

## ERC Sandbox: Thailand's Pilot Virtual PPA and How RECs and Virtual PPAs Can Further Its Decarbonization Goals



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### Introduction: the ERC Sandbox

In 2019, the Energy Regulatory Commission (“ERC”) launched the “ERC Sandbox”, an innovative regulatory initiative designed to foster the development of innovative energy solutions to support energy transition. This program provides a controlled environment where companies can test and pilot their innovations with temporary regulatory flexibility, under the supervision of the ERC. This initiative is a significant step towards accelerating Thailand's energy transition and achieving its sustainability goals. As of 2025, two ERC Sandbox phases have been announced: Phase 1 was announced in 2019 with 34 approved projects; Phase 2 was announced in 2022 with 36 approved projects; and ERC Sandbox (Addition) was announced in 2023 as an addition to Phase 2, which canceled many of the Phase 2 approved projects and refocuses the criteria of eligibility for the ERC Sandbox to be projects with a duration of not more than one year, for which no more than 3 months of tariffs are applied, which do not generate commercial profit, and which are focused on the following areas of innovation: REC trading platforms, smart grids, innovative forms of PPAs (Virtual PPA, Sleeved PPA), Green Innovation and Green Regulation.

## **Thailand's Pilot Virtual PPA**

In February 2025, two private entities entered a Memorandum of Understanding to study and develop a virtual power purchase agreement ("Virtual PPA") pilot project, whereby the purchaser thereunder will be able to financially invest in a solar rooftop project without accepting physical delivery of the generated electricity. This project marks Thailand's first Virtual PPA and will last one year. It is part of the second phase of the ERC Sandbox.

In addition to the pilot Virtual PPA project, other virtual PPA projects, virtual power plants, and virtual battery projects have also been approved under the ERC Sandbox Phase 2.

If the Virtual PPA pilot project proves successful, useful information from the project will be used by the ERC to further develop the regulatory framework for Virtual PPAs in general.

## **Virtual PPAs vs Physical PPAs**

A Virtual PPA, also known as a Financial PPA or Synthetic PPA, is a contract-for-differences (CFDs), which functions as a form of price hedging agreement between the electricity producer and the buyer. It is a purely financial transaction that does not involve the physical delivery of goods (i.e., power) to the buyer's premises, unlike under physical PPAs - the parties to the Virtual PPA merely jointly agree on the electricity price or 'strike price'. Where the market price is greater than the strike price, the seller provides a rebate to the buyer; vice versa, where the market price is lower than the strike price, the buyer pays the difference to the seller.

Physical PPAs/ Direct PPAs are separated into two types: On-site and Off-site. Broadly speaking, On-site PPAs are where the power plants are located within the vicinity of the purchaser's organization and the electricity is fed directly to the buyer. An Off-site PPA is where the power plant may be located elsewhere, and electricity is produced and delivered to the utility provider. Under this Off-site arrangement, the producer receives the electricity fees and the utility provider receives a transmission fee. A Virtual PPA is a type of Off-site PPA (in certain countries like Singapore, Virtual PPAs do fall into this category) without physical delivery of generated power. Generated power is sold to the grid at spot market rate.

On its own, the concept of a Virtual PPA is an electricity price hedging tool. However, when coupled with other decarbonization mechanisms like Renewable Energy Certificates ("REC"), Virtual PPAs can be used to promote investment in lower carbon power generation. Where power producers supply clean electricity to the grid and receive RECs from the Electricity Generating Authority of Thailand ("EGAT"), the contractual mechanism under the Virtual PPA allows RECs to be transferred to the buyer. Unlike conventional REC transactions where the buyer simply pays for the RECs, a Virtual PPA strike price may be set above the market rate of electricity and generate positive cash flow for the buyer from day one.

## **Renewable Energy Certificates (RECs)**

An REC is an attribute tracking mechanism, first introduced in the United States in 1987 and first traded in 1995. Increasingly applied in many countries, an REC certifies that electricity is generated from renewable power. In a system with a central grid, once electricity from power plants enters the grid, the electrons become indistinguishable. This is similar to cash deposited in a bank and then withdrawn by the public. Like carbon credits, an REC is a tradeable offset mechanism (1 REC = 1 MWh of renewable energy generated) that helps purchasers reduce Scope 2 emissions, thus it has economic value. Thailand's REC issuance has grown at an average CAGR of 105.48% from 2017 to 2024.

The international standard for RECs, developed and regulated by the International REC Standard Foundation (I-REC Standard), requires REC issuers and stakeholders to register under the I-REC Organization's system. EGAT has been certified by The International Tracking Standard Foundation as the local certifying authority and issuer of I-REC since 2020. While not explicitly stated as a duty under the Electricity Generating Authority of Thailand Act B.E.2551 (2004), this role aligns with EGAT's activities. Bundle REC in Thailand is implemented under the Utility Green Tariff program.

Other than EGAT, Green Certificate Company and APX Company, both of which follow the Tradeable Instrument for Global Renewables (TIGR) Standards, another internationally accepted REC standard, also issue RECs in Thailand.

However, it is worth noting that, while the Ministry of Energy is responsible for RECs from an energy perspective, the Ministry of National Resources and Environment is responsible for RECs from a decarbonization perspective.

## **Cross-border trading of RECs**

As a member state of the Association of Southeast Asian Nations ("ASEAN"), Thailand participates in the ASEAN Center of Energy ("ACE") initiatives. REC activities in ASEAN were launched around 2015 with the early developments of ASEAN's renewable power industry. All six ASEAN member states allow voluntary REC trading, but each state has its own regulatory and infrastructure challenges to fully enable the benefits and address the challenges of RECs and Virtual PPAs, and most have yet to establish clear legal frameworks to regulate the REC market.

The ASEAN Power Grid Advancement Program ("APG-AP") is a project involving the ACE, UN ESCAP, Energy Transition Partnership, and Clean, Affordable, and Secure Energy for Southeast Asia to help accelerate the development of an ASEAN Power Grid and a Multilateral Power Trade ("MTP") environment. Like carbon credits, the prices of REC in these countries still differ.

EGAT estimates the indicative price to be approximately 30-50 Baht/MWh in Thailand in 2024 (depending on the renewable power source), while Vietnam has an abundance of renewable energy and REC pricing as of 2023 was around US\$0.50-1.00 / MWh. In Singapore, as of mid-2024, the price of REC ranged from SG\$ 30-40/ MWh. The APG-AP recommends harmonization of REC standards; regulatory alignment on power trade; and establishing sub-regional markets.

The standardization of REC issuance, with appropriate regulatory and technical infrastructure to trade the same within and across borders, could help buyers achieve decarbonization targets.

## **Analysis and Implications**

The aim of the Thai government policy as announced in September 2024 was to reduce the price of electricity. Virtual PPAs, in its function as a price hedging mechanism as well as a potentially positive cashflow REC procurement tool, help Thailand's energy transition by facilitating investments in renewable energy projects and providing financial incentives for clean energy production. Virtual PPAs are currently only being piloted in Thailand, but have seen widespread success in the United States, where Virtual PPAs were introduced around 2015. The success of this initiative and a properly regulated REC market infrastructure in Thailand could unlock both local and cross-border exchange and be offset against renewable energy certificates. However, given the pilot project duration of one year and the pace at which regulations are generally developed and passed in Thailand, it may be some time yet before Virtual PPAs become generally available on the renewable energy market in Thailand.

For more information and queries on bidding submissions, please contact the key contact persons listed above.

## References

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