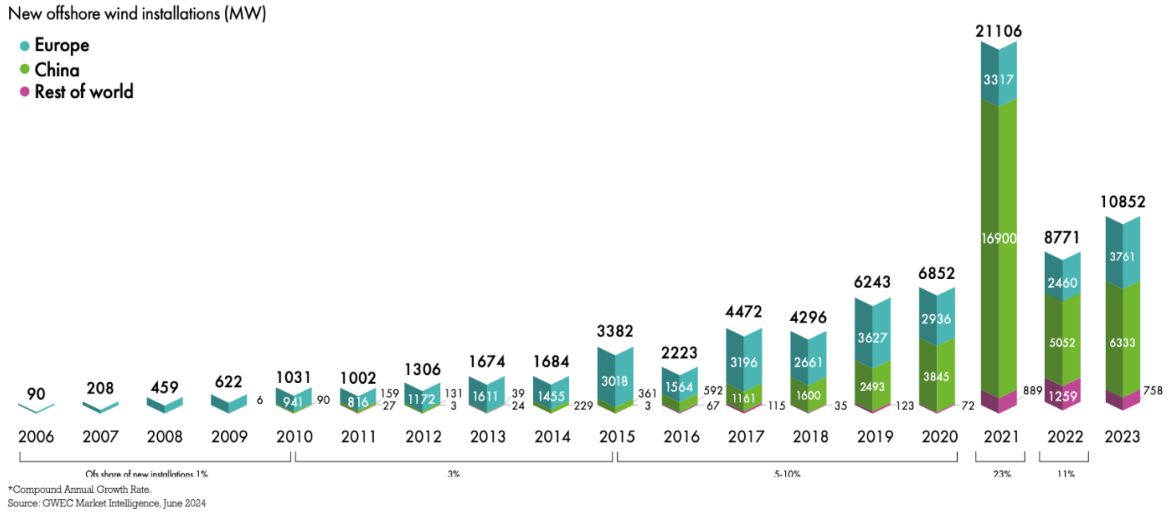
Phase V: High-quality development and internationalisation (2021 onwards)

15. As mentioned previously, in 2021 the Government of China set the country's goals of achieving carbon peak by 2030 and carbon neutrality by 2060. In this context and as an essential component of clean energy, wind power plays an even more important role for China to achieve the set targets for green development. Onshore and offshore wind power is gradually achieving "grid parity", with policy support shifting from subsidies to market-oriented mechanisms. Offshore wind power has become a new growth driver, with China's installed offshore wind capacity growing rapidly and its technological level reaching the global forefront. The wind power industry is also transitioning toward AI-driven approaches, with technologies such as big data playing a significant role in wind farm operation and maintenance.

16. By the third quarter of 2024, China had accumulatively installed 39.1 GW of offshore wind capacity, representing over 50% of the global capacity and solidifying its foothold for grid parity. While the national subsidies for offshore wind projects were diminished in 2022, local governments continue to incentivise development through reduced land use fees and investments in grid infrastructure as well as local subsidy. These measures aim to sustain momentum despite the increased cost pressures. Transition to competitive auctions has reduced dependency on FiTs while encouraging cost efficiency. High-capacity turbines have been developed, such as Mingyang's 16 MW turbine, which has gained popularity in new projects. The Dongfang Electric Corporation started to commercialise the world's largest offshore turbine (26 MW) in October 2024. Meanwhile, floating wind turbine technologies have also been piloted in deepwater zones.

17. As shown in figure 1, China has established itself as one of the global leaders in offshore wind power. China's offshore wind farms are concentrated in provinces like Jiangsu, Guangdong, Zhejiang and Fujian, reflecting a regional approach to leveraging natural resources. Chinese companies, including Goldwind and Mingyang, are advancing innovative technologies, challenging the dominance of established global players.

Figure 1. Megawatts of new offshore wind installation across the world: 2006-2023



Source: Global Wind Energy Council, Market Intelligence, June 2024.

D. Local context

18. Guangdong Province is located on the coast of the South China Sea, with a coastline spanning 4,084.48 km and a sea area of 419,300 km^2, which is 2.3 times the size of its land area. Benefiting from its strategic location, Guangdong was designated as one of China's Special Economic Zones following the launch of economic reform and opening-up initiatives. In 2023, Guangdong became the first province in China to surpass RMB 13 trillion in GDP, maintaining its position as the country's top-ranking provincial economy for 36 consecutive years. As a key economic powerhouse, Guangdong is also one of China's largest energy consumers, with electricity consumption reaching 850.2 billion kWh in 2023.[4]

19. Guangdong Province is at the forefront of offshore wind energy development, leveraging its strategic coastal location and abundant wind resources. The South China Sea provides favourable wind speeds and shallow waters, making it suitable for large-scale turbine deployment. Additionally, the region presents opportunities for floating wind turbines, enabling expansion into deeper waters beyond nearshore zones. Offshore wind plays a crucial role in addressing Guangdong's energy challenges, as the province lacks significant hydropower resources, has limited land for large-scale solar installations, and remains heavily reliant on carbon-intensive fossil fuels for thermal power production. In recent years, offshore wind has accounted for a growing share of the province's energy mix, reshaping its clean energy portfolio, and supporting sustainable industrial and commercial development. By 2023, Guangdong positioned second in offshore wind capacity (after Jiangsu province) in China, contributing over 8 GW of installed capacity.[5]

20. Guangdong's offshore wind strategy prioritises the creation of a sustainable and resilient energy system. Key initiatives include the development of offshore wind clusters, integration with the local power grid, and advancements in turbine technology. The provincial government has incentivised both private and state-owned enterprises through preferential policies, including infrastructure development, increased grid

[4] Data retrieved from China Electricity Council.
[5] Global Energy Monitor. A Race to the Top. China 2023. Figure 3. Available here.

absorption capacity, supply chain upgrades, and streamlined permitting processes. Additionally, Guangdong has focused on capacity-building through public-private partnerships and international collaboration, fostering technical expertise and knowledge transfer to accelerate offshore wind innovation.

II. The project

A. Project area

21. The Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project is located in the Shapa township of Yangjiang city, Guangdong province. It was expected that with an improved 300 MW of offshore wind capacity in Yangjiang's shallow water area, the project could replace coal-fired power plants scheduled to be phased-out by 2020, accelerating the region's transition to cleaner energy sources. Geographically, the project site covers an offshore sea area of 48 km^2 with the centre of the project site about 20 km away from the shore in Shapa township. Apart from the facilities built offshore, the operations and maintenance (O&M) and control centre were built onshore in Yangjiang city.

B. Project objectives

22. The key objective of the project is to provide clean power supply and improve the energy structure of Guangdong Province through financing the construction of an offshore wind farm in Yangjiang city. This was to be done through two expected outcomes: (i) increased electricity generation of 810 GWh of green electricity annually, and contribution to avoidance of hazardous emissions; [6] and (ii) enhanced capacity for accelerating development of offshore wind power in Guangdong.

C. Project components

23. As specified in the project design document, the project has three main components:

    Component A: installation and commissioning of equipment. This component will cover: (i) all the civil work related to the construction of wind turbine generators (WTGs), foundation and installation of WTGs, inter-array cables connecting each WTG to the offshore substation; (ii) construction of an offshore substation; and (iii) export cables from offshore substation to the onshore control centre.

    Component B: WTGs and installation: supply of 55 WTGs each of 5.5 MW connected to the system by 35 kV line as well as the cost of O&M of these WTGs for a period of five years by the supplier of the WTGs.

    Component C: Project management, construction supervision, contract management, land acquisition, lease of the marine area, implementation of environment and social management plans and project monitoring, etc.

24. A separate component on capacity-building was included in the project document to the Board (PDB)[7] as part of the overall project cost by components and financing. However, no budget was included for the capacity-building component. Moreover, there was no

[6] To avoid the consumption of 247,200 tons of coal and offsets 499,500 tons of carbon emissions each year over its 25-year operational period.

[7] Project Document to the Board on A Proposed Loan of RMB 2 billion to the People's Republic of China for Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project, 2018-BD17-DOC-008-REV1.

mention of capacity-building in the final loan agreement signed by both parties (NDB and the Government of China).

D. Project financing

25. The total project cost was estimated at USD 880.96 million. A sovereign loan of RMB 2 billion was approved by the NDB Board of Directors in November 2018, accounting for 33% of the total cost. In addition, an estimated amount of USD 592 million in counterpart funding was provided to the project, of which USD 188.45 million was provided by Guangdong Energy Group (GEG) and USD 403.51 million was mobilised from domestic commercial banks through a syndicated loan. The summary of the project estimated cost at appraisal is shown in table 3 based on the PDB.

Table 3. Project cost by components and financing at design (USD million)

Project components	Total cost	NDB loan	GEG equity	Commercial loans
Component A: Works and installation of electromechanical equipment				
A1. Works for foundation of WTGs, cables, and offshore substation	325.12	263.70	61.42	
A2. Offshore substation and onshore control centre & equipment	38.89			38.89
Sub-total	**364.01**	**263.70**	**61.42**	**38.89**
Component B: Equipment/machines and goods				
B1. Wind Turbines Generators	359.72			359.72
B2. Wind power forecasting system and other equipment	4.90			4.90
Sub-total	**364.62**			**364.62**
Sub-total: components A and B	**728.63**	**263.70**	**61.42**	**403.51**
Component C: Project management, technical assistance, environmental & social compensation, etc.				
C1. Preparatory and design studies, and construction Supervision	21.08		21.08	
C2. Other costs (land, environment, social etc.) technical assistance	61.55		61.55	
Sub-total	**82.63**		**82.63**	
Component D: Capacity building				
Contingencies	**33.23**		**33.23**	
Interest during construction	**35.75**	**24.57**	**11.18**	
Front-end fee (NDB 0.25%)	**0.73**	**0.73**		
Total	**880.96**	**289.00**	**188.45**	**403.51**

Source: PDB.

E. Implementation arrangements

26. The project implementation arrangements were made at the national, provincial, and local levels. The Ministry of Finance of China signed the loan agreement with NDB for the sovereign loan of RMB 2 billion as the borrower on behalf of the Government of China.

27. At the provincial level, the People's Government of Guangdong Province served as the project entity, holding the overall responsibility to ensure the project would be implemented with due diligence and efficiency, and in conformity with sound applicable technical, financial, business and development practices. The project was implemented by the Guangdong Yudean Group Co. Ltd., which was renamed as Guangdong Energy Group in 2019, as the project implementation agency (PIA). The Guangdong Provincial Department of Finance acted as the chief administrator of the loan proceeds, ensuring financial management aligned with project requirements.

28. At the local level, Guangdong Yudean Yangjiang Offshore Wind Power Generation Limited Company (YOWP) was the project implementation unit (PIU), responsible for the daily implementation of the project. YOWP's departments, including planning and operations, project management, finance, and safety supervision, managed key functions such as procurement, supervision of the construction process, and operations and maintenance of the project.

III. Project evaluation

A. Rationale

29. This project is the second wind power project financed by NDB in China. As one of the early offshore wind power projects financed by NDB, this project performance evaluation provides the opportunity to assess the added value of NDB financing to the offshore wind power sector development in China. Moreover, as mentioned before, this evaluation will expand the evidence base for the China country portfolio evaluation by IEO, which will be completed by the end of the year.

B. Evaluation objectives

30. The overarching objective of this evaluation is to promote accountability and learning. Specifically, the evaluation will assess the performance of the project towards achieving its objectives of accelerating offshore wind power development in Guangdong province and increasing power supply through clean energy. The evaluation is envisaged to identify lessons and experience that can support the design and implementation of future projects, particularly in the renewable energy sector in China and other NDB member states.

C. Methodology

31. This project evaluation will be undertaken within the overall framework of the NDB Evaluation Policy, the IEO Evaluation Strategy 2024-2026 as well as the first edition of the Evaluation Manual which was published by IEO in 2024. It will take into consideration internationally recognised evaluation criteria, methodologies, and processes established by the Evaluation Cooperation Group (ECG) of Multilateral Development Banks (MDBs), ensuring the criteria are properly customised to NDB context.

32. **Evaluation criteria.** This project evaluation will apply the following five core evaluation criteria:

    (i) **Relevance.** The assessment of relevance will examine the extent to which: (i) the objectives of the project are consistent with country, and partner/institution needs, policies; (ii) the design of the project is consistent with the objectives; and (iii) the project design has been (re-)adapted to address changes in the context.

    (ii) **Effectiveness.** Effectiveness includes the assessment of the extent to which the project or intervention achieved, or is expected to achieve, its objectives and results at the time of the evaluation, including any differential results across groups. The analysis of effectiveness involves taking account of the relative importance of the different objectives or results.

    (iii) **Efficiency.** Efficiency focusses on how well resources are used to achieve anticipated results. In particular, the assessment of efficiency will examine the

extent to which the intervention delivers, or is likely to deliver, results in an economic and timely manner.

(iv) **Impact.** Impact is the extent to which the project, overall, has generated, or is expected to generate, significant positive or negative, intended, or unintended, and higher-level effects.

(v) **Sustainability.** Sustainability assesses the extent to which the benefits of the project continue or are likely to continue after the project period.

33. Based on the assessments and the ratings of these five criteria, a composite score of the **overall project achievement** will be determined to provide holistic review of the project results.

34. Apart from the overall project achievement, the evaluation will also systematically assess the **performance of NDB and the borrower**, including the PIA and PIU. As part of NDB's performance, the assessment will consider the Bank's additionality and its contributions to the project. This is an important aspect of the evaluation, as NDB aims to become a global reference in financing renewable energy projects, and in this case, offshore wind power. A mixed-methods approach will be employed, combining quantitative and qualitative analyses. The evaluation team will use triangulation techniques to ensure a comprehensive and evidence-based analysis of the project outcomes. These criteria have been customised to reflect the project's specific context, as well as the strategic priorities of NDB and the host country (see the Evaluation Framework in annex 2).

35. **Rating system.** Based on the evidence collected and the analysis conducted, the evaluation team will assign a performance rating to each evaluation criterion. In line with the NDB Evaluation Manual, a six-point rating scale will be applied to determine the project's overall achievement (see table 4). The rating would be assigned based on its evaluative judgement, using triangulation techniques, after analysing all data and information collected before and during the main evaluation mission.

Table 4. IEO six-point rating scale

Score	Rating	Description
6	Highly Successful	The activity (project, programme, non-lending, etc.) achieved or surpassed all (indicatively, over 95%) of the main targets, objectives, expectations, and results and could be considered as a model within its project typology.
5	Successful	The activity achieved almost all (indicatively, between 80-95%) of the main targets, objectives, expectations, and results
4	Moderately Successful	The activity achieved the majority (indicatively, between 60-80%) of the main targets, objectives, expectations, and results.
3	Moderately Unsuccessful	The activity did not achieve most (indicatively, less than 60%) of the main targets, objectives, expectations, and results
2	Unsuccessful	The activity achieved only a minority (indicatively, less than 50%) of the main targets, objectives, expectations, and results.
1	Highly Unsuccessful	The activity achieved almost none (indicatively, less than 20%) of the main targets, objectives, expectations, and results.

D. Evaluation questions

36. The evaluation team developed a comprehensive evaluation framework that includes the overarching evaluation question, key questions for each criterion and sub-questions to dive deep into the project evaluation, along with quantitative and qualitative research tools for collection of data and evidence (see annex 2 for details).

37. The overarching evaluation question is: "**To what extent has the project contributed to increasing the share of offshore wind power in China's energy mix and boosting offshore wind power-based electricity generation?**". In answering this question, the evaluation is anchored in the five criteria previously presented, each with two key questions for issues to be addressed:

Relevance

- To what extent was the project aligned with China's national renewable energy policies, Guangdong's regional energy transition goals, and NDB's strategic priorities?
- Was the design of the project, in terms of the mix of components, institutional arrangements and capacities, financing plan and other aspects, appropriate to achieve project results?

Effectiveness

- To what extent did the project achieve its intended results and outcomes, including the generation of offshore wind power and its integration into the regional electricity grid?
- What were the major technical, regulatory, or operational challenges encountered during implementation, and how effectively were they addressed to ensure project success?

Efficiency

- Were the project's resources utilised efficiently, ensuring timely implementation within the estimated budget, and how did external factors (e.g. supply chain disruptions, policy changes) impact cost efficiency?
- How adequate were the procurement, contracting, and project management/supervision arrangements in ensuring smooth execution and mitigating risks, including those related to offshore construction challenges?

Impact

- How has the project contributed to Guangdong's carbon emissions reduction goals, local economic development, and social well-being, including job creation and industry capacity-building?
- Were there any unintended positive or negative consequences of the project on local communities, marine ecosystems, or the broader offshore wind sector in China?

Sustainability

- What is the likelihood that project benefits – including energy generation capacity, technical innovations, and environmental improvements – will be sustained beyond the project's completion?

- How effective are the financial, technical, and institutional arrangements in ensuring long-term maintenance, operational efficiency, and adaptability to future market and regulatory changes?

38. **Customisation of the evaluation approach.** Given the unique operating model of NDB's on-the-ground operations —particularly its emphasis on country ownership and the use of country systems — this evaluation will be customised to reflect the specific contexts of both NDB and China. This tailored approach will ensure the evaluation is not only technically robust but also contextually appropriate, thereby enhancing its validity and utility. Specifically, the customisation will focus on the following key areas:

    (i) **Selection of evaluation team members.** A specialised team of experts has been mobilised to support this evaluation, including senior energy economists and evaluation specialists with in-depth knowledge of China and the NDB. These experts are not only well-versed in the Chinese context – including its policies, strategies, regulations, and socio-cultural characteristics – but also possess a thorough understanding of the NDB's mandate and unique operational model.

    (ii) **Comprehensive consultation with government authorities and project stakeholders.** Throughout the evaluation process, the team will conduct regular consultations with relevant government authorities and project stakeholders. These consultations will take various forms, such as bilateral meetings, semi-structured surveys, interviews, and focus group discussions. All feedback and comments received will be carefully considered. Upon concluding the main evaluation mission, a wrap-up meeting will be held to present preliminary findings to stakeholders. Additionally, the draft evaluation report, including proposed recommendations, will be sent to the Ministry of Finance of China, the project stakeholders, and the NDB China Operations Team for review and comments before finalisation.

    (iii) **Due consideration of the NDB context.** The evaluation will also carefully consider the unique nature of NDB as the first MDB entirely established by developing countries and emerging markets as well as the roles that NDB played throughout the project lifecycle in the special context of NDB. This will include the constraints and limitations, to ensure that the assessment accurately reflects the unique aspects of the NDB's business model.

39. Considering the distinct operating model of NDB's operations on the ground, in particular the focus on country ownership and the use of country systems, the evaluation approach to be applied to this evaluation would be customised with due consideration of the specific context of NDB and the borrower member state. Specifically, the evaluation questions to be analysed to assess the performance of each criterion will be customised with an understanding of China's country context, including the 13th Five-Year Plan of China, China's target to achieve carbon neutrality by 2060 as well as the use of country and corporate systems in the management of procurement, environmental and social risks and impacts. This customised approach will ensure the evaluation is not only technically sound but also contextually appropriate, enhancing its validity and utilisation.

E. Evaluation team and process

40. The evaluation will be conducted under the overall guidance and responsibility of Mr. Ashwani K. Muthoo, Director General of IEO. The evaluation will be managed by Ms. Xiaozhe Zhang, Senior Professional, who will be supported by a team of experts, including Dr. Igor Carneiro (Senior Development Evaluation Specialist), Dr. Kangbin Zheng (Senior Energy Economist), and other specialists as necessary. Mr. Heng Zhao (Research Analyst), Ms. Jaqueline Rabelo Souza (Communication and Outreach Expert) and Mr. John Laird (Evaluation Editor and Content Creator) from IEO will also support the evaluation.

41. The evaluation will comprise the following steps:

    (i) **Desk review**. The IEO will conduct an initial literature review. The documents to be reviewed will include, *inter-alia*, the background documentation on the country and project area, the project document to the Board, the feasibility study report, the loan agreement and its amendment(s) (if any), the project administration manual, project performance reports, project performance assessments, the project completion report and any other supporting documents.

    (ii) **Approach paper.** Following the initial interactions with key partners and stakeholders during the preparatory mission, IEO will refine the draft evaluation approach paper (the current document). The revised approach paper will be finalised and ready before the main mission to be conducted at mid-April 2025, ensuring all key stakeholders could provide their valuable comments and feedback.

    (iii) **Main evaluation mission (field work).** The main evaluation mission is tentatively scheduled for 14-18 April 2025. The evaluation team will interact with representatives from the government, PIA, beneficiaries and other stakeholders and key informants. The evaluation team will conduct field visits to project sites and collect additional data and evidence. At the end of the field mission, IEO will organise a wrap-up meeting with key stakeholders to share its initial observations and discuss key strategic and operational issues.

    (iv) **Drafting of the evaluation report**. Drawing from the desk review and field work, the evaluation team will draft the main evaluation report (see annex 3 for its indicative table of contents). The draft report will be shared simultaneously with the Government of China and NDB Management for feedback. Comments received will be incorporated into the final report.

    (v) **Report finalisation**. Following the receipt of comments, IEO will finalise the report and prepare an audit trail to show how the comments received have been addressed. The evaluation report will be finalised with a written response to be provided by NDB Management, which will accompany the published report.

42. **Knowledge-sharing and dissemination.** In line with the NDB Evaluation Policy and Evaluation Strategy 2024-2026, the final evaluation report inclusive of the NDB Management Response will be published on the IEO webpages. Evaluation findings will also be shared through relevant social media and communication instruments. An "Evaluation Lens" summary pamphlet will be prepared in both English and Chinese and disseminated to a wider audience. The results and lessons generated from the evaluation will also be shared during the nation-wide seminar planned by IEO on the China country portfolio evaluation in early 2026.

IV. Evaluation timeline

43. The evaluation will be conducted from February to July 2025. The key steps and a corresponding timeline are presented on the following table.

Table 5. Tentative timeline of the project evaluation

Key steps	Timeline
Desk review	February-April, 2025
Preparatory mission	13-14 February, 2025
Draft approach paper shared with key stakeholders for comments	31 March, 2025
Comments received on the draft approach paper	18 April, 2025
Finalise the approach paper based on comments received and share it with NDB Management	21 April, 2025
Main evaluation mission	22-29 April, 2025
First draft report to IEO for internal peer review	15 May, 2025
IEO internal peer review	20 May, 2025
Revised evaluation report to be sent to the key stakeholders and external peer reviewer for comments	26 May, 2025
Comments received on the draft evaluation report	30 June, 2025
Final evaluation report to be sent to NDB management for preparation of Management Response	15 July, 2025

Annexes

Annex 1: Project data sheet

Project Country / Name	China / Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project			
Loan number	18CN03			
Borrower	People's Republic of China			
Implementation Agency	Guangdong Energy Group Co., Ltd.			
Implementation Unit	Guangdong Yudean Yangjiang Offshore Wind Power Generation Ltd. Co.			
Financial modality	Sovereign Project Loan			
Interest rate	3-month Shanghai Interbank Offered Rate (SHIBOR) + spread			
Front-end fee	0.25%			
Commitment fee	0.25%			
Loan tenor	22 years			
Grace period	3 years			
Sector and subsector	Renewable Energy	Offshore Wind Power		
			Estimate at approval (RMB million)	**Actual*** (RMB million)
Project costs (RMB million)		**Total project cost**	**6,096**	**6,778**
		NDB Loan	2,000	2,000
		Domestic Banks	2,792	3,423
		Equity Contribution	1,304	1,356
Approval date	November 16, 2018	**Loan signing date**	December 03, 2019	
Effectiveness date	January 13, 2020	**Project closing date**	May 03, 2023	
Last Drawdown Request Date	September 3, 2023	**First Principal Repayment Date**	March 15, 2023	

* Figure based on the project completion report. The team will verify if final costs have been finalised during the evaluation. During the PCR phase, the actual project cost had not been finalised. The figure provided in the PCR represented a conservative estimate.

Annex 2: Evaluation Framework

Evaluation criteria	Evaluation questions	Sources
Overarching evaluation question: To what extent has the project contributed to increasing the share of offshore wind power in China's energy mix and boosting offshore wind power-based electricity generation?		
Relevance	**Key questions for relevance** 1. To what extent was the project aligned with China's national renewable energy policies, regulations as well as Guangdong's provincial energy transition goals, and NDB's strategic priorities? 2. How did the project design and implementation respond to the needs of Guangdong's energy consumers, local communities, and industry stakeholders? **Sub-questions** • To what extent has the change of state, provincial and city policy on offshore wind power, especially financial subsidy policy, like feed-in tariff, affected the project? • Was the project design and monitoring relevant to best practice appropriate for offshore wind power construction and maintenance? What kind of technical innovations will the project bring to the sector? • To what extent were ethical and social dimensions incorporated in the design and implementation of the project? • To what extent was the project design aligned with NDB's policies, strategies, and plans? • Were the expected outcomes of the project aligned with NDB's policies and strategies at the sector and project levels?	• Policies/strategies/guidelines at all levels • Interview with national/provincial/local authorities • Interviews with NDB staff • Review of design and implementation in the context of stated and inferred ethical issues • Review project and operations and maintenance (O&M), consultation with project technical experts
Effectiveness	**Key questions for effectiveness** 1. To what extent did the project achieve its intended outcomes, including the generation of offshore wind power and its successful integration into the regional electricity grid? 2. What were the major technical, regulatory, or operational challenges encountered during implementation, and how effectively were they addressed to ensure project success? **Sub-questions** • To what extent have the offshore wind power turbines, stations, sub-stations, cables, etc. as stipulated in the project design report been completed and well operated? • To what extent has the electricity been connected to the grid? Is it compatible with the project design and project agreement?	• Review of project documents • Analysis of electricity database • Analysis of results data • Discussions with users and beneficiaries • Interview with China Southern Power Grid Company • Interview with project stakeholders • Interviews with relevant NDB staff • Interviews with local community members

Evaluation criteria	Evaluation questions	Sources
	• To what extent has the design of the offshore wind power project improved the levels of electricity power generation? • To what extent is the offshore wind power in line with China's environmental and social regulations? Was land acquisition and resettlement minimal as anticipated at appraisal? • Has the project met its design objectives for avoiding carbon dioxide emissions and enhancing confidence for China's large-scale adoption of offshore wind power generation under various challenges? • Has the project alleviated the electricity shortage in Guangdong province? • What innovative technologies have been applied in this project to improve the effectiveness and project delivery? • Is there evidence of parallel improved infrastructure in the project areas related to project activities (e.g. roads, markets, etc.)? • Has the capacity ratio increased because of the innovative technology? • Is there any waste of energy due to energy storage methods or other factors? • To what extent did the project achieve its good lessons? • To what extent were Environmental, Social and Governance (ESG) and Sustainable Development Goal dimensions incorporated in the design and implementation of the project? • Did the project contribute to promoting clean energy and energy efficiency in the province and country? • Was the project site location most appropriate for results? • To what extent did the project promote innovative solutions to energy infrastructure development and economic growth, especially for the region? • **Strategic effectiveness**: How has the project contributed to Guangdong's goals of reducing reliance on fossil fuels and achieving carbon neutrality? – What is the project's contribution to Guangdong's renewable energy share? – How much fossil fuel-based power generation has the project displaced? • **Construction effectiveness**: What are the gaps between planned and actual project investments and construction timelines?	• Physical project site inspections • Review of electricity data and data collected during project implementation and evaluation mission • Review of regulations and safeguards pertinent to the project

Evaluation criteria	Evaluation questions	Sources
	- Were there delays or cost overruns during project development and execution? If so, what were the primary causes (e.g. supply chain disruptions, regulatory approvals, weather conditions)? - How effectively were risks managed during the construction phase? • **Management effectiveness**: How effectively is the project managed in terms of operations, risk mitigation, and overall performance optimisation? - Are asset management strategies, supply chain coordination, and regulatory compliance aligned with industry's best practices? - How well has the project adapted to technological advancements and evolving policy landscapes? - Main areas for improvement in management capacities and procedures?	
Efficiency	**Key questions for efficiency** 1. Were the project's resources utilised efficiently, ensuring timely implementation within the estimated budget, and how did external factors (e.g. supply chain disruptions, policy changes) impact cost efficiency? 2. How adequate were the procurement, contracting, and project management/supervision arrangements in ensuring smooth execution and mitigating risks, including those related to offshore construction challenges? **Sub-questions** • What was the economic and (if applicable) financial return on the project? Was it aligned with the appraisal expectations? • Was the results framework sound and to what extent are the performance indicators being monitored? • To what extent were the project design, construction processes, operations, and administration activities efficient? • Are there any good lessons learnt and measures to increase the management efficiency and quality of the project? • During project operation, how is the performance of project's economic return related cost, compared with data in feasibility report? Are the environmental impacts in line with Environmental Impact Assessment reports?	• Review of project Documents • Analysis of comparative economic and financial data • Interview with implementation staff and local authority • Interviews with project stakeholders • Interviews with local community members • Onsite inspections • Perusal of relevant documentation • Discussions with NDB and project financial management staff • Review of results framework, implementation, effectiveness of performance indicators

Evaluation criteria	Evaluation questions	Sources
	• What was the proportion of project management costs and overheads in comparison to investment costs? • Was the project's disbursement performance in line with appraisal estimates? • Was the project implemented within timelines estimated at design? What has led to the amendment of closing time? • How did the COVID-19 pandemic affect project cost, construction, etc.? • What measures were taken during the COVID-19 pandemic to ensure timely delivery of the project? • To what extent did the project's procurement and contracting arrangements facilitate project delivery? • Were the procurement and contracting procedures and arrangements compliant with applicable government and NDB's procurement policy, green investment principles and result based investment principles? • Is there any space for improvement of NDB's green investment procedures? • Could there be other possibilities to improve timing and expenditure for project implementation? • Were the loan agreement and the project agreement signed off and effective in a timely manner, and was this in line with the estimated sound project readiness at the appraisal stage? • Have the financial resources been used to achieve the intended outcomes? • **Resource efficiency**: Is the project's effective capacity factor optimised to match or exceed the best practices in the offshore wind power industry? – The efficiency of power generation depends on how well wind resources are utilised. Low utilisation rates lead to resource waste and suboptimal electricity output. – What specific measures have been adopted to enhance wind resource utilisation (e.g. turbine layout optimisation, wake effect mitigation, advanced forecasting techniques)? • **Production efficiency:** Is the project's levelized cost of energy (LCOE) competitive and within a reasonable range (at or below the grid parity level)? – How effectively has the project managed grid integration, minimised transmission bottlenecks, and addressed intermittency challenges?	

Evaluation criteria	Evaluation questions	Sources
	– Are there opportunities to reduce costs through improving O&M strategies? For example, could predictive maintenance, AI-based diagnostics, drones, and remote monitoring reduce downtime and operational expenses? • **Financing efficiency:** What is the project's lifetime risk-adjusted cost-benefit ratio, and how sensitive is it to external fluctuations? – How does the project compare financially with other renewable energy sources (e.g. hydro, solar, onshore wind) in terms of return on investment and financial risk exposure? – How does the project compare with similar projects implemented in other regions (e.g. those supported by the Asian Development Bank, in financial performance and investment returns)?	
Impact	**Key questions for impact** 1. How has the project contributed to Guangdong's carbon emissions reduction goals, local economic development, and social well-being, including job creation and industry capacity-building? 2. Were there any unintended positive or negative consequences of the project on local communities, marine ecosystems, or the broader offshore wind sector in China? **Sub-questions** • To what extent does the project contribute to socio-economic development through improved electricity connectivity and accessibility for the local populations served? • Is there evidence of improved living standards, supporting local economic development and poverty reduction in the project areas because of the project? • To what extent have projects increased reliability and quality of supply of electricity via offshore wind power at the local and regional level? • Any good demonstrations in offshore power sector in country and provincial level? • Are there any adverse effects brought by the turbines, such as extra noise, or an impact on animals' route in the air? • What mitigative measures have been taken? • What disadvantages have been brought by the project to local farmland and residence? • Please describe the compensation mechanism and explain why there is a significant gap between the estimate and actual compensation.	• Review of project documents • Interview with local community • Interview with China southern grid company • Interview with local authorities • Interview with project stakeholders • Review of baseline and collected data and evidence from similar projects • Review of statistics relevant to the project and field evidence

Evaluation criteria	Evaluation questions	Sources
	• How has the capacity-building fund been allocated? What positive effects were generated from it? • How many jobs have been created? How many are/were temporary and how many are permanent? • For the project, is there an Environment, Health, and Safety system and responsible staff on site? • What safety measures were/are taken to protect the employees? • Are the employee benefits and safety protected during the construction process? • What measures were taken to support the health and safety of employees during the COVID-19 period? • Have employees, and their families, received reasonable compensation for extra working hours, including a 24-hour working schedule? • What will be the impact of decommissioning the project in the future, and are there any prevention measures taken to alleviate the possible adverse effects? • Are there any corporate social responsibility (CSR) practices or CSR reports for the project? • Will the project achieve the planned additional capacity by way of alternative forms of renewable energy? • **Socio-economic impact**: How has the project contributed to socio-economic development in Guangdong? – What are its direct and indirect effects on reducing electricity imports from other provinces, lowering overall energy costs, creating employment opportunities, and bolstering regional economic growth? – Has the project stimulated local investment in renewable energy-related industries? • **Technological impact**: How has the project contributed to technological innovation, industrial supply chain development, smart grid advancements, and institutional capacity-building? – Has it facilitated advancements in offshore wind turbine technology, floating wind platforms, or energy storage solutions? – Has it contributed to the integration of smart grid solutions and digitalization in power distribution?	

Evaluation criteria	Evaluation questions	Sources
	– Has it improved the installation and O&M practices for offshore wind power generation? • **Environmental impact:** What are the project's environmental impacts in terms of global greenhouse gas (GHG) reduction, local pollution abatement, and marine ecosystem protection? – What is the estimated reduction in CO_2 emissions attributed to the project? – Have measures been taken to minimise negative impacts on marine biodiversity and local fisheries?	
Sustainability	**Key questions for sustainability** 1. What is the likelihood that project benefits – including energy generation capacity, technical innovations, and environmental improvements – will be sustained beyond the project's completion? 2. How effective are the financial, technical, and institutional arrangements in ensuring long-term maintenance, operational efficiency, and adaptability to future market and regulatory changes? **Sub-questions** • Technical and economic sustainability of the project. Are they confirmed? • What is the likelihood that project benefits will be sustained within and beyond the life of the project? • Is there a strong exit strategy developed to ensure the maintenance of the interventions? • What conditions, such as operations, maintenance, etc., are required for the project to be sustainable after completion? • What are the terms and conditions of project maintenance contracts and how will they contribute to the sustainability of the project's results? • Does the implementing agency have enough capacity to maintain the project after its completion? • To what extent is funding available for future project maintenance? • Does the local government have sufficient funds or proper mechanisms for offshore wind power maintenance?	• Review of project Documents • Interview with NDB staff • Interview with project stakeholders • Interview with relevant authority • Research on institutional capacity • Review relevant contracts

Evaluation criteria	Evaluation questions	Sources
	• Will the China southern grid company keep the 100% grid policy after the project is completed? • Were natural hazards carefully considered to ensure continued operation? • Are there any institutional issues that affect the performance of the project? • Was the capacity development provided during the project adequate to maintain O&M? Is more capacity development required? • After a few years of operation, does the offshore wind farm, transmission systems, and other facilities meet the functions, qualities and reliability listed in project feasibility study reports? Has the project suffered any technical failures during operation? • **Risk resilience**: How robust is the project against climate change risks and extreme weather events (e.g. typhoons, rising sea levels, increased storm intensity)? – Have adaptive measures (e.g. robust turbine designs, enhanced foundation structures, storm-resistant technology) been incorporated? – What contingency plans are in place for rapid recovery in case of weather-related damage? • **Life-span reliability**: How does the project ensure long-term operational reliability and performance over its expected lifespan (20-30 years)? – What maintenance strategies and technology upgrades are planned to extend the project's lifespan? – How does the degradation rate of the turbines compare with industry benchmarks? • **Demonstration effect:** What is the project's role in demonstrating best practices and influencing future offshore wind developments in China and globally? – Has the project set benchmarks in regulatory frameworks, technological adoption, or financing models for offshore wind energy? – How has the project influenced policy decisions, investment flows, and public-private partnerships in the renewable energy sector? – Can any evaluation outcomes be converted into knowledge products for exchange and dissemination in NDB's member countries and emerging market economies?	
NDB Performance	• What is the overall quality of the project design? • Was the project preparation process participatory?	• Review of project Documents

Evaluation criteria	Evaluation questions	Sources
	• Is the loan agreement appropriately aligned with the project design? • Did NDB conduct project supervision in accordance with guidelines? What was the frequency and quality of supervision processes and deliverables? • Did NDB assign appropriate human resources to accompany project implementation? • Were the roles and responsibilities of NDB clearly defined in the project life cycle? • Did NDB put in place a knowledge management and learning plan to document and share lessons learned? What was NDB's financial additionality overall? • Was NDB catalytic in mobilizing funding for the project? • Was NDB engagement important to reduce risks or to provide comfort to other investors and lenders? • What was NDB's non-financial additionality overall, including during project preparation and implementation stages? • Did NDB's knowledge and expertise strengthen project design and provincial and local capacity-building?	• Interview with project implementation agency and unit • Interview with relevant authorities • Research on institutional capacity
Borrower Performance	• To what extent did the borrower support the loan negotiation process? • To what extent did the borrower support the start-up of the project? • Did the borrower make available the financial resources (co-financing) in line with the project design and loan agreement? • As executing agency, what type and level of human resources did the PIA/PIU assign as part of the "project execution team"? • Did the borrower and sub-borrowers have an appropriate financial management system in place? Was the frequency and quality of audits appropriate? • Did the borrower conduct timely supervision of all projects, monitoring of activities and produce the required progress reports? • Comment on the timeliness and quality of the PIU reports. • Any issues related to procurement or financial management? • Were all ESG reports duly and timely prepared?	• Review of project Documents • Interview with NDB staff • Interview with project implementation agency and unit • Interview with relevant authorities

Annex 3: Evaluation report outline*

Acknowledgement	1 page
Preface by DG IEO	1 page
List of acronyms	1 page
Executive summary	3-4 pages
Management Response	
Background	3 pages
• Country context	
• Sector, project, and local context	
• Government/local initiatives for clean energy	
Project background	3 pages
• Project objectives	
• Project design and components	
• Implementation arrangements	
Evaluation objectives, methodology and process	3 pages
• Objectives	
• Methodology, questions, and rating system	
• Limitations and mitigation measures	
• Process steps	
Evaluation findings on project achievement	10 pages
• Relevance	
• Effectiveness	
• Efficient	
• Impact	
• Sustainability	
• Overall project achievement	
Other assessment criteria	3 – 4 pages
• NDB and borrower performance	
• NDB Additionality	
Conclusions and recommendations	5 pages
• Storyline	
• Conclusions	
• Recommendations	
Annexes	

***** This is a draft and will be further developed as the evaluation is undertaken.

Annex 4: Evaluation criteria definitions*

EVALUATION CRITERIA	
Relevance	The assessment of relevance will examine the extent to which: (i) the objectives of the project are consistent with beneficiaries' requirements, country needs, institutional priorities and partner policies; (ii) the design of the project is consistent with the objectives; and (iii) the project design has been (re-) adapted to address changes in the context. Finally, under relevance, an assessment will also be made of the compatibility of the intervention with other interventions in a country, sector, or institution.
Effectiveness	Effectiveness includes the assessment of the extent to which the project or intervention achieved, or is expected to achieve, its objectives and results at the time of the evaluation, including any differential results across groups. The analysis of effectiveness involves taking account of the relative importance of the different objectives or results.
Efficiency	Efficiency focusses on how well resources are used to achieve anticipated results. In particular, the assessment of efficiency will examine the extent to which the intervention delivers, or is likely to deliver, results in an economic and timely manner.
Impact	The impact is the extent to which the project, overall, has generated, or is expected to generate significant positive or negative, intended, or unintended, and higher-level effects.
Sustainability	Sustainability assesses whether the benefits will last or are expected to last after completion of the intervention.
EVALUATION ASPECTS	
NDB and Borrower Performance	The aim is to assess the contribution of the key partners to design, execution, monitoring and reporting, supervision and implementation support, and evaluation. The performance of each partner will be assessed on an individual basis with a view to the partner's expected role and responsibility in the policy/strategy/project life cycle.
NDB Additionality	The rating of the NDB's additionality considers the organization's value proposition in providing support to the project. It is based on the counterfactual assessment of how the project would have (or would not have) proceeded without NDB support. It should consider all factors relevant to the role and contribution of the NDB.

* See IEO Evaluation Manual.

Annex 5: Project design and monitoring framework

Design summary	Performance indicators and targets	Reporting mechanism	Assumptions and risks
Impact			
Increased share of offshore wind power in the energy mix of the province	Installed offshore wind power capacity in Guangdong increases to 3 GW by the year 2020	Statistics published by the Energy Bureau	**Assumption** Continued government commitment, regulatory support, and incentives for offshore wind power projects. **Risk** Delays in project implementation.
Outcome			
Increased offshore wind power-based electricity generation Reduced pollutants	810 GWh of electricity generated in 2021. Reduced carbon emissions by 499,500 tonnes, smoke dust by 16.75 tonnes, Sulfur oxides (SOx) by 414.07 tonnes, nitrogen oxides (NOx) by 115.33 tonnes, and ashes by 16,400 tonnes annually	Project financial statements Project progress reports NDB project reviews	**Assumption** Power purchase agreements for the project signed with the grid company. Offtake and payment obligations honoured by grid company and government agencies. Coal-fired power plants which do not meet the environmental protection standard will be shut down, as per the government's plan. **Risk** Disruption in power generation due to operational reasons.
Output			
Construction and commissioning of offshore wind power plant	Successful commissioning of 300 MW offshore wind power capacity by 2020	Project progress reports from Guangdong Yudean Group Co. Ltd. NDB project reviews	**Assumption** Project executed within the stipulated timeframe and within the estimated cost. **Risk** Delays in project implementation

Source: Project document to the Board.

Annex 6: Project risks and mitigation measures

The evaluation will examine the risks identified during appraisal, assessing the extent to which they materialized and the effectiveness of the proposed mitigation measures. Additionally, it will identify any unforeseen risks, such as the COVID-19 pandemic, inflation, other services, and studies, and evaluate their impact on the project and its outcomes.

#	Risk	Mitigation measures
Technical		
1.	**Challenging weather conditions** (medium)	Typhoons and tropical cyclones frequently visit the coastline of Guangdong. The concerns are about operations and maintenance under such extreme conditions. Category I wind turbine generators (WTGs) will be selected, and an operations and maintenance (O&M) strategy will be carefully designed to mitigate weather risks.
2.	**WTG** (medium)	WTG's performance is important for the successful implementation of the project. Such risk can be mitigated through proper contract arrangement, strict manufacturing supervision and installation quality control, and carefully designed O&M strategy.
Policy		
3.	**Feed-in tariff adjustment** (low)	Policy adjustment usually applies to projects not yet approved by the time when policy is issued, in rare cases applies to projects already approved. Hence ensuring the project to be constructed on time will help mitigate such risk.
Environmental and social		
4	**Biodiversity** (high)	The project will affect protected marine habitats, protected fishery zones, endangered species and International Union for Conservation of Nature red-listed birds, and other fishery areas such as artificial fish reefs and near-shore aquaculture farms. Mitigation measures include direct compensation for habitat restoration, pollution prevention and marine life ecological protection measures.
5.	**Land acquisition and compensation** (medium)	The project will not require resettlement but will need to acquire 3.0 hectares of land, potentially having a minor impact on 1,000 households and other users of the land. These impacts will be compensated according to national laws and local standard practice.
Implementation		
6.	**O&M** (medium)	O&M costs of such a project can be substantial after the warranty. An O&M strategy will be prepared and implemented, incorporating international experience and that of other offshore wind farms in China in particular.
7.	**Capacity development** (low)	As this is the first offshore wind power project by the Guangdong Yudean Group Co. Ltd. (GYG), marine engineering and hydrodynamics of wind power generation remain a critical challenge for GYG. The expert panel has been proposed by NDB to strengthen the capacities of GYG and mitigate the risks in project implementation.

#	Risk	Mitigation measures
Technical		
8.	**Project delays and cost overruns** (low)	The current construction schedule of completing project's construction, installation and commissioning in two years is ambitious given the tough environment for construction. Risks associated with construction schedule will be minimised by mobilising sufficient number of construction equipment and vessels and by following strict construction quality criteria.

Source: PDB, 2018.

Annex 7: Bibliography of project documents reviewed

Section A: Strategies, Policies and Plans of the People's Republic of China

- The 13th Five-Year Plan for Economic and Social Development of People's Republic of China (2016-2020)
- The 14th Five-Year Plan of the People's Republic of China — Fostering High-Quality Development (2021-2025)
- Implementation Plan for Addressing the Issues of Abandoned Hydropower, Wind Power, and Solar Power. National Development and Reform Commission. National Energy Administration. 2017
- 2018 National Wind Power Investment Monitoring and Early Warning Results
- 2018 Guiding Scheme for Competitive Allocation of Wind Power Projects (Trial)
- Clean Energy Consumption Action Plan (2018-2020)
- Renewable Energy Law of the People's Republic of China (2006)
- Amendment of Renewable Energy Law of the People's Republic of China (2010)
- Energy Law of the People's Republic of China (2025)

Section B: NDB's policies, guidelines and general strategies

- New Development Bank Environment and Social Framework, March 2016
- NDB Project Implementation Guidelines, April 2018
- New Development Bank General Strategy: 2017 – 2021
- New Development Bank General Strategy for 2022-2026: Scaling Up Development Finance for a Sustainable Future, May 2019
- New Development Bank Policy on Loans with Sovereign Guarantee, March 2018
- New Development Bank Policy on Processing of Loans with Sovereign Guarantee, March 2019
- Policy on Financial Management and Financial Analysis, and Economic Analysis of Projects, January 2016
- New Development Bank Procurement Policy, September 2020
- New Development Bank Project Implementation Guidelines, August 2020
- New Development Bank Environment and Social Guideline, October 2021
- New Development Bank Project Procurement Guidelines, August 2022

Section C: Project documents

- Project Document to the Board on a Proposed Loan of RMB 2 billion to the People's Republic of China for Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project, October 2018
- Project Agreement Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project Between People's Government of Guangdong Province and New Development Bank, December 2019

- Loan Agreement Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project Between People's Government of Guangdong Province and New Development Bank, December 2019
- Project Progress Report, 3rd July 2020
- Project Progress Report, 31st January 2021
- Project Progress Report, 20th July 2021
- Project Progress Report, 28th January 2022
- Project Progress Report, 28th July 2022
- Project Progress Report, 29th January 2023
- Project Completion Report Loan Number 18CN03 the People's Republic of China Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project, 2024

Section D: External documents

- Evaluation Cooperation Group (ECG). Good Practice Standards for the Evaluation of Public Sector Operations (2012)
- Floating offshore wind outlook (2024). International Renewable Energy Agency (IRENA)
- Global Wind Energy Council. (2024). Global Offshore Wind Report 2024.
- Off-grid Renewable Energy Statistics (2024). International Renewable Energy Agency (IRENA)
- A just and inclusive energy transition in emerging markets and developing economies: Energy planning, financing, sustainable fuels, and social dimensions (2024). International Renewable Energy Agency (IRENA)
- The Strategic Value of Community Benefits in Offshore Wind Development (2024). Energy Sector Management Assistance Program (ESMAP)