



**45th APEC EGNRET Meeting**

# **Strategy and Roadmap for Renewable Energy in Chinese Taipei**



**Bureau of Energy  
Ministry of Economic Affairs  
Chinese Taipei**

**17 November, 2015    Xiamen, China**

**Chinese TAIPEI**

# Outline



1. New Energy Policy of Chinese Taipei
2. Renewable Energy Development Act
3. Principles of Renewable Energy Development
4. Renewable Energy Targets
5. Development Strategy :
  - 5.1 Thousand Wind Turbines Program
  - 5.2 Million Solar Rooftop PVs Program
6. Concluding Remarks

# 1. New Energy Policy of Chinese Taipei

## Chronology of Energy Policy Development

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2015.01.15-16

Held the 4th **National Energy Conference**

2011.11.03

President Ma announced **New Energy Policy** to “Steadily Reduce Nuclear Dependency, Gradually Move Towards a Nuclear-free Homeland, and Create a Low-carbon Green Energy Environment”

2010.05

Approval of the **National Master Plan on Energy Conservation and Emission Reduction**

2010.01

Establishment of the **Committee on Energy Conservation and Emission Reduction**

2009.07.08

Promulgation of **Renewable Energy Development Act**  
Amendment of **Energy Management Law**

2009.04.15-16

Held the 3rd **National Energy Conference**

2008.06.05

Launched **Framework of Sustainable Energy Policy**

## 2. Renewable Energy Development Act

- In order to systematically promote renewable energy, in July of 2009, Chinese Taipei promulgated the *Renewable Energy Development Act*. **The core strategy of the Act is a Feed-in-Tariff system.**
- A Committee is formed to decide the calculation formula and feed-in tariffs. Tariffs and formula should be **reviewed annually**, referring to **technical advancement, cost variation, goal achievement status**, etc.  
→ **no degression system in place**
- Tariffs shall not be lower than the average cost for fossil-fired power of domestic power utilities.

## Mechanism of Feed-in Tariffs

- Current, only Solar PV tariff rates are set on date when generating equipment installations are completed. Other technologies have tariff rates set on the Power Purchasing Agreement (PPA) signing date.
  - ➔ **tariffs applied for 20 years**
  - ➔ **PPA being a very important credit for banks to provide project financing**
- **BOE announces PV capacity quota every year.** PV systems > 50 kW are subject to a bidding procedure to decide tariffs. Developers proposing higher discount rates receive the priority to get the quota.
- **The installed capacity of PV systems has been increased by more than 60 times in 5 years after the implementation of FIT.**

### 3. Principles of Renewable Energy Development

- ◆ Five principles which have been considered to expand Chinese Taipei's renewable energy development to maximum potentials :

1 Subject to technological maturity and feasibility

2 Cost effectiveness

3 Development in phases

4 Acceptable increase in electricity price

5 Facilitating development of related industries

## 4. Renewable Energy Targets

- ◆ The Ministry of Economic Affairs raised the renewable energy target to 17,250 MW for 2030 (was 10,858 MW set in 2010), which is its third-time upward adjustment for the renewable energy target.

Year	Capacity of Renewable sources (MW)						Electricity generated from renewable sources (GWh)					
	2013	2014	2015	2020	2025	2030	2013	2014	2015	2020	2025	2030
On-shore Wind	614	637	737	1,200	1,200	1,200	1600	1500	1800	2900	2900	2900
Off-shore Wind	0	0	0	520	2,000	4,000	0	0	0	1800	6800	13600
Hydro Power	2,081	2,081	2,089	2,100	2,150	2,200	5400	4300	4600	4700	4800	4900
Solar PV	392	620	1,115	3,615	6,200	8,700	300	600	1400	4500	7800	10900
Geothermal	0	0	0	100	150	200	0	0	0	600	1000	1300
Biomass	741	741	741	768	813	950	3400	3500	5400	5600	5900	6900
<b>Total</b>	<b>3,828</b>	<b>4,079</b>	<b>4,682</b>	<b>8,303</b>	<b>12,513</b>	<b>17,250</b>	<b>10800</b>	<b>9900</b>	<b>13200</b>	<b>20100</b>	<b>29200</b>	<b>40500</b>
Share of Total System	7.8%	8.4%	9.6%	15.0%	20.6%	27.1%	4.3%	3.8%	5.0%	7.0%	9.5%	12.6%

## 5. Development Strategy

- ◆ To prompt solar PV and offshore wind power, **Thousand Wind Turbines** and **Million Solar Rooftop PVs** promotion programs were approved in 2012.



## 5. Development Strategy

### 5.1 Thousand Wind Turbines Program



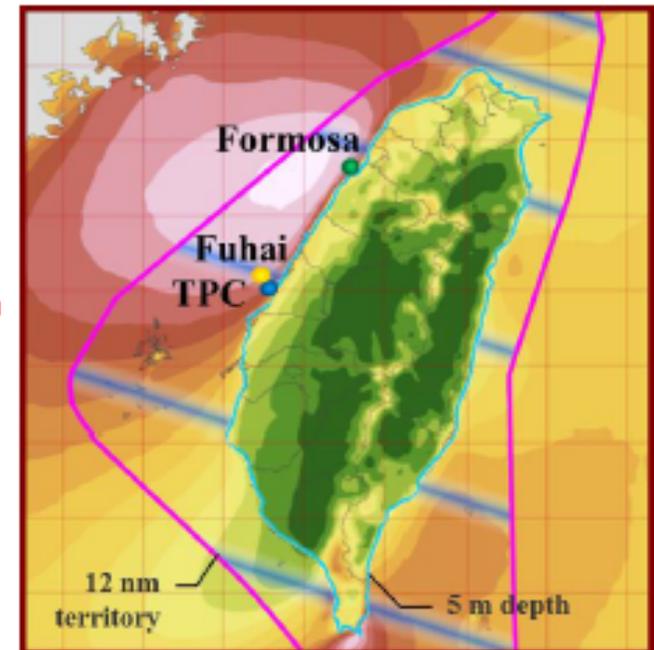
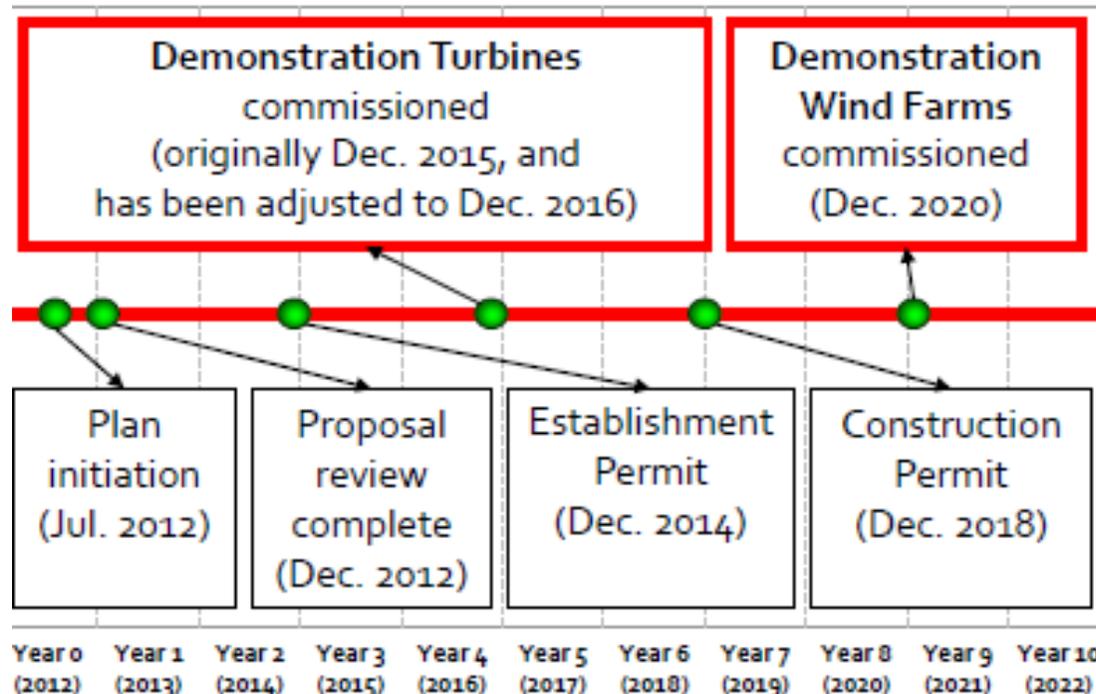
## Strategies for Offshore Wind

- **Feed-in Tariff** (tariffs for 2015 as below)
  - **Option #1:** US\$ 0.1794 / kWh for 20 years
  - **Option #2:** US\$ 0.2221 / kWh for the first decade and US\$ 0.1081 / kWh for the second (assuming exchange rate: US\$ 1 = NT\$ 32)
- **Offshore Demonstration Incentive Program (DIP)**
  - 4 Demonstration Turbines by 2016, 3 Demonstration Wind Farms by 2020
  - Government provides subsidy for both equipment & developing processes.
- **Directions of Zone Application for Planning (ZAP)**
  - 36 Zones of Potential revealed for preparation in advance of Zonal Development
  - Applicants must acquire EIA consent by 2017 and Preparation Permit by 2019.
- **Offshore Zonal Development**
  - To be announced by 2017 while SEA is currently in progress
  - Commercial scale for cost reduction

## Offshore Demonstration Incentive Program

### ■ 3 Demonstration Wind Farms

- Winners (Fuhai, Formosa & TPC) officially announced on 9<sup>th</sup> January 2013
- To subsidize 50 % cost of the Demonstration Turbines (FIT advances/interest-free loan)
- To subsidize NT\$ 250M for preparatory (wind mast, EIA, etc.) expense
- To confirm feasibility in terms of administration, technology and finance



## Potential Zones → ZAP → Zonal Development

### ■ Siting for Zones of Potential (ZoP)

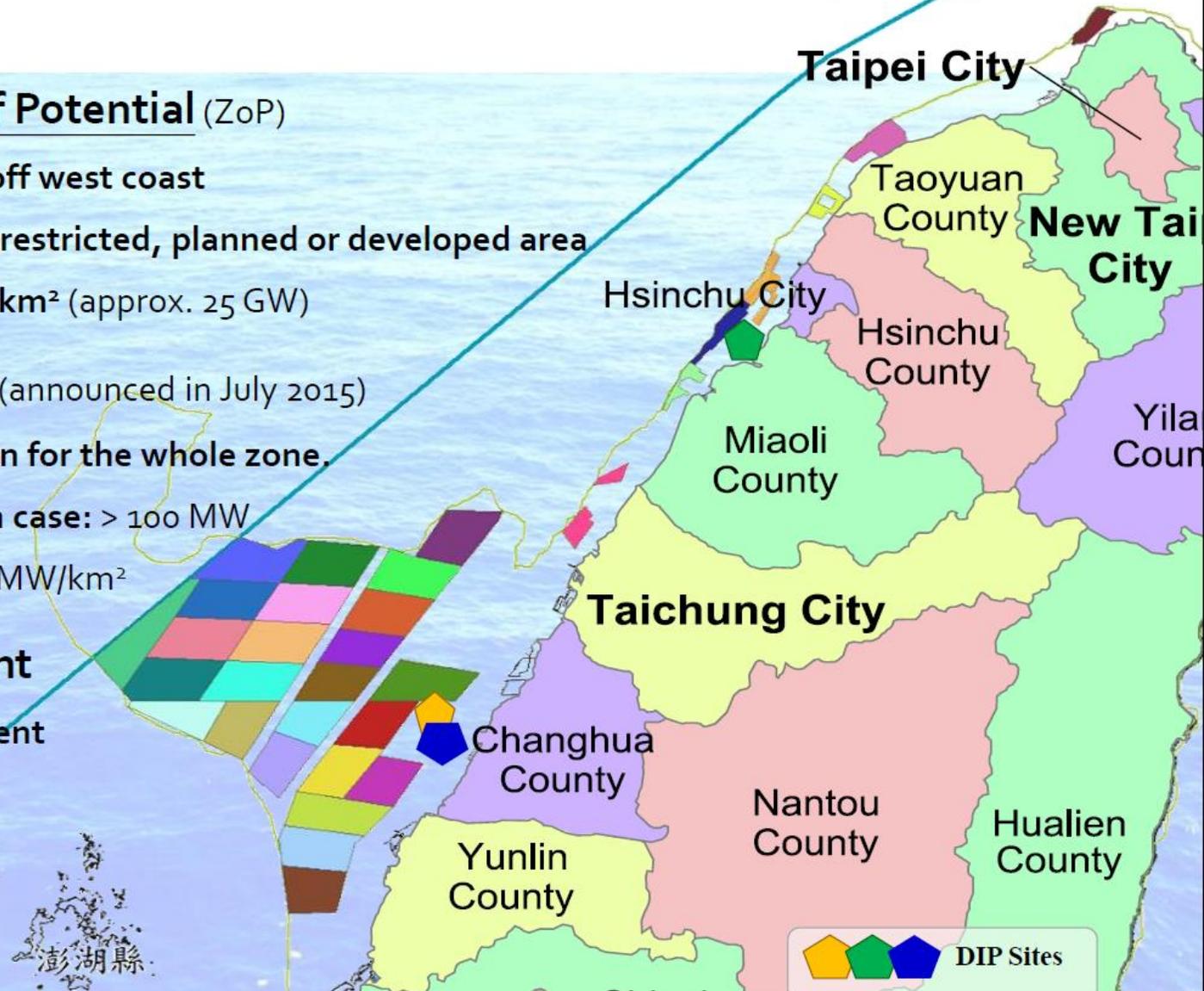
- Within 50 m isobath off west coast
- Excluding protected, restricted, planned or developed area
- 36 ZoP: total 3,084.5 km<sup>2</sup> (approx. 25 GW)

### ■ Directions of ZAP (announced in July 2015)

- Applicants should plan for the whole zone.
- Total capacity of each case: > 100 MW
- Capacity density: > 5 MW/km<sup>2</sup>

### ■ Zonal Development

- SEA & inter-department negotiation will be conducted based on 36 ZoP.



## 5. Development Strategy

# 5.2 Million Rooftop PVs Program

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## Goal and Strategy of Solar PVs

### ➤ Goal

- 8,700 MW developed by 2030
    - A. Roof-top (3,000 MW)
    - B. Ground (5,700 MW)
- Priority placed to contaminated agricultural farmlands and severe land subsidence areas, with 6.5% open to PV installation as the current target

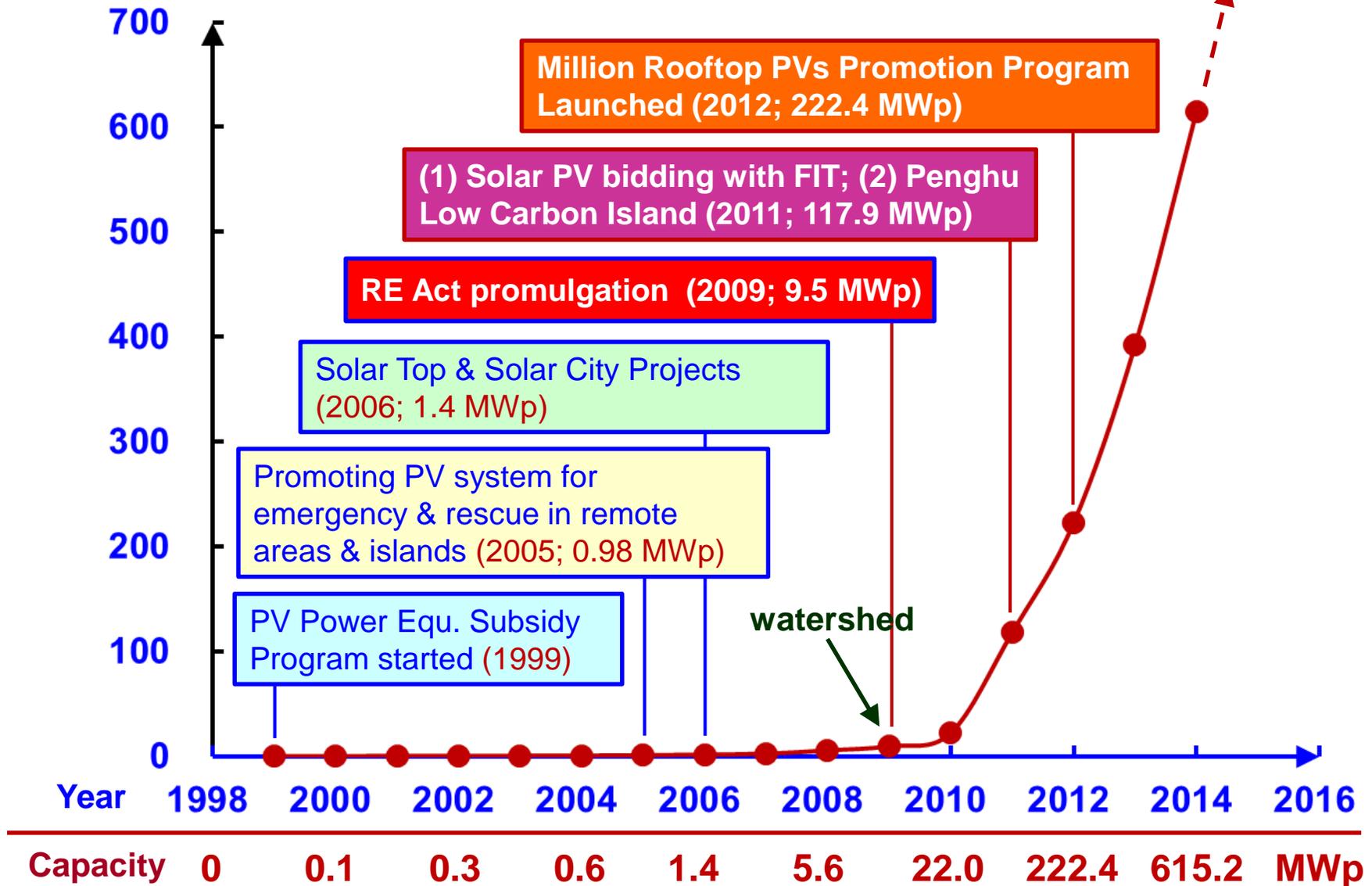
### ➤ Strategy

- The Feed-in Tariff as a strategy to achieve annual targets for roof-top and ground installations
- A cap quota is decided annually, while expecting large scale expansion after grid-parity is reached.
- PV ESCO



# Progress in PV Promotion in Chinese Taipei

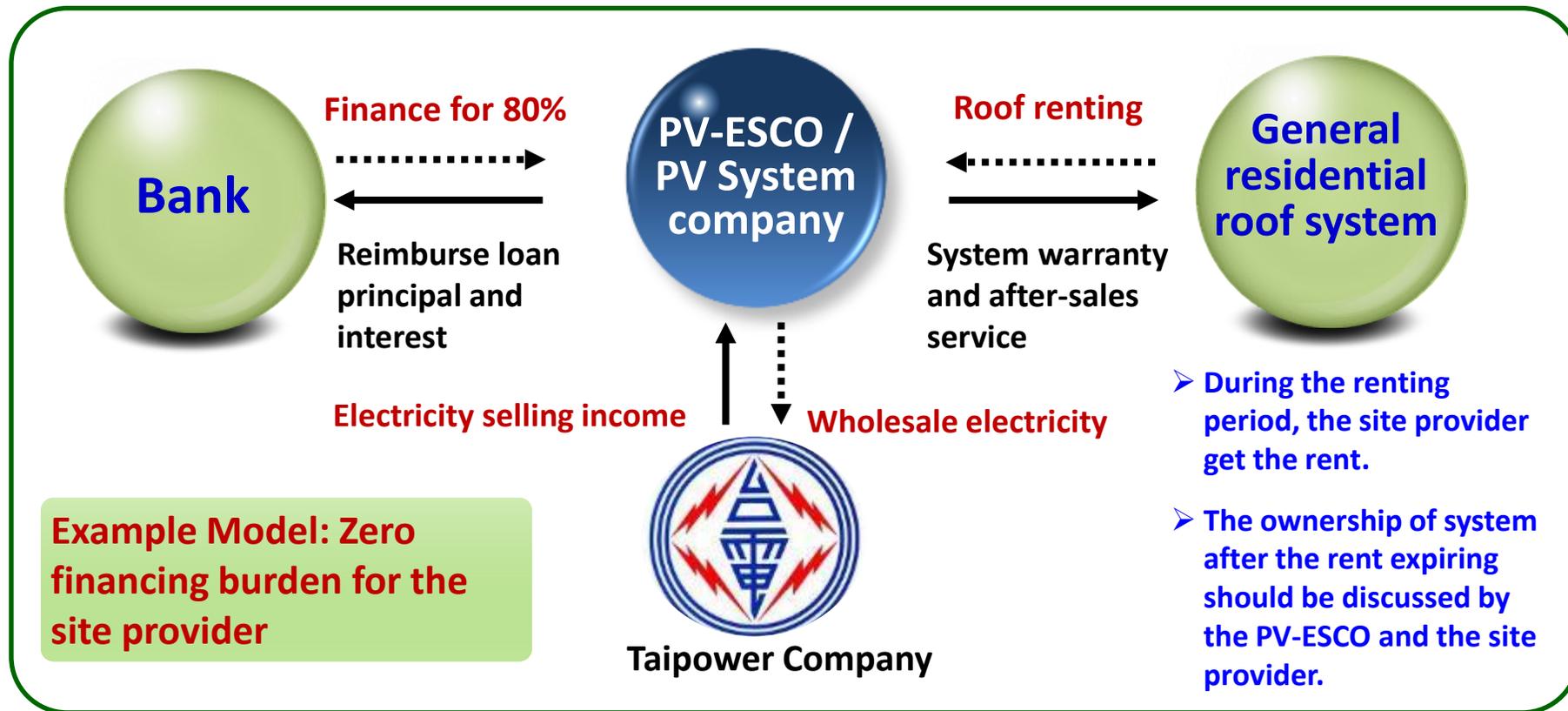
**New Target :  
8,700 MWp by 2030**



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## Establishment of PV-ESCO Mechanism

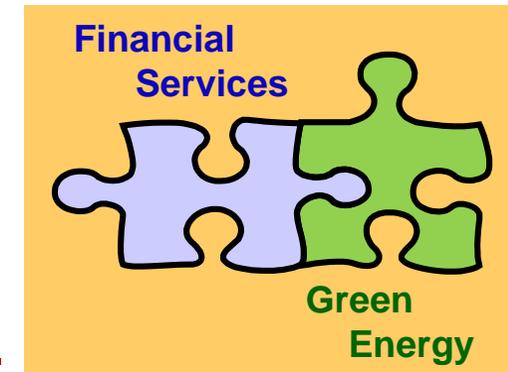
Encouraging banks to participate in project financing and to provide soft loans to PV-ESCO players



# Achievements of PV-ESCO: Green Financing



- **16 banks** now provide PV system financing support, green energy investment funds grows from **USD 1.6 to 222 million** from 2011 to 2013.
- USD 222 million funds could generate USD 317 million in system installation value, about 170 MW of domestic demand, and create more than USD 0.5 billion in industry chain value.
- PV-ESCO assists in installations for all buildings including solar community, public roof, solar farm, solar terminal, solar factory, solar rail, solar MRT, solar campus, etc.
- ESCO model plays an important role in Chinese Taipei PV installation. **PV capacity ratio increase from 48% (2012), 63% (2013), and up to 80% (2014).**



## 6. Concluding Remarks

- The promulgation of Renewable Energy Development Act and related regulations has paved the way for a sustainable long-term development of renewable energy in Chinese Taipei.
- Various incentives have been issued to encourage the investment in of renewable energy in Chinese Taipei.
- The development of renewable energy is expected to be prosperous in Chinese Taipei.
- Chinese Taipei will devote itself for the continuous growth of renewable energy , and welcomes the international cooperation to foster the development of RE together in the global society.

***Chinese Taipei, Your Best Partner !***

**LIGHT YOUR FUTURE**

**Thank you for your attention**

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