

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

APERC Workshop

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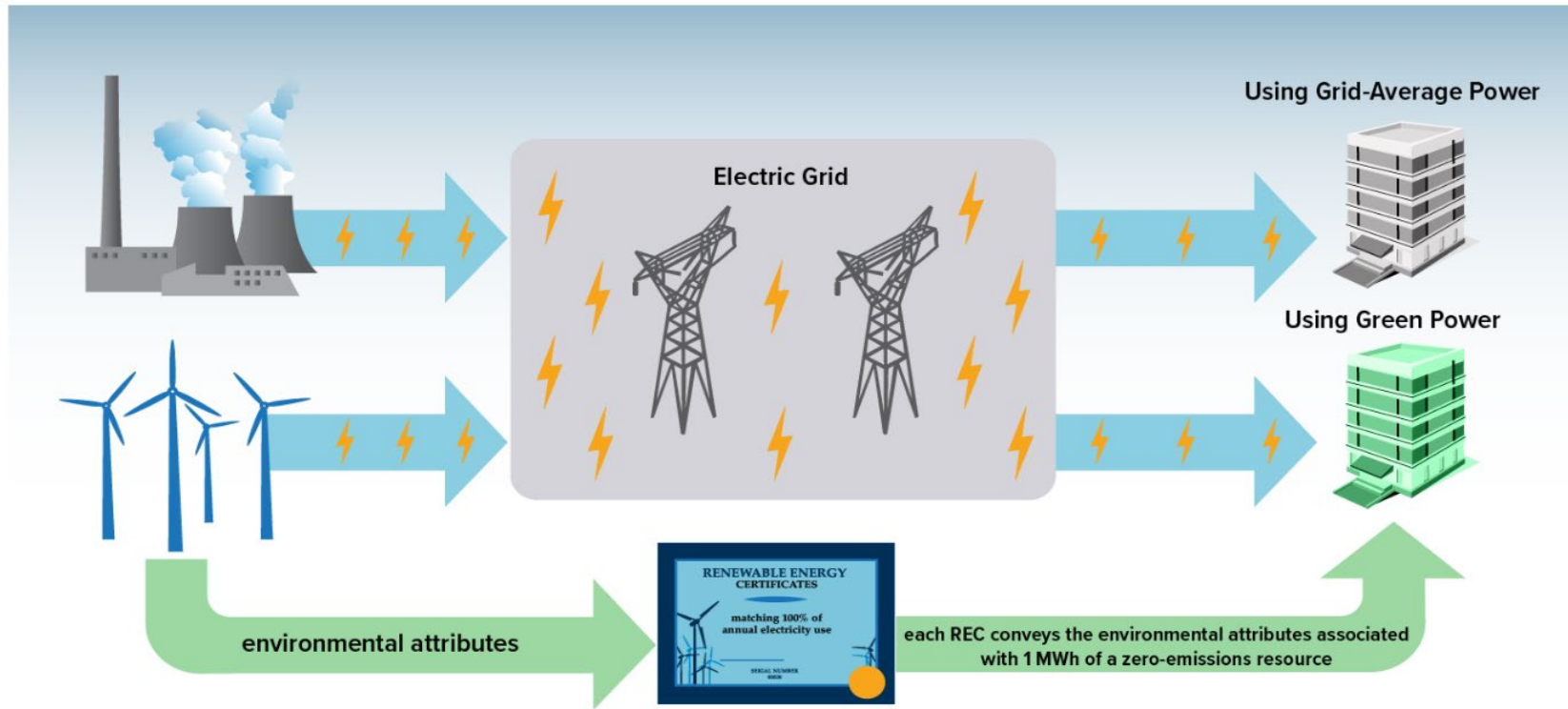
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Outline

- What is a REC ?**
- RECs in the US, Japan, and Australia**
- RECs in APEC Southeast Asia**
- Summary and Key Findings**

What is a REC ?



- It represents the environmental attributes associated with 1 MWh of renewable electricity.
- A REC addresses Scope2 emission reductions, which is indirect emission from purchased energy.
- A tradable commodity: bundled or unbundled with electricity.

REC demand driver

❖ Several corporate sourcing of RE electricity :

- ❑ Self-generation
- ❑ Power Purchase Agreement (PPA)
- ❑ Utility green procurement
- ❑ Energy Attribute Certificate (EAC)
ex. RECs

❖ Importance of RECs in APEC Southeast Asia (SEA) economies

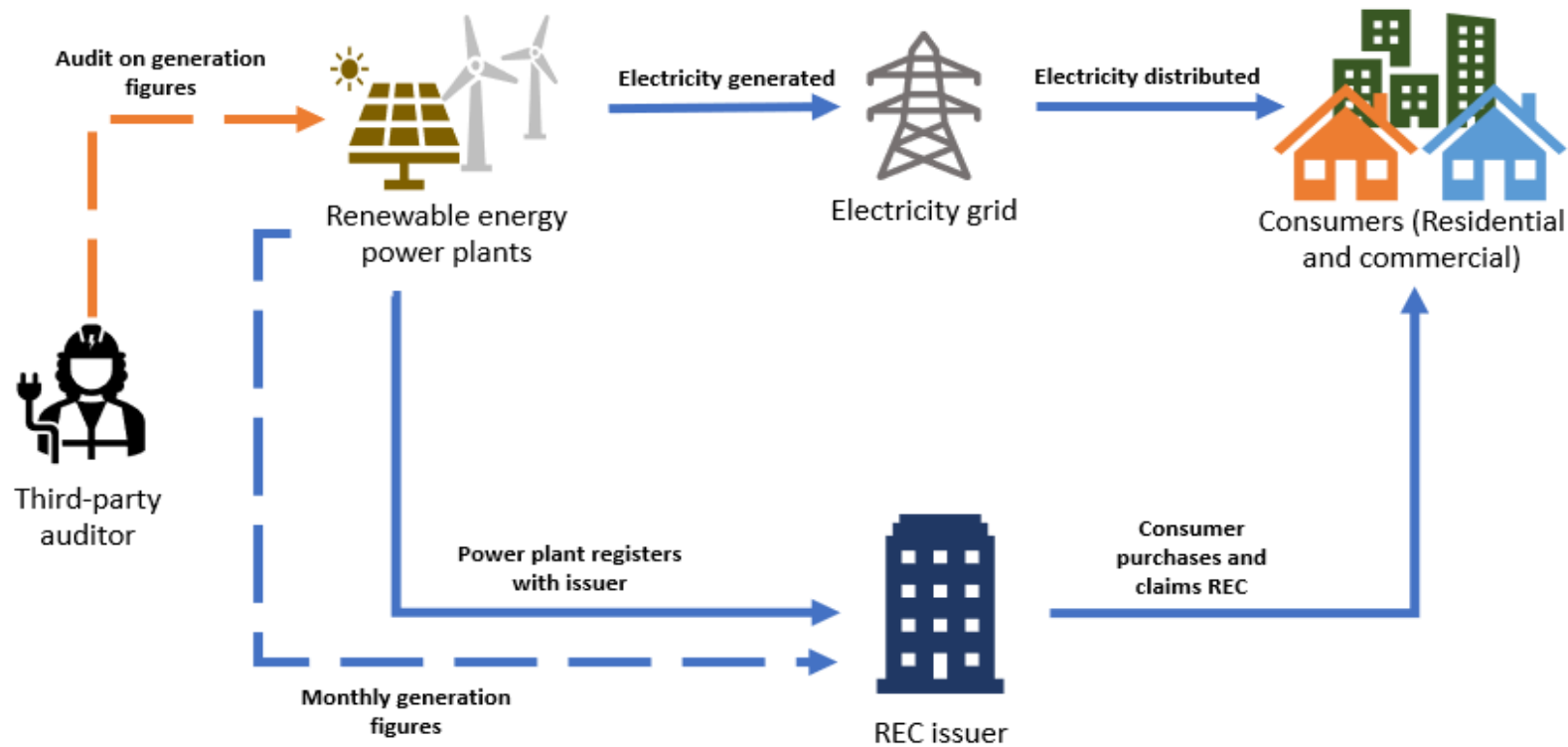
- ❑ Demand : corporates wish to meet RE-100 targets
- ❑ Supply : renewable power plants seek additional sources of revenue streams
- ❑ Regulators hope to use RECs as a policy lever to boost renewable investment.



<https://www.there100.org/>

The RE100 group of companies is committed to achieving 100% renewable electricity

Typical REC Mechanism



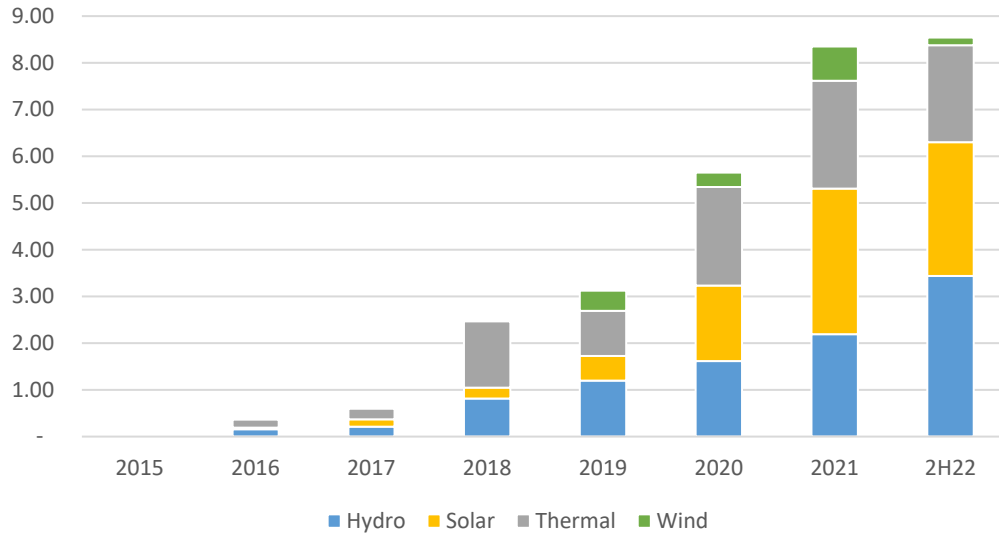
- A REC is issued when the RE power plant registers its generation device with an issuing organization.
- Third-party auditor may be involved to verify the amount of RE generation to the number of RECs.
- The Issuer issues the REC, and through REC's Registry, the REC is tracked from electricity sources until the end-user claims.

Comparison of EAC/REC in Selected APEC Economies

	US	Japan	Australia
Start year	<ul style="list-style-type: none"> • First trading of REC 1998 	<ul style="list-style-type: none"> • GEC (Green Electricity Certificate) launched in 2000 	<ul style="list-style-type: none"> • REC launched in 2000
Types of market and certificate system	<ul style="list-style-type: none"> • Compliance market (RPS : Renewable Portfolio Standard) • Voluntary market for electricity retail consumers 	<ul style="list-style-type: none"> • GEC: for self-generation • J-Credit (renewable energy) : for voluntary electricity customers to promote EE and RE, and the trading unit in yen/tCO₂ • NFC (Non-Fossil Certificate): for electricity retailers to meet the 44% non-fossil target by 2030 and prevent exploitation of FIT (Feed in Tariff) generations. 	<ul style="list-style-type: none"> • Compliance market (RET: Renewable Energy Target) • REC type : <ul style="list-style-type: none"> • LGC -Large Scale Generation Certificate, and • STC – Small-Scale Technology
Estimated market size	<ul style="list-style-type: none"> • Compliance 358 TWh (2020) • Voluntary 192 TWh (2020) 	<ul style="list-style-type: none"> • GEC 585 GWh (2020); J-Credit 980 GWh (2020); • FIT NFC 99.7 TWh and Non-FIT NFC approx. 90 TWh (2020) 	<ul style="list-style-type: none"> • 36 TWh (LGCs) in 2022 • 10 TWh (STCs) in 2022
Trading and tracking system	<ul style="list-style-type: none"> • Different systems in each region (Ex. NAR and ERCOT) 	<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"> • National system (REC Registry) managed by the CER: Clean Energy Regulator.
Lesson (key points)	<ul style="list-style-type: none"> • REC markets are regulated in the federal level • Introduction of RPS and REC resulted in large market size and participants. The voluntary market gained popularity, enabling different market offerings 	<ul style="list-style-type: none"> • The government regulates energy certificates. • Each certificate serves different purposes. • Nuclear is included in the scope of NFC 	<ul style="list-style-type: none"> • Single authority/single system to promote and regulate REC • 2 type of certificates (LGC & STC) to serve different needs

Overview of RECs in Six APEC economies in Southeast Asia

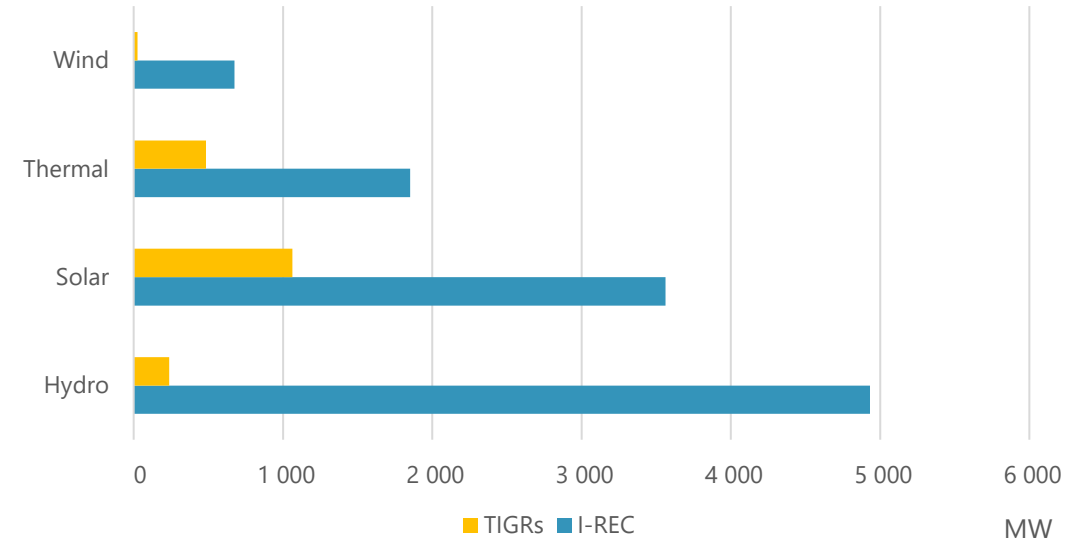
Total RECs Issued in Six Economies, 2015 – 2H22 (TWh)
(Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam)



Notes: Thermal: Biomass and geothermal combined

Sources: I-REC and TIGR registries

Total Registered RE Capacity in Six Economies (2015 – 2H2022)
(Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam)



Sources: I-REC and TIGR registries

- REC markets in six APEC SEA economies started around 2015 and grew quickly with increased demand from corporate electricity consumers who have committed to meeting RE targets.
- The International REC Standard (I-REC) and the TIGRs (APX) registries are used in APEC SEA economies.
- By 2H2022, accumulating RECs: 29 TWh issued by I-REC and TIGRs.

Overview of RECs in Six APEC economies in Southeast Asia

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam
Types of market and certificate system	Voluntary market with REC					
Cumulative registered RE capacity (2H2022)	1.5 GW	2.3 GW	1.4 MW	0.8 GW	3.9 GW	2.9 GW
Cumulative RECs issued (2015-2H2022)	4.3 TWh	4.0 TWh	6.3 TWh	1.2 TWh	6.5 TWh	6.8 TWh
REC certification and tracking system	I-REC, TIGRs	I-REC, TIGRs	I-REC, TIGRs	I-REC, TIGRs	I-REC, TIGRs	I-REC, TIGRs
REC issuer	GCC, APX	GCC, APX	GCC, APX	GCC, SPG, APX	GCC, EGAT, APX	GCC, APX
REC prices*	Market-based					
	IDR 35 000 (USD 2.29) (only from PLN platform)	MYR 37 (USD 8.3) (bundled- only for mGATs platform)	NA	SGD 15 - 25 (USD 11.3 -18.8)	THB 50 (USD 1.47)	USD 0.25 - 2.04

*Sources:

www.pln.co.id

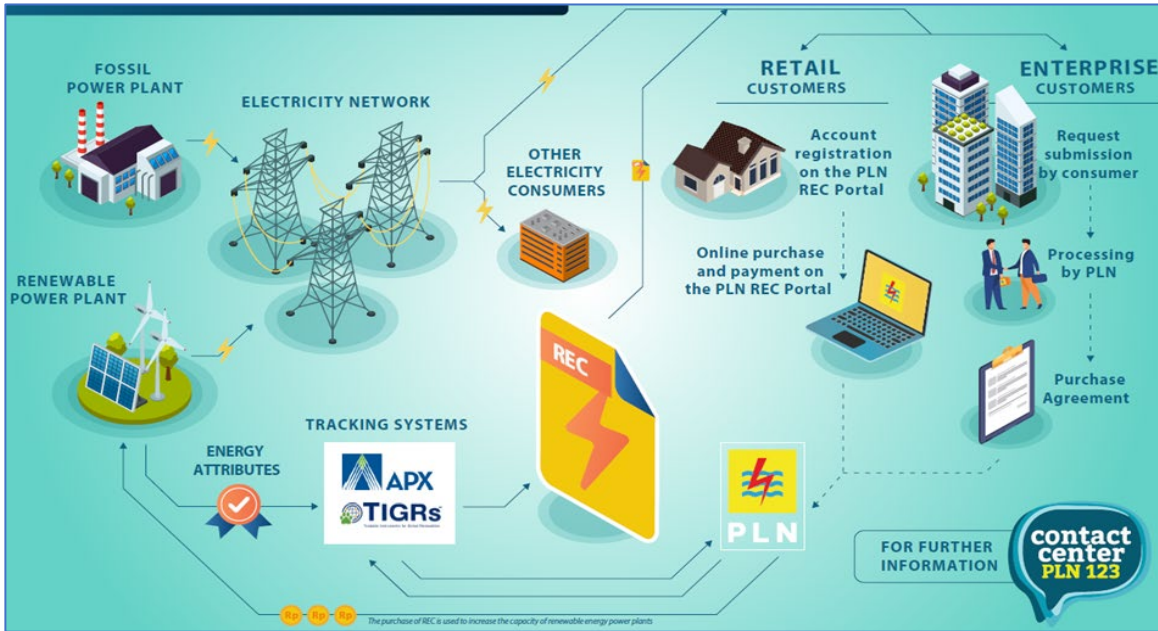
<https://getsolar.ai/blog/rec-singapore-how-to-sell/>

<https://www.bangkokpost.com/business/1999115/toyota-buys-egats-first-rec-for-fuel>

USAID Report: USAID VIETNAM Low Emission Energy Program

RECs in Indonesia

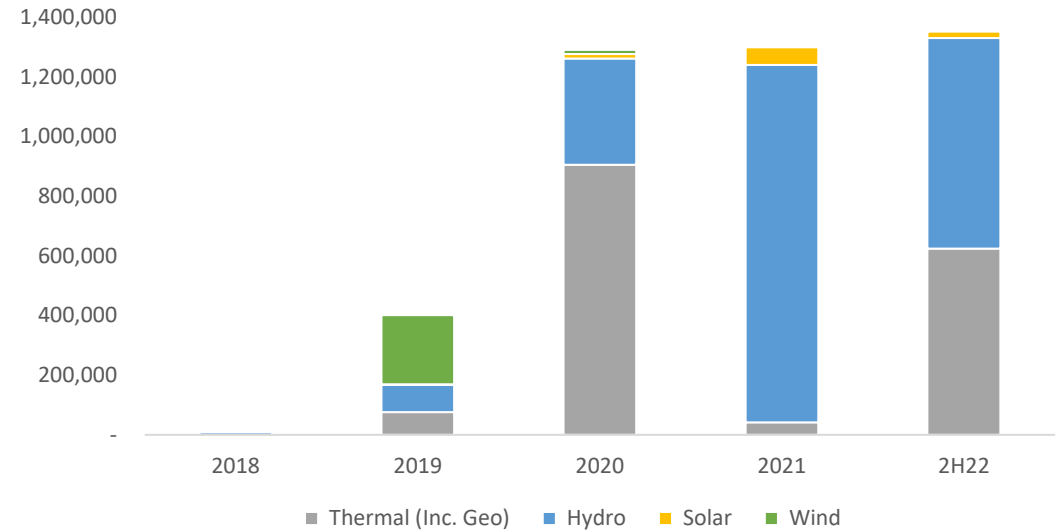
Utility's (PLN) Unbundled REC via TIGRs



Sources: PLN.

- A voluntary REC market started in 2018 via I-REC. In 2020, Utility started selling unbundled REC via TIGRs exclusively to its customer (35 000 IDR/MWh: 2.29 USD/MWh).
- Currently, there is no legal framework governing the RECs.
- RECs issued were dominated coming from hydro and geothermal generations.
- **Challenges Ex.:** dispute on REC ownership for generator under PPA; some REC coming from RE power plants which have been in operation for some time; the market has not been clearly regulated.

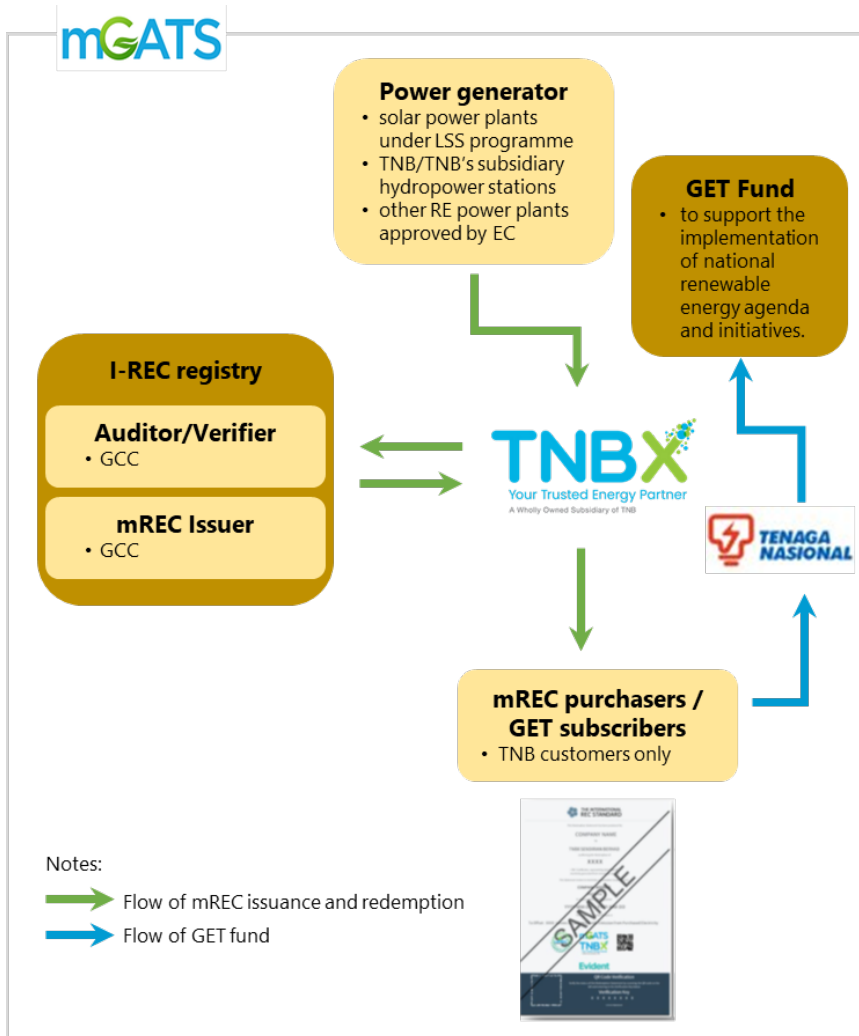
Total RECs Issued in Indonesia, 2018 – 2H2022 (MWh)



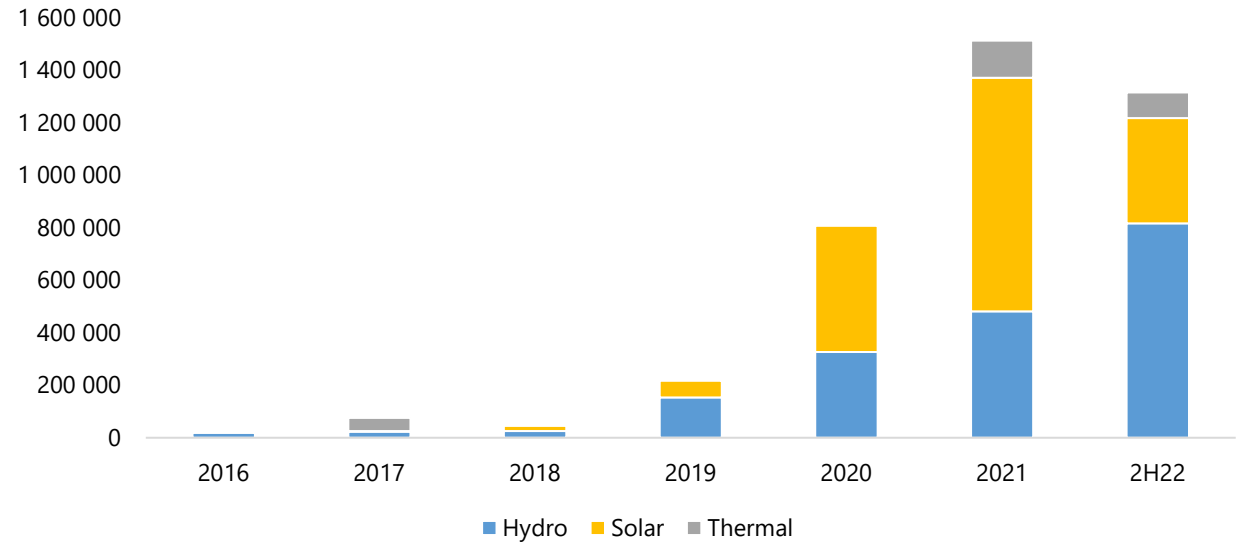
Sources: I-REC and TIGR registries
Notes: Thermal: mostly geothermal

RECs in Malaysia

The mREC mechanism under mGATS platform



Total RECs Issued in Malaysia, 2016- 2H2022(MWh)



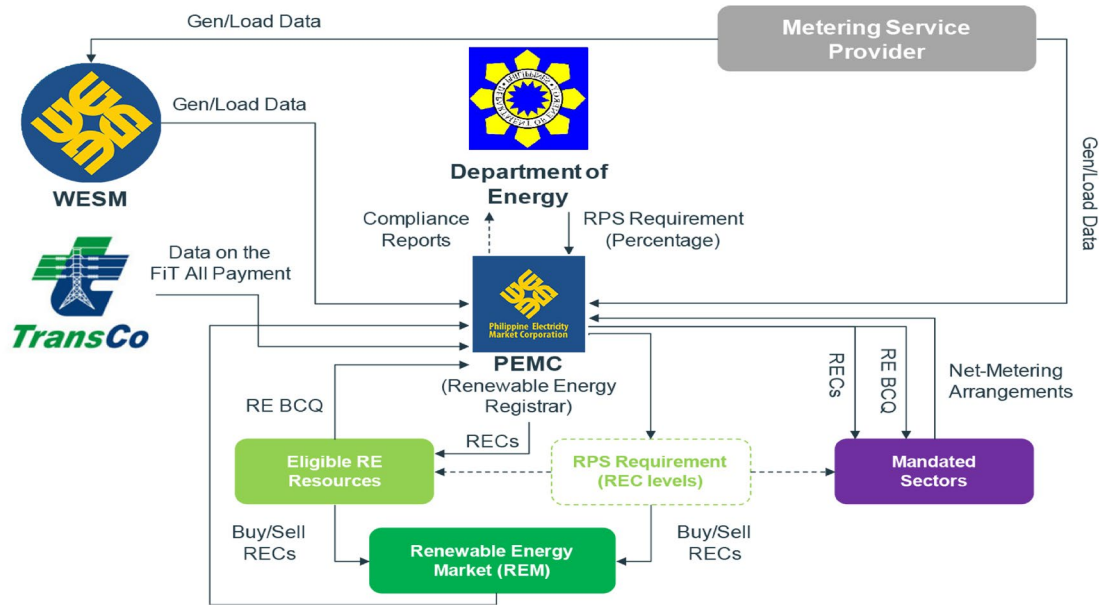
Sources: I-REC and TIGR registries

Notes: Thermal: biomass

- A voluntary REC market started in 2016 (I-REC & TIGRs).
- MyGreen+ (local registry) started in 2017 and was replaced with Green Electricity Tariff – GET (I-REC registry) in 2021.
- GET via the mGATS platform offers bundled RECs (mREC) for TNB's (utility) customers (37 MYR/MWh: 8.3 USD/MWh).
- **Challenges Ex.** : more than one platform for REC procurement; mREC available only for TNB customers; some REC coming from RE power plants which have been in operation for some time.

RECs in the Philippines

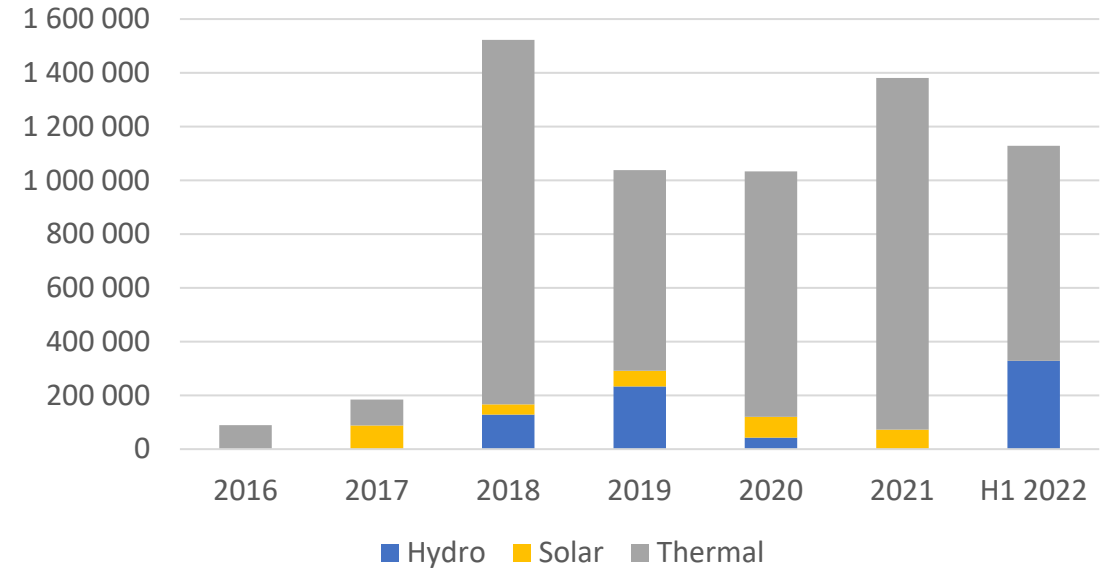
The Philippines Renewable Energy Market (REM) structure



Sources: DOE Philippines.

- A voluntary REC market started in 2016 via I-REC and TIGRs. Geothermal generations dominated RECs issued, in which one of the geothermal plants has already been operating since 1983.
- The economy has established the REM to regulate the RECs and to designate PEMC (the Philippines Electricity Market Corporation) to operate REM and manage the domestic REC registry.
- **Challenges Ex.:** some REC coming from RE power plants which have been in operation for some time, currently more than one platform for REC procurement, domestic REC trading has not yet commenced due to the pending introduction of the domestic REC price cap.

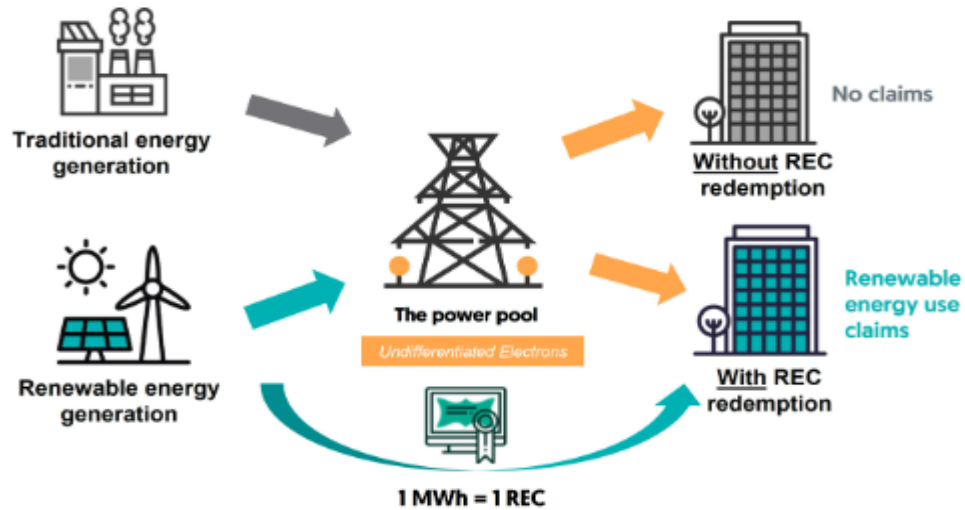
Total RECs Issued in the Philippines, 2016 – 2H2022 (MWh)



Sources: I-REC and TIGR registries Notes: Thermal: geothermal

RECs in Singapore

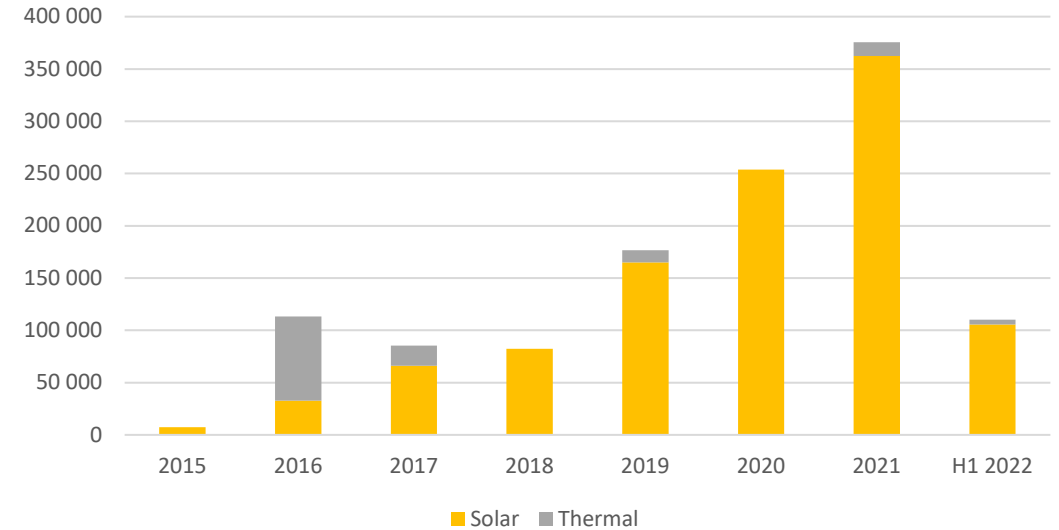
REC mechanism under I-REC Registry – SPGroup



Sources: SPGroup

- A voluntary REC market started in 2015 using I-REC and TIGRs registries, with Singapore Power Group (SPG) playing a role as a local REC Issuer under the I-REC.
- RECs issued were dominated coming from solar generations.
- The economy has issued voluntary standards on the Code of Practice for Renewable Energy Certificates (SS 673), providing a clear framework for governing RECs.
- **Challenges Ex. :** the RECs issued are limited by land area as most of the RECs come from Solar PV, RECs redeemed (based on I-REC registries) in the economy came from unbundled RECs issued outside Singapore.

Total RECs Issued in Singapore, 2015 – 2H22 (MWh)



Sources: I-REC and TIGR registries Notes: Thermal: biomass

RECs in Thailand

REC mechanism under I-REC Registry



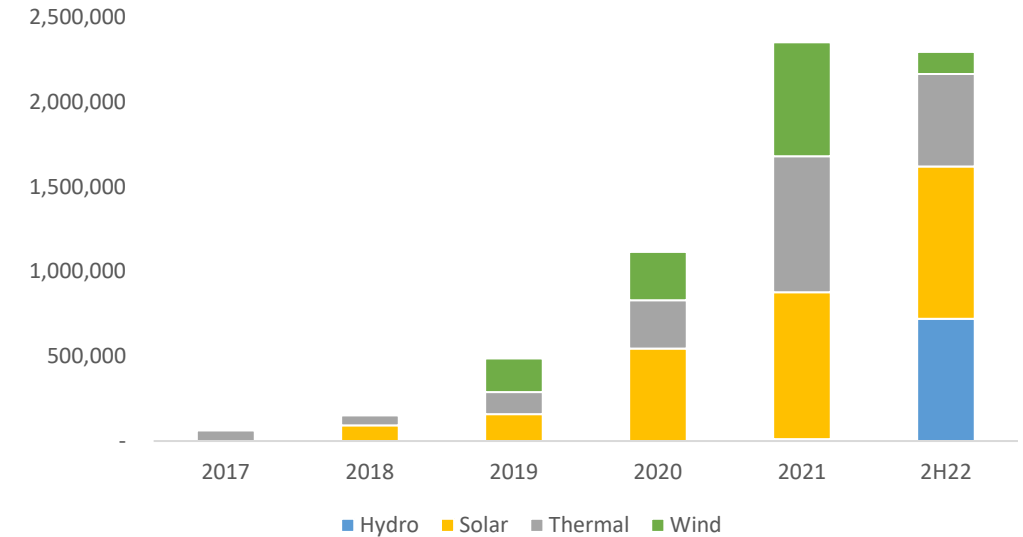
Process :

1. Buyer REC (Participant) notifies REC purchase request to REC seller (Registrant).
2. REC sellers receive REC audit and certification from EGAT (Issuer).
3. EGAT delivers certified RECs to REC buyers through the I-REC registry system.
4. The REC buyer pays the REC fee to the REC seller.

Sources: EGAT

- A voluntary REC market started in 2017 using I-REC and TIGRs registries (mostly I-REC), with EGAT (utility) playing a role as a local REC Issuer under the I-REC.
- Currently, no legislation specifically supervises and regulates the RECs market.
- RECs issued dominated coming from solar hydro and biomass generations.
- **Challenges Ex.** : more than one platform for REC procurement, intention to limit REC trading to be within the economy to serve increasing local needs as currently the REC can be purchased and redeemed outside the economy.

Total RECs Issued in Thailand, 2017 – 2H22 (MWh)

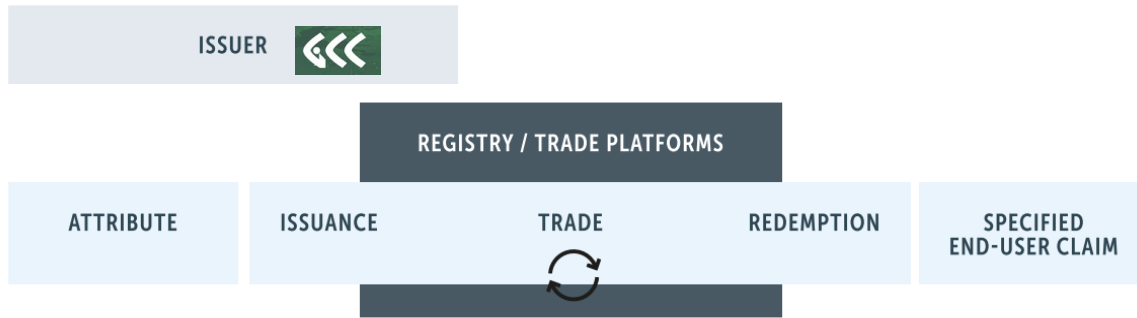


Sources: I-REC and TIGR registries

Notes: Thermal: biomass

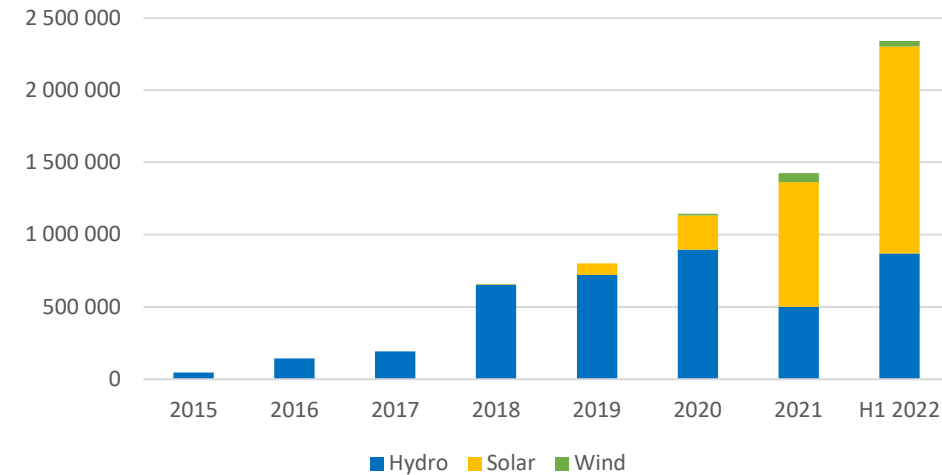
RECs in Viet Nam

REC mechanism under I-REC Registry



Sources: Adopted from I-REC.

Total RECs Issued in Viet Nam, 2017 – 2H22 (MWh)



Sources: I-REC and TIGR registries

- A voluntary REC market started in 2015 using I-REC and TIGRs registries, with RECs issued dominated coming from solar and hydro generations.
- There is no legal framework governing the RECs, and currently, no designated domestic organization plays a role as a domestic RECs issuer in Viet Nam.
- **Challenges Ex.** : minimize the double accounting issues between RECs and other instruments (Ex. Carbon Credit), some RECs issued come from projects under the FIT program.

Summary of REC in APEC SEA Economies

- ❑ The REC markets in APEC SEA economies are relatively new and are growing rapidly. The markets were initially developed to respond to the demand for RECs from corporate consumers.
- ❑ The REC markets currently conform with I-REC Standard and TIGRs registry, which are accepted internationally. Nevertheless, several economies try to develop their own registries to facilitate and regulate the REC markets to meet their specific goals.
- ❑ Most APEC SEA economies have not yet established a clear legal framework or guidance governing the REC market.
- ❑ In several economies, some RECs came from renewable power plants which have been in operation for more than ten years or enrolled in the Feed-in Tariff program, raising the issue of additionality – are RECs encouraging incremental renewable energy capacity?
- ❑ There is evidence of REC ownership disputes between IPPs and utilities for renewable power generation under a PPA that need to be addressed.
- ❑ There is some intention to limit REC transactions within the economy to serve increasingly local needs. Currently, unbundled RECs in APEC SEA economies are traded across economy borders.

Key Findings

- ❑ If designed properly, coexistent compliance and voluntary REC markets could accelerate RE investments.
- ❑ A legal framework, legislation, and a dedicated governance body for REC are crucial and should be a priority for establishing an effective REC market.
- ❑ Domestic REC trading platforms and harmonised standards are essential tools to facilitate REC transactions, ensure the integrity and prevent double-counting.
- ❑ The REC market should encourage additional investment in renewable energy generation capacity.
- ❑ Clear ownership of REC for existing independent RE generators should be incorporated into the existing electricity generation legislation or new REC legislation.
- ❑ The interaction of REC transactions across six APEC South economies should be studied and evaluated.

Thank you.

<https://aperc.or.jp>

