Long-term REC Price Forecasting

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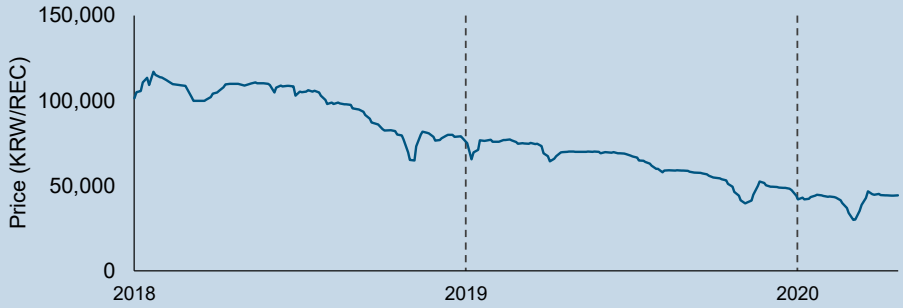
Over the past three years, the share of renewable generation in South Korea has grown from 3.6% in 2016 to 5.4% in 2019. The Renewable Portfolio Standard (RPS) and Renewable Energy Certificate (REC) systems contributed to this growth by mandating large generators equal to or above 500MW of capacity to meet certain share of generation with renewables or by procuring RECs from renewable power producers and by allowing renewable developers to have additional revenue stream by selling RECs to the obliged generators. Spot REC prices once hovered around 110,000 KRW per REC in H1 2018, but have steadily declined down to 29,900 KRW per REC on 3 March 2020 (Figure 1).

Figure 1: Historic Spot REC Prices (Average price on each trading day, 2018 – YTD 2020)



Source: Korean Power Exchange (KPX)

As the REC price decline continues, industry stakeholders have expressed concerns. Some countermeasures are now being discussed. In order to facilitate the discussion, The Lantau Group presents our perspective on the REC price forecast and its implications.

REC Price Forecasting Methodology

Most REC price forecasting methodologies thus far are based on the estimated Levelized Cost of Electricity (LCOE). The LCOE methodology is based on the concept that an economically rational renewable investor participates in the REC market assuming that REC prices will converge at 'LCOE less expected revenues from the wholesale market' to recover its capital cost. The wholesale market price is called the System Marginal Price (SMP).

QUAFU supplements the limitations of the REC price forecasting methodology based on LCOE.

This method is simple and appealing; however, it has inherent analytical limitations. Whilst REC and SMP are based on the marginal cost concept, the LCOE represents the average cost of certain technologies, thus theoretically invalidating the relationship from the start. Also, market dynamics driven by banking and borrowing as allowed under the REC trading rules cannot be explained. Finally, the LCOE approach implicitly assumes that investments can be recovered from REC prices regardless of the investment cost or SMP input, which in turn can provide a self-fulfilling, but wrong, basis for investment decision-making.

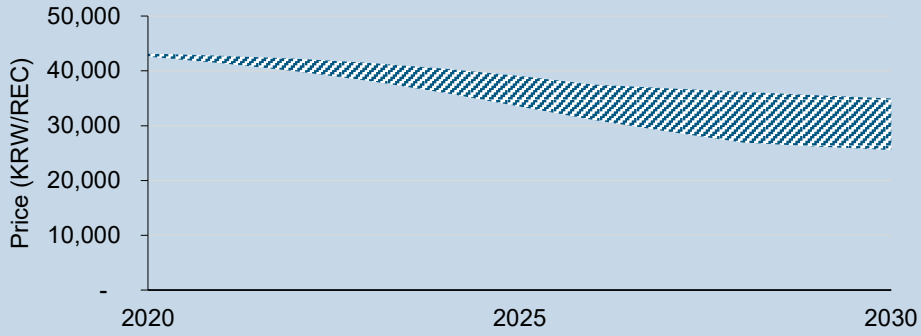
We use our QUAFU model of the Korean electricity and REC market to solve this problem. QUAFU is a proprietary market simulation tool that we have used for more than 10 years to analyse the power market dynamics. It co-optimises three key elements – short-term dispatch, capacity expansion, and REC workings (such as supply and demand, multipliers, banking and borrowing and non-compliance penalty) – to understand the value of REC in the market.

REC Long-term Price Forecast and its Implications

REC prices are forecast to continue to fall under the current system.

Our modelling suggests how mid- to long-term REC prices are likely to continue to fall, reaching around 30,000 KRW. (Figure 2)

Figure 2: REC Price Projection Based on QUAFU Modelling (2020-2030)



Source: TLG Analysis

According to our simulation, the value of RECs reflect various market elements such as the investment cost of renewable energy, future electricity demand, annual RPS target and its long-term target, fuel prices and resulting SMP. Below are key takeaways from our analysis.

It is time to conduct a thorough analysis on how to complement the RPS and REC system, and rethink how renewables are to be traded in the power market going forward.

Investment Cost and O&M Cost of New Renewable Entry

- RPS policy began as a means to secure project feasibility, but in the long run, it is a key driver for technologies to reach grid parity while promoting competition and inducing new competitive entrants. A project supported by a higher RPS requirement will naturally require less value from the REC market. Accordingly, REC prices will fall if RPS becomes a more significant factor. It should be recognized that RECs are no longer a guaranteed means to secure project feasibility. As the share of renewable generation increases, the SMP may also fall, which will require all power generators to make various efforts to secure business feasibility. Renewable energy developers will have to make efforts to reduce investment and operating costs, rather than seeking future RECs to support their investments.

Revisions to REC Multipliers

- We expect future multiplier revisions to gradually lower the multipliers for each technology in consideration of the changing economic feasibility of the generation cost of new and renewable energy sources. Initially multipliers were introduced for the purpose of securing business feasibility of renewable energy generators, but it is also clearly a policy tools with which to influence REC prices by adjusting REC supply. As REC supply exceeds demand, the REC price softens. We recommend an in-depth review is needed to determine the direction and extent of future changes in upcoming periodic revisions.

Difference Between Spot Market Price and Contract Market Price

- In response to the REC price plunge, the government is gradually expanding the contract market as a part of enhancing the business potential for small-scale solar developers. In April 2020, the largest capacity to date (1.2GW) is to be auctioned for 20-year contract. However, expanding contract market based on a predetermined price cap upper limit targeting a specific power generation source cannot be a fundamental measure. It will likely widen the price gap between contract market and spot market rather than reflecting the real unit value of the REC. It is necessary to review the basic redesign of the REC trading market system.

The interactions between the RPS and REC approaches create additional commercial risk and may result in either additional costs to Korean customers or a failure of the market to achieve the overall objectives. This is a problem evident in many markets around the world in which environmental policy initiatives evolve on top of electricity market foundations. A thorough review of the most effective way forward is strongly recommended.

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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 for over ten years. David holds a PhD in Mechanical Engineering from Massachusetts Institute of Technology. David is fluent in Korean and English.

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About The Lantau Group

The Lantau Group is a specialist economic and strategy consultancy focussed on the energy sector in the Asia Pacific and Middle East regions. With offices in Hong Kong, Singapore, Korea and Australia, we also have senior advisors based in Abu Dhabi, Indonesia, New Zealand, Thailand, UK, USA, and Vietnam.