Asia-Pacific Economic Cooperation

APERC Asia Pacific Energy Research Centre

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

Joint Meeting EGNRET 58 and EGEDA 34
Hawaii, 5 April 2023

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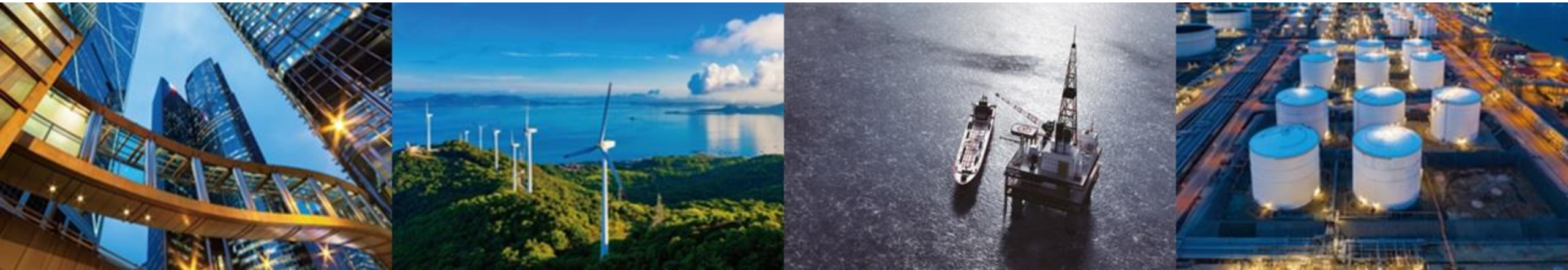
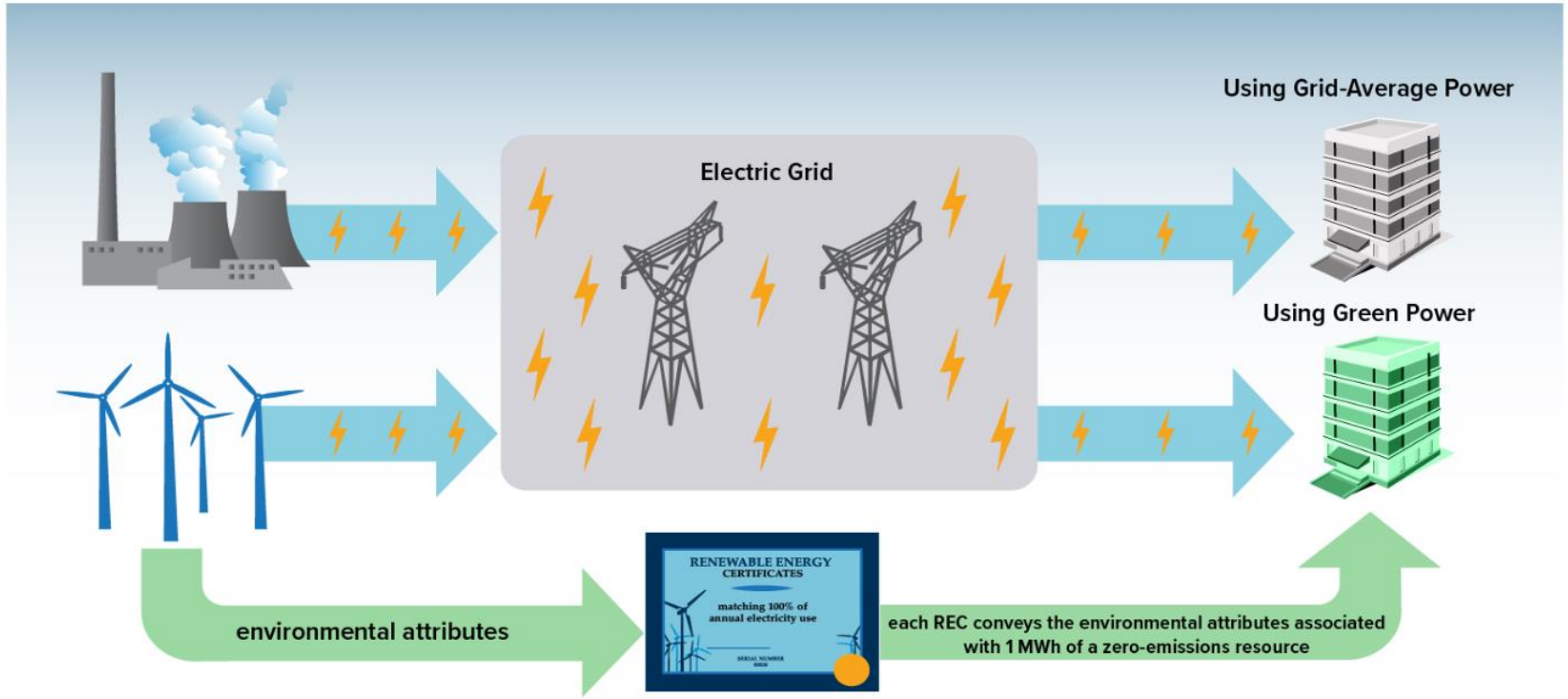


What is REC ?



- It represents environmental attributes associated with 1 MWh of renewable electricity.
- REC serves to address the scope – 2 emission reduction.
- A tradable commodity: bundled and unbundled with electricity.

Sources: USEPA

REC demand driver

- *Several corporate sourcing of RE electricity :*
  - *Self-generation*
  - *Power Purchase Agreement (PPA)*
  - *Utility green procurement*
  - *EAC (ex. RECs)*

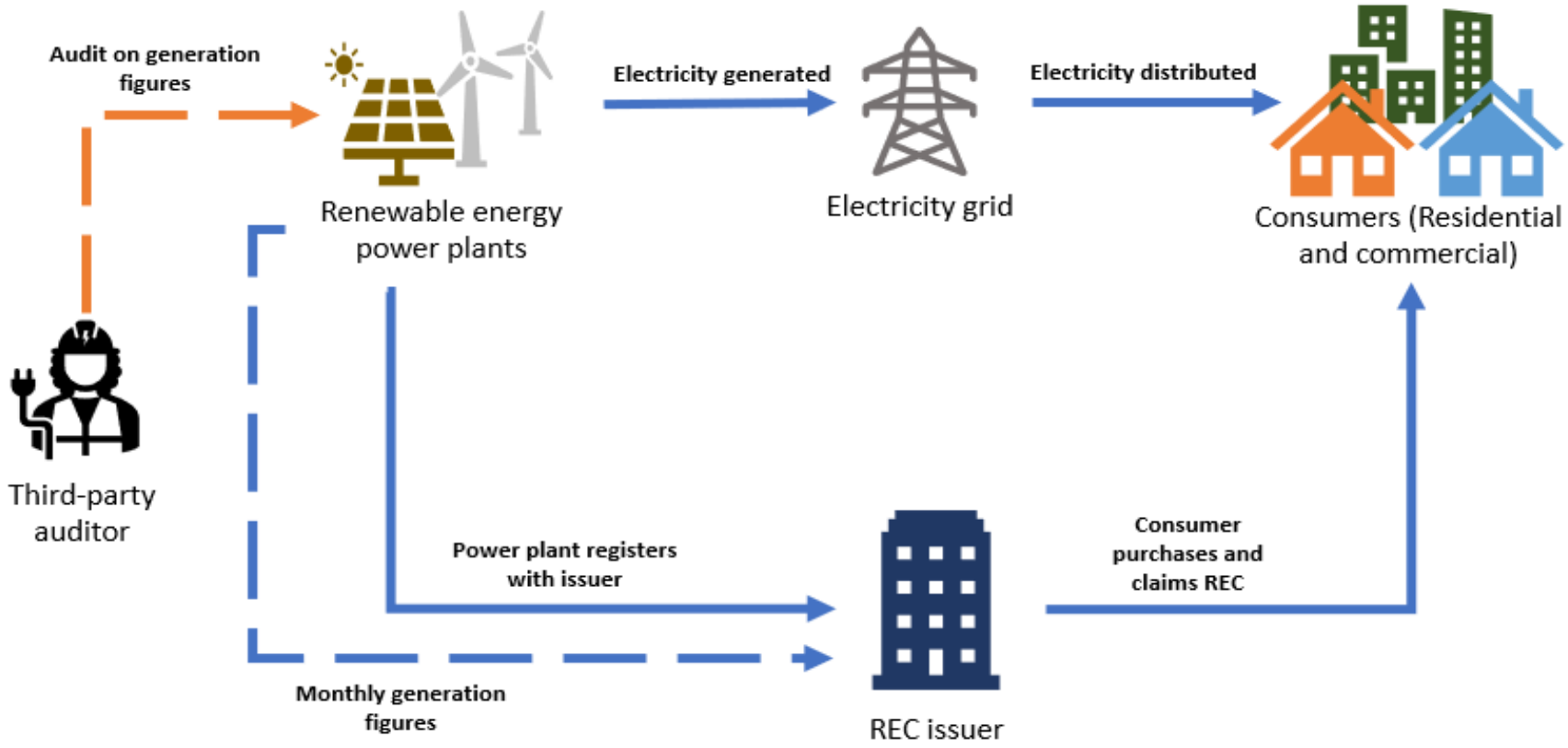
- *Importance of RECs in APEC Southeast Asia economies*
  - Demand : corporates wish to meet RE-100 targets
  - Supply : renewable power plants seek additional sources of revenue streams
  - Regulator : hope to use RECs as policy lever to boost renewable investment.

https://www.there100.org/

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

Source: Global Renewable Report of REN21, RE100

Typical REC Mechanism



- The REC starts when the RE power plant registers its generation device with the issuing organization.
- Third-party auditor involved to independently 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	• First trading of REC 1998	• GEC launched in 2000	• REC launched in 2000

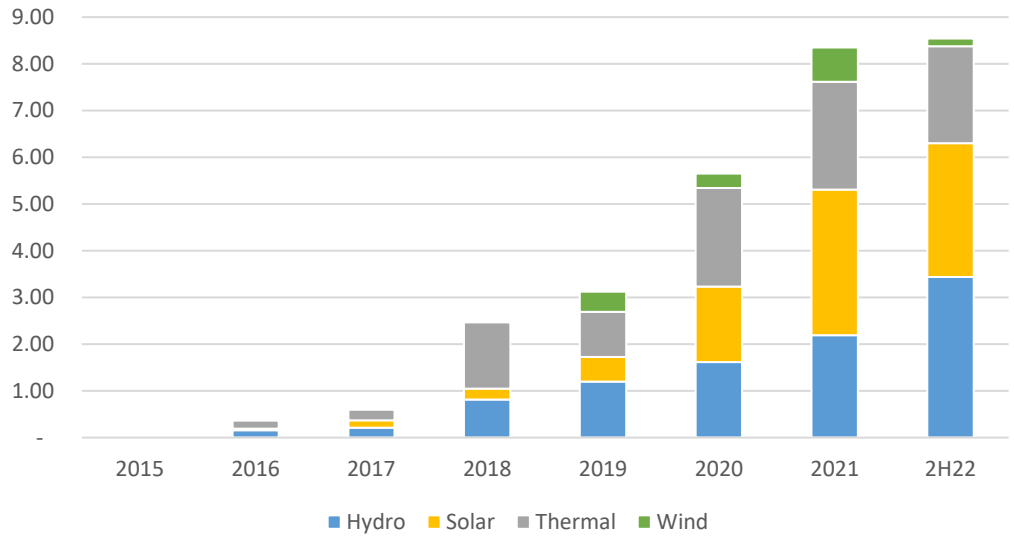
Types of market and certificate system	• Compliance market (RPS : Renewable Portfolio Standard)
	• Voluntary market for electricity retail consumers
		• GEC (Green Electricity Certificate): for self-generation
		• J-Credit: for voluntary electricity customers to promote EE and RE. trading unit in the amount of CO_2
		• NFC (Non-Fossil Certificate): for electricity retailers to meet the 44% non-fossil target by 2030 and prevent exploitation of FiT generations.
			• Compliance market (RET: Renewable Energy Target)
			• REC type :
			  • LGC -Large Scale Generation Certificate, and
			  • STC – Small-Scale Technology

Estimated market size	• Compliance 358 TWh (2020) • Voluntary 192 TWh (2020)	• GEC 585 GWh in 2020 ; J-Credit (renewable energy) 980 GWh in 2020 ; NFC : 189.7 TWh in 2020	• 36 TWh (LGCs) in 2022 • 10 TWh (STCs) in 2022
Trading and tracking system	• Different system in each region (Ex. NAR, ERCOT, etc)	• GEC: tracked by JQA (Japan Quality Assurance Organization) • J-Credit by J-Credit auction (online) • NFC by JEPX (Japan Energy Power Exchange)	• National system (REC Registry) managed by the CER: Clean Energy Regulator.
Lesson (key points)	• Introduction of RPS and REC resulted in large market size and participants • Voluntary market gained popularity, enabling different market offerings	• Each certificate serves different purposes. • Nuclear is included in NFC	• Single authority/single system to promote and regulate REC • 2 type of certificates (LGC & STC) to serve different needs

Source : USEPA, NREL, CER, RE100, Renewable Energy Institute

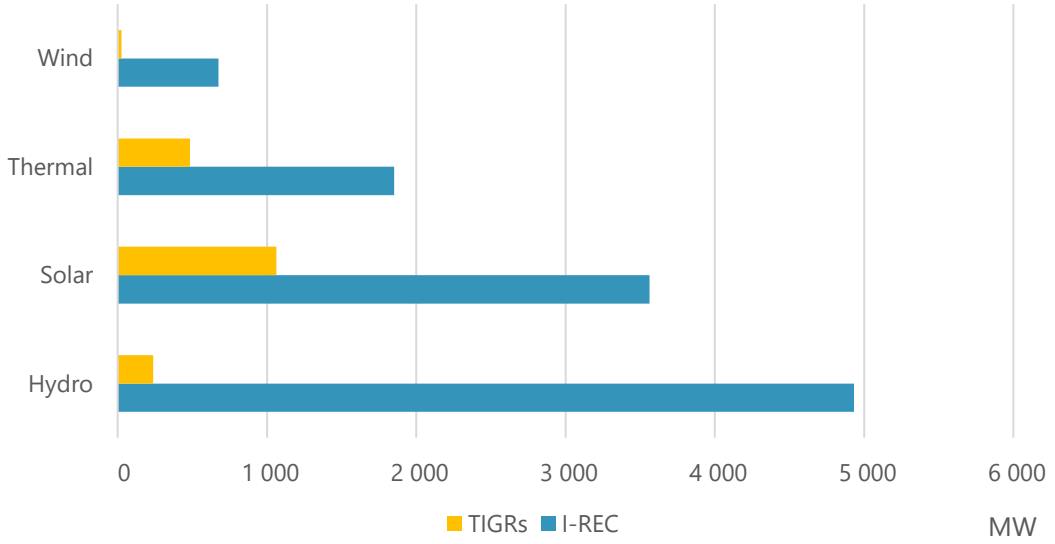
Overview of RECs in six APEC economies in Southeast Asia

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



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 the demand from corporate electricity consumers who have obligations to meet RE targets increased.
- 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.

Notes:
Thermal: Biomass and geothermal combined

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	Voluntary market with REC	Voluntary market with REC	Voluntary market with REC	Voluntary market with REC	Voluntary market with REC
Cumulative registered RE capacity (2H22)	1.5 GW	2.3 GW	1.4 MW	0.8 GW	3.9 GW	2.9 GW
Cumulative RECs issued (2015-2H22)	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, SPX, APX	GCC, EGAT, APX	GCC, APX
REC prices*	Market-based					
	IDR 35 000 (2.29 USD) (only from PLN platform)	37 MYR (8.3 USD) (bundled- only for mGATs platform)	NA	SGD 15 to 25 (11.3 -18.8 USD)	50 THB (1.47 USD)	0.25 - 2.04 USD

*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

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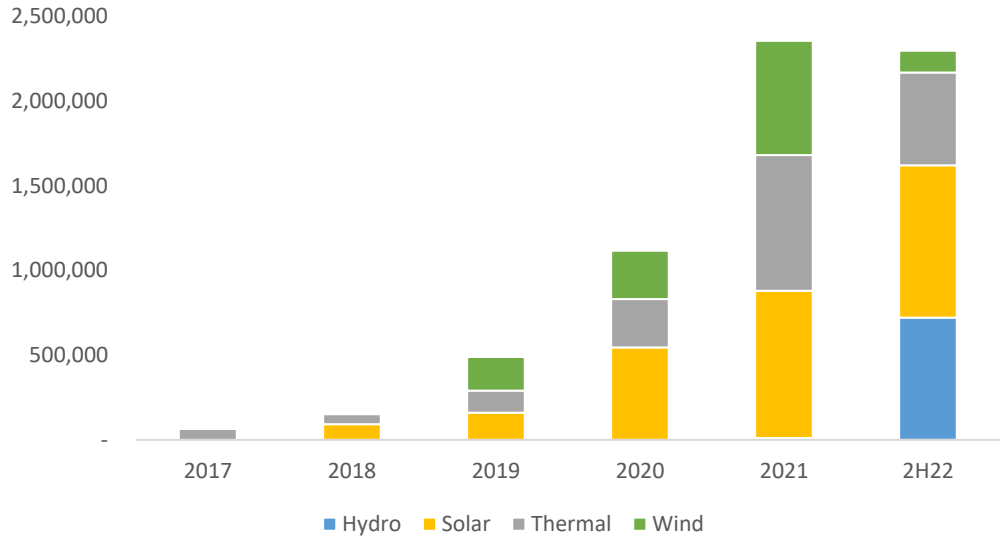
Overview : RECs in Thailand

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

Thailand Number of Issued RECs, 2017 – 2H22 (MWh)

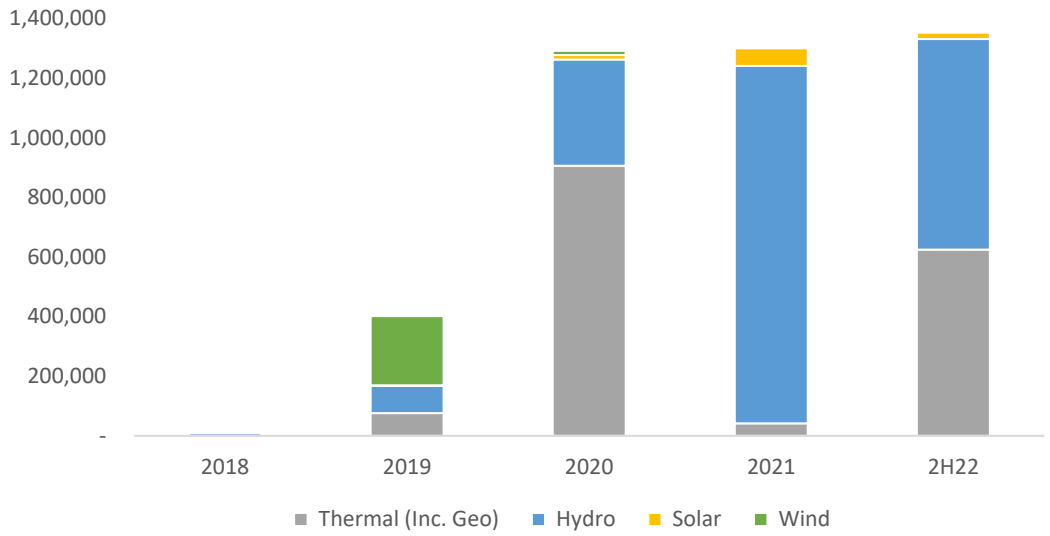


Sources: I-REC and TIGR registries

- A voluntary REC market started around 2017 using I-REC and TIGRs registries (mostly I-REC).
- EGAT (utility) plays a role as a local REC Issuer under the I–REC.
- Registered RE generation capacity of 3,9 GW with total accumulated REC issued 6,5 TWh (2H22)
- Challenges: more than one platform for REC procurement, no boundary for REC trade : the REC can be purchased and redeemed outside the country.

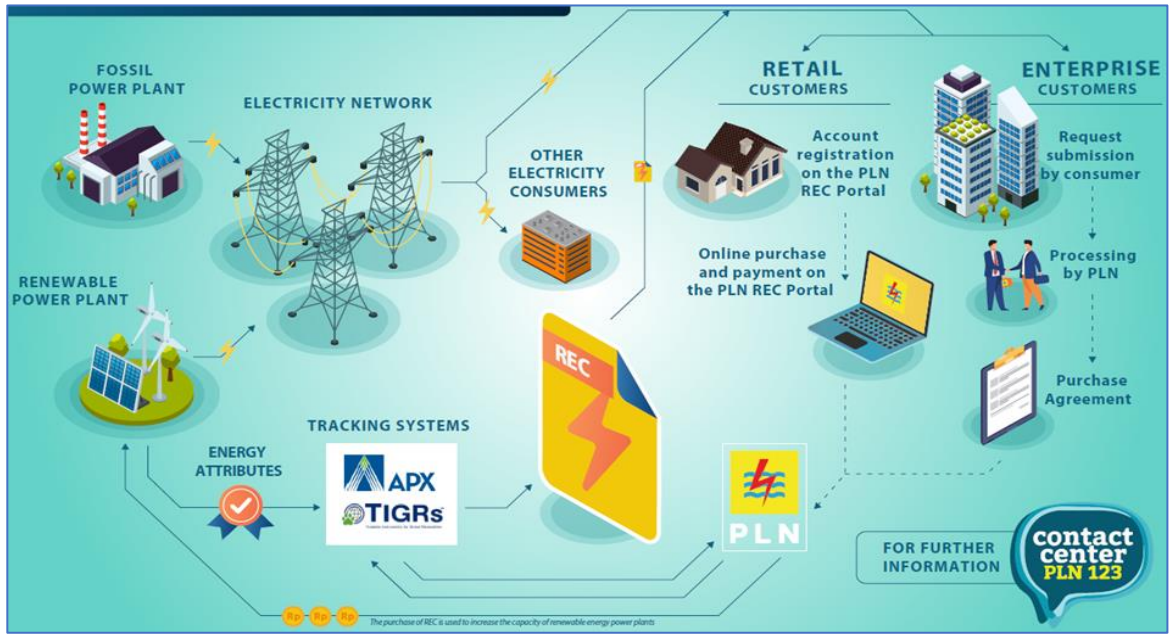
Overview : RECs in Indonesia

Total RECs Issued in Indonesia, 2018 – 2H22 (MWh)



Sources: I-REC and TIGR registries

Utility's (PLN) Unbundled REC via TIGRs

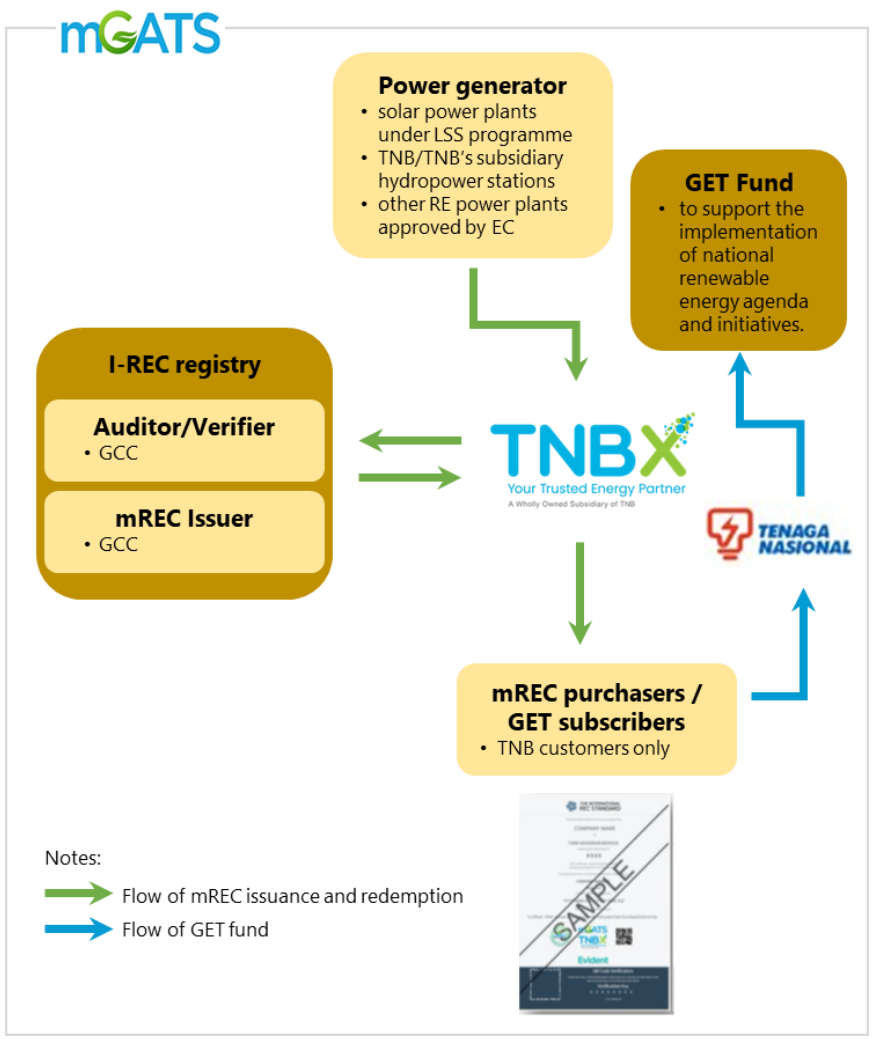


Sources: PLN.

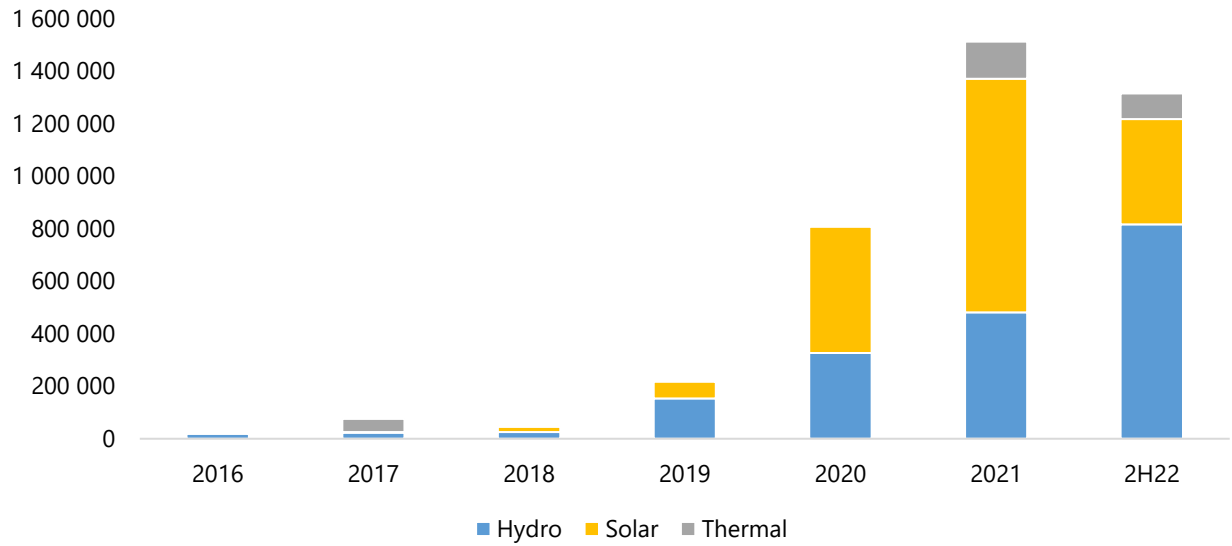
- Voluntary REC market started around 2018
- In 2020, Utility started selling unbundle REC via TIGRS exclusively to its customer (IDR 35 000/MWh: 2.29 USD/MWh). REC is retired immediately.
- Challenges: dispute on REC ownership for generator under PPA, some REC coming from RE power plant which have been in operation for some time, the market has not been clearly regulated.

Overview : RECs in Malaysia

The mREC mechanism under mGATS platform



Total RECs Issued in Malaysia, 2016- 2H22(MWh)



Sources: I-REC and TIGR registries

- Voluntary REC market started around 2016 (I-REC & TIGRs)
- MyGreen+ (local registry) started in 2017 and has been replaced with Green Electricity Tariff (GET) program since 2021.
- GET via the mGATS platform (I-REC registry) offers bundled RECs (mREC) for TNB's customers (37 MYR/MWh: 8.3 USD/MWh).
- Challenges : more than one platform for REC procurement, mREC available only for TNB customers, and some REC comes from RE power plants that have been in operation for some time.

Key Summary of REC in APEC SEA Economies

- REC markets in APEC SEA economies are relatively new and are growing rapidly. The markets in APEC SEA were initially developed to respond to the demand for RECs from renewable energy consumers in voluntary markets.
- The REC markets currently conform with I-REC Standard and TIGRs registry, which are accepted internationally. Nevertheless, several economies plan to develop their own registry to further facilitate and regulate the REC markets to meet their specific goals and targets.
- Most APEC SEA economies have not yet established a clear legal framework or guidance governing the REC market.
- In several economies, the RECs came from renewable generations which have already been in operation for more than ten years or already been enrolled in the Feed-in Tariff program, raising the issues of additionality – are RECs encourage incremental renewable energy capacity.
- There is evidence of REC ownership disputes between IPP and utility for renewable power generation under PPA that need to be addressed.
- Several economies are working to limit REC transaction within the country to serve increasing local needs. Currently the unbundled RECs in APEC SEA economies are traded across the economy's borders.

Findings

- If designed properly coexistent compliance and voluntary REC markets can accelerate RE investments.
- A legal framework, legislation, and a dedicated governance body for REC are crucial and should be a priority in establishing an effective REC market.
- Domestic REC trading platform and harmonised standards are essential tools to facilitate REC transactions, ensure integrity and prevent double-counting.
- 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 SEA economies should be studied and evaluated.

Thank You for Your Attention

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