The Korea RE100 Scheme and Renewable Energy Procurement Strategy

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Globally, new strategies for achieving carbon neutrality are taking shape. Leading global companies have been declaring clear targets for their use of renewable energy and have begun encouraging or even requiring their supply chain partners to do so as well.

In this edition of our periodic "TLG On ..." series we discuss the Korean RE100 scheme and how to establish a renewable energy portfolio in Korea given these new market dynamics.

In 2021 the Korean electricity market saw major changes on the retail tariff front with decisions to reflect fuel price changes and environmental costs. In addition, a new Korean RE100 scheme provides five ways for corporates to procure RE: the Green Premium, REC Procurement, Indirect PPA, Equity Investment, and Self-generation (Table 1).

Table 1: Korea RE100 (K-RE100) Procurement Options

Procurement Option	Overview
Green Premium	• End-users purchase renewable electricity by paying KEPCO an additional Green Premium on top of the existing electricity bill. • The price floor for the premium is set by KEPCO in consideration of renewable energy generation costs and the current level of electricity tariff. • Green Premium revenue will be passed to KEA and be used for reinvestment of renewable energy.
REC Procurement	• End-users procure Renewable Energy Certificates (REC) from renewable generators over-the-counter or via the REC trading platform established by KEA.
Indirect PPA	• End-users sign PPAs with KEPCO at an agreed price with a renewable generator, while KEPCO is an intermediary agency. • End-users pay grid usage fee and market and grid operation fees to KPX and KEPCO on top of electricity price.
Equity Investment	• End-users sign an indirect PPA or REC purchase agreement with the renewable project they invest in.
Self-generation	• End-users can use the electricity from their on-site renewable facilities and obtain certificate from KEA.

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As the RE100 plan for companies become concrete, companies should find a way to compose the optimal portfolio of renewable energy by utilising the currently specified implementation means. Minimisation, or zero increase, in energy purchase cost should be achieved based on each company's business environment and limited financial resources. Through this article, TLG presents focus and direction on how to establish a renewable energy portfolio in Korea.

KEPCO electricity retail tariff forecast.

Understanding the Electricity Retail Tariff

Since the K-RE100 options are new electricity purchase paths other than electricity procurement directly from KEPCO, companies shall evaluate and review so that the cost of purchasing renewable energy through the K-RE100 mechanism does not increase compared to the existing KEPCO retail price, and even if it increases it should be minimised. To this end, understanding and forecasting of the KEPCO electricity retail tariff should be preceded to set the baseline for the evaluation.

KEPCO electricity retail tariff, which had been unchanged over the past seven years, was revised in 2021. The main changes within the revision were the newly added 'fuel cost adjustment charge' and 'environmental charge,' which will change by quarter and by year respectively.

- **Fuel cost adjustment charge:** Historically, the C&I retail tariff was set in 2013 and did not reflect fuel cost changes since then. After the 2021 tariff revision, the fuel cost changes of actual generation began to be reflected with limits in adjustment (quarterly ±3 KRW/kWh, annually ±5KRW/kWh). Considering the domestic KOGAS LNG price is dominant in determining the price of electricity in Korea, and that a significant amount of LNG is linked to oil price, a view of future oil prices and the correlation between oil price and the retail tariff is required.
- **Climate and environmental charge:** Large generation companies are currently mandated to comply with the Renewable Portfolio Standards (RPS) and the Emission Trading Scheme (ETS). This leads to a rise in electricity supply prices, an increase in the cost KEPCO pays to power generators, and, ultimately, a rise in retail rates. The increase in the amount of renewable generation has the effect of reducing some total costs. However, it is estimated that climate and environmental charge will continue to rise due to structural issues in power supply. An understanding and forecasting of the increment is essential.

Before establishing the RE purchasing portfolio, companies should first analyse the currently used electricity tariff structure and the cost of electricity use. Establishing a base scenario that reflects this is the very first step.

Main Points in Constructing RE Purchasing Portfolio

When constructing a renewable energy purchasing portfolio, the following three factors are considered as main aspects: required and available electricity volume, contribution to corporate goals, and economic feasibility.

Selection of economical means of implementation to secure corporate competitiveness.

1. Required Electricity vs Available Electricity by Procurement Options

Companies should estimate the amount of annual electricity required in the short, medium, and long-term. After estimating the demand based on the business strategies, the available electricity volume by means of implementation is diagnosed.

The amount of supply from the **Green Premium** option, which is conducted through annual bidding, is limited. The amount of power secured through KEPCO's own PPA with small-scale solar power generation and the amount of renewable electricity KEPCO purchases under the RPS scheme are definitely not small amounts, considering the amount of power consumed by companies. However, the annual tendered amount of electricity offered by KEPCO should be reviewed thoroughly.

In case of **self-generation**, it is important to check whether it is possible to install the renewable generator within the company's premises, and if so, how much capacity can be installed and how the investment cost required for installation can be financed. If there is a limitation or restriction on the scale of renewable energy sources that can be installed, it will be hard to meet the 100% of the company's electricity demand.

REC procurement option is a way for companies to get certification on renewable usage performance by signing contracts with RE generators or purchasing REC through trading platform. The REC trading has been actively made between the RPS-mandated Gencos and renewable generation companies since 2012. As the RPS target is raised to 25% by 2026 in 2021, the demand for RECs from those mandated to supply RPS is expected to increase significantly, increasing uncertainty about the amount of REC available to the end-users. In the case of large-scale RE projects, the contract with RPS-mandated Gencos has been an indispensable factor in project financing, but the bankability for the REC purchase by the end-users is not clear nor guaranteed at the moment. The RPS-mandated Gencos are preferred from the perspective of renewable generators.

Indirect PPA is recently introduced into the Korean market. The RE generators could be reluctant to the indirect PPA scheme since their electricity sales are guaranteed under the current power trading structure. The situation may be subject to changes in the future if uncertainties regarding electricity sales, such as curtailment, rise.

2. The Extent of Contribution to Companies' Objective: The Contribution to the Actual Usage of RE and the GHG Emission Reduction

If the company has specific objectives such as using specific RE source, directly using RE power produced by the project, considering GHG emission reduction and ETS cost reduction as their final objective, the range of available options become limited. For those companies, indirect PPA, equity investment, and self-generation should be prioritised.

When comparing the REC procurement to Green Premium, information such as energy source, multiplier, and generation amount can be known in advance of the contract in the case of REC procurement. This makes it possible to choose the energy source more proactively. In the case of a company that plans to purchase renewable energy with the goal of reducing GHG emissions, Green Premium that are not recognised as GHG emission reduction should be excluded from consideration, even if they are relatively economical means of implementation or if additional measures to reduce GHG emission must be separately sought.

3. Economics: What Means of K-RE100 Options are the Most Economical?

Competitiveness is one of the most important issues, especially for supply chain partners. To make a sound decision about timing (how much now vs how much later) while balancing concerns about competitiveness, one has compare the projected cost of renewable energy to the baseline of busines as usual.

Green Premium and REC procurement still require electricity purchase from KEPCO. The Green Premium is operated through auction bidding for limited amount of power, where the price floor is set at 10 KRW/kWh and the price ceiling is not set in 2021. The Green Premium option entails significant uncertainty because information is limited during the bidding process with a high risk of potential failure of procuring RE if the bid turns out to be unsuccessful. The REC procurement option also has price volatility risk, but it is possible to sign a long-term contract, and the range of REC prices can be predicted to some extent based on the unit cost of renewable power generation.

Indirect PPA is a measure to sign a contract with RE generators with KEPCO as an intermediary agency. Both short-term and mid-to-long term contracts are available and, since it has KEPCO as the intermediary agency, offer a more convenient way to deal with the issue that RE generators cannot provide electricity in certain time period. The advantage of a short-term contract is that it can be converted to a project with a lower unit price when the contract expires.

The renewable usage of companies can be recognised through **Equity Investment** by signing a separate power contract or REC contract with the RE project where the company has invested. Therefore, it is important to ensure economic feasibility for key items of renewable energy or REC contracts.

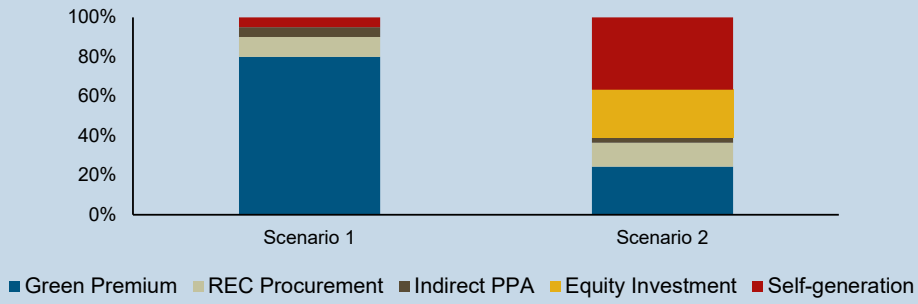
Self-generation can be interpreted as a concept in which most of the electricity costs for the life of a project are paid in advance through initial capital expenditure. The analysis can be conducted based on the perspective of Levelised Cost of Electricity (LCOE), which is a measure of the average net present cost of electricity generation over its lifetime that takes into account the construction cost, fuel cost, and operating cost, and more. This option involves a long-term strategic decision.

The required renewable electricity demand, electricity retail price forecast, and available investment scale are analysed on an annual basis to construct scenarios for the portfolio, and to calculate the unit cost per kWh by scenario. An example of such a scenario is illustrated in the figure below. Scenario 1 focuses on Green Premium, while scenario 2 focuses on Self-generation and Equity Investment routes. Please note the analysis of these scenarios is set arbitrarily for illustration purpose.

Examples of RE Portfolio.

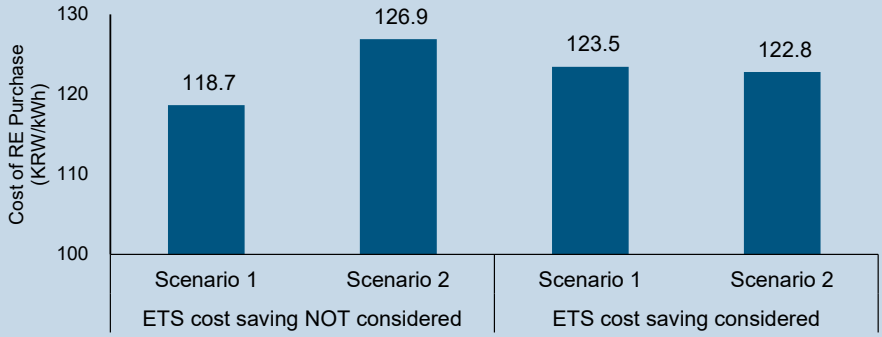
TLG supports the RE portfolio construction by forecasting power price with in-house modeling and evaluating the procurement cost by options.

Figure 1: Renewable Energy Portfolio Composition by Scenario



Source: TLG Analysis

Figure 2: The Cost of Renewable Electricity Purchase by Scenario (KRW/kWh)



Source: TLG Analysis

Note: The KEPCO electricity retail tariff is assumed 100 KRW/kWh, and ETS cost saving is assumed 8 KRW/kWh

As in the hypothetical example, each stakeholder may reach a different conclusion regarding timing and approach depending on the nature of their commitments and their consideration of 'now' vs 'later'. Analysis informs these decision. Working through scenarios allows companies to formulate more robust renewable energy procurement strategies reflecting company objectives. Currently, in the short-term, the unit cost of renewable energy purchase is higher than KEPCO retail tariff. However, the energy transition is happening quickly, with recent fuel and other market disruptions suggesting a complex road ahead. We recommend paying closer attention to the details and not to assume that options will become less expensive in the future. Individual technologies may become less expensive but the challenge of integrating more and more renewable energy will also become more complex.

A company's ESG performance is utilised as a standard to evaluate the non-financial achievements, such as a company's environmental awareness, social responsibility, and corporate governance, and it is positioned as an investment index in evaluating the company value and its sustainability. Meticulous preparation and implementation of renewable energy utilisation and greenhouse gas emission reduction, which are major elements of the E (environmental) sector among ESGs, should be a priority for corporate management agenda.

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About The Lantau Group

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