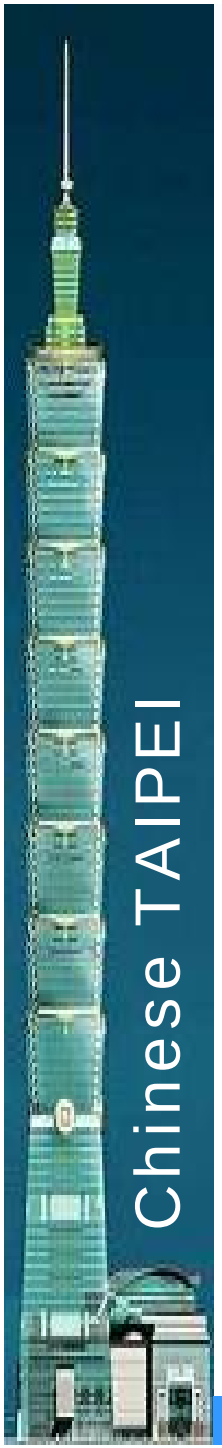

38th APEC EGNRET Meeting

Financial Incentives for Promoting New and Renewable Energy in Chinese Taipei

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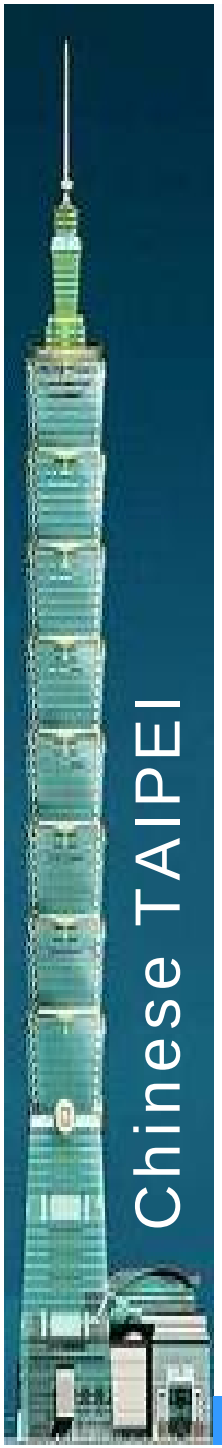
Bureau of Energy

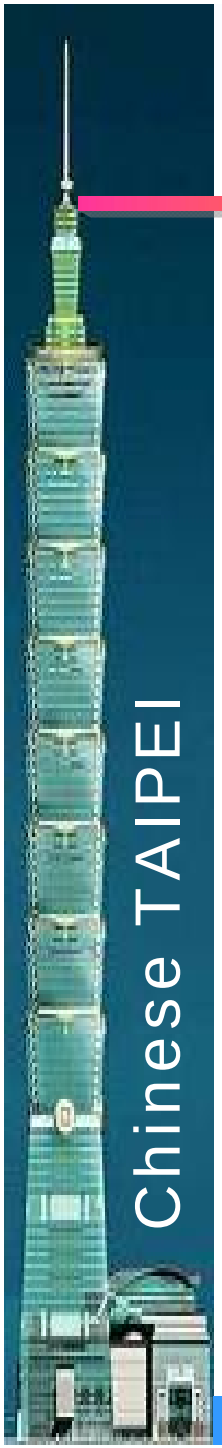
Ministry of Economic Affairs

18 June, 2012 Willington, New Zealand



Outline

- New and Renewable Energy targets under the "New Energy Policy Framework"
- Renewable Energy Development Act
- Million Solar Rooftop PVs project
- Thousand Wind Turbines Project
- Off-Shore Wind Power Demonstration Program
- Concluding Remarks



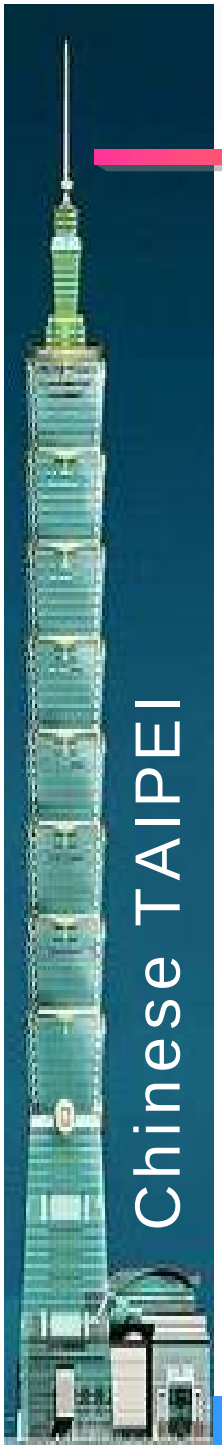
NRE targets under the "New Energy Policy Framework"

I. Target Expansion and Overall Development Strategy

Due to the geographical environment and natural resource limitations, The renewable energy with matured technology and low power generation costs will have priority in government development policy. Moreover, the authorities will encourage the industry players to consolidate their R&D and manufacturing capabilities. Thus, Chinese Taipei can be one of the Green Power Exporting countries.

II. Target of the Promotion of Renewable Energy

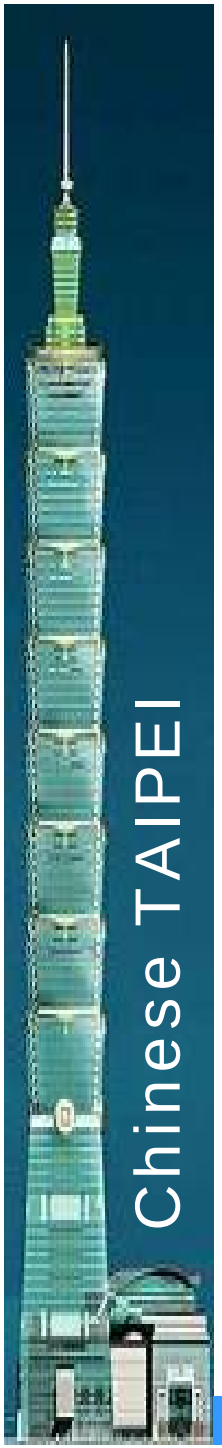
According to the "Renewable Energy Development Act", the target of renewable energy installation shall increase up to 6,500MW for 20 years. To correspond with the upcoming goals for GHG reduction, energy diversification, and renewable energy expansion, the renewable energy installation target is revised to reach 9,952MW by 2025, and 12,502MW by 2030. In other words, more aggressive targets are set for developing renewable energy in Chinese Taipei.



Aggressive Installation capacity Targets (MW)

To prompt the solar PV and off-shore wind power, we also approve the "Million Solar Rooftop PVs" and "Thousand Wind Turbines Promotion" project. The goal of project will be conducted to reach the goal of installing 3,100 MW of PV systems by 2030 and 1,000 wind turbine (including 450 on-shore and 600 off-shore wind turbine) .

Energy Source	2011	2015	2020	2025	2030
On-shore Wind	564	866	1,200	1,200	1,200
Off-shore Wind	0	15	600	1,800	3,000
Hydro Power	2,041	2,052	2,112	2,502	2,502
Solar PV	88	420	1,020	2,500	3,100
Geothermal	0	4	66	150	200
Biogas	9	29	29	31	31
Waste to Energy	790	848	925	1,369	1,369
Ocean Energy	0	1	30	200	600
H2&Fuel Cells	0	7	60	200	500
Total	3,491	4,242	6,042	9,952	12,502
Percentage of installed capacity	8.57%	9.9%	10.6%	14.8%	16.1%



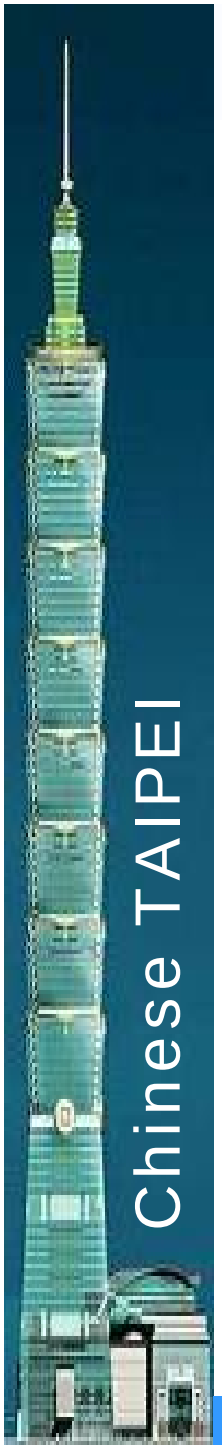
Renewable Energy Development Act in Chinese Taipei

Promulgated on July 8, 2009

Objectives: To promote the utilization of renewable energy, increase energy diversification, improve environment quality, energize related industries and enhance the national sustainable development

Contains: 23 articles

Definitions: Renewable energy - solar energy, biomass energy, geothermal energy, ocean energy, wind power, non-pumped-storage hydropower, the energy generated directly from domestic general waste and general industrial waste and/or derived from the treatment of solid wastes *(including Hydrogen energy and fuel cell)*



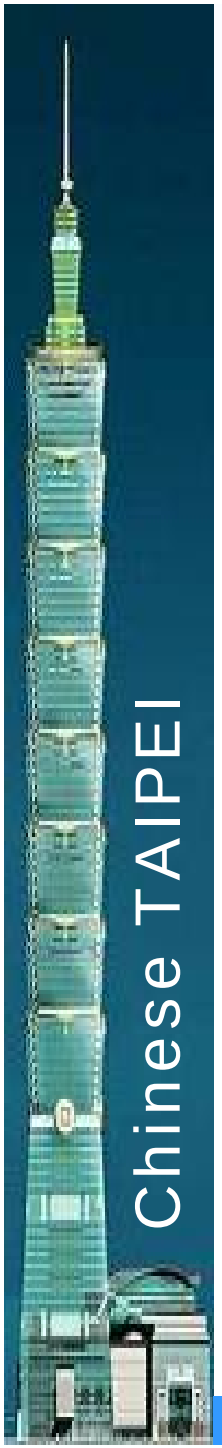
Essences of the Act

- **The breakthrough of market competition and installation barriers for renewables**

  - **Obligation:** power utility operating grid obligated of grid connection and purchase of renewable electricity; public constructions prioritized of utilizing renewable energy

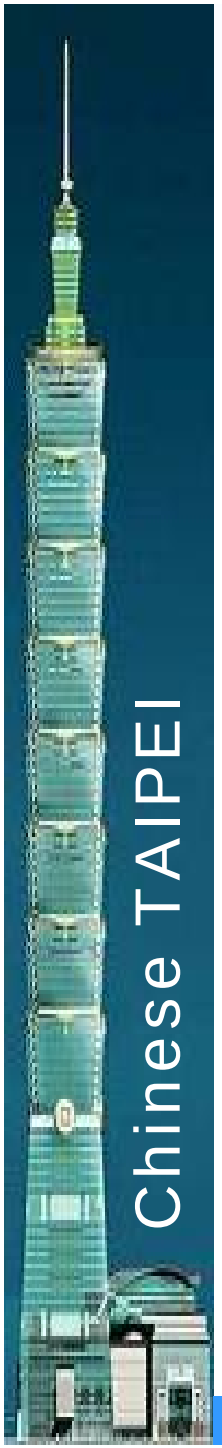
  - **Incentive: fixed feed-in tariffs (FIT) for renewable electricity; subsidies for the RE power generation equipment with development potential in the early stage of technological development**

  - **Deregulation:** removal of limitations for land use and requirements for installing of self-usage power facilities



Financial Mechanism of the Act

- **Renewable Energy Development Fund (Article 7)**
  Provide for the funding sources needed and purposes of use for developing renewable energy
- **Feed-in tariffs (Article 9)**
  Constitute a committee for stipulating the buy wholesale rate and formula of calculation for power generated by renewable energy facilities
- **Subsidy (Article 10)**
  Subsidize power utilities for purchasing or self-generating of renewable electricity
- **Rewarded demonstration (Article 11)**
  Be reward for renewable energy facilities with potentiality in an early stages of technical development
- **Incentives to thermal applications (Article 13)**
  Subsidize thermal applications of solar energy and biofuels



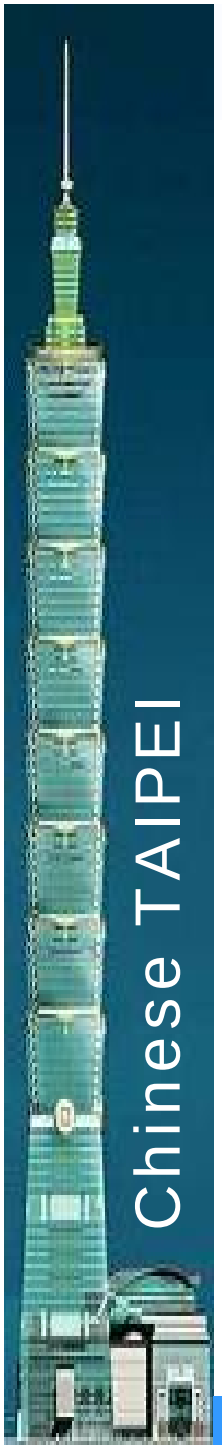
Renewable Energy Development Fund

- **Budget Source**

Power utilities and operators of self-usage power generation equipments that reach a certain level of capacity shall pay, according to the non-renewable energy portion in ones' total power generation, a certain amount annually to the Fund

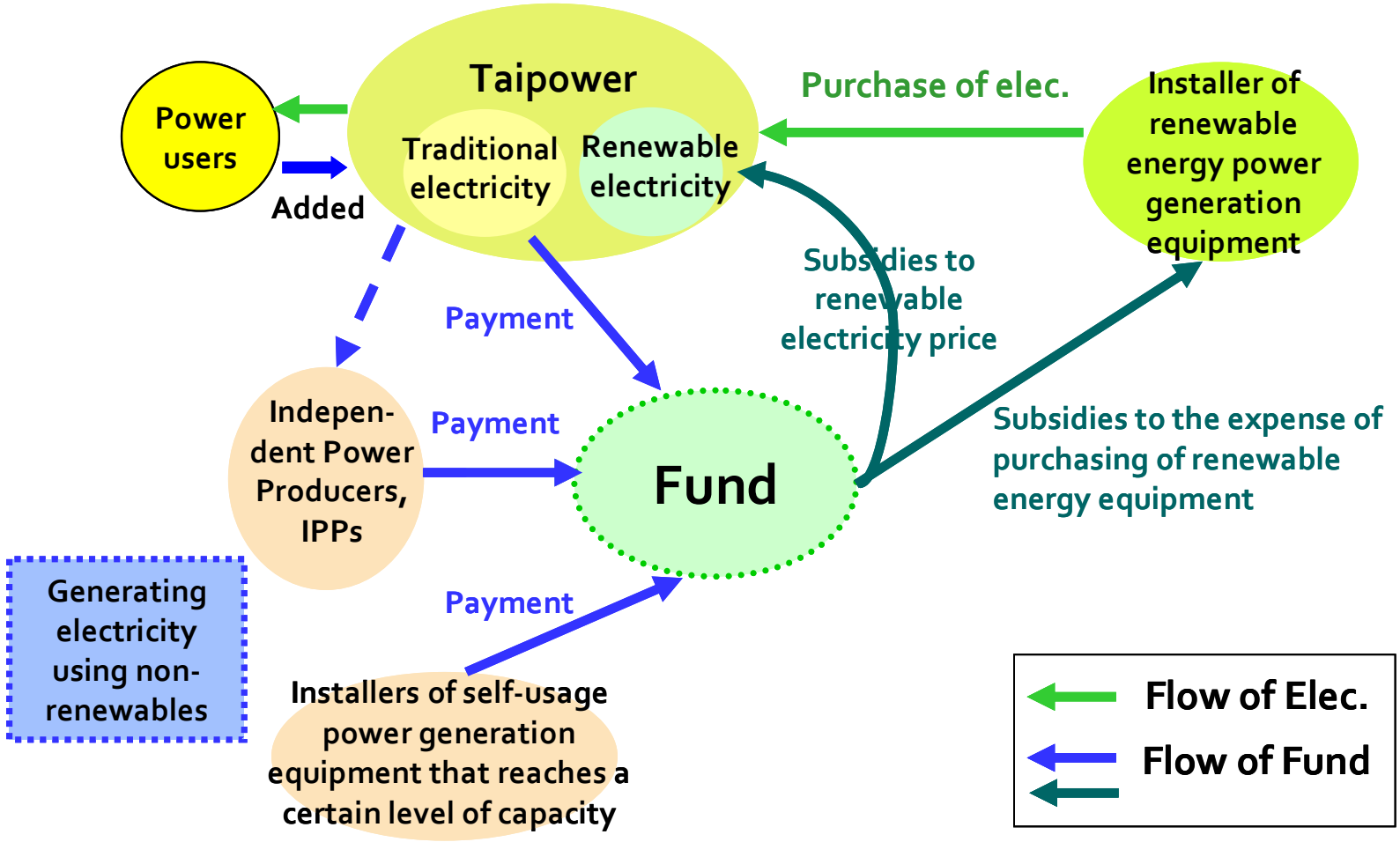
- **Usage**

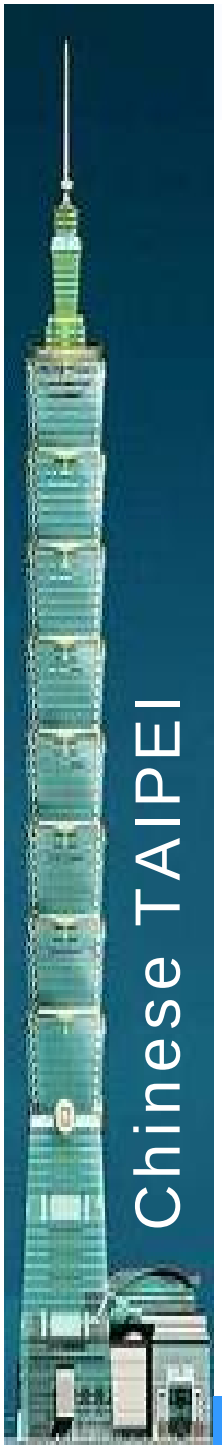
Subsidies to renewable electricity price, renewable energy equipment and renewable energy demonstration, and the promotion of application



Mechanism of RE Development Fund

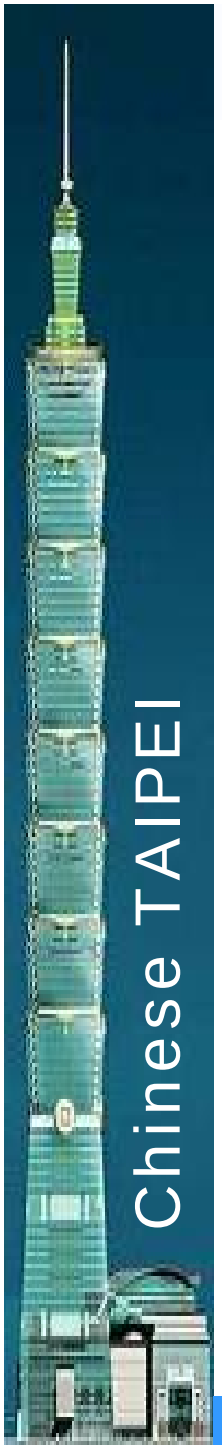
Income based on expected expenses to balance revenue and expenditure





Mechanism of Feed-in tariffs (FIT)

- MOEA shall invite related Ministries, scholars and experts, and other groups to form a Committee to decide feed-in tariffs and the calculation formula for renewable electricity.
- Tariffs and formula should be reviewed annually by referring to technical advancement, cost variation, goal achievement status, etc.
- **Tariffs shall not be lower than the average cost for fossil-fired power of domestic power utilities.**

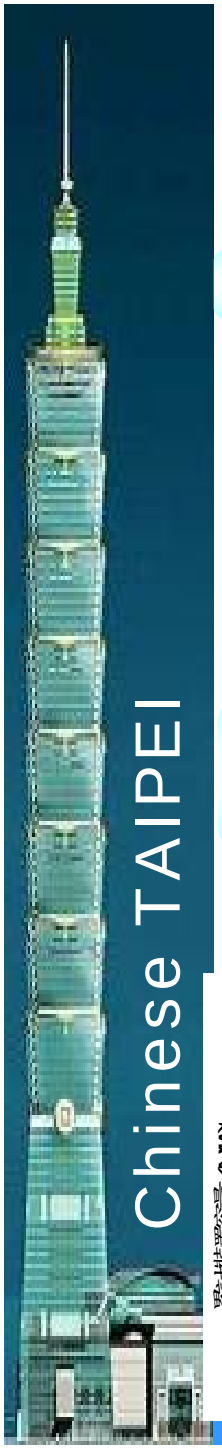


FIT for Renewables

Applied for 20 years to electricity from renewables (except PV) whose owner signs PPA with power utility from **1 Jan. 2012 to 31 Dec. 2012**

Item	Type	Capacity (kW)	2012 Tariff (US¢/kWh)	2011 Tariff (US¢/ kWh)	Variation (%)
PV	Roof type	≧1 ~ <10	31.5483	34.3950	-8.28%
		≧ 10 ~ < 100	28.4647	30.5997	-6.98%
		≧ 100 ~ < 500	27.2787	29.4137	-7.26%
		≧ 500	24.4323	26.5670	-8.04%
	Ground type	≧1	23.0090	24.4323	-5.83%
Wind Power	Onshore*	≧ 1 ~ < 10	24.5207	24.5207	0.00%
		≧ 10	8.6570	8.7127	-0.64%
	Offshore	--	18.5420	18.5420	0.00%
Hydropower	Stream-Type	--	7.7673	7.2737	6.79%
Geothermal	--	--	16.0130	16.0130	0.00%
Biomass	No biogas eqip.	--	7.7673	7.2737	6.79%
	With biogas eqip.	--	8.9983	7.2737	23.71%
RDF	--	--	9.4133	8.9583	5.08%
Others	--	--	7.7673	7.2737	6.79%

*** For the system requires LVRT, the tariff is US¢ 8.8580/kWh**



Million Solar Rooftop PVs project

I. Solar Energy Potential

Goal : 3,100 MW developed by 2030

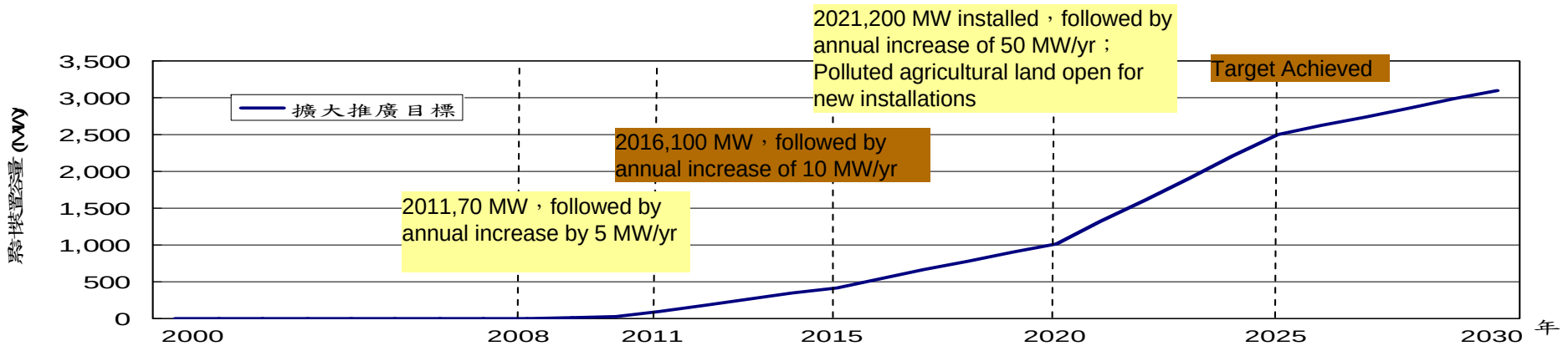
A. Roof-top (3,000 MW)

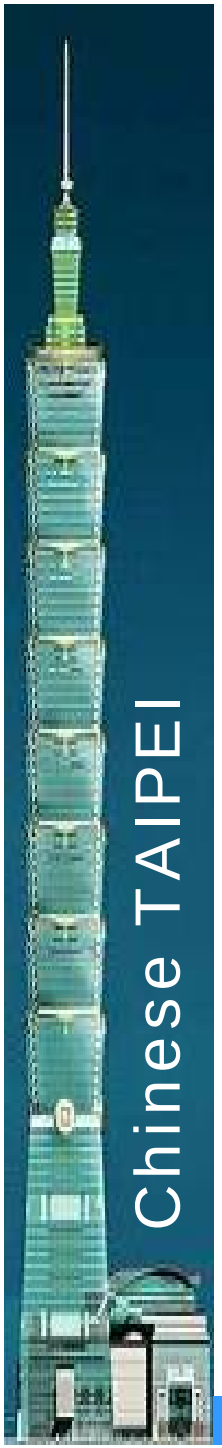
B. Ground (100 MW)

Constrained by agricultural regulations (EPA released in 2008.12), considering contaminated soil a 60% building coverage rate, the installed capacity could reach 100MW.

II. Strategy－First slow then fast/ incentivizing roof-tops prior to ground installations

- **The Feed-in Tariff as a strategy to achieve annual targets for roof-top and ground installations**





Thousand Wind Turbines Project

I. Wind Power Generation Potentials

A. On-shore：Potential ~ 9,000 MW

1,200 MW installed by 2020

B. Off-shore：Potential ~ 48,000 MW

3,000 MW installed by 2030

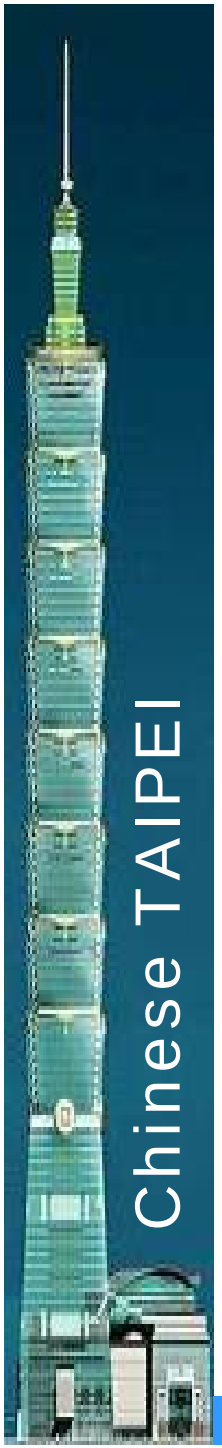
II. Strategy －Develop on- shore prior to off-shore wind farms

A. On-shore：develop areas with higher power generating potentials prior to 2015, then develop areas with less potential thereafter.

Develop 564 MW in the initial phase,and complete another 270 MW by 2015,which amounts to a total of 800 MW；for areas with less potential, develop 400 MW following the years after 2015. 1,200 MW on-shore wind installed capacity will be reached by 2020.

B. Off-shore：develop among the shallow areas prior 2020 then develop in deep water off-shore areas.

- Establish the first off-shore wind farm by 2015, and reach 600 MW installed capacity on shallow off-shore areas (approximately 120 turbines) by 2020.
- Develop large wind-farms in areas possessing economic scalability between 2021-2030 (reaching 2,400 MW, which is approximately 480 wind turbines in 10 years)

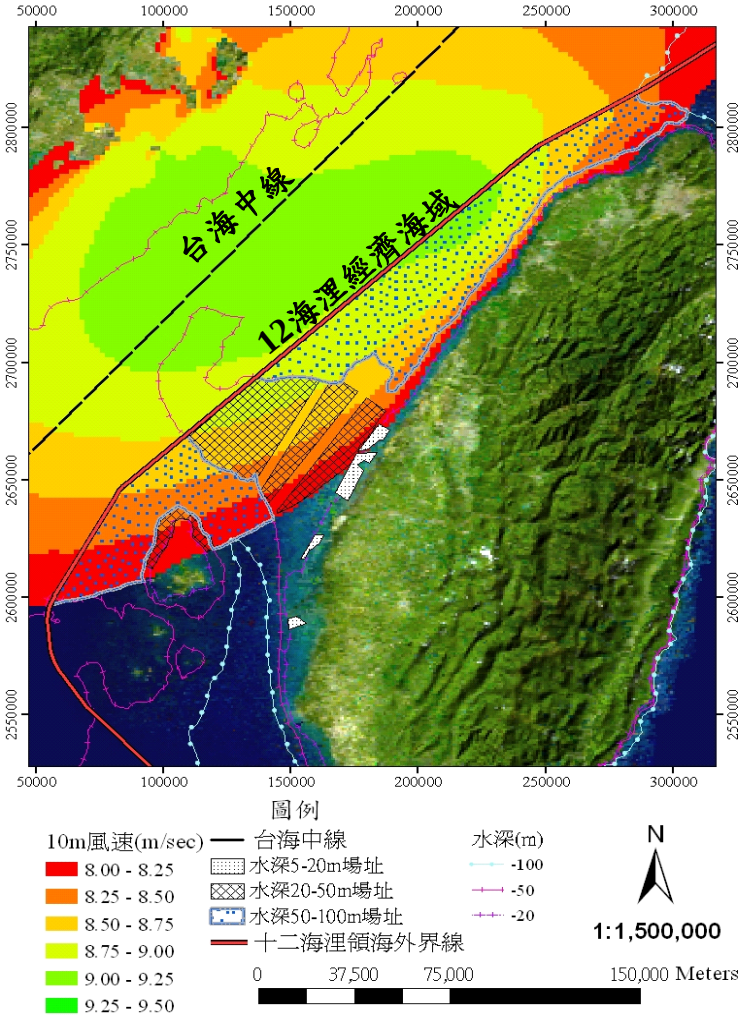


Off-Shore Wind Power Demonstration Program

Offshore Wind Potential

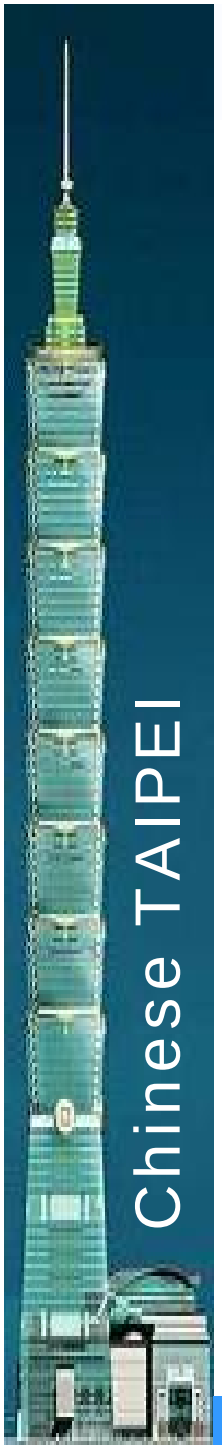
1.The development potential of offshore wind power is estimated more than 15 GW with the market incentive and large scale development opportunity.

- **Water deep 5-20 m (shallow sea)**
  - About 177,920 hectare
  - About 9 GW in potential
    - 1.2 GW exploitable (13% development)
- **Water deep 20-50 m (deep sea)**
  - About 654,700 hectare
  - About 48 GW in potential
    - 6.2 GW developable (13% development)
- **Water deep 50-100 m (deeper sea)**
  - About 1,195,400 hectare
  - About 90 GW in potential
    - 9 GW developable (10% development)



※ The wind power device of 3 MW is estimated by 4Dx10D wind farm within the boundary of 12 nm territorial sea (D: the diameter of the blade 100 m).

資料來源：工研院綠能所 (2011/04)
Source: ITRI/GEL (Apr. 2011)



Incentive amount

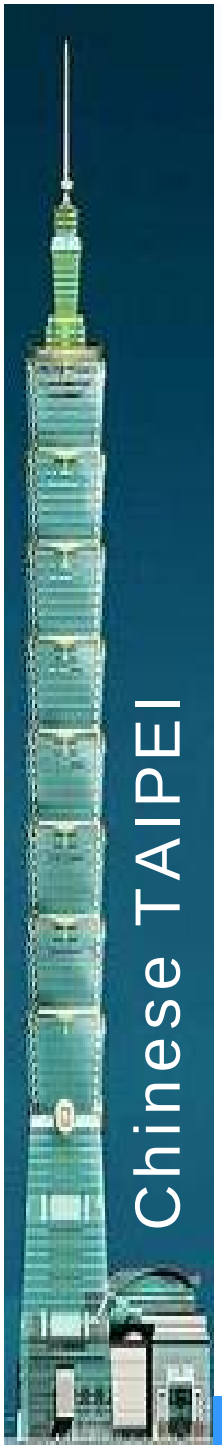
The incentive includes “demonstration incentive” and “development incentive”.

(1)Demonstration incentive:

- **The upper limit: shall not exceed 50% of the total cost of demonstration device set up.**
- **To avoid double rewards, the subsidy of this part must be returned by receiving lower FIT until the subsidy is totally returned.**

(2)Development incentive:

- **The limit is NT$ 250 million. This part of subsidy is in full reward and won’t be returned. However the technical and cost information shall be put into public as future reference for the review of FIT.**



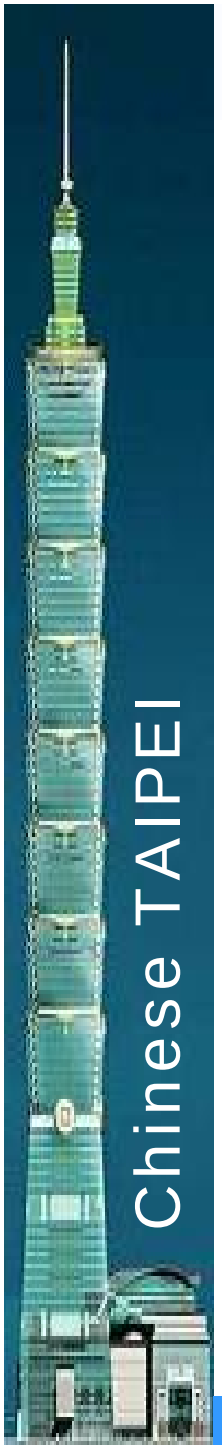
- **Demonstration wind farm: in the ocean of 5 m isobaths or deeper, with total capacity above 100 MW but not exceeding 200 MW.**
- **Demonstration devices: 2 offshore wind power systems of single capacity above 3 MW**
- **Complete 1 offshore meteorological observation tower and the application of ecological environmental investigation; complete basic, structural, parallel construction test, business operation, and maintenance.**

Demonstration wind farm: depth ≧ 5 m；total scale ≧ 100 MW and ≦200 MW

ecological investigation and environmental evaluation

Demonstration devices
2 devices ≧ 3 MW

Offshore meteorological observation tower: depth ≧ 10 m；height ≧ 75 m



Concluding Remarks

- The promulgation of Renewable Energy Development Act and related regulations has paved the way for a sustainable long-term development of renewables in Chinese Taipei.
- Various kinds of incentives have been issued to encourage the investment in renewables in Chinese Taipei.
- The development of renewable energy is expected to be prosperous in Chinese Taipei.
- Chinese Taipei's government will devote itself for the continuous growth of renewable energy.

Thank you for your attention

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