

Prospects and Challenges of Energy Transition in Taiwan

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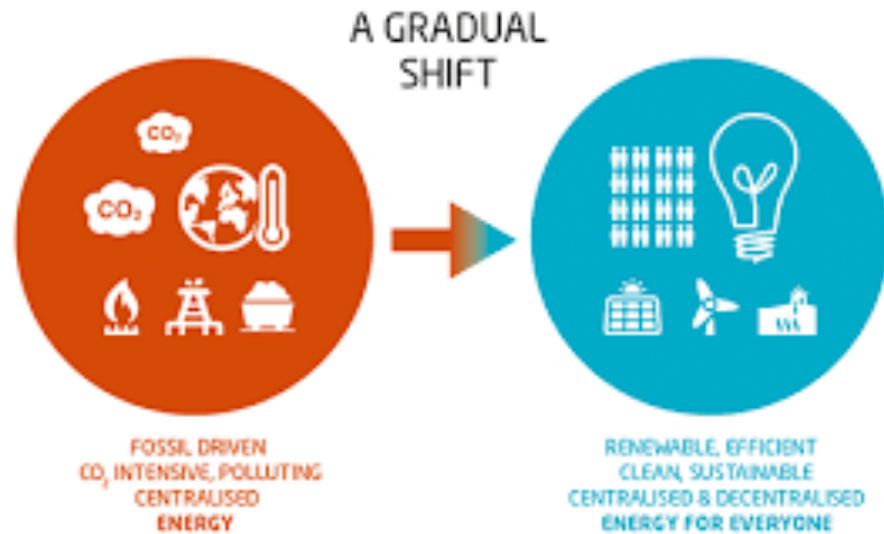
Seoul, South Korea

Outline

I. Key Energy Transition Policy and Strategy in Taiwan

II. Prospects and Challenges

Global Energy Transition Trend



Embarking on Energy Transition

《Inaugural Speech on May 20, 2016》

- ✚ We will regularly **review goals** for cutting greenhouse gas emissions in accordance with the agreement negotiated at the **COP21 meeting** in Paris. **Together with friendly nations**, we will safeguard a sustainable earth.
- ✚ We **will not be absent** in the efforts to prevent global warming and climate change. We will **create** within the Executive Yuan **an office for energy and carbon-reduction**.

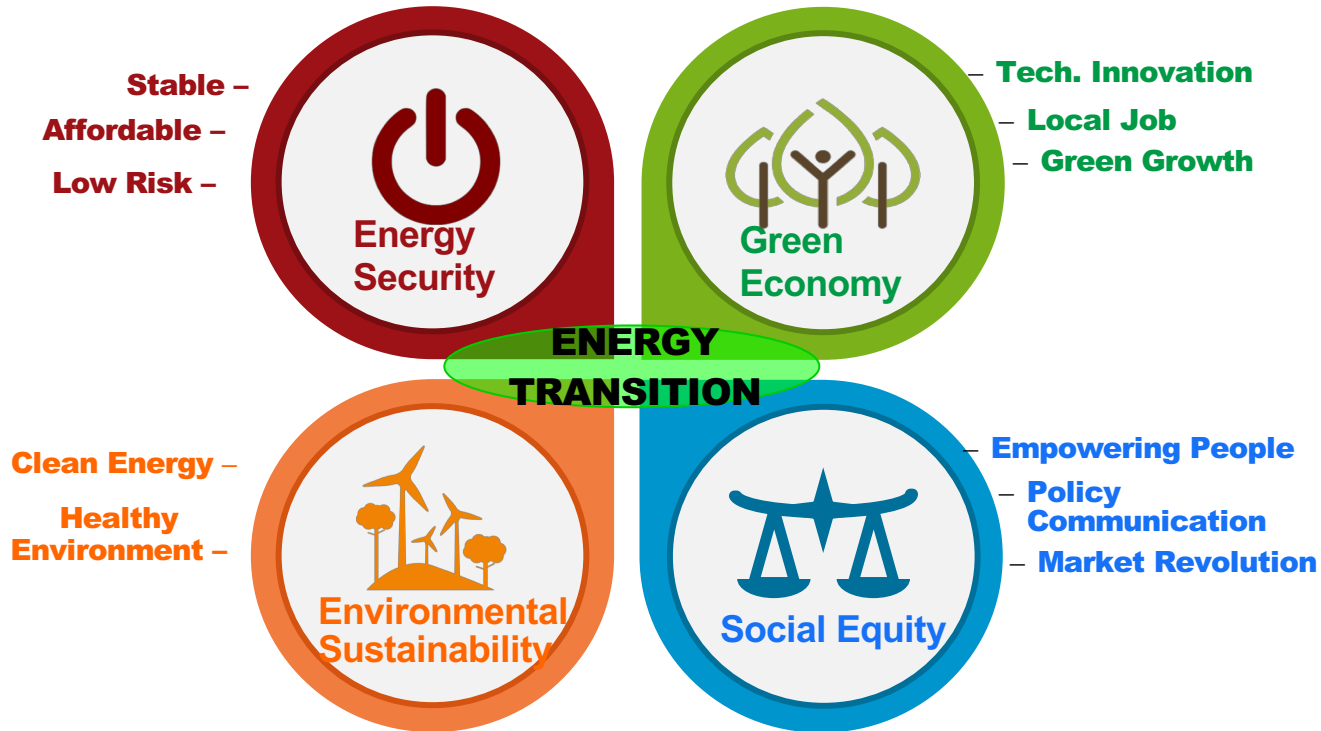


President **Tsai Ing-wen**

- ✚ The “**Greenhouse Gas Reduction and Management Act**” that came into force on 1 July 2015, laid down **greenhouse gas emission reduction targets by 2050** for Taiwan. We will adopt a stage-wise approach to formulate our deployment strategies, including periodic reduction goals (in 5-year stages) along with measures to reach them.

The Vision of Energy Transition Policy (1/2)

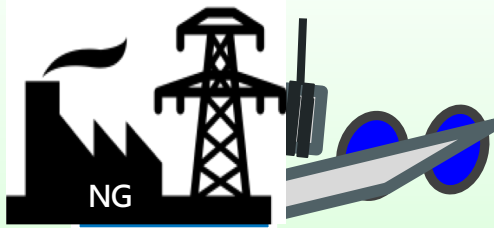
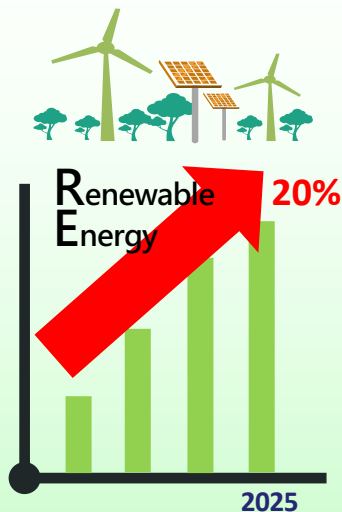
■ Core Value of Taiwan's Energy Transition



The Vision of Energy Transition Policy (2/2)

■ Launch Energy Transition and Power Market Reform in June, 2016

- ❌ Establish a low-carbon, sustainable, stable, high-quality and economically efficient energy system, and to achieve the **“Nuclear-Free Homeland” (非核家園)** vision by **2025**.



- Expansion NG Power Generation
- Building No.3 LNG Terminal



Energy Transition Development in Taiwan

Current Status

- Approximately **98 %** Energy Import Dependency
- Approximately **5 %** RE (2016)
(/ total power generation)
- Centralized/ Quasi-monopolized Electricity Market

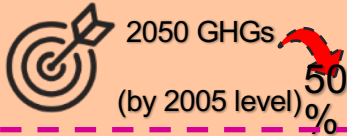


Policy Goal: 2025 Nuclear-Free Homeland

- **20 %** RE (/ total power generation)
= installed capacity of 27 GW
- **50 %** Natural Gas (/ total power generation)
- **30 %** Coal (/ total power generation)
(27 % Coal, new target, March 4, 2019)
- Electricity Market Reform

Taiwan's Energy Transition Policy

2015/07
**Greenhouse Gases
Reduction and
Management Act**



2016/05/25
Energy Transition Policy



**2025
Nuclear-free**



20% RE

2017/12/21
**Electric Vehicle
Implementation Schedule**

**2030 all city new buses and
car of public offices**
2035 all new motorcycles
2040 all new vehicles



2015

2016

2017

2018

2015/09/17
**Intended
Nationally
Determined
Contribution
(INDC)**



2017/01/26
**Amendment of
Electricity Act**

- ✓ **Open Market for
Renewable Energy**
- ✓ **Introduction of
Users Purchasing
Option**

2017/04/26
**Amendment of Guideline
on Energy Development**

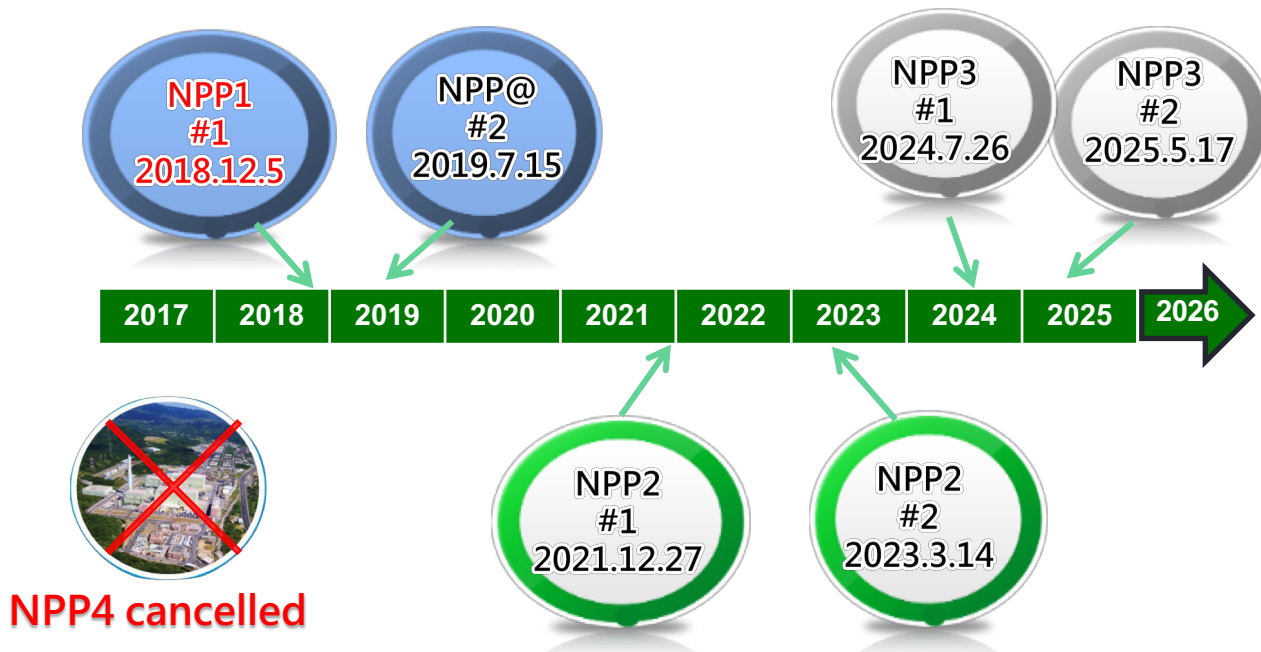
2017/06/28

**Initiative to Draft
Energy Transition
White Paper**

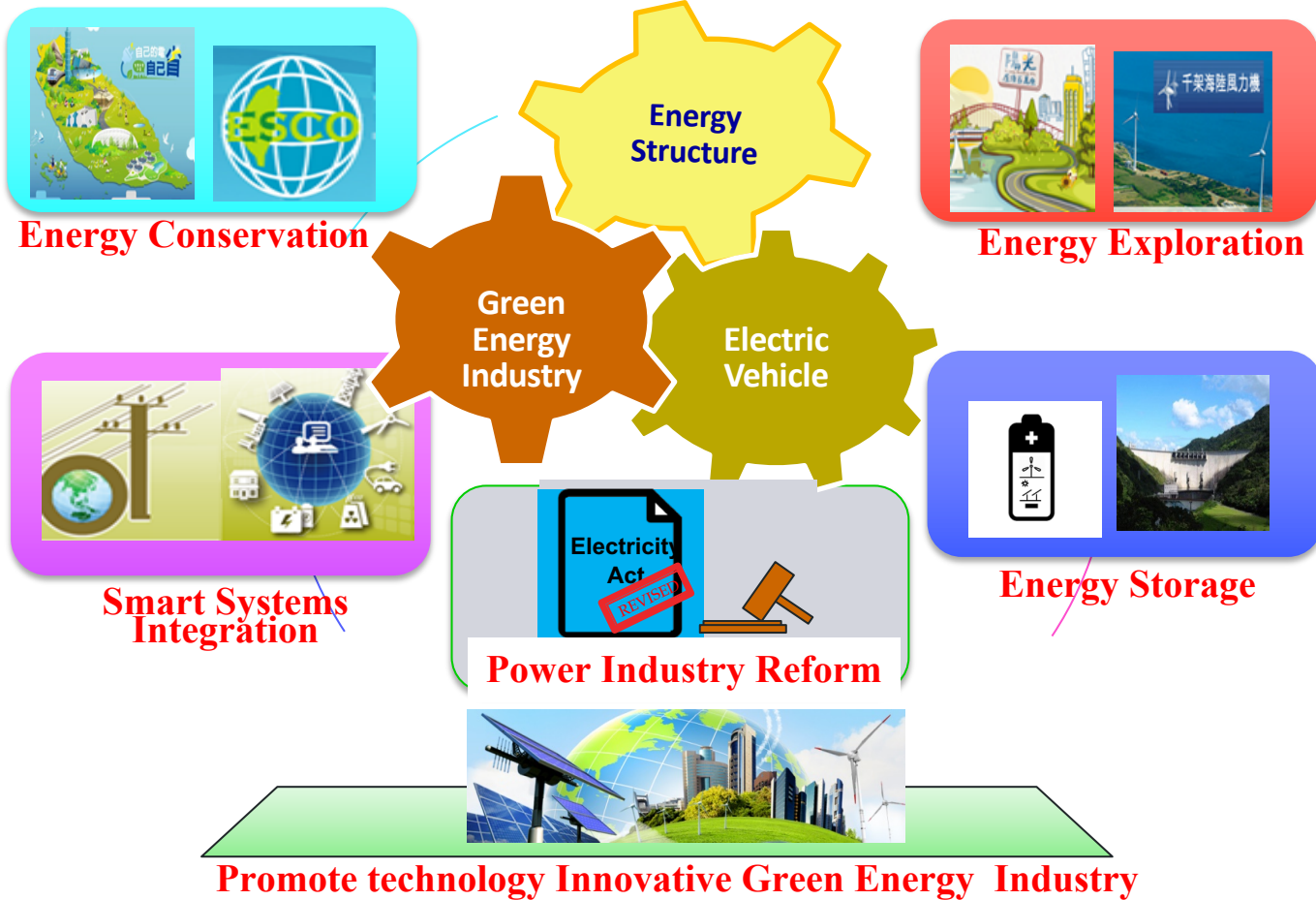


Timeline of Nuclear Phase-out in Taiwan

- According to the newly amended Electricity Act (2017): All nuclear power plants should stop operation by 2025
- “No Nuclear Homeland Task Force” under the Executive Yuan (2017)



Key Strategy for Energy Transition



Key Programs



■ Energy Conservation

- ✓ New Electricity Saving Initiative(新節電運動)
- ✓ Services and Residential Sector Energy Saving Project
- ✓ Industrial Sector Energy Efficiency Project
- ✓ Building Sector Energy Saving Project
- ✓ Transportation Sector Energy Saving Project



■ Energy Exploration

- ✓ 2-Year Solar PV Development Plan
- ✓ Green Energy Roofs Project
- ✓ 4-Year Wind Power Development Plan
- ✓ Expanding Use of Natural Gas



■ Smart Grid System Integration

- ✓ General Plan for Smart Grid Planning
- ✓ Energy Storage Project



■ Electricity Market Reform

- ◆ Implement the Electricity Act Amendment
- ◆ Renewable Energy Development Act Amendment

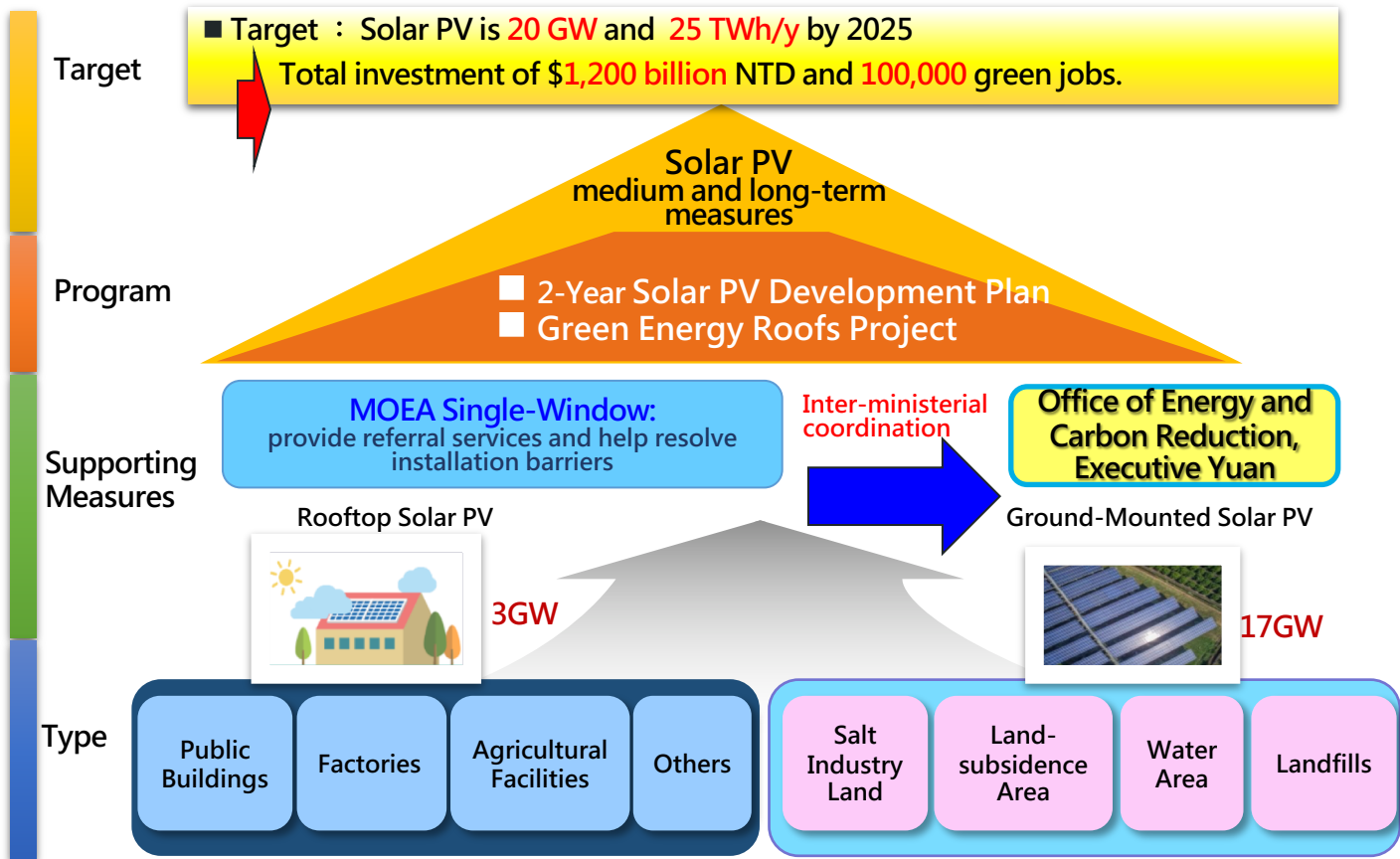


■ Green Energy Technology Industry Development

- ◆ Green Energy Technology Innovative and Industry Promotion

Energy Exploration (1/5)

Framework of Solar PV Development Plan



Energy Exploration (2/5)

◆ 2-Year Solar PV Development Plan

- Target: install **1.52 GW** from July, 2016 to **June, 2018**.
- Strategy:
 - ✓ **Single-window consultation:**
provide referral services and help resolve installation barriers.
 - ✓ **Expand land available for solar PV:**
gradually promote **large-scale ground mounted** solar PV systems.
 - ✓ **Strengthen power grid infrastructure**



◆ Green Energy Roofs Project

- Target: install **2GW** by 2020.
- Principle: **zero payment** from the public, **zero subsidy** from the government.
- Strategy:
 - ✓ Realize the economies of scale through the local governments.
 - ✓ The **service providers give rebate**.
 - ✓ Electricity generated by PV is **first consumed** by the building **occupants**, and any **surplus is wholesaled** by the service provider to the **public grid**.

Energy Exploration (3/5)

■ Framework of Wind Power Development Plan

Target : Wind power is to reached **6.9 GW** by 2025.

Onshore **1.2 GW**

Offshore **5.7 GW**

Wind Power
Zonal Development

4-year Wind Power Development Plan

MOEA Single-window

→ Tracking progress and help
resolve installation barriers

→ Inter-ministerial
coordination

Office of Energy and
Carbon Reduction,
Executive Yuan

Onshore

Offshore

Negotiation

Sites
Selection

Parallel Power
Distribution
Feeder

Fishery
Industry

Sole
Purpose
Docks

Industrial
Parks

Construction
Teams

Regulations

grid-
connected
power
stations

Space
Management

Supporting Measures

Energy Exploration (4/5)

4-Year Wind Power Development Plan - Onshore

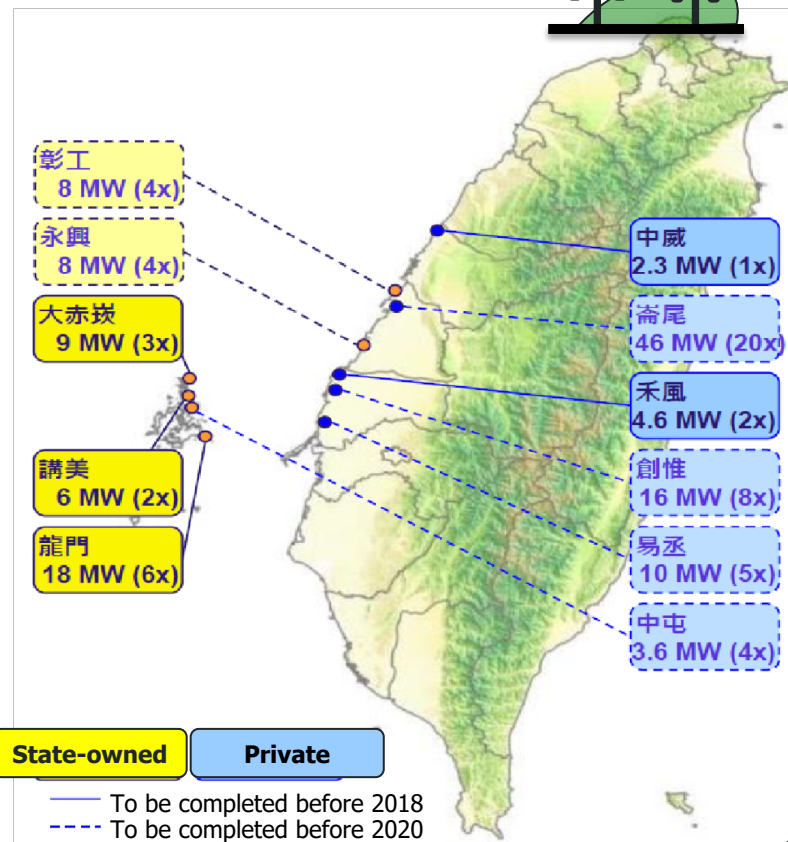
Onshore Target

● 2016	682 MW
● 2018	773 MW
● 2020	814 MW
● 2025	1,200 MW

Potential Sites for Onshore

● Taipower	49 MW
● IPPs	37 MW
● Lunwei, Changhua	46 MW

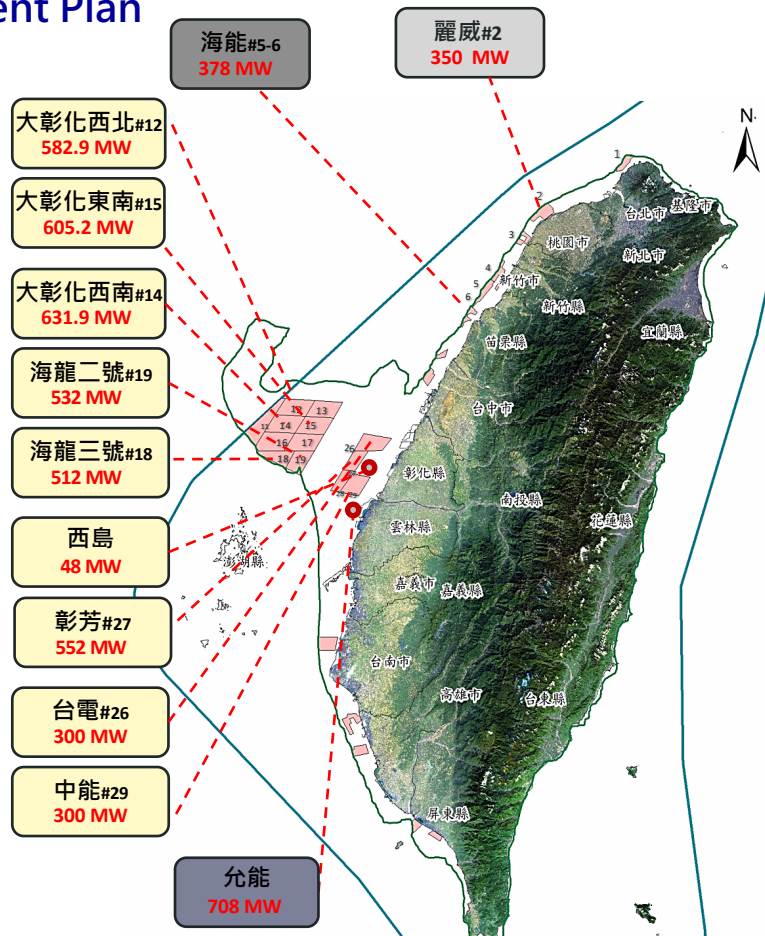
Total 132MW in 2020



Energy Exploration (5/5)

4-Year Wind Power Development Plan - Offshore

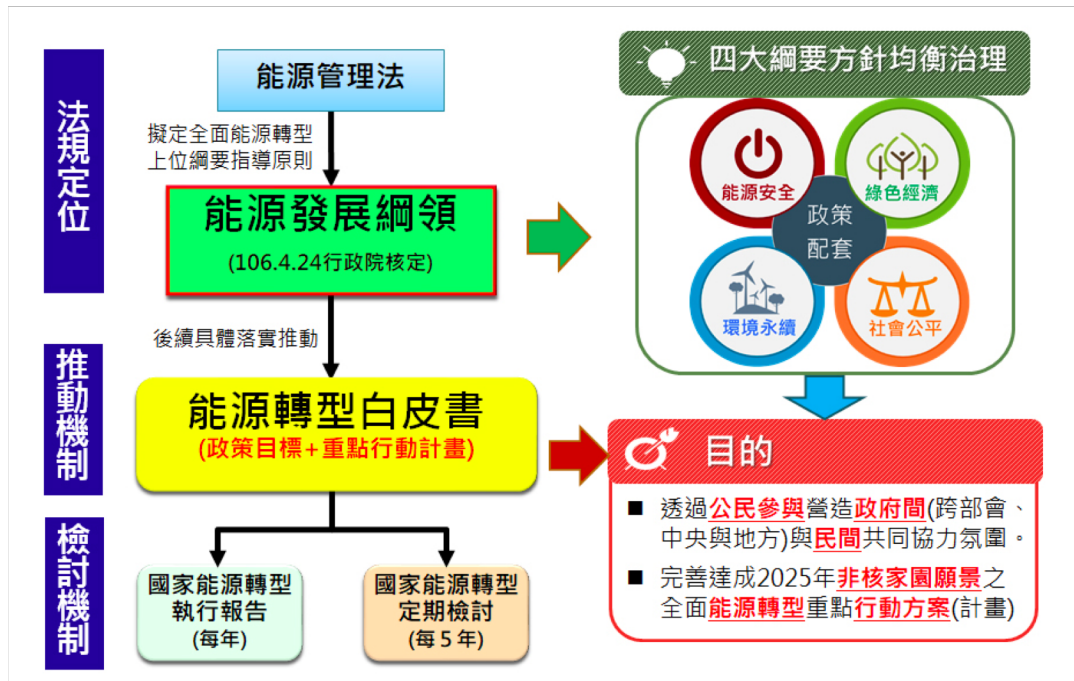
Area	Capacity	ratio
Taoyuan	350 MW	6.3 %
Miaoli	378 MW	6.9 %
Chung-hua	4,064 MW	73.9 %
Yunlin	708 MW	12.9 %
total	5,500 MW	100 %



Energy Transition White Paper Meetings

- Energy Transition White Paper: The action policy based on the *Guidelines on Energy Development (2017)* in order to accomplish the national governmental goal of Nuclear-Free Homeland by 2025
- Governance Principles of the Guidelines on Energy Development (2017):
 - Energy Safety
 - Green Economy
 - Environmental Sustainability
 - Social Justice

→ Democratic Energy Transition



Energy Transition White Paper Meetings

- Since energy transition requires **monitoring and participation of the society**, the government expanded citizen participation and cross-sectoral discussion for the drafting of the Energy Transition White Paper
- 1st Stage: *Preparation Meetings*
2nd Stage: *Collaboration*
3rd Stage: *Citizen Dialogue*



Phase II Taskforce Collaboration

- **Establish Five Taskforces to Collaborate**

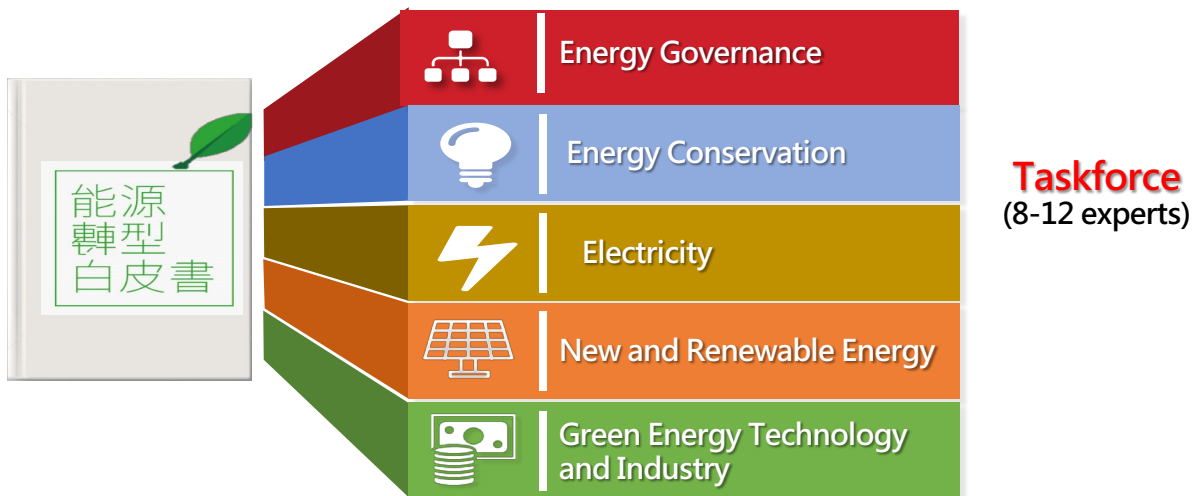
Five taskforces were established and experts collaborated to come up with concrete works of **key programs**.

- **Principle for Recruiting Experts**

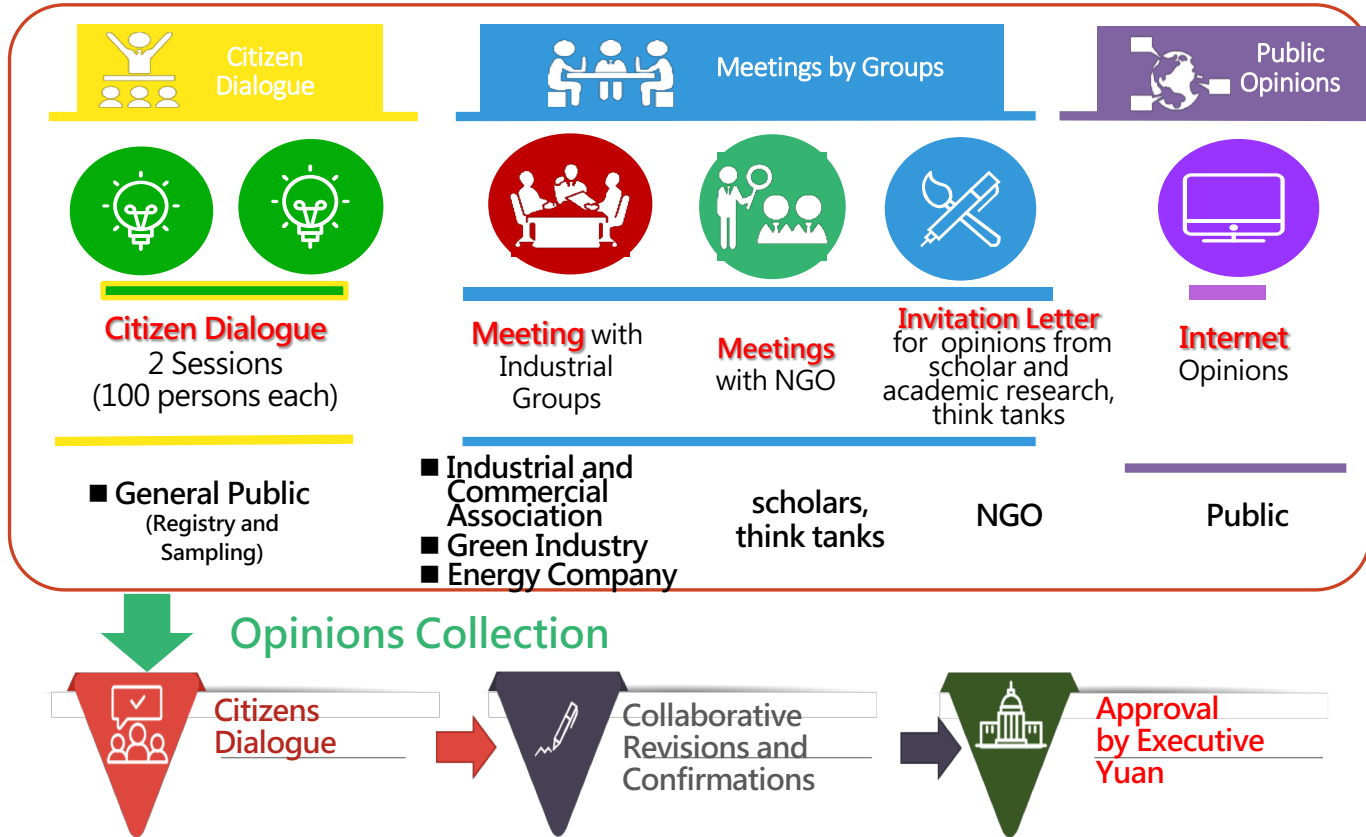
8-12 experts from **academia**, **industries**, **NGO** and **governments** were recruited to discuss key programs in each field.

- **Dispute resolution**

When running into difficulties, **Energy and Carbon Reduction Office** of the Executive Yuan will coordinate and integrate.



Phase III Citizen Dialogue



Transportation Sector : Electric Vehicles

- **2030:** All new buses and government vehicles should be electric
- **2035:** All new scooters sold should be electric
- **2040:** All new cars sold should be electric



Emerging Community Energy Movement

Miaoli Sky No.1 Energy Cooperative (first community Power 2015)

- First **energy cooperative** in Taiwan
- Solar PV combined to the grid in December 2017;
Estimated to produce 10,000 kWh of electricity annually
- Installed capacity: 10.03 kW
- Installed area: 61.16 square meters
- Payback: 10-12 years



Emerging Community Energy Movement

Miaoli Sky No.1 Cooperative



- Challenges of Energy Cooperatives:
Cooperatives value **information transparency** and **deliberative decision-making**, thus taking more time for cooperatives to be established:
It took more than 1 year for Sky No.1 to be established
- Future Perspective:
Establishments for **Kaohsiung Sky No.2** and **New Taipei Sky No.3** are ongoing
→ Bringing in more citizen power and voices from other organizations

Emerging Community Energy Movement

Taromak Village Green Power Company

- First **citizen power company** in Taiwan
- Goal of becoming RE100 Village in 2 years:
Solar + Hydro
- Energy autonomy equals **indigenous autonomy**
- Hopes to expand the scale in the future, and **return the profits for local welfare**



Prospects and Challenges for Energy Transition in Taiwan

- Progressive energy transition plan
(President Tsai Ing-Wen in 2016 declared a new energy transition strategy by 2025)
- Public dialogue and citizen engagement
- Anti-coal/anti-air pollution campaigns
- Low energy(electricity/oil) prices
- Strong political tension/divide
- Energy-intensive industry dominates
- Setback on nuclear phase-out issue in recent referendum on Nov.24, 2018

Recent Nuclear Referendum in Taiwan (Nov.24, 2018)

Issue		
第7案：你是否同意以「平均每年至少降低1%」之方式逐年降低火力發電廠發電量？	Do you agree to reduce the amount of power generated by thermal power plants year by year by "averaging at least 1% per year?"	あなたは「平均毎年少なくとも1%」の方法で火力発電所による発電量を年々削減することに同意しますか？
第8案：您是否同意確立「停止新建、擴建任何燃煤發電廠或發電機組（包括深澳電廠擴建）」之能源政策？	Do you agree to establish an energy policy that 「to stop building new or expanding any coal-fired power plants or generator sets (including the construction of Shen-Aou Power Plant)?	あなたは、「如何なる石炭発電所や発電設備の新設、拡大[増築](Shen'aou 発電所の拡大[増築]を含む)も停止する」エネルギー政策を確立することに同意しますか？
第9案：你是否同意政府維持禁止開放日本福島311核災相關地區，包括福島與周遭4縣市（茨城、栃木、群馬、千葉）等地區農產品及食品進口？	Do you agree that the government will continue the embargo of agricultural products and food from 311 Fukushima-nuclear-disaster affected areas including neighboring four prefectures (Ibaraki, Tochigi, Gunma, Chiba)?	あなたは日本・福島県及びその近隣の四県(茨城、栃木、群馬、千葉)における2011年3月11日の原発事故関連地域からの農産物及び食品類に対する、政府の禁輸措置の維持に同意しますか？
第16案：您是否同意：廢除電業法第95條第1項，即廢除「核能發電設備應於中華民國一百十四年以前，全部停止運轉」之條文？	Do you agree to abolish the paragraph 1, Article 95 of the Electricity Act, that is, to abolish the provisions of " Nuclear power generation equipment should be completely shut down before 2025? "	あなたは、電気事業法第95条第一項、すなわち「2025年までに原発をすべて停止する」という条文を無効化することに同意しますか？

Thanks for your attention

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