

# Taiwan Renewable Energy Certification (T-REC) Mechanism (2018)

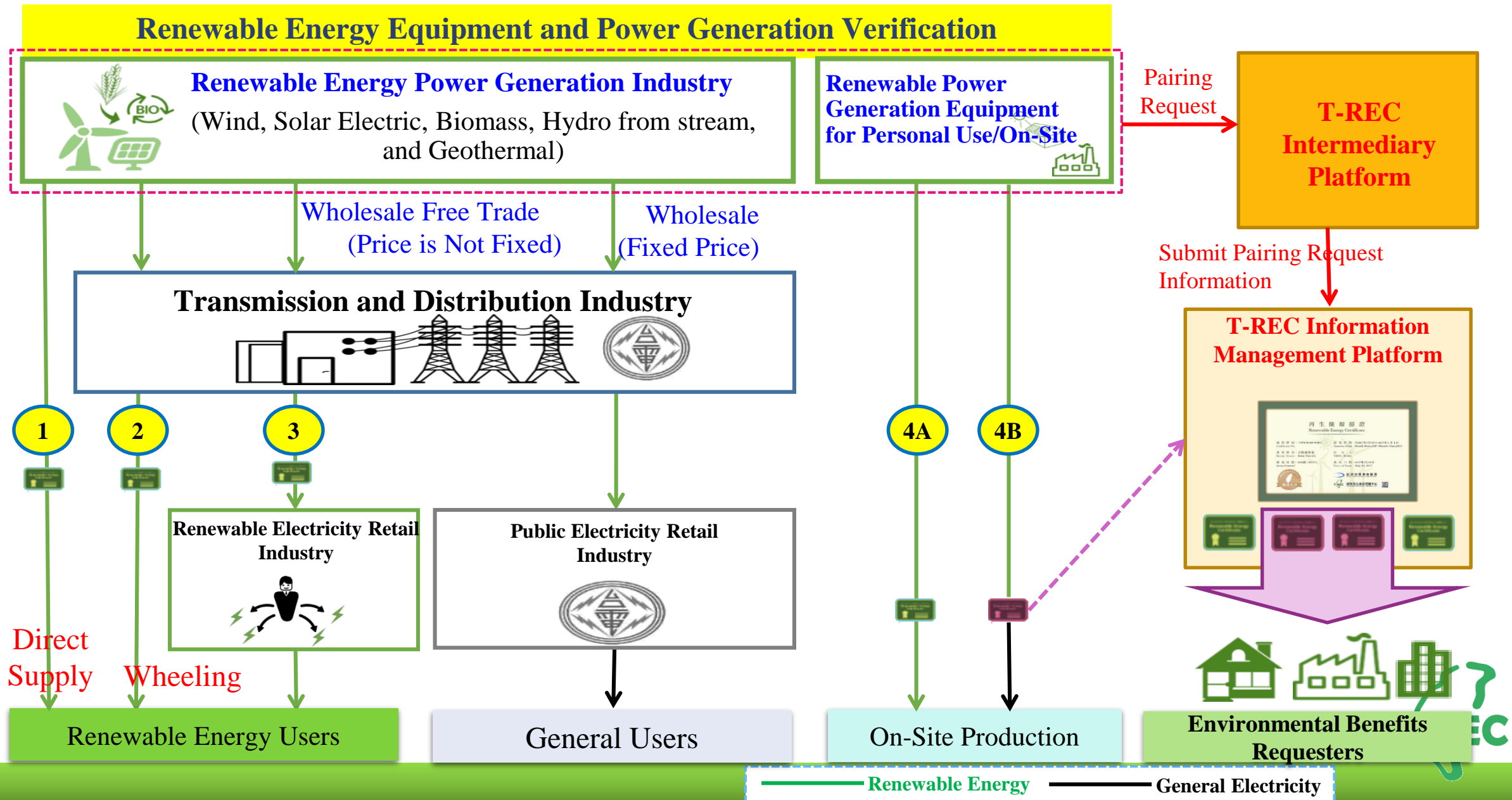


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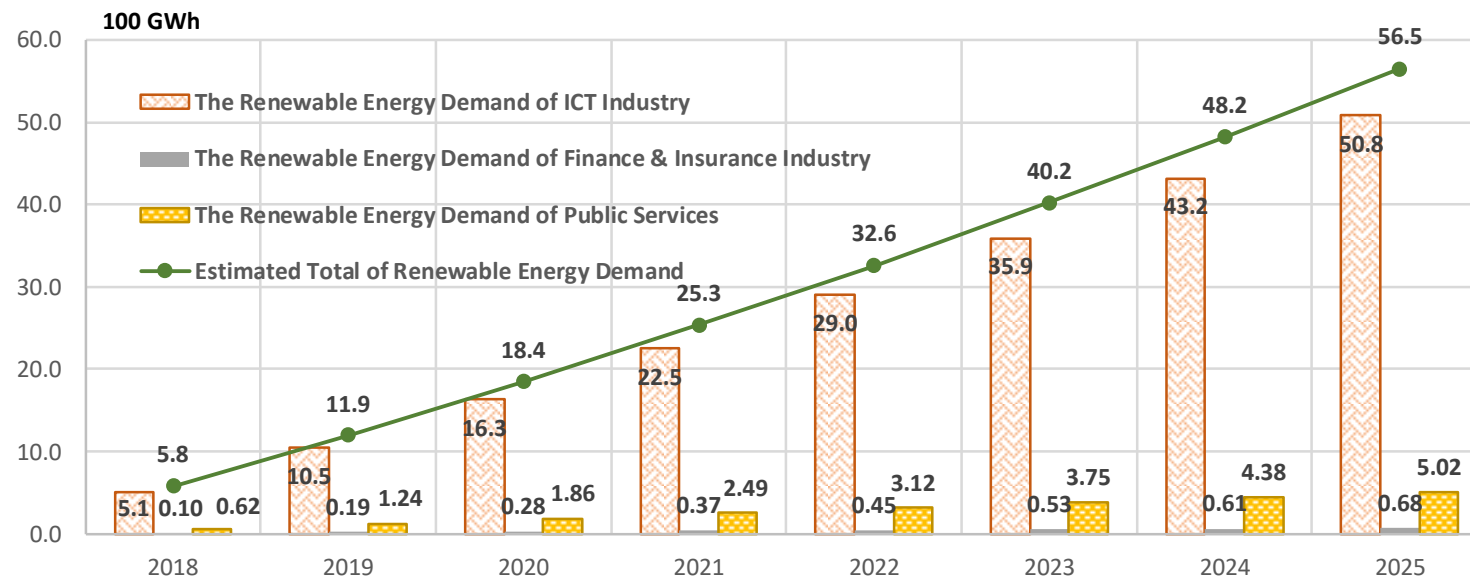


# T-REC Market Structure After the Electricity Act Opens up Renewable Energy Market



# The Demand Scenario of Voluntary Renewable Energy Market in Taiwan

- According to the current T-REC applicants, the demand is coming from **ICT industry and finance & insurance sectors**.
- If **the public services, ICT industry, and finance & insurance sectors increase 1% renewable energy usage each year**, by 2027, there would be more than 10% renewable energy usage. Through the trend, we can estimate that **Taiwan enterprises will increase 0.5 billion kWh renewable energy demand each year**, which means that T-REC issuance could be increased by **500,000 each year**.



# 51 Renewable Energy Projects



Installed  
**29 Projects**



Uninstalled  
**7 Projects**



Disagree to install  
meters.  
**15 Projects**



Accomplish data comparison  
**28 Projects**



Electricity meter data is not  
transmittable  
**1 Project**



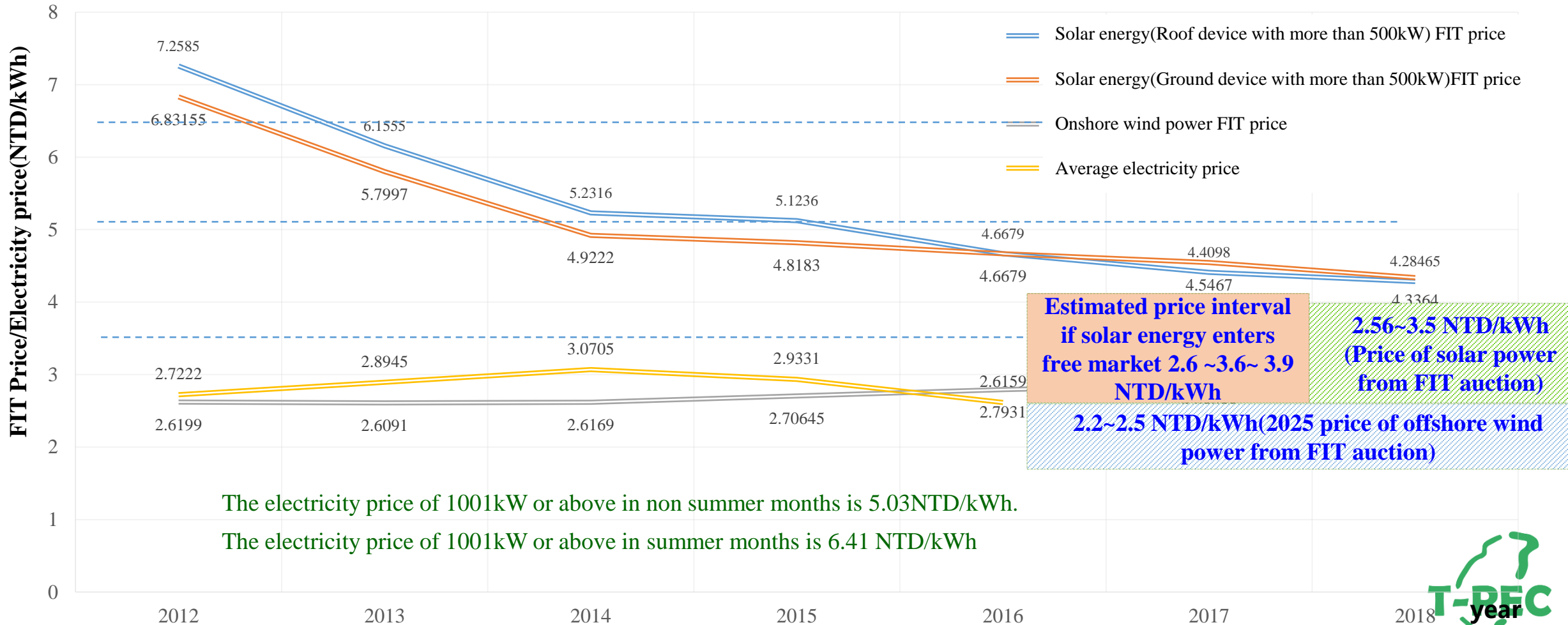
Wind power projects: 3 (5.9%)



Solar power projects: 48(94.1%)

# Analysis of Taiwan Renewable Energy Price Competitiveness

- Onshore wind power has reach the normal electricity price.
- Some corporations have the competitiveness of choosing solar energy.
- FIT prices of onshore wind power and solar power have faced downward pressures.



# The Current T-REC Market Transaction (till September 28)

## ■ Quantity

- In 2017, T-REC market had **5** transactions with **83** T-RECs.
- In 2018 (till now), T-REC market has **53** transactions with **1054** T-RECs.
- **Total transactions: 58    Total T-REC transacted:1137**

## ■ Price

- T-REC price(unbundle) range is from **\$ 34USD(1060NTD)** to **\$ 74USD(2300 NTD) per REC.**

Note: The exchange rate is 1 USD to 31 NTD.



# The Responsibility for Large Electricity Consumers to Use Green Power and Purchase REC

- The draft amendment of Article 12 “Renewable Energy Development Act”: If the contract capacity is above a certain amount(800kW), electricity consumer shall
  1. set up renewable energy power generation equipment and energy storage above a certain capacity of the equipment in a suitable place, or
  2. purchase a certain amount of renewable energy certificate.
- If large electricity consumers violate the previous regulations, it shall pay the deposit to the competent authority for the purpose of renewable energy development.
- The amended Article 12 will be approved in November.

# The Estimation of Renewable Energy or REC Demand

- According to the data provided by Bureau of Energy, Ministry of Economic Affairs regarding **large electricity consumer (greater than 800 kW)** the total contract capacity is **23,402 MW** (with the total of **4,800 households**)
- From 2016 data, total power system peak capacity is 37,422 MW and the total power consumption is 255,381 GWh, we can estimate the **total electricity consumption from the large electricity consumers** is about **159,703 GWh**.
- If large electricity consumers are requested to buy **1% extra green energy**, the **renewable energy demand will be approximately 1.6 billion kWh** which is **equivalent to 1.6 million T-RECs**. (approximately 146 MW of solar power generation capacity). If large electricity consumers are requested to buy **5% extra green energy**, the renewable energy demand will be about **8 billion kWh** which is **equivalent to 7.5 million T-RECs**. (about 730MW solar power generation capacity)





Thank you !



# REC Applied to GHG Management Value Calculation

Cost of decreasing carbon	EU	Taiwan
Carbon trade market, carbon right price every ton <sup>Note1</sup>	€20(In 2019, the price might rise to €35)	There's no carbon trade market in Taiwan, so there's no price data.
Excessive emission penalty(USD/tCO <sub>2</sub> e)	120.67USD (3620 NTD)	50USD(1500NTD)
Electricity carbon emission factor(tCO <sub>2</sub> e/MWh) <sup>Note2</sup>	0.275	0.554
Added-value of greenhouse gas benefit on each REC (tCO <sub>2</sub> e)	0.275	0.554
Every REC value relative to excessive greenhouse gas emissions penalty	32.67 USD (980 NTD)	27.7 USD (831NTD)
Every REC value relative to carbon right value buying from reducing the carbon trading	6.5 USD (195NTD)	non
Every REC's value to apply to GHG management	6.5 to 32.67 USD (195 to 980 NTD)	27.7 USD (831 NTD)
Relative to paying extra fees to buy 1 kWh green energy	0.0065 to 0.0327 USD (0.195 to 0.98 NTD)	0.0308 USD (0.831 NTD)

**Note1:** Resources of EU's carbon right price-<https://technews.tw/2018/09/03/new-wind-and-solar-now-competes-with-existing-coal-and-gas/>

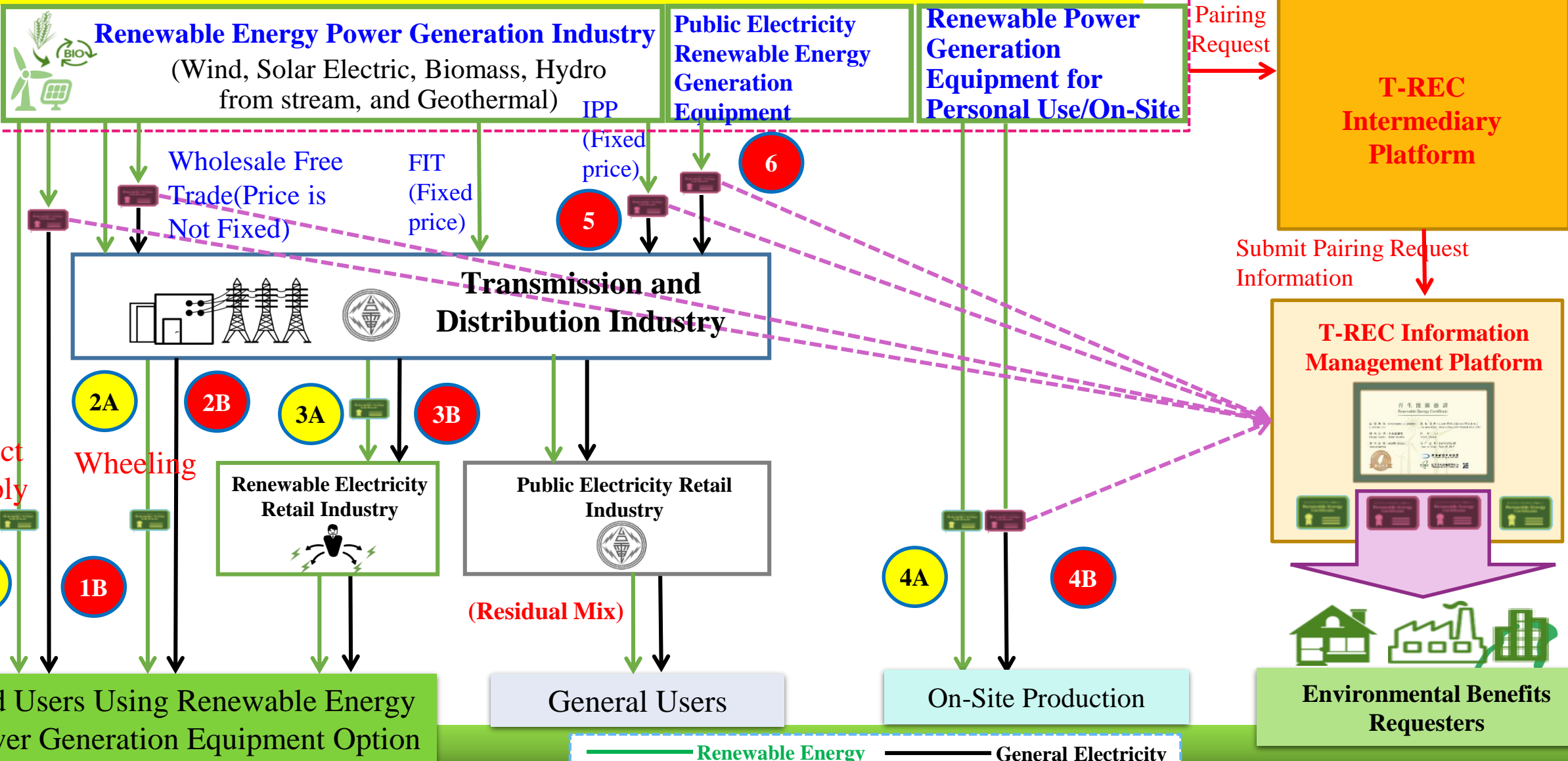
**Note2:** EU's Emission Factor data is from Covenant of Mayors, 2010, In 2017, Taiwan EPA announced Taiwan's emission factor data

The exchange rate is 1 USD to 30NTD.



# Possible Solution for Unbundle RECs to Enlarge T-REC Market

## Renewable Energy Equipment and Power Generation Verification



# Current T-REC Issuance

1. Until end of August 21, 2018, **32,674** T-REC have been issued.
2. Accumulative generation amount is 32,674,000 kWh of green electricity.



**Wind T-REC**  
**28,021**



**Solar T-REC**  
**4,653**

