Strategies to Achieving a Green Economy in Taiwan

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Introduction

- Paris agreement leads to a new era of GHG management
- Governmental measures encouraged to achieve a green economy
- GHG management, Green Trade, Business Models: perspectives from government and academia
1. Status of Taiwan
2. Greenhouse Gas Management for Green Economy
3. Green Trade for Green Economy
4. Business Models for Green Economy
5. Conclusions
Status of Taiwan
Taiwan is an export-driven economy,

Ranked 20th largest economy in the world.

<table>
<thead>
<tr>
<th>Item</th>
<th>Data of the year 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>23.43 million</td>
</tr>
<tr>
<td>Gross National Product (GNP)</td>
<td>529.5 billion (country comparison to the world: 20)</td>
</tr>
<tr>
<td>Per Capita GDP</td>
<td>US$ 40,537</td>
</tr>
<tr>
<td>Economic Growth Rate*</td>
<td>3.7%</td>
</tr>
<tr>
<td>Total Exports / Imports**</td>
<td>US$ 314 billion / US$ 274 billion</td>
</tr>
</tbody>
</table>

Source: *IMD World Competitiveness Yearbook 2015

* * Department of Statistics, Ministry of Finance, “Summary of Exports and Imports for March, 2015”
Carbon Emission & Intensity

Source: Bureau of Energy, MOEA, Taiwan (2014)
Taiwan’s CO₂ emissions

- In 2014, CO₂ emissions from fuel combustion: 251 million tons of CO₂e, ranked 31st in 2014, 28th in 2015 in the world.
- Main: **energy and industrial sectors**, 

Source: 2013 CO2 emissions from fuel combustion, estimation by Bureau of Energy
2 GHG Management Approaches
The New Government
since May 20th 2016

- More aggressive in global GHG reduction, fulfilling Paris Agreement
- Green Energy as one of the six focused industries for development by the new government
  1. Green Energy
  2. Health Care
  3. Biological Technology
  4. Quality Agriculture
  5. Tourism
  6. Cultural and Creative Industry
Low-Carbon Legislations

• National Sustainable Energy Agenda
• Renewable Energy Development Statue
• Energy Management Act
• GHG Reduction and Management Act
• Energy Tax Bill (draft)
• National Climate changes Adaptation Guidelines
Greenhouse Gases Reduction and Management Act

◆ Taiwan’s commitment to combat climate change

◆ Emission target:
  • 80% of emission in 2030 compared to 2005
  • 50% of emission in 2050 compared to 2005

◆ Most important features:
  • Target revised every 5 years
  • Cap and trade scheme
  • GHG management fund
GHG Management Fund

From:

- Donations
- Penalties
- Other
- Revenue from sales and auction
- Government budget
- Transaction fee

To:

- These funds must be used to reduce carbon emissions at the national level acts.
- Adapt to climate change.
Mandatory GHG Reporting

- 262 emissions sources reported, covering about 88.8% of industrial and energy sector emissions, totaling 226.49MT CO2e.
The total capacities of wind and solar power generated by private companies have increased faster than before because the authority announced the preferential feed-in-tariffs to which renewable energy equipment can apply under article 9 of the Renewable Energy Development Statute.
Green Trade
# Taiwan Green Technology Competitiveness

7\textsuperscript{th} in Asia, and 20\textsuperscript{th} in the World.

(Source: IMD World Competitiveness Yearbook 2015)

<table>
<thead>
<tr>
<th>Category</th>
<th>Our Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Energy</td>
<td>• PV production ranked 2\textsuperscript{nd} worldwide (2014).</td>
</tr>
<tr>
<td></td>
<td>• LED production ranked 3\textsuperscript{rd} worldwide (2014).</td>
</tr>
<tr>
<td>Green ICT</td>
<td>• ICT products got the world's first carbon footprint certification, e.g., notebook computers, desktop computers, LCD panels, ICs.</td>
</tr>
<tr>
<td></td>
<td>• The world's first LEED (Energy and Environmental Design) Gold-Certified green TFT-LCD plant.</td>
</tr>
<tr>
<td>Green Building</td>
<td>• Taiwan has the highest density in Green Building worldwide. (4532 green buildings in 2014)</td>
</tr>
<tr>
<td>Green Consumer Staple</td>
<td>• Bike production ranked 1\textsuperscript{st} worldwide.</td>
</tr>
<tr>
<td></td>
<td>• Quality of green Fabric ranked 1\textsuperscript{st} worldwide.</td>
</tr>
</tbody>
</table>
Trade Liberalization, Economic Growth and Climate Change

Trade Liberalization and Climate Change

Trade Liberalization ↑
Climate Change ↑
Trade liberalization increases the production, transportation and consumption.

Trade Liberalization ↑
Climate Change ↓
Trade liberalization boosts the transactions of Low carbon products and technologies.

Green New Deal vs. Green Trade

\[ \text{GDP} = C + I + G + X - M \]

Private Consumption  Gross Investment  Government Spending  Exports  Imports

Government Spending (G)
Gross Investment (I)

Exports (X)
Government Spending (G)
Gross Investment (I)

※ Taiwan’s total export value (X) takes 60% of GDP, net export value (X-M) takes 10% of GDP. Taiwan is an export-oriented economy.
Definition of Green Trade

● General Definition
The cross-border trades of products, services, resources, and rights, which support sustainable development of environment and ecology.

● Defined Definition
The trades of green products and services.

● Type A
The products or services for environmental protection or environmental recovery, such as pollution abatement facilities and services, waste water management, resource recycling, technology of carbon capture and storage.

● Type B
The products or services that produce less impacts than the traditional products to the environment and ecology in their life cycles.
Green Trade vs. Traditional Trade

- The trade is not only determined by price and function, but also by “green level” of goods.
- The comparative advantages of trade is determined by production cost plus environmental cost.
- The environmental goods are normally considered as public goods; so governments are deeply involved in green trade.
- As providing green products and services is part of enterprise’s social responsibility, the procurement policies of international enterprises change gradually.
- Green trade redefines the national competitiveness and changes the rules of trading.
Statistics of Export of Taiwan’s Green Products 2010-2014

Unit: thousand US$

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
<td>64469191</td>
</tr>
<tr>
<td>2011</td>
<td>62679624</td>
</tr>
<tr>
<td>2012</td>
<td>57,500,000</td>
</tr>
<tr>
<td>2013</td>
<td>58,750,000</td>
</tr>
<tr>
<td>2014</td>
<td>61774872</td>
</tr>
</tbody>
</table>

Source: ITC Trade Map Database
• Taiwanese green products go to
  • China, Honk Kong, the United States, and Japan

• EU28 as a whole is the third largest export market of Taiwan

Source: ITC TradeMap Database
• United States, China, and Japan. The proportion of total environmental protection equipment to these three countries was over 50%.
• In addition to these three countries, Germany and countries in South Asia were our important trade partners.

Source: Sinotech Engineering Consultants, Ltd. (2013), 'Environmental Protection Industry and Water Saving Guidance Project'.
Taiwan Eco-Products Directory

Taiwan Eco-Products Directory is updated quarterly on-line and published annually since 2011. It covers the products that feature low chemical, waste reduction, pollution prevention, anti global warming, resource saving, and increase bio-diversity for the world. This English-written directory can be served as a reference for green procurement.


http://apo-ecoproducts.com
How to classify

ISO 14024 - Type I Environmental Labeling
ISO 14021 - Type II Environmental Labeling
ISO 14025 - Type III Environmental Declarations
Other Types of Environmental Labels
Product Carbon Footprint Labels and Declarations
Taiwan Green Classic Awards

Product’s Green Value (25 Points)
Green Supply Chain Management (25 Points)
Innovative Technology and Green Marketing (25 Points)
Corporate Social Responsibilities (25 Points)
Example: Far Eastern New Century

**Introduction:**
A multi-billion market cap company with polyester and textile business, now reinventing itself in green economy.

**Product Characteristics:**
- Recycled/recyclable polyester products, such as food-grade recycled PET resin
- Recycled fiber, which is made from used PET bottles

**Far Eastern New Century**
- The 1st Taiwan Green Classics Award Winner
- Far Eastern EcoARK, the world’s 1st building with exterior walls made entirely by discarded PET bottles
- Football jersey made by recycled fabrics, used by Nike in the FIFA World Cup for two consecutive years
Green Demo house

- Launched in 2013
- Modular approach to delivering various green quality products/services.
Demo House can be arbitrarily assembled and disassembled

Assembling parts
Design I: Home Space
Design II: Retailing Space
Design Ⅲ: Office Space
Green Demo House Road Show

2014.10 Singapore
2014.12 Taipei
2015.03 London Eco Build
2015.07 Tsingtao Energy fair
2015.09 Bangkok Green Building Expo
2015.10 Tokyo Home & Building
2016.03 London Eco Build
Green Demo Site

Off-Grid power system @ Liberty State Park, NJ, USA
Opened in July 2016
Introducing *SKYNERGY™*

- A totally off-grid energy integration system with green materials
- Location: Liberty State Park, New Jersey.
- Replacing traditional diesel generator with solar PV generator for the supply of electricity
- 2 X 20 foot container with 5KW of power
Renewable energy generated and saved

Modular Energy Bank

Store energy as hydrogen from electricity

Energy signal sent to cloud

Customer alerted of energy availability via a mobile device

Solar PV Panels

Home Appliances

Fuel Cell Backup Power System
Business Models to Facilitate Green Tech Deployment
Basic Structure of Partnership

- **Green Products Providers**
- **GTPO/Platform**
- **Service Providers/Installers**
- **Project Owners/Managers**
- **Customers**
- **Local Government/Incentive Provider**

**Monetary flow**

**Equipment/Service flow**
Energy Service Company, ESCO

Shared Savings Financing

- ESCO bears debt responsibility, execution risk and credit risk.

Guaranteed Saving Financing

- ESCO bears project performance risk.
- Customer bears responsibility for the debt on the balance sheet.
Design, Build, Finance and Operate, DBFO

Contractor

Government

Facilities

Manufacturers provide maintenance and warranty.

Public services responsible for government

Revenue

Investment, building

Contract

Pay the cost (rent)
Conclusions
Green growth re-emphasized after Paris agreement

Low-carbon society is a goal and a reality

Innovative business models are key to the success of green economy, including different formats of partnership

Public-Private Partnership unavoidable