

# Taiwan Renewable Energy Certification (T-REC) Mechanism & Trading Guidance Pilot Program



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# Summary

- The Policy & Development of Taiwan Renewable Energy Certification (**T-REC**)
- The Function & Value of **T-REC**
- The **T-REC** Market Trading Guidance Pilot Program
- The **T-REC** Information Platform System (Tracking System)





# The Milestone of Electricity Development in Taiwan

**Deregulated  
Electricity Market**

**1880**

**The first Coal-fired  
Power Plant**



Installed by LIU Mingchuan (first Governor of Taiwan) in **Qing Dynasty**

**1905**

**The first  
Hydropower Plant**



Kwei Shan Power Plant during **Japanese ruled** period

**1991**

**The first  
Wind Farm**



Installed by **Taiwan Power Company** in Cimei Island, Penghu

**2017**

**The first  
Renewable Energy  
Certificate**



Issued by Bureau of Standards, Metrology and Inspection (**BSMI**)

# The Policy & Development of Taiwan Renewable Energy Certification (T-REC)



# Promoting T-REC Policy

## 1. To Expand the Usage of Renewable Energy

- 1) The Goal of 2025 for **Non-Nuclear Homeland: 20%** of the total power generation is from **renewable energy**
- 2) Renewable Energy Certificate could confirm the source and the power quality of green energy.



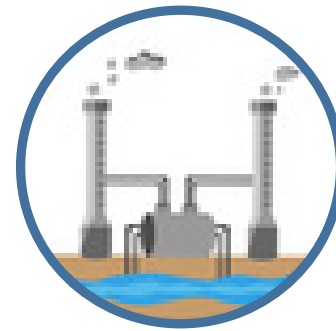
Wind



PV



Biomass



Geothermal



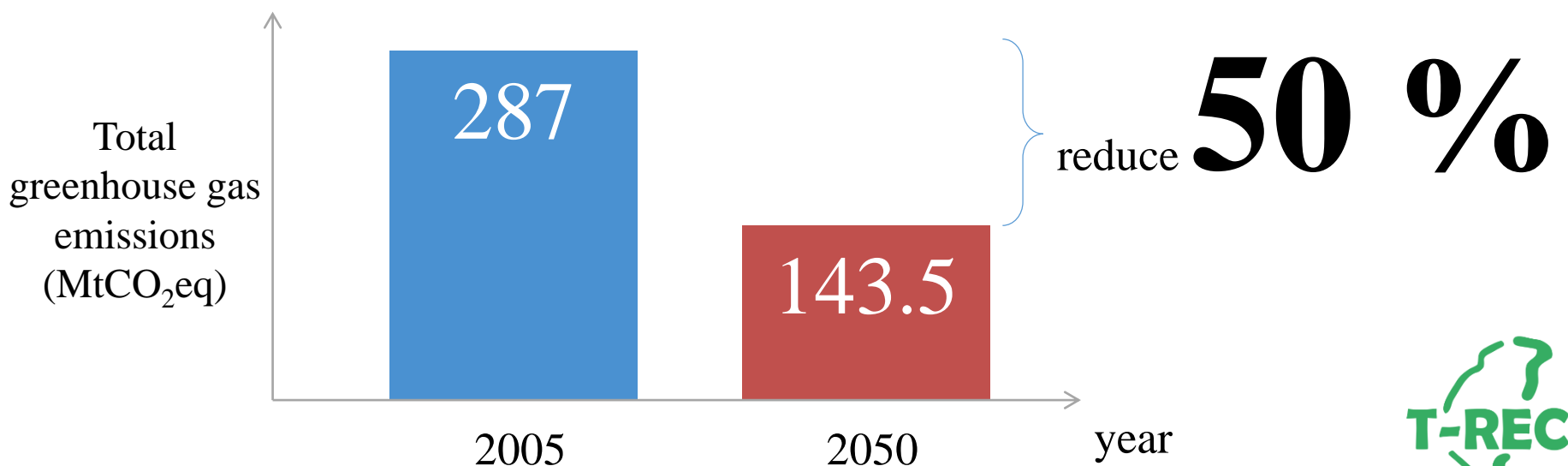
Hydro from  
stream



# Promoting T-REC Policy (Cont.)

## 2. Greenhouse Gas Reduction and Management

- 1) The Republic of China (Taiwan) supports the 21st Conference of the Paris
- 2) Intended Nationally Determined Contribution (INDC): reduce greenhouse gas emissions (214 MtCO<sub>2</sub>eq) by 50% from the business-as-usual level (428 MtCO<sub>2</sub>eq) by 2030
- 3) GHG Reduction and Management Act: **By the year of 2050, green house gas emissions reduced to 50% of 2005**
- 4) Renewable Energy Certificate could be used to calculate the total **greenhouse gas emission calculation**, help to achieve the GHG emission Reduction Target



# T-REC Demand from International Enterprises

- **Google currently has 13 data centers worldwide, the electricity needed is about 5.7TWh (about 5.7 billion kWh),** the annual purchase of renewable energy capacity is 2.6GW. The demand needed in Taiwan is still unable to be determined, Google plans to have long-term contract with 50MW PV Power Plant.
  - **The renewable energy facility must be newly constructed**
  - **Prefer wheeling due to cost effectiveness, and REC must be included**
  - **Long-term contract from single facility with the scale capacity around 50 MW (only selling to Google)**
- Apple's facilities and data centers operated in US have been using 100% renewable energy, and now Apple is encouraging its global supply chain to do so.
  - In 2015, Taiwan has 25 companies working in Apple's production supply chain. The estimated electricity usage from a few major suppliers such as TSMC, Largan Position Co., and Catcher Technology is 1600 GWh.



The BSMI & Google  
Cooperation Meeting



# T-REC Implementing Agencies

1. BSMI was officially designated by the ROC Executive Yuan to be in charge of Taiwan Renewable Energy Certification (T-REC)
2. BSMI is supported by 「**Taiwan Renewable Energy Certification Center Development Project**」 to issue T-REC.
3. The issue categories include **Wind, Solar Electric, Biomass, Hydro from stream, and Geothermal**





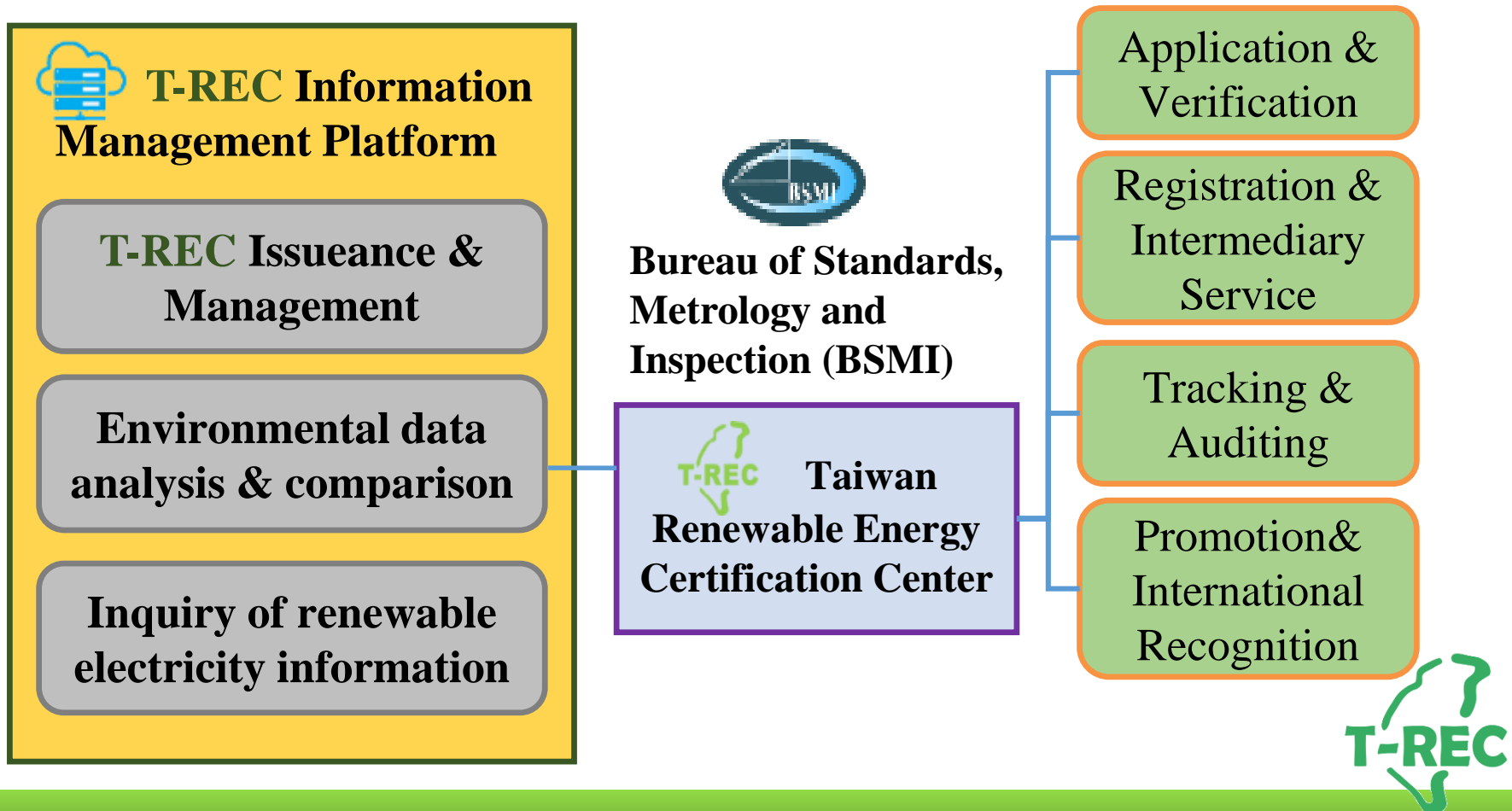
# What is Renewable Energy Certification ?

1. **REC = ID of Green Electricity + additional value**
2. After the facility verification and power generation inspection by certifying authority, the REC will be issued and it could be the CV or ID of green electricity.
3. International companies such as Microsoft, Apple, Google, and Facebook have committed to use 100% renewable energy, **REC could be used to confirm the usage of green electricity.**



# General Affairs of Taiwan Renewable Energy Certification Center

BSMI has established **Taiwan Renewable Energy Certification Center** to coordinate the issuance and management of T-REC.



# Taiwan Renewable Energy Certificate (T-REC) Recent Milestones

Announced :

- ❑ “Voluntary Renewable Energy Certification Pilot Guidance”
- ❑ “Voluntary Renewable Energy Generation Equipment Verification Application “
- ❑ “Voluntary Renewable Energy Power Generation Verification Application”

Announced  
“Voluntary  
Renewable Energy  
Certification  
Implementation Act”.

Implementation of  
T-REC Domestic  
Transaction  
Demonstration  
Project

April 21<sup>st</sup>

May 15<sup>th</sup>

May 19<sup>th</sup>

May 31<sup>st</sup>

June 12<sup>th</sup>

July

2018 Q1



The establishment of  
National Renewable  
Energy Certification  
Center Preparatory Office.

The first issuance of T-  
REC, total of 268 T-  
RECs from 8 generation  
sites.

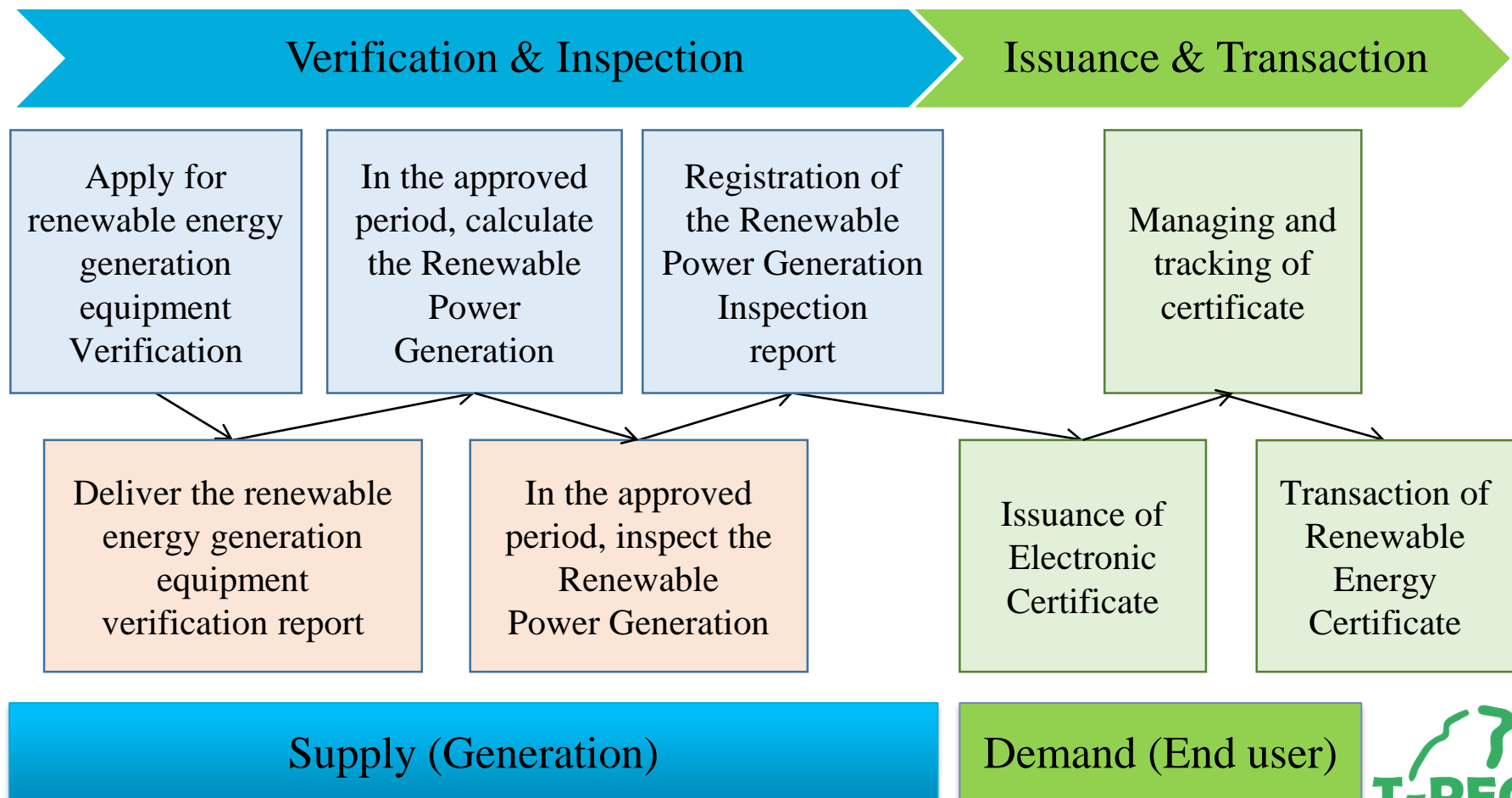
Announced  
“Directions for the  
Establishment of  
National Renewable  
Energy Certification  
Center”.

Issue the first  
batch of T-REC  
for direct supply  
or wheeling  
green electricity



# T-REC Application Process

**The Renewable Energy Power Generation Industry & Personal On-Site User which did not joint FIT or carbon offset program could apply for T-REC.**



# Amendment to Electricity Act

- **Amendments to the Electricity Act** passed their third and final reading in the legislature **on 11<sup>th</sup> Jan 2017**.
- The Electricity Act have been held up for **20 years**, and their passage marks a **significant milestone** in Taiwan's development of **green energy sources**.
- Set a goal to **make Taiwan nuclear-free by 2025**
- **Prioritize the development of green energy**, with an eye to expanding renewable energy and creating a **green, eco-friendly country**.



Source: Legislature passes **amendments to reform energy market** and fund long-term care, Executive Yuan, 2017-01-12

# Amendment to Electricity Act – New Power Industry Sector

## Generation

- Non-Utility (2)
- Unclear and 2MW  
Hydro limited to Public,  
others open private  
investment

## Traditional Generation

- Only sell power  
to Public Retail  
or Transmission  
& distribution

## Renewable Generation

- **sell power to  
customer by  
wheeling or direct  
power supply (45)**

## Transmission & distribution

- Utility (5)
- One Public  
Company (5)
- Concurrently  
running Public  
Retail business by  
allowance

## Retail

## Public Retail

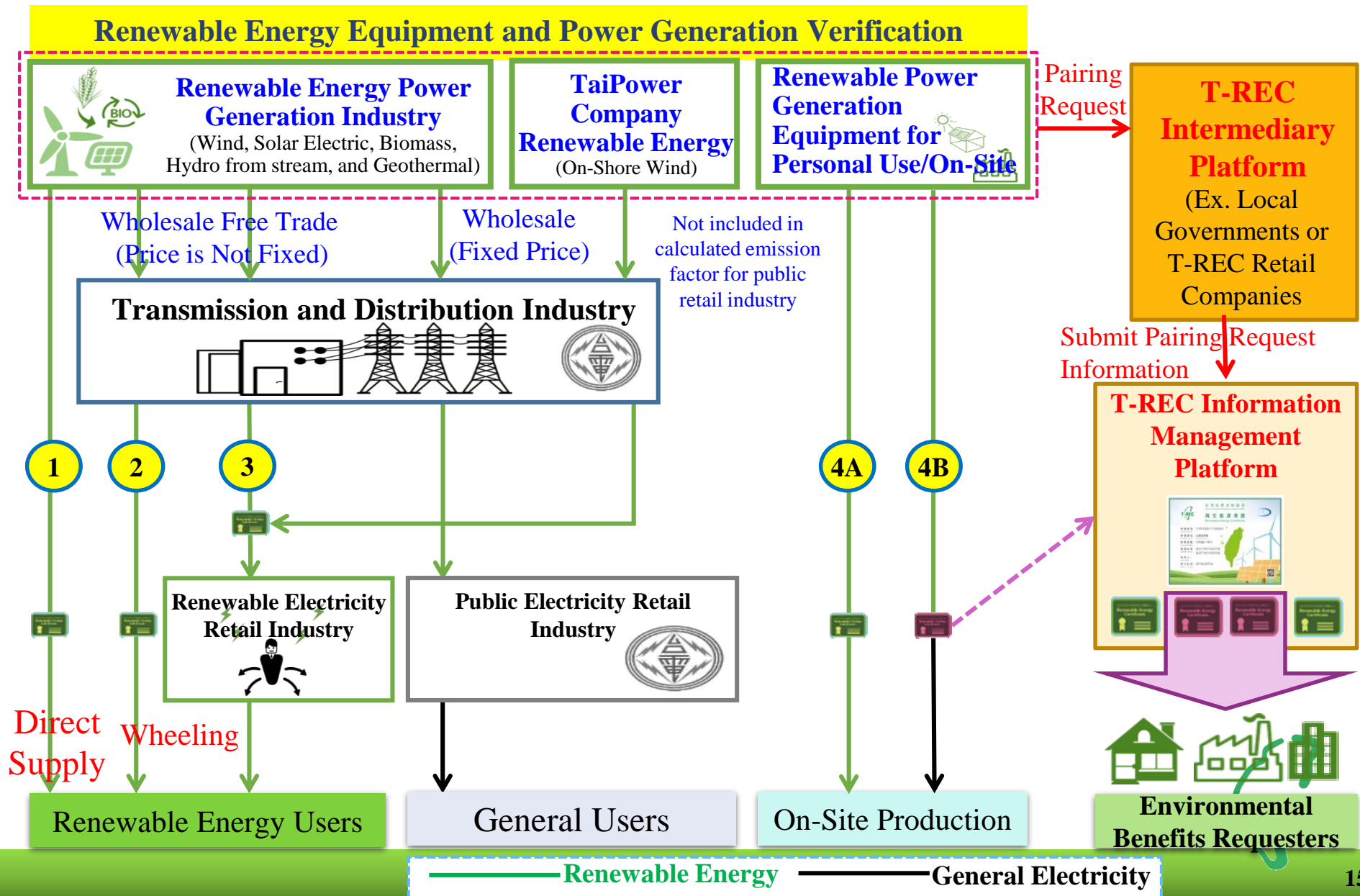
- Utility (2)
- Take over the  
power supply  
responsibility  
(47)

## Renewable Retail

- **Non-  
utility(2)**
- **trade only  
Renewable  
Energy(2)**



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



# Operation Mechanism Planning Under Different renewable energy power Supply

**The T-REC application fee is priced by the REC Center, and the T-REC price is set by the bilateral contract.**

## **① Direct Supply of renewable energy power:**

The electricity generation company apply for T-REC from the REC Center, pay for the application fee, then supply green electricity with proof of T-REC

## **② Users and electricity industry sign a contract, wheeling:**

The electricity generation company apply for T-REC form the REC Center, pay for the application fee, then supply green electricity with proof of T-REC

## **③ The generation industry applies T-REC from the REC Center, sells the electricity to retail industry, T-REC is the proof for green electricity for retail industry.**

## **④ Renewable power generation equipment for personal use:**

Renewable energy power for personal use can apply for T-REC

Could sell the environmental benefits to those requester through the T-REC broker





# Electricity Dispatch & Wheeling Fee for Renewable Energy

- The Electricity Act has requested to use the **emission factor to calculate the fee**, since the emission factor for renewable energy is zero, therefore it has the **lowest fee**. The terms of the Electricity Act itself has included the preferential benefits for renewable energy, and **encourages renewable energy generations to trade**.
- The earliest for direct supply and wheeling to be available is **in the end of October**.

Unit: NT\$/kW (1\$ = 32 NT\$)

Payment Item		Ancillary Service	Power Dispatch	Wheeling (Transmission)	Wheeling (Distribution)
Average Tariff		0.0460	0.0802	0.2164	0.3375
Fuel Type	<b>Renewable Energy (zero mission)</b>	<b>0.0230</b>	<b>0.0040</b>	<b>0.0108</b>	<b>0.0169</b>
	Renewable Energy (non-zero mission)	0.0692	0.1223	0.3299	0.5144
	Unclear	0.0230	0.0416	0.1123	0.1751
	Coal	0.0599	0.1060	0.2861	0.4462
	Oil	0.0557	0.0987	0.2662	0.4151
	Gas	0.0408	0.0728	0.1963	0.3062
	Pumping Hydro	0.0230	0.0416	0.1123	0.1751

- Note1: Renewable energy emission emitters includes waste, tires, and other power generation from waste.
- Note2: Fees are subjected to 5% business tax in accordance with the relevant provisions of the Business Tax Act. The total amount for the payable per month shall be the total amount of the total cost of the transmission and distribution industry, divided by 1.05.

(effective from 2017 October 1st to 2017 December 31th)



# Grid System Usage & Payment Item Conditions

Applicant	Type of Service	Grid System Usage Conditions	Payment Item			
			Ancillary Service Fee	Power Dispatch Fee	Power Wheeling Fee	
					Transmission	Distribution
Renewable Energy Generation	Non Grid-tied direct supply		X	X	X	X
	Grid-tied direct supply		O	O	X	X
	Power Wheeling	Transmission System	O	O	O	X
		Distribution System	O	O	X	O
		Transmission & Distribution	O	O	O	O
Renewable Energy Retail	Power Wheeling	Transmission System	O	O	O	X
		Distribution System	O	O	X	O
		Transmission & Distribution	O	O	O	O
Self-Generation Equipment	Power Wheeling	Transmission System	O	O	O	X
		Distribution System	O	O	X	O
		Transmission & Distribution	O	O	O	O

(O : payment required ; X : payment not required)

- Transmission and Distribution Scope of Service: Renewable Energy Wheeling, Direct Supply, and On-Site for Self-Use
  - Transmission and Distribution Service Categories and Fees
1. Ancillary Service: to maintain the safety and reliability of the power supply to ensure the stability of the power system to maintain the quality of electricity and in response to occasional accidents, to provide FM reserve capacity, real-time capacity, replenishment capacity, all black start and other services.
  2. Electricity Dispatch: the implementation of unit scheduling, system balance, real-time scheduling, security monitoring and other scheduling service, as well as transmission and distribution system through the transmission of energy transmission losses.
  3. Wheeling: the use of transmission and distribution system to transmit power.



# Current T-REC Issuance

1. Until September 2017, 4,422 T-REC have been issued.
2. Accumulation generation amount is 4,422,000 kWh of green electricity.



# The Function & Value of T-REC



# The Function & Value of T-REC

1. **T-REC** can proof the value of the green electricity, and provide the additional revenue to renewable energy developers.
2. After the establishment of **T-REC market**, the contract could ensure the transaction of green electricity, reduce financial risk, encourage the willingness of investment, expand the green electricity market, support the development of renewable energy.



**Increase  
Revenue**



**Promote  
Investment**



**Industry  
Development**



# The Linkage between T-REC and GHG Management

For example in Scenario 2, during the 2016 **GHG emission (Scope 2)** inventory, A company could claim the inventory for 529 tCO<sub>2</sub>e .

Assume A Company consume 3,000,000 kWh electricity in 2016

Scenario 1 :

Do not have any T-REC :

$$3,000,000 \text{ kWh} * 0.529 \text{ kg CO}_2\text{e/kWh} \\ = 1,587 \text{ tCO}_2\text{e}$$

Scenario 2 :

To have 1,000 T-REC  
issued in 2016

Bought 1,000  
T-REC reduce 529  
tCO<sub>2</sub>e emission

$$\frac{1,000,000 \text{ kWh} * 0 \text{ kg CO}_2\text{e/kWh}}{= 0 \text{ tCO}_2\text{e}}$$

$$2,000,000 \text{ kWh} * 0.529 \text{ kg CO}_2\text{e/kWh} \\ = 1,058 \text{ tCO}_2\text{e}$$

# The Linkage between T-REC and CSR Rating



## Corporate Social Responsibility Report

Purchasing electricity generated from renewable or other low-carbon sources is a big part of our GHG reduction strategy. Cisco's global renewable electricity purchases are summarized in Table 28. We have purchased renewable electricity primarily in the United States and Europe since FY06 **by buying Renewable Energy Certificates (RECs) and entering into green power contracts with various electricity suppliers.** In FY16, we purchased 1157 GWh of Green-e Certified RECs and green power in the U.S., 68 GWh of green power in Europe.

**T-REC could be used as the reference for CSR Rating**



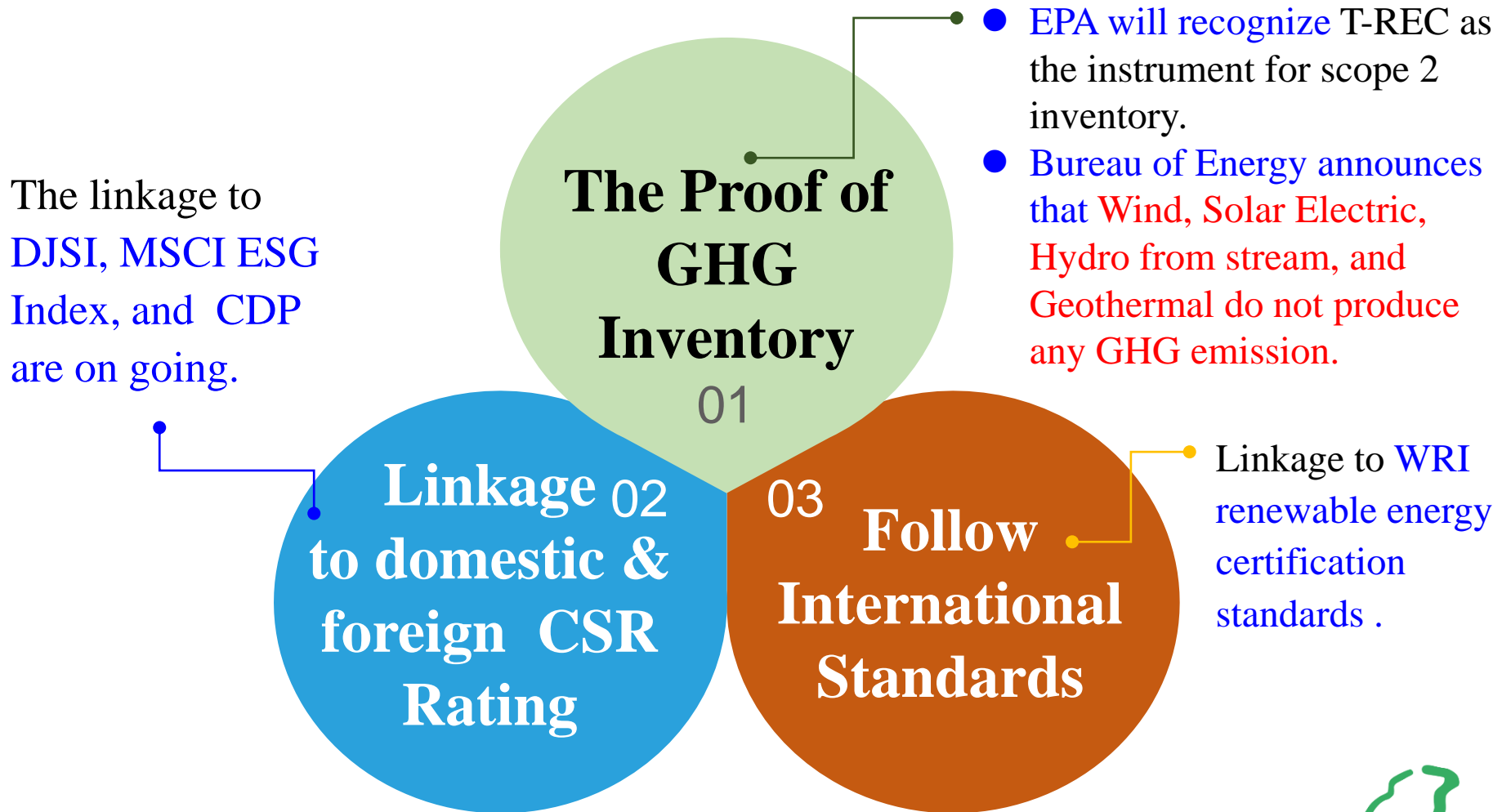
### Domestic CSR Rating



### Foreign CSR Rating



# The Function & Value of T-REC





# The **T-REC** Market Trading Guidance Pilot Program



# Pilot Program Participants and Qualification



## T-REC Suppliers

On-site generation renewable electricity self-consumption and equipment owner OR renewable electricity generation equipment owner that did not claim its environmental benefits that has applied and received T-REC from the T-REC Center.



## National Renewable Energy Certification Center

Agency that issues T-REC



## T-REC Intermediary

Juridical persons, businesses, or local governments that are willing to participate in intermediary service.



## T-REC Demanders

Juridical persons that are willing to purchase T-REC (including juridical persons that are in line with Company Act, hereinafter the same), business (registered under the Commerce Regulation Act to the competent authority of the place where the business is located, hereinafter the same), non-juridical persons, organizations, or etc.

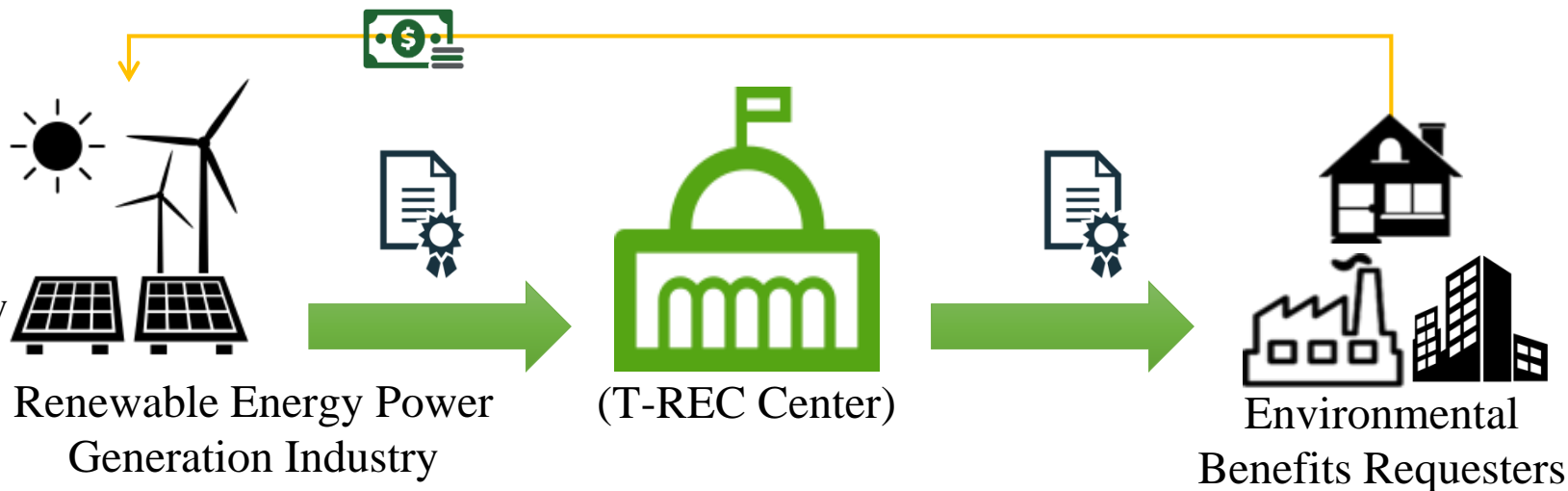


# T-REC Market Trading Guidance Pilot Program Diagram

**Payment to Purchase T-REC (concretized environmental benefits, green power, and labor fee)**

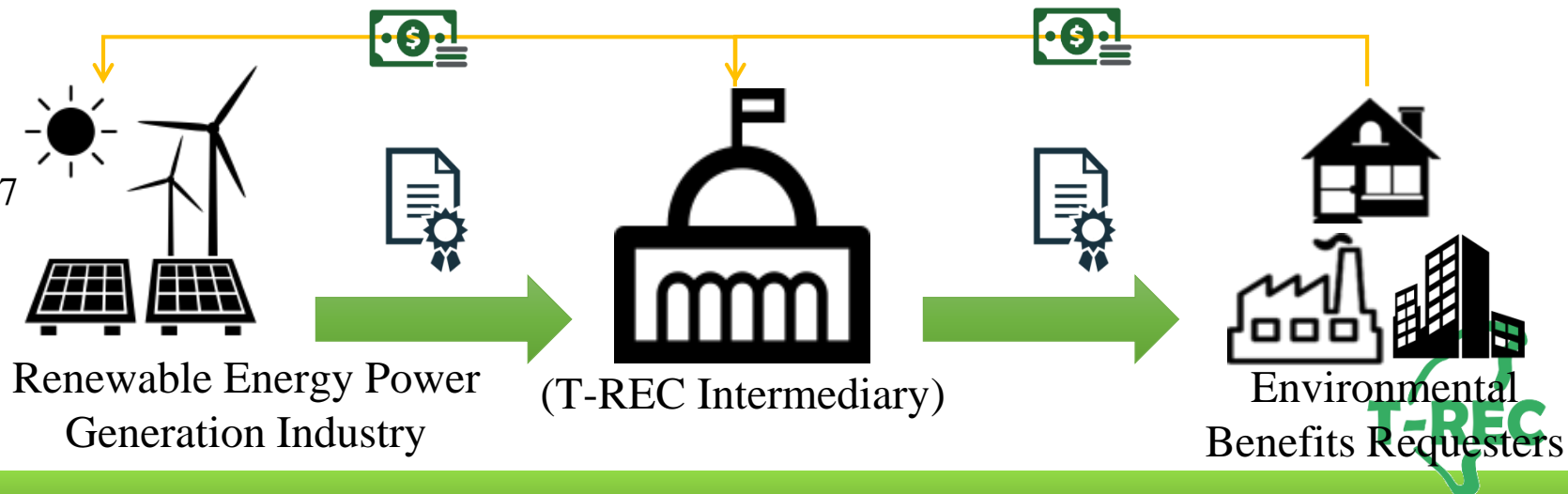
## First Stage

Starting since the effective day of this Program till the end of 2017.



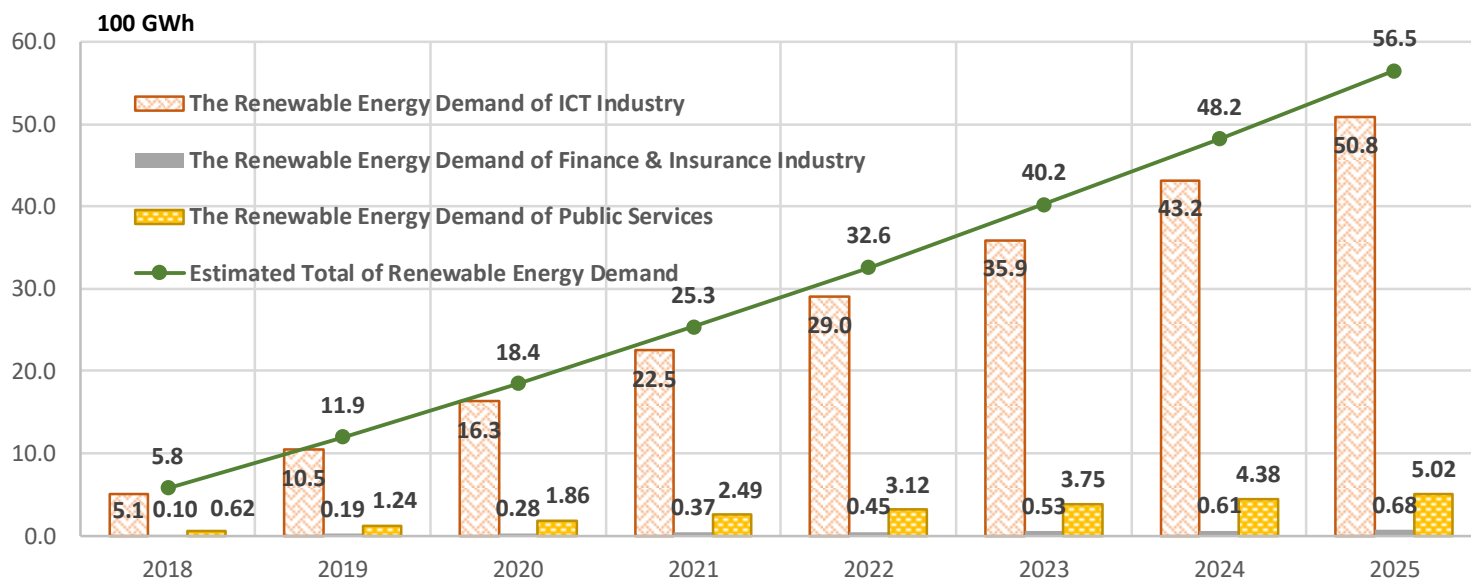
## Second Stage

August 2017 till the end of 2017.



# The Demand Scenario of Voluntary Renewable Energy Market in Taiwan

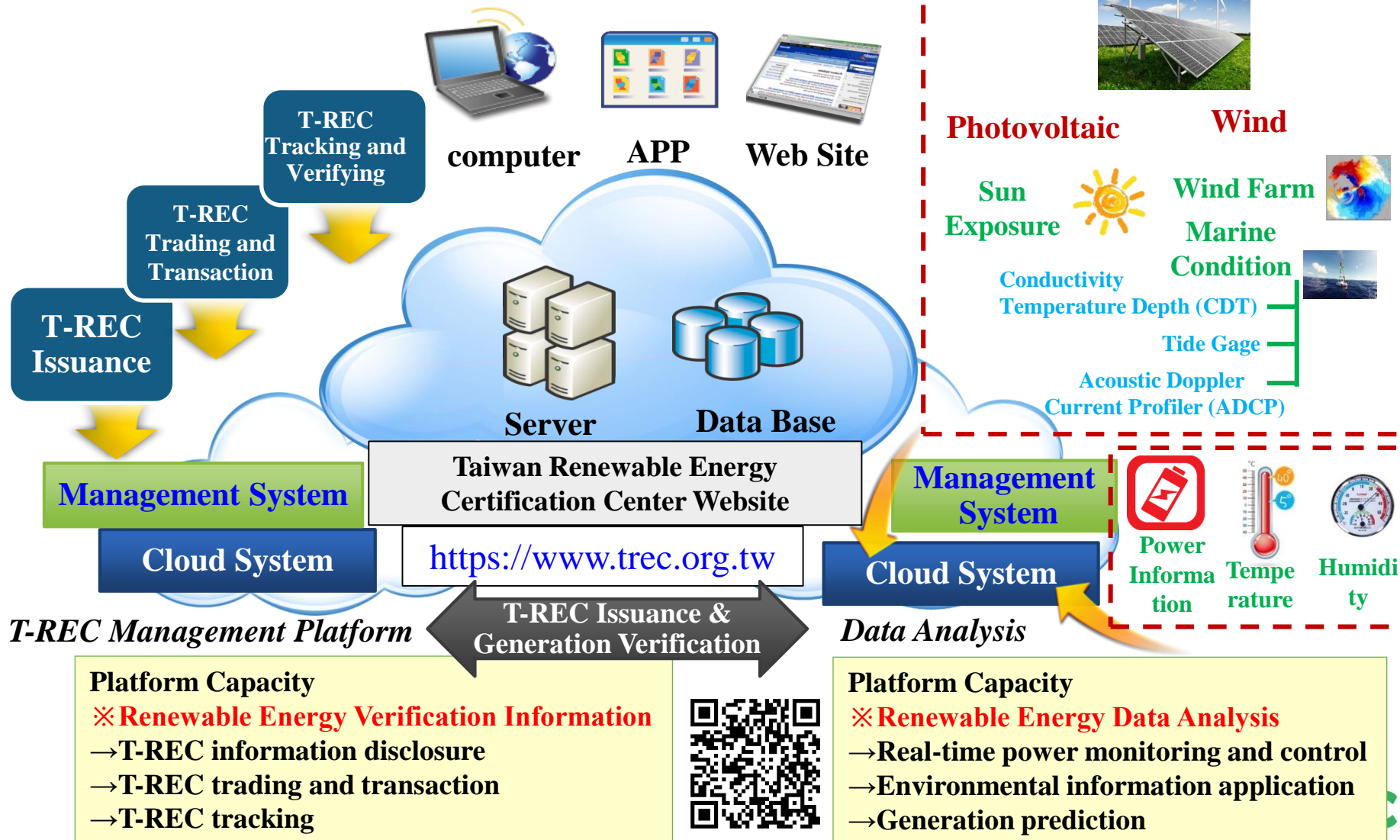
- According to the current of T-REC applicants, the demand is coming from **ICT industry and finance & insurance sectors**.
- If **the public services, ICT industry, and finance & insurance sectors increase the renewable energy usage by 1% each year**. Based on this estimation, we hope that T-REC issuance could be increased by **500,000 each year**, market **volume increased each year by \$16.7 million**.



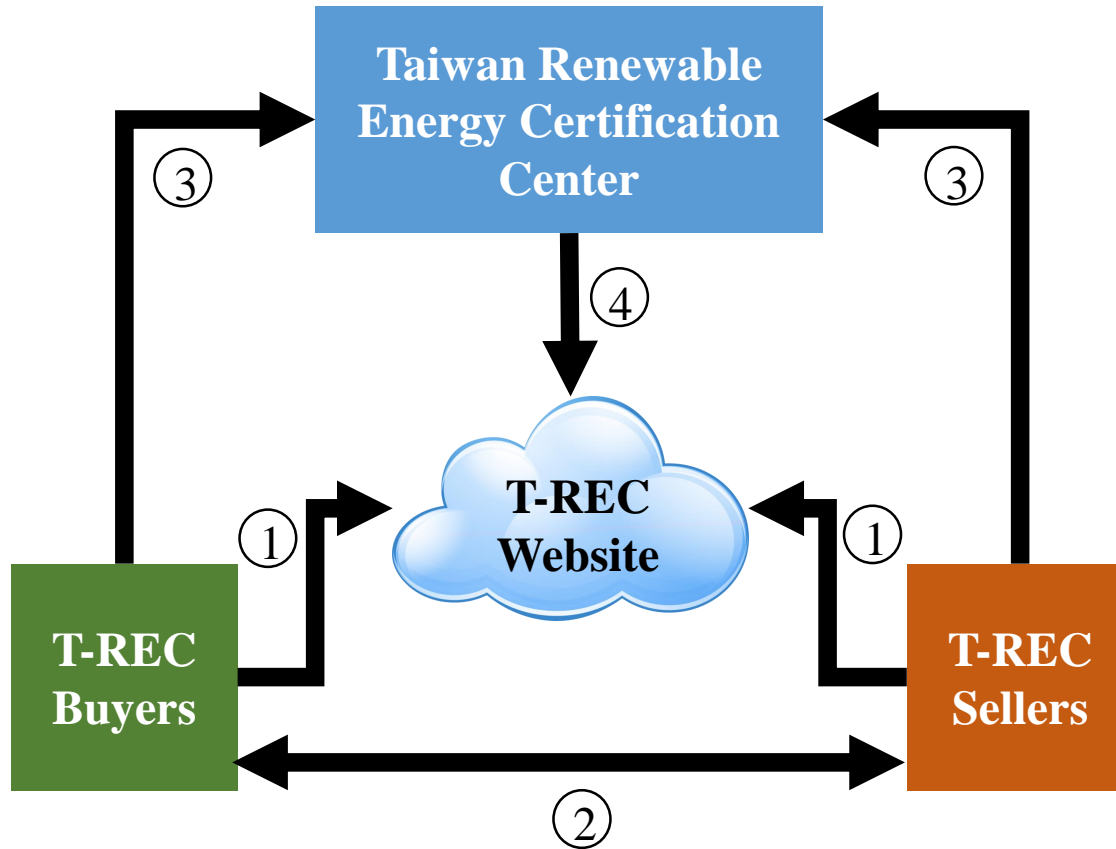
# The **T-REC** Information Platform System (Tracking System)



# Renewable Energy Certification Information Platform



# T-REC Transaction Relationship and Process



## T-REC Transaction Process :

1. T-REC buyers and T-REC sellers will **published their requirements for buying or selling information on T-REC website.**
2. T-REC buyers and T-REC sellers **would then negotiate a contract for the T-REC trading.**
3. Once the contract was negotiated/signed, one party need to inform T-REC Center and **present related contract documents.** T-REC Center will act as the third party witness.
4. T-REC Center will **publish the related information** of T-RECs trading on T-REC website.



# REC Pilot Trading Rule

- Verified renewable energy generation equipment generates a **T-REC for every megawatt hour of renewable electricity** that has been produced.
- The generated T-RECs can be used in **next calendar year's environmental benefits inventory and reporting.**
- Every T-REC can only be traded once, hence **the ownership can only be transferred once.**
- Once the environmental benefits of the T-RECs have been “claimed”, the **T-RECs will be retired and can not be traded/used anymore.**
- If T-RECs are not used for its accounted environmental benefits claim within the right calendar year, T-RECs are still available to sell.





# Taiwan Renewable Energy Certification Paper Copy Design

## 再生能源憑證

### Renewable Energy Certificate

憑證號碼: 17SP00--B017000001  
Certificates No.

發電時間: 自2017年05月15日 ~ 2017年05月19日  
Generation Period **May 15, 2017 ~ May 19, 2017**

發電類型: 太陽能發電  
Energy Source **Solar Electric**

持有人  公司  
T-REC Holder

發電度數: 1000度(1REC)  
Amount Generated

發行日期: 2017年05月19日  
Date of Issue **May 19, 2017**



國家再生能源憑證中心  
National Renewable Energy Certification Center



# Thank You



**Bureau of Standard, Metrology and Inspection,  
Ministry of Economic Affairs  
Taiwan Renewable Energy Certification Center**

**Miss Kate Wu (02)2343-4529  
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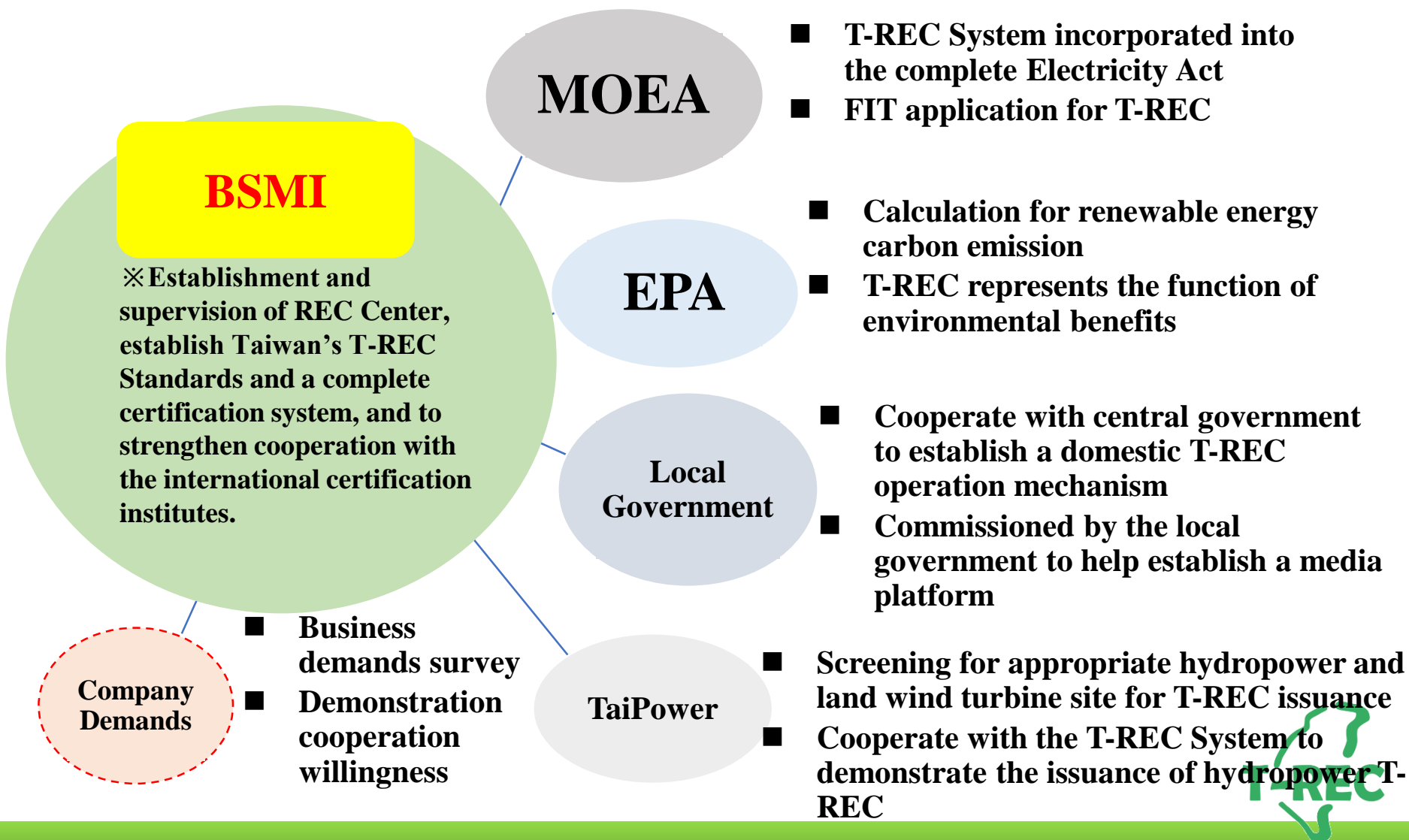


# Appendix

# Involved Agencies, Departments, and Institutes for **T-REC** Program



# Communication and Cooperation between Departments and Industry to promote T-REC



# Institutes Involved in T-REC Program



**BSMI is responsible for the establishment of REC Center and T-REC Development Foundation management, all project members will carry out international exchange and cooperation mechanism planning.**



Assist BSMI to **develop the T-REC System and management mechanism planning, and assist with T-REC Center and industry association promotion planning.**



A unit for professional development in information communications, inspection, and other aspects of the standard testing and verification. Responsible for the construction **of cloud data analysis and T-REC Management Platform, to provide large data analysis application service planning and hydropower verification standard.**



Provide wind power industry testing and verification services, **also responsible for certification process for land and offshore wind power, checking and tracking mechanism, wind power verification, and collection and retrieval of verification data.**



Provide wind energy related services, such as meteorological tower equipment inspection, maritime operation review mechanism, **responsible for the offshore wind certification verification standard, checking and tracking mechanism, and data collection and retrieval planning.**



Focusing on sustainable energy and energy-saving technology research, development, and innovation. In this project, **it is responsible for biomass, geothermal, and energy storage system certificate verification standard, and data collection and retrieval planning.**



Specialized in the electrical equipment testing and verification research. In this project, **it is responsible for solar photovoltaic system certificate verification standards, checking and tracking mechanism to collect and capture solar photovoltaic related environmental data planning.**