



Knowledge Sharing Platform (KSP) Workshop  
for the Energy Smart Communities Initiative

# An Introduction to Chinese Taipei's Current Development on Energy Smart Community

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# Outline

## ■ Policy Framework and Action Plan

- Guideline of Sustainable Energy Policy
- Action Plan of Guideline of Sustainable Energy Policy
- National Energy Saving and Carbon Reduction Scheme

## ■ Current Development and Strategies

- Smart Transportation
- Smart Buildings
- Smart Grid
- Smart Jobs and Consumers

## ■ Case Study

- Low Carbon Communities/Cities/Islands
- Penghu Low Carbon Island

## ■ Conclusion



# Policy Framework and Action Plan



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# Guideline of Sustainable Energy Policy

Passed on June 2008

## Policy Objective

### Efficiency

#### Enhancing energy efficiency

- Improve energy efficiency by at least 2% annually
- Reduce energy intensity by 20% by 2015 (with 2005 as base year)
- Reduce energy intensity by at least 50% by 2025 via technical breakthrough

Energy saving target

### Cleanness

#### Developing clean energy

- Reduce CO<sub>2</sub> emission to the level of 2005 by 2020, and further reduce CO<sub>2</sub> emission to the level of 2000 by 2025
- Increase the share of low carbon energy in power generation to at least 55% by 2025

Carbon reduction target

### Stability

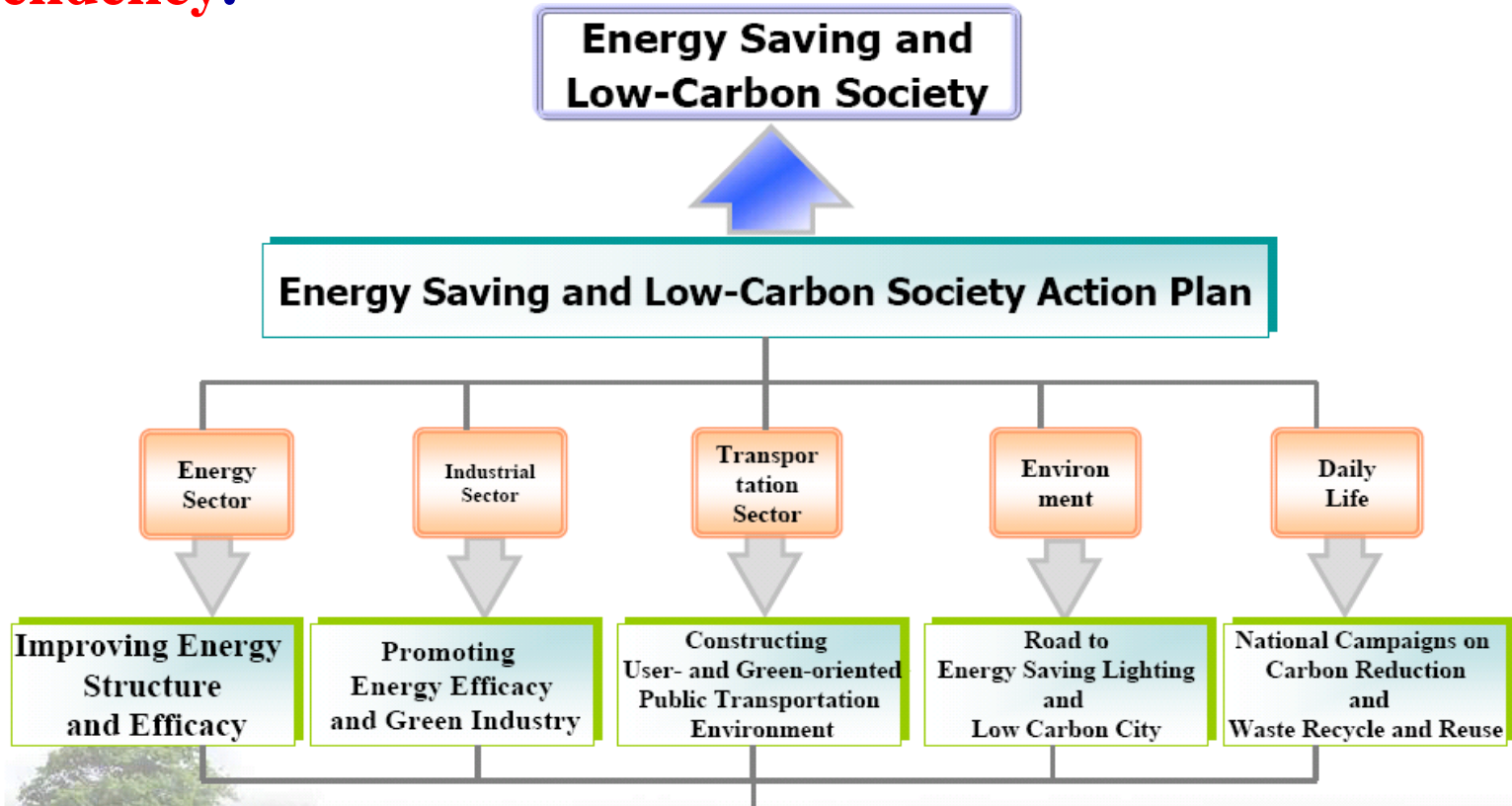
#### Securing stable energy supply

- To build a secure energy supply system which meets economic development targets



# Action Plan of Guideline of Sustainable Energy Policy

➤ To establish a energy consumption pattern and energy supply system with **high efficiency, high value, low emission and low dependency.**



**Providing a comprehensive regulatory framework and supporting mechanisms**



# National Energy Saving and Carbon Reduction Scheme

➤ Passed on May 2010.

➤ 10 benchmark projects with 35 sub projects (concrete implementation of Guideline of Sustainable Energy Policy & extension of action plan of Guideline of Sustainable Energy Policy)

NESCRS

ESCI

1. Enhance regulatory regime
2. Remodel low carbon energy system
3. Develop low carbon communities/society
4. Construct low carbon industrial structure
5. Build green transportation network
6. Popularize green building
7. Expand technical capacity for energy saving and carbon reduction
8. Promote energy saving and carbon reduction in public construction
9. Deepen energy saving and carbon reduction education
10. Strengthen public communication on energy saving and carbon reduction

Smart transportation

Smart buildings

Smart grid

Smart jobs & consumers

Low carbon modal town

1. Major components and priority works are in line with four pillars of ESCI.

2. Outreach beyond the ESCI in areas such as regulatory regimes, industrial transformation...





# Current Development and Strategies



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# Smart Transportation (1/8)

Build  
green  
transportation  
network

- 1. The establishment of seamless public transportation system**
  - ✓ Highway transportation
  - ✓ Demonstration project of bike trails in eastern region
- 2. The promotion of rail transportation network**
  - ✓ Follow-up construction of high speed rail
  - ✓ Rail transit project
  - ✓ Mass rapid transit system in metropolitan areas
- 3. Smart road service**
  - ✓ Highway traffic management
  - ✓ Electronic fare collecting system on highway
  - ✓ Smart traffic control system
- 4. The promotion of human-oriented transportation**
- 5. The escalation of energy efficiency standards of new vehicles**

→ The concept of Intelligent Transportation System (ITS) has been introduced and incorporated in the construction of infrastructure and the improvement of transportation services step by step.





# Smart Transportation (2/8)

## Public Transportation System Plan

**The 3-year public transportation system plan has been launched since 2010, and that is focused on**

- ✓ **Improvements to public transport infrastructure**
- ✓ **Increasing the ridership of public transport by changing the general public's travel behavior**
- ✓ **Providing public transport services to the socially disadvantaged**
- ✓ **Seamless public transport service**



# Smart Transportation (3/8)

An integrated electronic fare collecting system provides seamless service among rapid transit, railway and bus to the general public



# Smart Transportation (4/8)

## Off-shore Island Electric Motorcycle Promotion Program

Implementing an “Off-shore Island Electric Motorcycle Promotion Program” in Green Island to achieve “Green Transport Island”



# Smart Transportation (5/8)

## Bicycle-Friendly Environment

- Along our beautiful Pacific (Eastern) coastline alone, we have developed 867 kilometers of bike trails
- Chinese Taipei will be holding the “2011 Cycling Festival” along our Pacific Coast

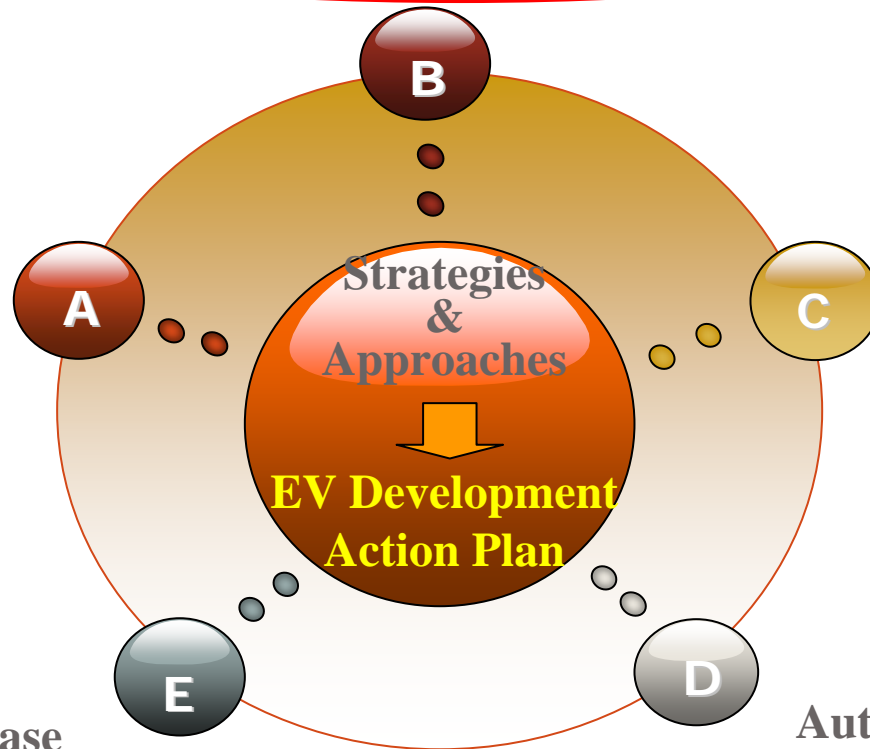




# Smart Transportation (6/8)

## Chinese Taipei's EV Strategies & Approaches

EV Pilot Run Project



Energy Saving & Carbon Reduction  
(Emission Regulation)

Complete Intelligent EV Environment

EV Purchase Incentive

Auto Industry Evolution



# Smart Transportation (7/8)

## EV Development Action Plan

The EV Development Action Plan will provide USD\$300 million in assistance for over 6 years.

### Phase 1

#### EV Pilot Run Project (2010~2013)

- To encourage eligible companies to demonstrate EVs in certain areas to accelerate EV and infrastructure development.

### Phase 2

#### EV Incentive Project (2013~2016)

- To make EVs more affordable and provide incentives.
- To popularize electric vehicles and the infrastructure.



# Smart Transportation (8/8)

## EV Promotion

### ■ EV Pilot Run

- To achieve 10 projects and 3000 units EVs on road
- Building refueling infrastructure for EVs

### ■ Tax Reduction

- **Commodity Tax Exemption** within the next 3 years has been approved
- Draft version of License Tax Free passed 1st investigation of Legislative Yuan

### ■ Industry Innovation

- Support and Upgrade Industry capability in EVs related tech. fields.

### ■ Global Cooperation

- Working with EU and Asia partners in exchanging Pilot Run experience and developing EVs and key components
- Global standard harmonization through International meeting and cooperation between Key EV Standard organizations



# Smart Buildings (1/3)

Popularize  
green buildings

- 1. The promotion of green building and green materials**
  - ✓ Advance newly-built buildings to obtain green building certificate
  - ✓ Enhance energy efficiency in buildings
  - ✓ Incorporate energy saving design in building codes
  - ✓ Encourage green building design of private buildings
  - ✓ Conduct study on green building materials
- 2. The promotion of smart building**
- 3. The promotion of energy saving and carbon reduction labeling system for building**

➤ Chinese Taipei is the **4th** economy in the world that formally implements assessment and certification of green building since 2007

➤ The only assessment system suitable for **tropical and subtropical regions**

➤ Dedicated to set up an **aggressive regulatory system** to support the promotion of green buildings





# Smart Buildings (2/3)

## Green building labeling system

- ✓ Established since 2007
- ✓ Aims at encouraging green building design
- ✓ 9 assessment indexes
- ✓ Classified in 5 levels: certified, bronze, silver, gold and diamond



- ✓ 2,990 buildings acquired by June 2011, evenly distributed across the region
- ✓ Estimated carbon reduction: 627,000 tons



## Green building material labeling system

- ✓ Established since 2004
- ✓ Green materials must be used for interior furnishing and flooring and account for at least 30% of all decorating materials



- ✓ 398 green building labels were conferred in 2010
- ✓ Covered more than 3,000 products in total
- ✓ Estimated value is 10 million USD per year



# Smart Buildings (3/3)

## Mandatory and incentive measures

### 1. Mandatory green building design in the public sector

- ✓ All new government buildings are required to pass green building certification prior to building license issuance
- ✓ From 2002 to 2010, 164 green remodeling projects for government buildings have been completed

### 2. Reward program for private sector to pursue green building

- ✓ Rewarded categories include environmental protection, energy saving, water reduction and health of indoor
- ✓ Maximum of reward per case is about 67,000 USD



# Smart Grid (1/2)

## National Advanced Metering Infrastructure Deployment Plan

### High voltage:

- ✓ 23,000 users
- ✓ 58% of total power consumption

### Low voltage:

- ✓ 12 million users
- ✓ 42% of total power consumption



**Two-phase implementation: high voltage → low voltage**



# Smart Grid (2/2)

## high voltage

Taipower Company started the construction of high voltage AMI system, which will be completed in 2012.

## Low voltage

### Phase 1 (2009-2010)

- Technology validation and evaluation
- To include 300~500 users as a demonstration system

### Phase 2 (2011~2012)

- Pilot program
- 10,000 users are targeted

### Phase 3 (2013-2015)

- 1 million users
- Policy trial & modification platform

### Phase 4 (2016~)

- 5 million users
- Supporting scheme: load management and demand response



# Smart Jobs and Consumers (1/4)

**Conduct energy Saving and carbon reduction education**

- 1. Comprehensive energy saving and carbon reduction program in campus**
  - ✓ replace traditional lighting appliance with high efficiency lighting appliance
  - ✓ “health check” for power consumption of schools of all levels
- 2. Assessment mechanism of energy saving and carbon reduction in campus**
  - ✓ promotional scheme for sustainable campus
  - ✓ guiding program for GHG management in campus
- 3. Strengthening energy saving and carbon reduction education**
  - ✓ create and promote a teaching platform for digital course of sustainable campus
  - ✓ Promotional video used in campus

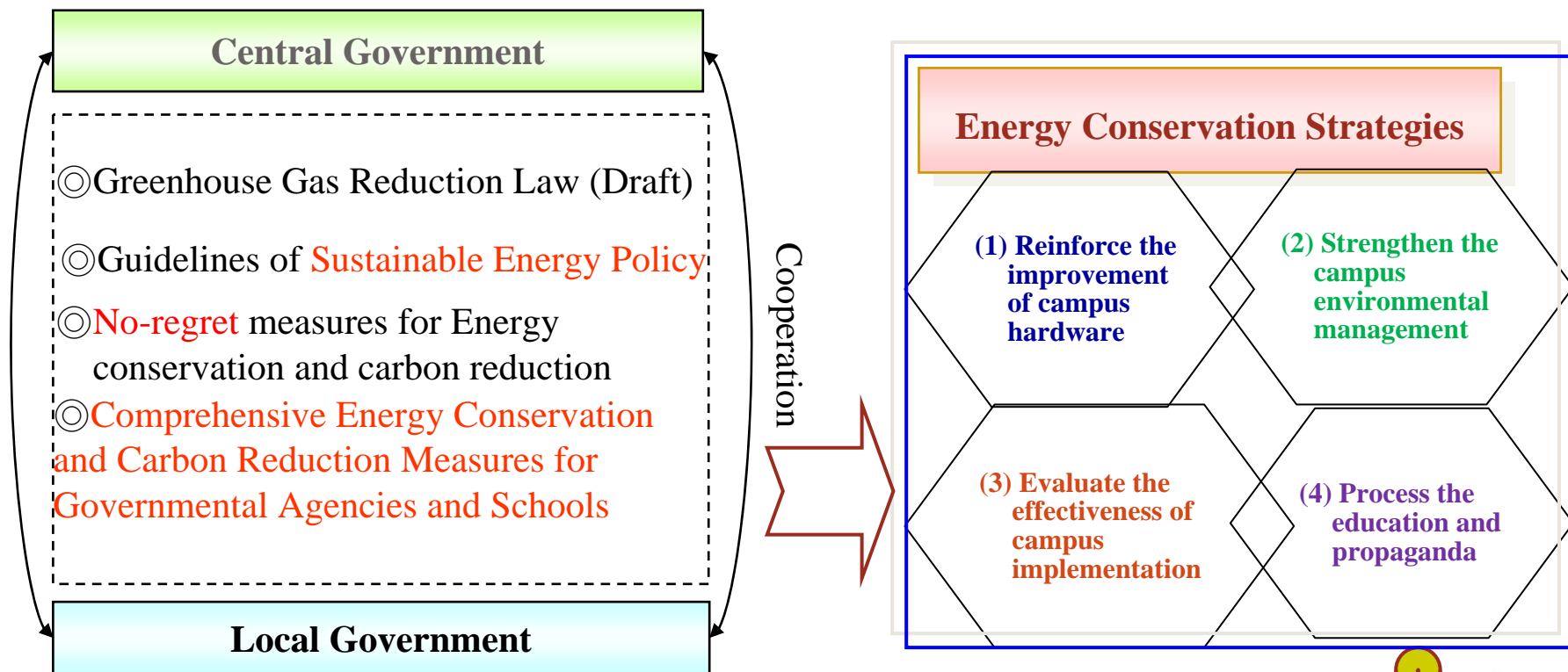
**Public communication on energy saving and carbon reduction**

- 1. Communication campaign of energy saving and carbon reduction**
  - ✓ enhance awareness and practical implementation in public & private sector
- 2. The promotion of environmental diplomacy**

**The promotion of energy saving and carbon reduction as a social campaign was initiated from the public sector and quickly spread to all sectors by multiple communication channels.**

# Smart Jobs and Consumers (2/4)

## The promotion of low carbon campus



In line with the governmental energy-conserving policy, the promotion of the energy conservation as well as the education and propaganda in schools at all levels have been strengthened, so as to facilitate the country's acknowledgement of the energy conservation and carbon reduction, increase the efficiency of using energy, reduce energy waste, and enhance overall national competitiveness.





# Smart Jobs and Consumers (3/4)

**Disseminate energy-saving conception and methods  
guiding public to do energy saving and emissions  
reduction manners.**

**Promote energy  
saving  
programs and  
measures**

- Start lighting-revolution (completely phase out incandescent bulb), keep pace with advance countries in the world.
- Improve energy efficiency of household appliances, creating wisdom energy-saving families.
- Promote energy efficiency ranking program –mandatory labels on electric appliances and automobiles.

**Energy saving and  
carbon emission  
reduction  
Specific measures**

**Energy saving  
and carbon  
emission  
reduction  
subsidy policies**

- Promote “electric fee discount program” to encourage the public to save energy and money.
- Step up ”counties and cities saving electric competition” electric fee give 35% discount best

**Competition, Praise  
and sharing  
experience**

- Participate “The energy-saving competition for industries”, sharing the experience and information of the outstanding energy-saving cases
- Established the energy-saving association for industries to promote voluntary energy-saving measure.
- Hold the electric-saving competition for families communities to encourage the public to save energy.





# Case Study



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# Low Carbon Communities/Cities/Islands

## Targets

- **25 low-carbon demonstration communities established in 2010**
- **50 low-carbon demonstration communities expected to be established in 2011**
- **4 cities (New Taipei, Ilan, Taichung and Tainan) selected for development of low-carbon cities**
- **Penghu island selected as the first example of low carbon islands: total expenditure of 0.26billion USD from 2011 to 2015**
- **Kinmen, Green Island and Little Liuquiu will continue to engage in the developemnt of low-carbon island**



# Penghu Low Carbon Island (1/6)

## **Make Penghu a world-class low-carbon island** **- a low-carbon clean-life living area -**

### SHOWCASE

- A pilot low-carbon sightseeing island

### ENERGY Supply

- >55% renewable energy technology

### ENERGY SAVING

- Widely use energy-saving equipments and advocate the concepts of energy saving strategies to common households

### RESOURCE

- Efficient use of water, and wastes should be reduced and recycled

### INDUSTRIES

- Promote sightseeing business with green energy infrastructures to boost local economy

### LIFE

- Sustainably use local resources and construct a low-carbon LOHAS of environment

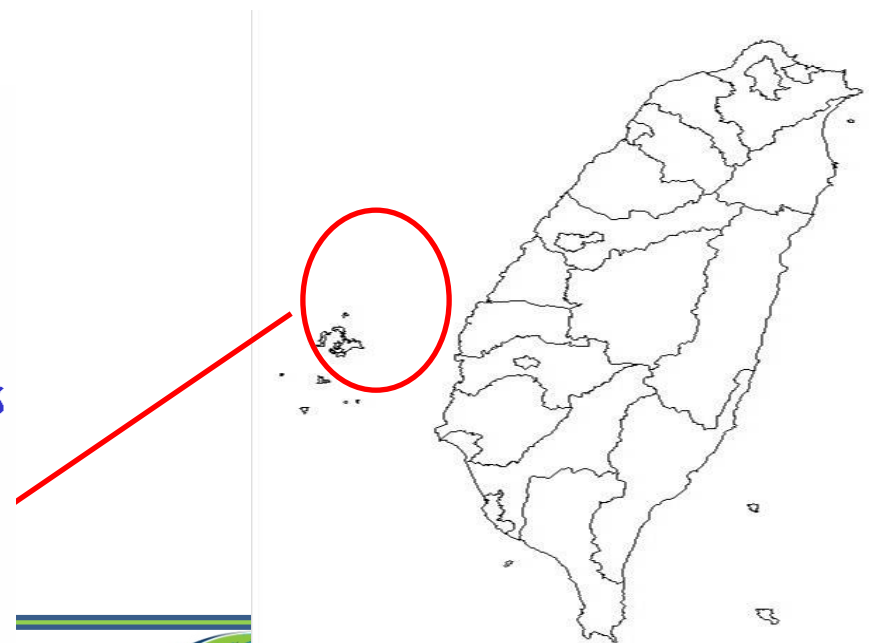
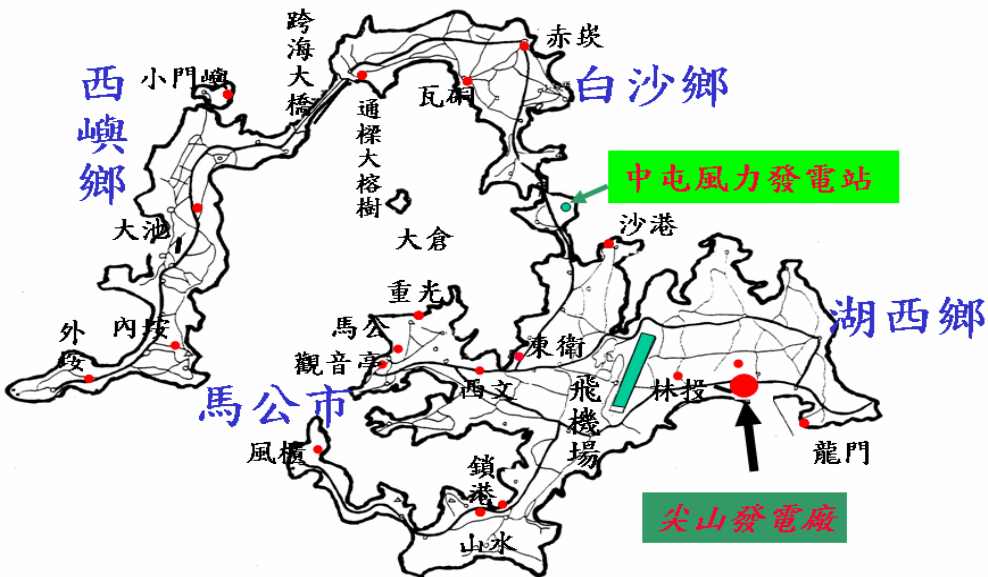


# Penghu Low Carbon Island (2/6)

## Area of the Plan

Including: Penghu Island, Hoojing Isle, Dogiao Isle, Jibei Isle, and Cimei Isle

- Population : 88,000
- Households : 30,000
- Land area : 127 km<sup>2</sup>
- Current energy supply :  
Electricity : 12 Diesel Engine (91MW) + Wind turbines 4.8MW + Oil: 37.2 million l



# Penghu Low Carbon Island (3/6)

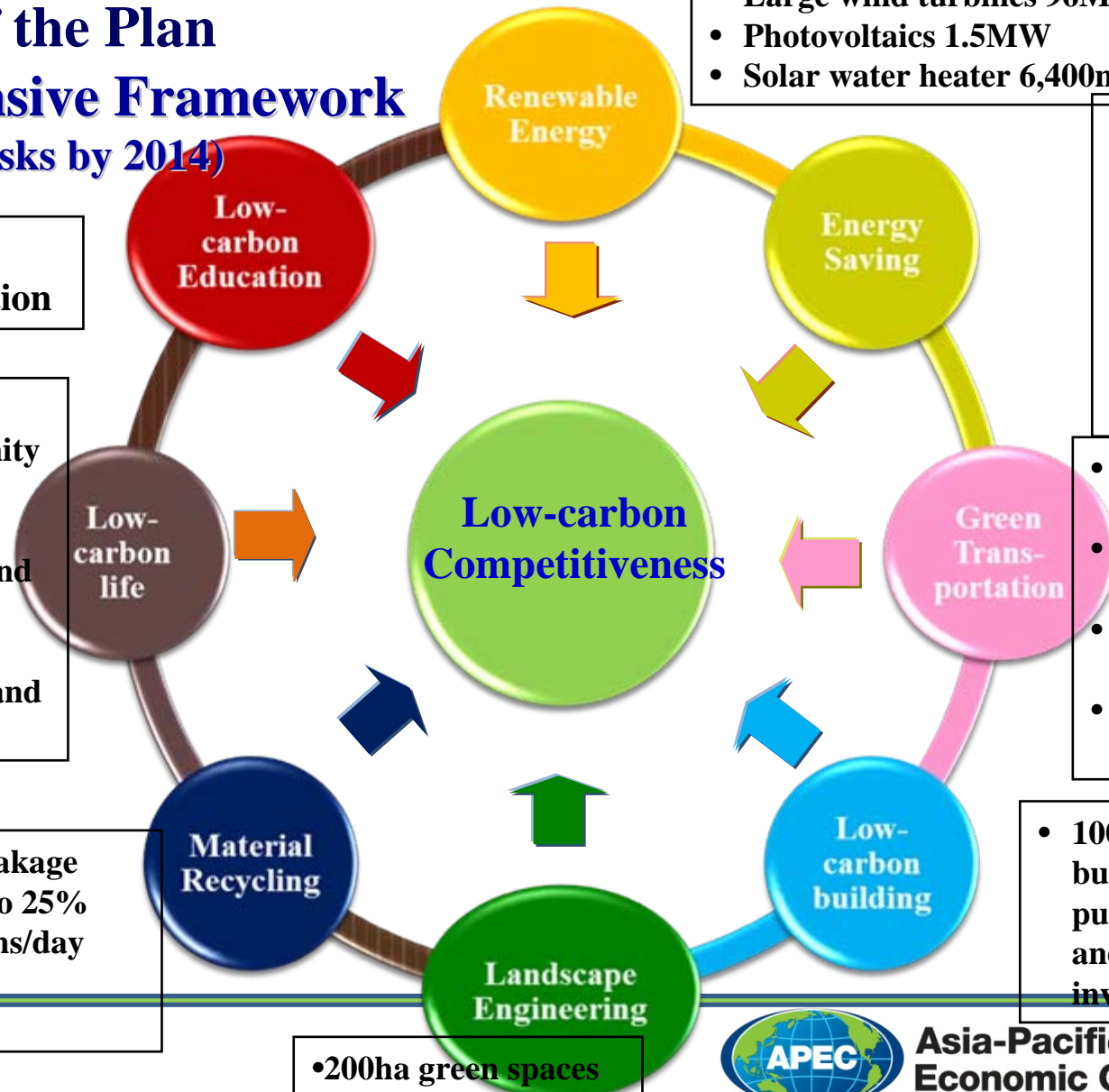
## Contents of the Plan Comprehensive Framework (complete all tasks by 2014)

- Promote low-carbon education

- Promote low-carbon community
- Public participation
- Carbon labels and energy management
- Zero carbon island pilot

- Reduce water leakage rate from 32% to 25%
- Reduce 5,700 tons/day water supply
- Zero waste

- 200ha green spaces



- Large wind turbines 96MW
- Photovoltaics 1.5MW
- Solar water heater 6,400m<sup>2</sup>

- 2,106 smart meters
- 4,000 LED lights
- 14,000 energy-saving domestic appliance

- 6000 electric motorcycles
- Demo electric vehicles
- B2 bio-diesel on the island
- Island-wide bicycling network

- 100% green building for all new public buildings and main private investments





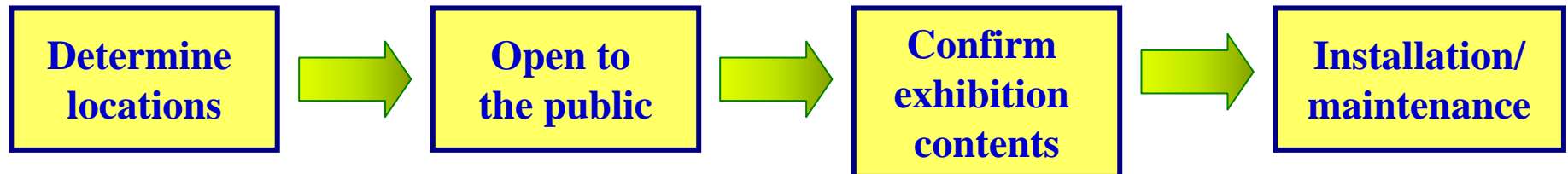
# Penghu Low Carbon Island (4/6)

## Public Participation

### ■ Public co-investment

- ✓ County government establishes an energy company to invest large wind turbines, and encourage public investment
- ✓ Private investment: 51%, government investment: 49%

### ■ Public participation through adoption program



- ✓ Provide and maintain renewable energy devices
- ✓ Regenerate commercial circles
- ✓ Tree planting and greening
- ✓ Promote low-carbon activities



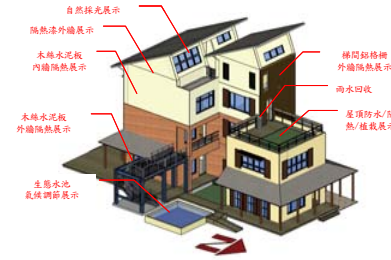
# Penghu Low Carbon Island (5/6)

## Expected Benefits - future appearance

Large wind turbines

Green building

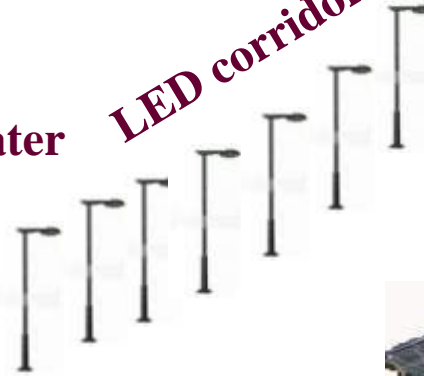
water reuse



hotel  
Solar water heater



LED corridor



Magong city  
center



PV passage/cafe



PV charger station



PV bus stops



Greening

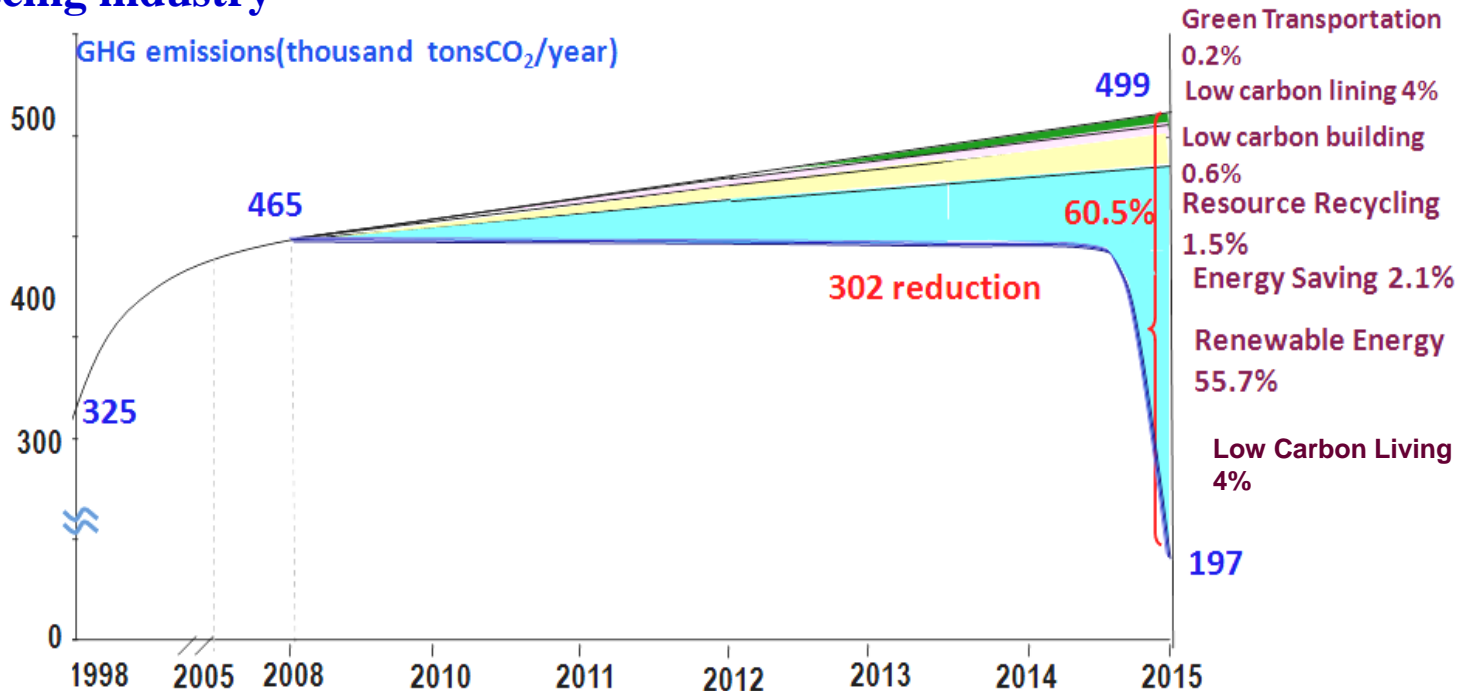


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# Penghu Low Carbon Island (6/6)

## Benefits

- Carbon emission will be reduced by 60% compared to BAU in 2015 ,and reduced to about 50% compared to emission in 2005
- Renewable energy supplies 56% of total energy consumption in 2015 , the generated electricity will have surplus to send out to Taiwan
- Reduce CO<sub>2</sub> emission from 5.4 tons/cap-yr (2008) to 2.1 tons/cap-yr (2015)
- Annual cost: 1.06 billions TWD, payback period: 6.8 years
- Boost sightseeing industry





# Conclusion



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- ✓ **Chinese Taipei has incorporated four pillars of ESCI and the concept of low carbon modal town in our policy.**
- ✓ **Regulatory regime and demonstration projects are extremely significant since we are setting up a new paradigm for the economic growth of the next generation.**
- ✓ **Comprehensive knowledge and experience sharing could help shorten the learning curve of APEC region in the building of low carbon economy/society.**

