

Renewable Energy Certificates (RECs) in Six APEC Southeast Asia Economies

Background and Purpose:

A REC represents attributes of electricity generated from a renewable energy sources and is considered to be one form of Energy Attribute Certificates (EACs). As for RECs, the energy attributes are either bundled or unbundled from the physical electricity, and the two products—the attributes embodied in the certificates and the commodity electricity—may be traded separately. Due to this nature, RECs are quickly becoming the currency of renewable energy markets, primarily because of their flexibility and the fact that they are not subject to the geographic and physical limitations of commodity electricity. RECs are currently used by utilities and marketers to supply renewable energy products to end-use customers as well as to demonstrate compliance with regulatory requirements, such as renewable energy mandates. For this reason, RECs have become widely accepted globally and demand for them is increasing rapidly. In APEC Southeast Asia economies, the RECs markets started as early as 2015. The demand for RECs in the region has been growing significantly due to the needs of multinational and local companies aiming to comply with their voluntary renewable energy consumption targets.

The purpose of this report is to describe and analyse the emerging RECs markets in six APEC Southeast Asia economies, namely Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam, and to present the authors' perspectives to sustainable development of RECs. This report provides an examination of RECs markets, describes how RECs are marketed in each economy, and describes the key challenges inhibiting further growth in these markets. The report also examines well-developed RECs markets in selected APEC economies to learn from their success and remaining challenges.

Outline:

The report comprises of 57 pages of self-explainable Powerpoint format. Section 1 of the report contains brief history of the development of RECs. Section 2 provides additional background on RECs in four APEC well-developed RECs markets, namely the US, Japan, China, and Australia. Section 3 presents the status of RECs markets in six APEC Southeast Asia economies in greater details. Section 4 describes the development and challenges of the RECs markets in the six APEC Southeast Asia economies, and presents issues for consideration for sustainable development of RECs. Comparisons of RECs in the well-developed economies and Southeast Asia economies are provided for references. Executive Summary of the report is also presented.

Summary of RECs in Four Advanced APEC Economies:

RECs in advanced APEC economies namely the US, Japan, China, and Australia are examined in order to provide background for the development for APEC Southeast Asia. RECs, as well as other forms of energy attribute certificates (EACs), have evolved over many years of development. RECs were first traded in California in 1995. In these selected economies, compliance markets were first introduced as the primary tools to increase renewable energy production. EACs/RECs are regulated, traded, and monitored by government agencies designated by specific legislation. In addition, in all four economies RECs are designed to provide a market-based mechanism to incentivise investment in new renewable capacities in addition to the government's support mechanisms such as the feed-in tariffs.

	US	Japan	China	Australia
Start year	<ul style="list-style-type: none"> First trading of RECs 1995 	<ul style="list-style-type: none"> GEC launched in 2000 	<ul style="list-style-type: none"> GEC launched in 2017 	<ul style="list-style-type: none"> RECs launched in 2000
Types of market and certificates system	<ul style="list-style-type: none"> Compliance market for utilities and Load Serving Entities-LSEs to meet RPS obligations Voluntary market for electricity retail consumers RECs is the main certificates system used in both markets 	<ul style="list-style-type: none"> GEC: targeted for self generation and consumption of RE electricity J-Credit: targeted for voluntary electricity customers to promote EE, fuel switching, carbon sink NFC targeted for electricity retailers to meet 44% non-fossil target by 2030 	<ul style="list-style-type: none"> GEC is the only certificates in China to claim for RPS target (launched 2019) 	<ul style="list-style-type: none"> From 2011 there are 2 types of RECs: Type 1 (Large Scale Generation Certificates-LGC) and Type 2 (Small Scale Technology Certificates-STC) LGCs are generated by large RE generators (>100kW), STC by small RE generators
Estimated market size	<ul style="list-style-type: none"> Compliance 358 TWh (2020) Voluntary 192 TWh (2020) Total 550 TWh (2020) 	<ul style="list-style-type: none"> GEC 585 GWh in 2020 J-Credit (renewable energy) 980 GWh in 2020 FIT NFC 99.7 TWh 189.7 TWh in 2020 	<ul style="list-style-type: none"> 8 TWh (2017) 	<ul style="list-style-type: none"> 36 TWh (LGCs) in 2022 10 TWh (STCs) in 2022
Estimated certificates price	<ul style="list-style-type: none"> Compliance RECs (2018): RECs=10-15 USD/MWh SREC (Solar RECs) =100-250 USD/MWh Voluntary RECs: 0.7 USD/MWh (2018) 	<ul style="list-style-type: none"> 2-4 Yen/KWh (2020) J-Credit 1.38 Yen/KWh (Jan. 2022) FIT NFC 0.3 Yen/KWh (2021) Non-FIT NFC 0.6 Yen/KWh (2021-floor price) 	<ul style="list-style-type: none"> GEC onshore wind 20-45 USD/MWh (2019) GEC solar 45-104 USD/MWh (2019) 	<ul style="list-style-type: none"> Spot LGC approx. 65 AUD/MWh (Sept. 2022) Spot STC 39.9 AUD/MWh (2022)

	US	Japan	China	Australia
Governance body	<ul style="list-style-type: none"> Federal and state regulatory commissions and authorities 	<ul style="list-style-type: none"> Government 	<ul style="list-style-type: none"> Central government 	<ul style="list-style-type: none"> Clean Energy Regulator (CER)
Trading and tracking system	<ul style="list-style-type: none"> Different system in each region (currently 9 systems being used) 	<ul style="list-style-type: none"> GEC: tracked by JQA (Japan Quality Assurance Organization) J-Credit by J-Credit auction (online) NFC by JEPX (Japan Energy Power Exchange) 	<ul style="list-style-type: none"> Using online China's Energy Trading System (ETS) 	<ul style="list-style-type: none"> National system (RECs Registry)
Successful development	<ul style="list-style-type: none"> Introduction of RPS and RECs resulted in large RECs market size and participants Voluntary market gained popularity, enabling different market offerings 	<ul style="list-style-type: none"> Use RECs market to reduce <u>FIT</u> 	<ul style="list-style-type: none"> Use RECs market to reduce <u>FIT</u> 	<ul style="list-style-type: none"> Introduction of RET to create demand for renewable and to replace <u>FIT</u> expenditure Single authority/single system to promote and regulate RECs One carbon market to serve various types of carbon commodities, including RECs (LGC & STC schemes)
Key challenges	<ul style="list-style-type: none"> Uniform of RECs tracking system and market platform Disaggregation of RECs attributes for other environmental claims Long-term buying of RECs as a tool to finance new RE projects 	<ul style="list-style-type: none"> Limited availability of RE and certificates Confusion and difficulty of certificates acquisition process Attributes not fully conform with international standards Disaggregation of RECs attributes for other environmental claims 	<ul style="list-style-type: none"> Disaggregation of RECs attributes for other GHG claims such as NOx GEC attributes not fully conform with international standards 	<ul style="list-style-type: none"> Attributes not fully conform with international standards Disaggregation of RECs attributes for other environmental claims

Summary of RECs in Six APEC Southeast Asia Economies:

For the six APEC Southeast Asia economies, RECs began trading as early as 2015, primarily to serve increasing demand from commercial users for renewable electricity in voluntary markets. Currently there is no compulsory RE requirement in these economies. By the end of 2021, there were 12 883 MW of RE generation capacity registered for RECs eligibility, three quarters of which were hydro and solar generators, followed by biomass, wind, and thermal. The total cumulative number of issued RECs from 2015-2021 was 29 million, with 8.3 million RECs issued in 2021 alone. With market mechanisms of RECs in place, demand for RECs in APEC Southeast Asia economies is expected to increase substantially, driven largely by the need from voluntary commercial users to achieve RE commitments, mostly by 2030-2035. Despite increasing demand of RECs, Southeast Asia economies, with the exception of Malaysia, currently rely on the market systems and procedures of private service providers of RECs. Malaysia developed its own RECs market platform and specific RECs framework in 2020. Specific legislation governing and/or departments regulating RECs markets are not yet in place in Southeast Asia economies but are currently under development. Summary table of RECs of APEC Southeast Asia Economies is provided below.

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam
Types of market and certificates system	Voluntary market with RECs	Voluntary market with RECs	Voluntary market with RECs	Voluntary market with RECs	Voluntary market with RECs	Voluntary market with RECs
Cumulative registered RE capacity (total 12.8 GW) as of 1H 2022	1.5 GW	2.3 GW	1.4 MW	0.8 GW	3.9 GW	2.9 GW
Cumulative number of issued RECs (2015-H1 2022) (total 29.1 TWh)	4.3 TWh	4.0 TWh	6.3 TWh	1.2 TWh	6.5 TWh	6.8 TWh
RECs certification and tracking system	I-RECs, TIGR	mGATs, I-RECs, TIGR	I-RECs, TIGR	I-RECs, TIGR	I-RECs, TIGR	I-RECs, TIGR
RECs issuer	GCC, APX	GCC, APX	GCC, APX	GCC, APX, SPG	GCC, APX, EGAT	GCC, APX
Trading platform	GCC and PLN (APX-based platforms)	mGATs platform GCC and APX-based platforms	PREMS GCC and APX-based platforms	SPG-based platform	EGAT GCC and APX-based platforms	GCC and APX-based platforms
RECs prices	IDR 35 000/MWh (only from PLN platform)	0.037 MYR/kWh (only for mGATs platform)	N/A	SGD 15 – 25 (USD 11.3 – 18.8)	Market-based	Market-based
Governance body	N/A	NRECC (regulates GET pricing for mGATs platform only)	Department of Energy	Energy Market Authority	MoE and MoNRE (jointly)	N/A

Key Findings:

In order to further develop sustainable and efficient RECs markets, it is recommended that dedicated legislation and regulatory unit(s) should first be established in each APEC Southeast Asia economy to regulate and set the direction for the RECs market. As seen from the examples of this report, well-design RECs markets can serve as an effective market-based mechanism to promote investment in renewable electricity in order to achieve renewable and decarbonisation targets, and at the same time to lessen the burden of government to incentivize RE investors. Additionally, coexistent compliance and voluntary RECs markets can accelerate RE investments

but a combined approach requires careful balancing of costs and benefits. The 'additionality criterion' of RECs and the use of RECs as a financial instrument can also help promote new RE investment. Harmonization of RECs attributes among six APEC Southeast Asia economies is important to ensure accounting and integrity of RECs in the region. Furthermore, RECs markets in the six APEC Southeast Asia economies could potentially be integrated to become a large and complex regional market to encourage integrated renewable energy investment and allow economies to benefit from the diverse and untapped renewable resources in the region in conjunction with plans for the expansion of a regional transmission grid. However, it is recommended that the APEC Southeast Asia economies study and evaluate this potential before moving forward on such a program.