TLG on

THE LANTAU GROUP

# Strategy for Winning Offshore Wind Auction Bids in Korea

## Status of Offshore Wind Project Developments in Korea

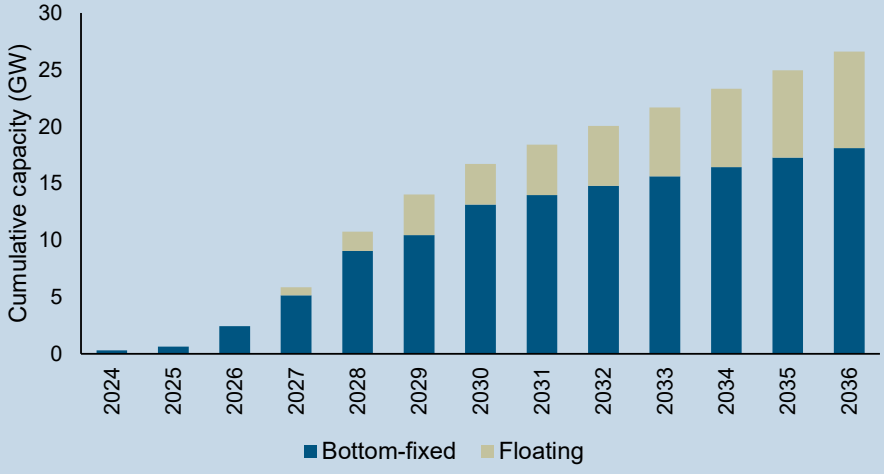
March 2024

In alignment with Korea's commitment to achieving carbon neutrality by the year 2050, the nation is actively advancing its investment in renewable energy sources. The pursuit of carbon neutrality necessitates a strategic shift towards cleaner, sustainable energy production methods. However, Korea faces inherent challenges due to its limited availability of suitable land, which naturally restricts the development of solar PV and onshore wind projects.

Amid these constraints, offshore wind energy emerges as a highly promising avenue for Korea. Recognized for its significant potential, offshore wind projects are now at the forefront of Korea's renewable energy strategy, primarily driven by the demand for the Renewable Energy Certificate (REC) required under the Renewable Portfolio Standard (RPS) scheme. The government, alongside offshore wind developers, is actively exploring opportunities to harness this untapped resource, signaling a pivotal shift towards exploiting the maritime advantages that the country possesses.

In assessing the potential for offshore wind energy development, TLG estimates the offshore wind project buildouts based on the latest Electricity Business License (EBL) data as shown in the below figure. The timeline for the construction and commissioning of offshore wind projects is a critical factor for developers and investors. Given the considerable duration required to bring these projects to fruition, it is imperative for stakeholders to meticulously plan their participation in the Korea Energy Agency's (KEA) offshore wind auctions. Engaging effectively in these auctions, prior to finalizing major supplier contracts, is essential for securing project viability.

**Figure 1: Cummulative Offshore Wind Capacity Projection**




Source: TLG Analysis

TLG on is The Lantau Group's in-house journal addressing current energy issues, and their policy and economic implications, facing the Asia Pacific region.

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## KEA's wind project auction – pricing and evaluation

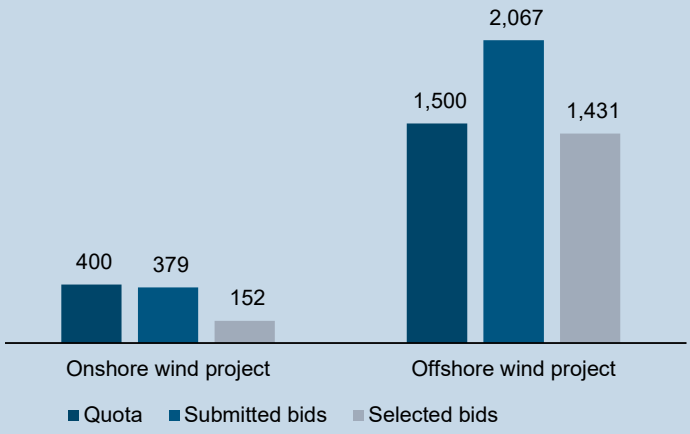
KEA continues to play a pivotal role in the management of annual long-term fixed-price auctions. These auctions are carefully designed to align with the dynamic needs of the renewable energy market, specifically catering to both the RPS obligors requiring scalable renewable capacities to meet growing mandates and the wind developers seeking long-term revenue security. In the 2023 auction round the allocation for offshore wind projects was set to up to 1,500 MW, a figure that KEA will adjust on a yearly basis, reflecting the demand from RPS obligors.

A unique feature of this auction process is the bidding mechanism, where bids are to cover energy revenue and REC revenue, in the form of System Marginal Price (SMP) plus one REC price. Projects must not only secure an EBL but also complete the necessary Environmental Impact Assessment (EIA) ahead of participating to the auction.

The selection process for bidders is designed with a 60% weight given to price evaluation and the remaining 40% to the assessment of the business plan. This holistic evaluation strategy emphasizes not just the financial aspects but also the potential community impact, economic benefits, grid integration capabilities, and a thorough review of the bidder's track record and the progress of their current projects.

The latest auction results exhibit oversubscription of offshore wind projects and undersubscription of onshore wind projects. On December 20, 2023, the results of the Wind Power Fixed Price Auction 2023 were announced, with offshore wind power securing 1,431MW (across 5 projects) and onshore wind power securing 151.8MW (across 4 projects). There was a partial shortfall in onshore wind power (advertised for 400MW, bid for 379MW), while offshore wind power received bids totaling 2,067MW (across 8 projects) for the advertised 1,500MW.

**Figure 2: Capacity Allocation in the 2023 Wind Auction (MW)**




Source: KEA

It is also understood that disqualifications of submitted bids including bid prices exceeding the price ceiling for the auction also result in a shortfall in selected bids against the quota. The KEA's policy of not disclosing the price ceiling before bid opening stage presents one of the hurdles for developers to set bid prices, as there is no guideline for prices.

## TLG approach

In the dynamic and competitive landscape of KEA's annual long-term fixed-price auctions for wind projects, developers confront the critical challenge of determining the most competitive and viable bid price to stand out among competitors. Addressing this challenge, TLG adopts a multifaceted approach. This approach is designed to refine bid strategies and significantly enhance the chances of success in the highly competitive auction environment. By leveraging its deep understanding and experience in the market, TLG aims to navigate through the complexities of the auction process efficiently.

TLG employs a comprehensive and strategic methodology for setting optimal bid prices for projects, ensuring that each bid is not only competitive but also profitable over the long term. This involves conducting an in-depth analysis of market trends, projecting costs, and assessing risks. The approach focuses on three pivotal considerations during its bid pricing assessment: understanding market dynamics, employing cost optimization strategies, and applying risk management techniques. These factors are integral to TLG's decision-making process, providing a robust framework for making informed bids in the competitive realm of business development.

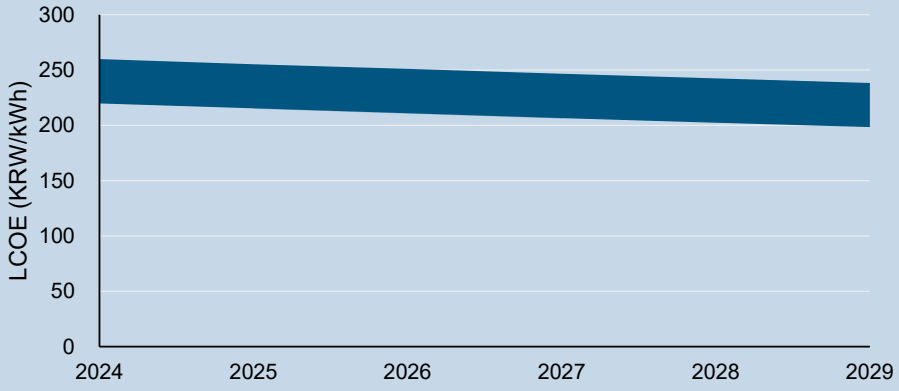
### 1. Understanding the Competitive Landscape

A fundamental step in TLG's assessment involves analysing the competitive landscape. This entails identifying potential competitors who are likely to participate in the auction and understanding the project's cost positioning relative to the market.

A key aspect of this analysis begins with accurately calculating the Levelized Cost of Electricity (LCOE) for the project, ensuring it reflects the project's unique cost structure and remains sustainable throughout its lifetime. TLG also considers current market data in its LCOE analysis, adding a layer of understanding about the prevailing price level influenced by major projects. Although the methodology for calculating LCOE is generally standardized, differences in the outcomes may occur due to variations in project-related inputs and economic or financial assumptions. To address these variations, TLG employs an in-house assessment tool that facilitates a comprehensive understanding of how diverse elements affect the LCOE

This competitive LCOE analysis will show how the project positions against the market, in turn, which guide the direction of how to participate in the auction.

**Figure 3: LCOE of Offshore Wind Project**




Source: TLG Analysis
Note: Figures are in real-dollar terms

## 2. Considering the Ceiling Price

The project faces uncertainty regarding ceiling prices in auction rounds since the KEA does not disclose these prices in advance. However, it is possible to estimate them through analysis of market markers and observations of past wind and solar auction ceiling prices. These estimated prices, which will be utilized for contracting with RPS obligors, can reflect their payment willingness. TLG possesses a historic database that facilitates this analysis, encompassing the entire period since the auction's inception.

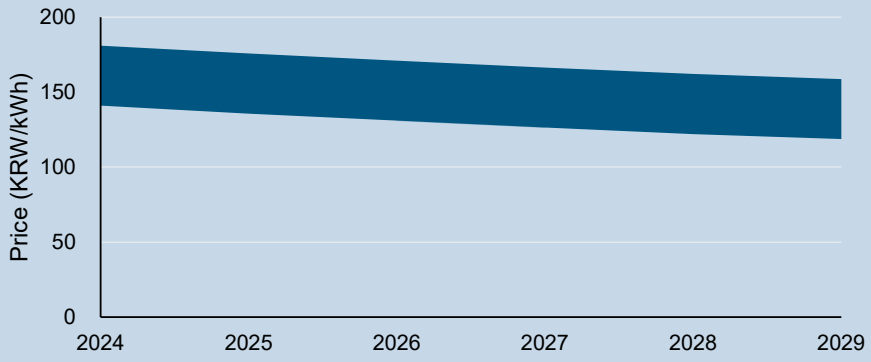
## 3. Formulating the Optimal Bid Price

TLG's assessment process culminates in determining the most likely bid price. Currently, KEA evaluates a bid price based on the formula of SMP + 1 REC. The competitiveness of the bid price, relative to the potential market revenue—which includes revenues from both SMP and REC—is central to securing a firm contract. It's crucial for bidders to be well-informed about market price forecasts to ensure their bid prices are within a reasonable spectrum.

To this end, TLG employs its proprietary in-house model of the Korean power system based on the QUAFU platform that TLG uses throughout the Asia Pacific. QUAFU is built on a rigorous mathematical optimization foundation, and has features similar to other widely used modelling platforms, but is further enhanced for faster deployment and execution. Our typical modelling approach incorporates detailed demand and supply fundamentals, incorporates key policies and regulations, as well as incorporates detail on fuel prices and fuel sources pertinent to individual power plants, to forecast future fuel mix and price trends.

Such forecasting is pivotal as it offers a prospective glance at potential revenue streams from both SMP and REC sales. These revenues are vital components of the auction's bid price structure, helping bidders strategically position their offers in a manner that balances competitiveness with profitability.

**Figure 4: Estimation of Bid Price (SMP + 1 REC) Based on Price Forecasting**




Source: TLG Analysis
Note: Figures are in real-dollar terms

TLG's comprehensive approach, which integrates forecasts of SMP and REC prices with LCOE calculations based on market data, provides our clients with a full frame perspective on opportunity value and risk when developing bid prices and bidding strategies. By synthesizing these insights, the aim is to propose bids that are competitive within the auction's pricing framework while securing a sustainable profit margin, taking into account the uncertainties and risks prevalent in the renewable energy market. This approach equips developers with the knowledge needed to make informed bidding decisions, ensuring their strategies are both attractive and financially viable.

## Moving forward

Determining the correct bid price is paramount for securing projects and fostering growth within the offshore wind sector. TLG approach to evaluating bid prices—characterized by an in-depth analysis of the competitive landscape, careful consideration of the ceiling price, and the crafting of an optimal bid strategy—highlights a commitment to strategic bidding. This approach not only enhances the developer's competitive position but also ensures that bids are realistically grounded and precisely tailored to the needs of project owners, allowing the developer to achieve prominence in the competitive business development arena.

Central to these efforts is a broader ambition: to significantly enrich the renewable energy mix with offshore wind projects, steering the energy sector towards a more sustainable and environmentally friendly future. The meticulous consideration of each project's cost structure in determining the bid price plays a vital role in this process, ensuring that the expansion of renewable energy resources is both economically viable and strategically driven.

## Client's testimonial

*"To pioneer the first domestic [in Korea] non-recourse project financing following the global standard through a multi-contract approach with overseas partners, TLG's market report and consulting were effective in educating unfamiliar partners and Lenders who expressed their intention to participate, about the Korean power industry and its offshore wind power-related laws, regulations, and practices, along with price forecasts. Thanks to this, we were able to smoothly complete the financial close within the targeted schedule."*

- Development and Operation Director

# About the Author

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David is a partner and director of TLG, based in Seoul, where he works with both inbound and outbound clients interested in investments in the energy sector. He particularly focusses on new energy opportunities throughout the region, helping to connect Korean and global companies into new markets and to help other companies evaluate opportunities in Korea. Prior to joining TLG, Dr Kim was the Managing Director at Hanwha Energy's Energy Solution System Division. Previously, David was a Partner at A.T. Kearney and a Principal at the Boston Consulting Group. David holds a PhD in Mechanical Engineering from Massachusetts Institute of Technology.

# About The Lantau Group

The Lantau Group (TLG) provides strategy and economic consulting services focused on the Asia Pacific's energy, network, and infrastructure sectors. We are the region's largest group of its kind. We offer a unique in-house resource pool equipped with experience and expertise in economic, commercial, financial and strategic aspects of the region's fuel-to-power value chain. We provide our clients with economic and regulatory consulting services, transaction support, asset valuation, and assistance in the development and evaluation of business strategy. Our access is unparalleled through our offices in Hong Kong, Singapore, Korea, Mainland China, Australia, Thailand, Vietnam and India, and with team members and affiliates across the world.