



*APEC New & Renewable Energy Technologies Expert
Group 33rd Meeting, October 5-6, 2009, Taipei*

*Overview of New and Renewable Energy
in Chinese Taipei*

**Bureau of Energy
Ministry of Economic Affairs**

October 5, 2009 Taipei

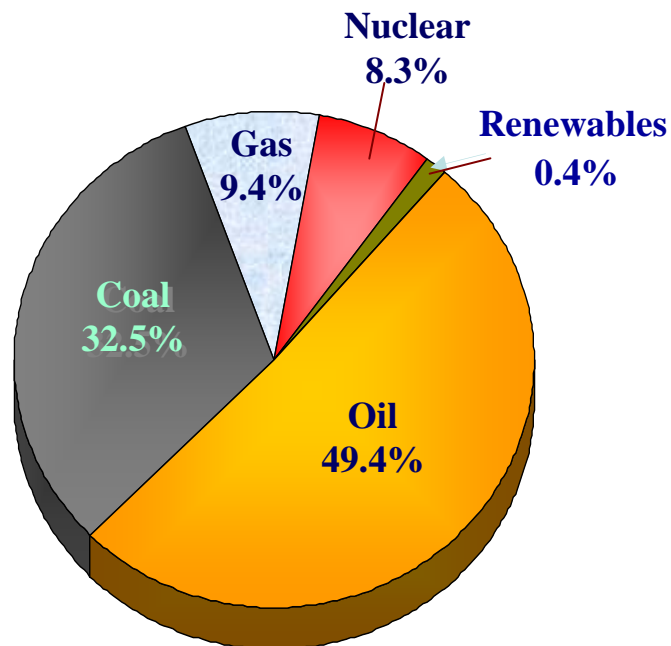
Outline

- I. Energy Situation and Policy
- II. Target and Status of Renewable Energy
- III. Dawning Green Energy Industry Program
- IV. Closing Remarks

1. Energy Situation and Policy

1. Energy Supply

Primary Energy Supply (2008)
142.39 Million KLOE

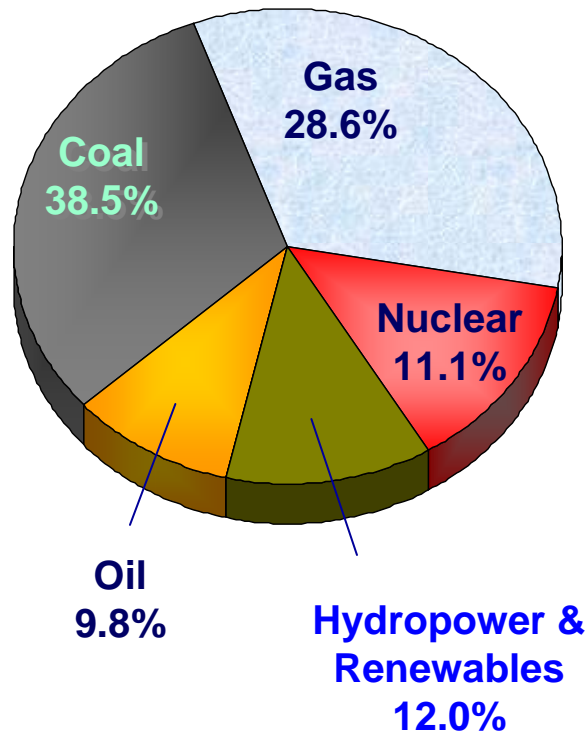


- (1) Highly import-dependent: **99.3%**
- (2) Oil accounted for a half: **49.4%**
- (3) Fossil fuels dominated: **91.3%**

2. Electricity Sector

Installed Capacity (2008)

46,382 MW



PS : Co-generation and pump-storage hydro are included.

(1) Average annual growth rate (1988-2008):

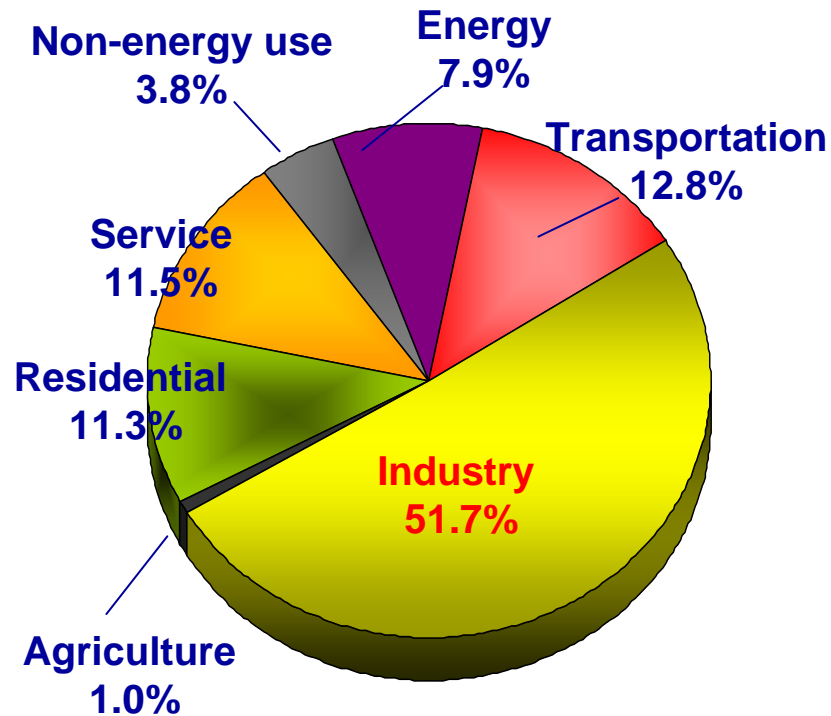
A. Installed capacity: **5.0%**

B. electricity consumption: **5.9%**

(2) Percentage of reserve capacity in 2008: more than **16%**

3. Energy Consumption

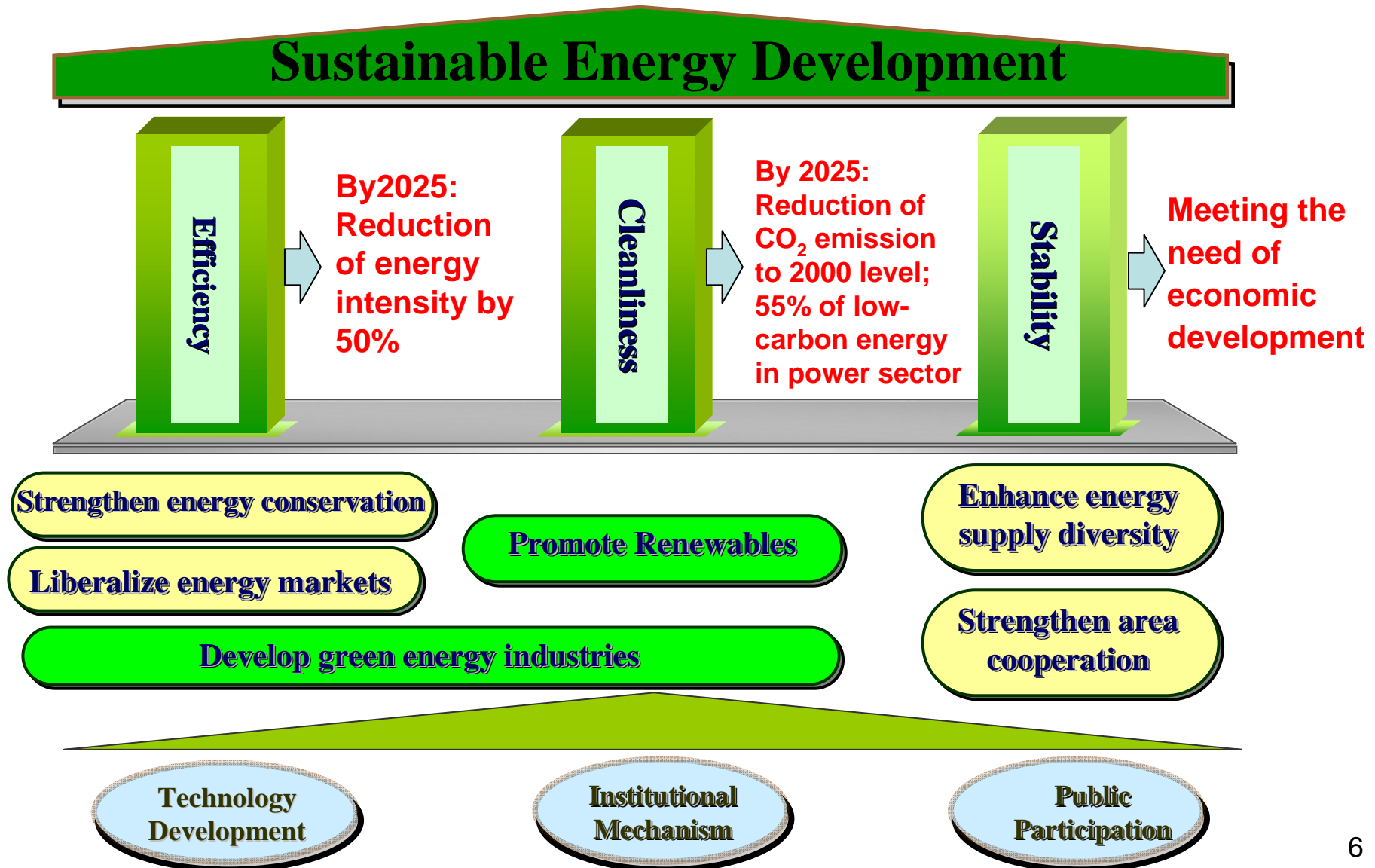
Energy Consumption (2008)
119.60 Million KLOE



(By Sectors)

- (1) Average annual growth rate (1988~2008):
 - A. Energy consumption: **4.9%**
 - B. GDP: **5.5%**
- (2) Major consumer of energy: **Industry sector**
- (3) The shares of energy consumption in **service** and **residential** sectors are increasing.

4. Energy Policy



II. Target and Status of Renewable Energy

Renewable Energy shall contribute 15%, in terms of installed power generation capacity, by 2025.

Targets of Renewable Energy

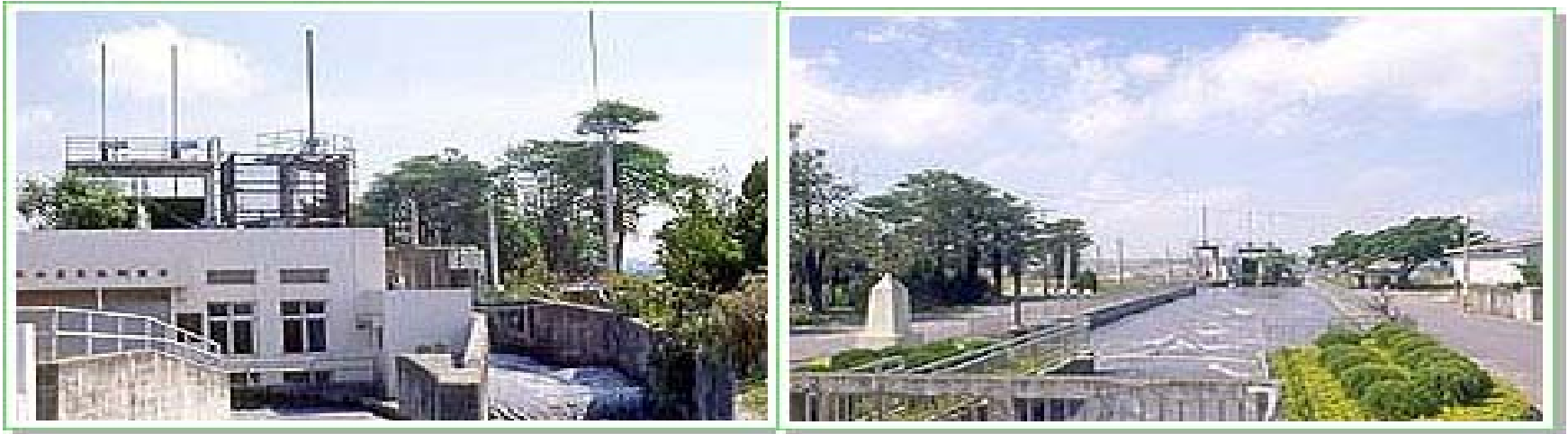
Renewables	2008		2015		2025	
	Installed Capacity (MW)	Rate (%)	Installed Capacity (MW)	Rate (%)	Installed Capacity (MW)	Rate (%)
1. Hydropower	1939	5.05	2261	5.1	2500	4.4
2. Wind power	358	0.93	1480	3.4	3000	5.3
3. Solar Photovoltaics	4.08	0.0	320	0.7	1000	1.8
4. Biomass	772	2.01	850	1.9	1400	2.5
5. Geothermal	—	—	10	0.0	150	0.3
7. Ocean Energy	—	—	1	0.0	200	0.4
Total	3073	8	4972	11.2	8250	14.7
8. Solar Thermal Water Heater	1.76 million m ²		2.8 million m ²		4.09 million m ²	

1. Hydropower

◆ Current Status (September 2009)

- ✓ Installed capacity: 1939 MW, with 158 MW as small hydro (<20 MW/plant)
- ✓ Almost all good large hydro sites been developed by Taipower
- ✓ Small hydro sites being future focus

◆ Target: 2500 MW by 2025



Wushantou hydro: 875kW

2. Wind Energy

▶ Current Status (September 2009)

- ✓ Installed capacity: 380 MW, with 200 wind turbines been erected
- ✓ Electricity generated: around 950 GWh annually
- ✓ Being able to provide electricity need for 237 thousand households

▶ Future Measures

- ✓ The First Phase of Development Project on Offshore Wind Energy being in effect from 1/9/2007, with a target of 300 MW

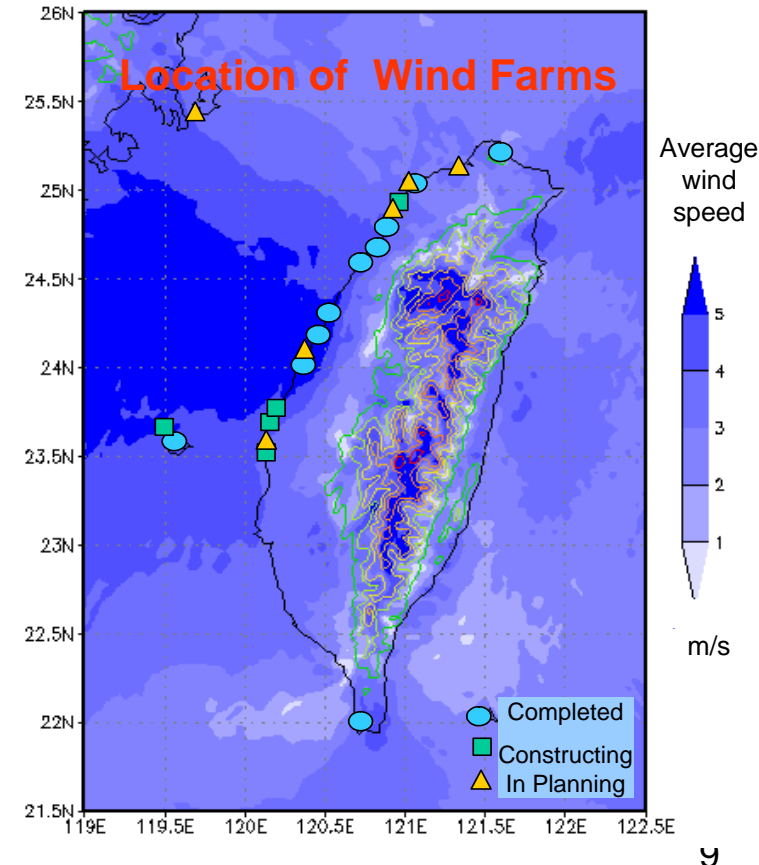
▶ Target: 3000 MW by 2025



Tao-Yuan: 30 MW



Chutung, Penhu: 4.8 MW



3. Solar Photovoltaic Systems

- ▶ **Current Status (September 2009)**
 - ✓ Demonstration projects: Solar Roof, Solar City, Solar Top, Solar Campus, Solar Community, Solar Farmhouse
 - ✓ Installed capacity: 5.2 MW, with 451 demonstration projects completed
 - ✓ Electricity generated: around 6.24 GWh annually
- ▶ **Subsidy:** NT\$150,000/kW, max. 50% of installation cost (Solar City and Solar Top being 100%)
- ▶ **Future Measure:** Expanded installing on public constructions
- ▶ **Target:** 1000 MW by 2025



Presidential Hall: 10.5 kW



The Main Stadium of The World Games 2009 Kaohsiung: 1 MW



Fu-Bon Memorial Building: 19.8 kW

4. Solar Thermal Water Heaters

- ▶ **Current Status (September 2009)**
 - ✓ Installed area of heat collectors: 1.83 million m²
 - ✓ Around 452 thousand households installed
 - ✓ Installation density ranks No. 3 in the world
- ▶ **Subsidy:** NT\$2,250~3,375/m², around 20~25% of Installation cost
- ▶ **Future Measure:** promotion of building-integrated systems and large-scale applications
- ▶ **Target:** Total installation area of 4.09 million m² (estimated about 1 million Installed households) by 2025



Hualien College, Hualien County
Installation area: 77 m² (for 115 students)



Diwan College, Tainan County
Installation area: 307.5 m² (for 450 students)

5. Biomass Power

▶ Current Status (September 2009)

- ✓ Installed capacity: 772 MW
- ✓ Promoting refuse derived fuel (RDF) systems for waste treatment and power generation

▶ Incentives:

- ✓ electricity purchased by Taipower at tariff of cogeneration plants (about NT\$1.78/kWh on average) and a NT\$0.5/kWh premium by EPA for biogas generated from landfills

▶ Target: 1400 MW by 2025



Biogas power plant,
Municipal waste landfill, Taipei



waste



RDF



RDF demon plant in Hualien
BOE Project, Tech. developed by ITRI

6. Bio-diesel

◆ Promotion Status

- ✓ Mandatory B1 since July 2008
 - ✓ Bio-diesel consumption: 38000 KL annually
 - ✓ Feedstock sources: 80% domestic waste cooking oil, 20% imported
- ◆ **Target:** 100 thousand KL (B2 in all stations) by 2010 (feedstock mainly from domestic waste cooking oil)



7. Bio-ethanol

▶ Promotion Status

- ✓ Demonstration project: Government Vehicles E3 Demo (Taipei City, KaoHsiung City)
- ✓ Feedstock sources: domestic sweet potato and imported bio-ethanol

▶ Target: 100 thousand KL (E3 supplied in most gas stations) by 2011

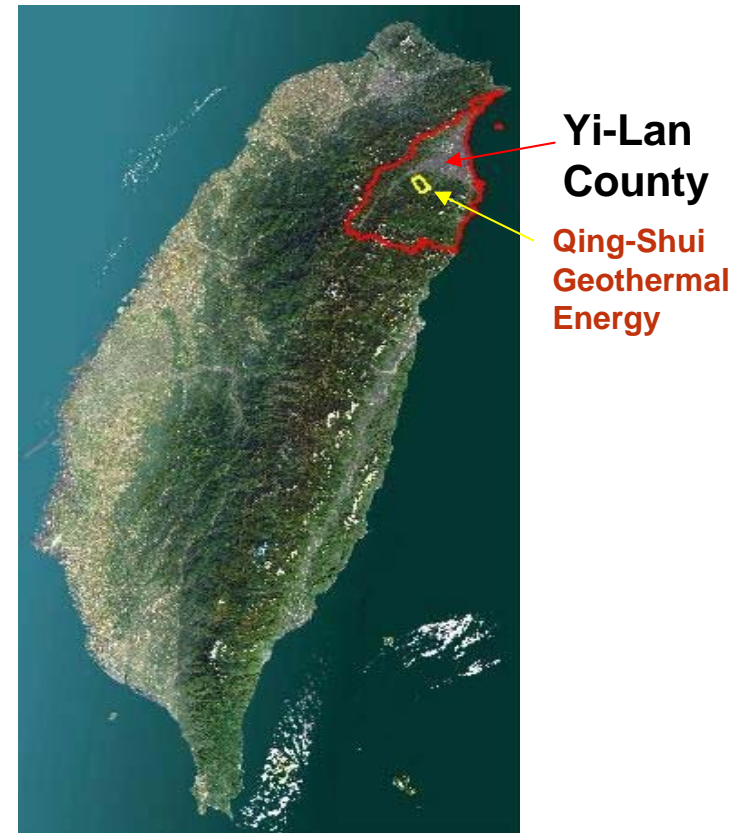
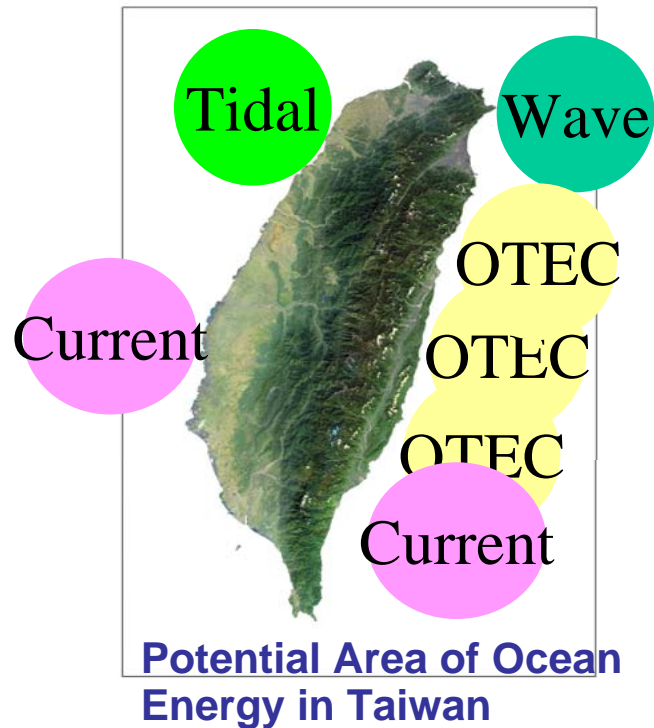


A gas station providing E3 gasohol in Taipei City

8. Other Renewable Energy to be Developed

▶ Geothermal Energy

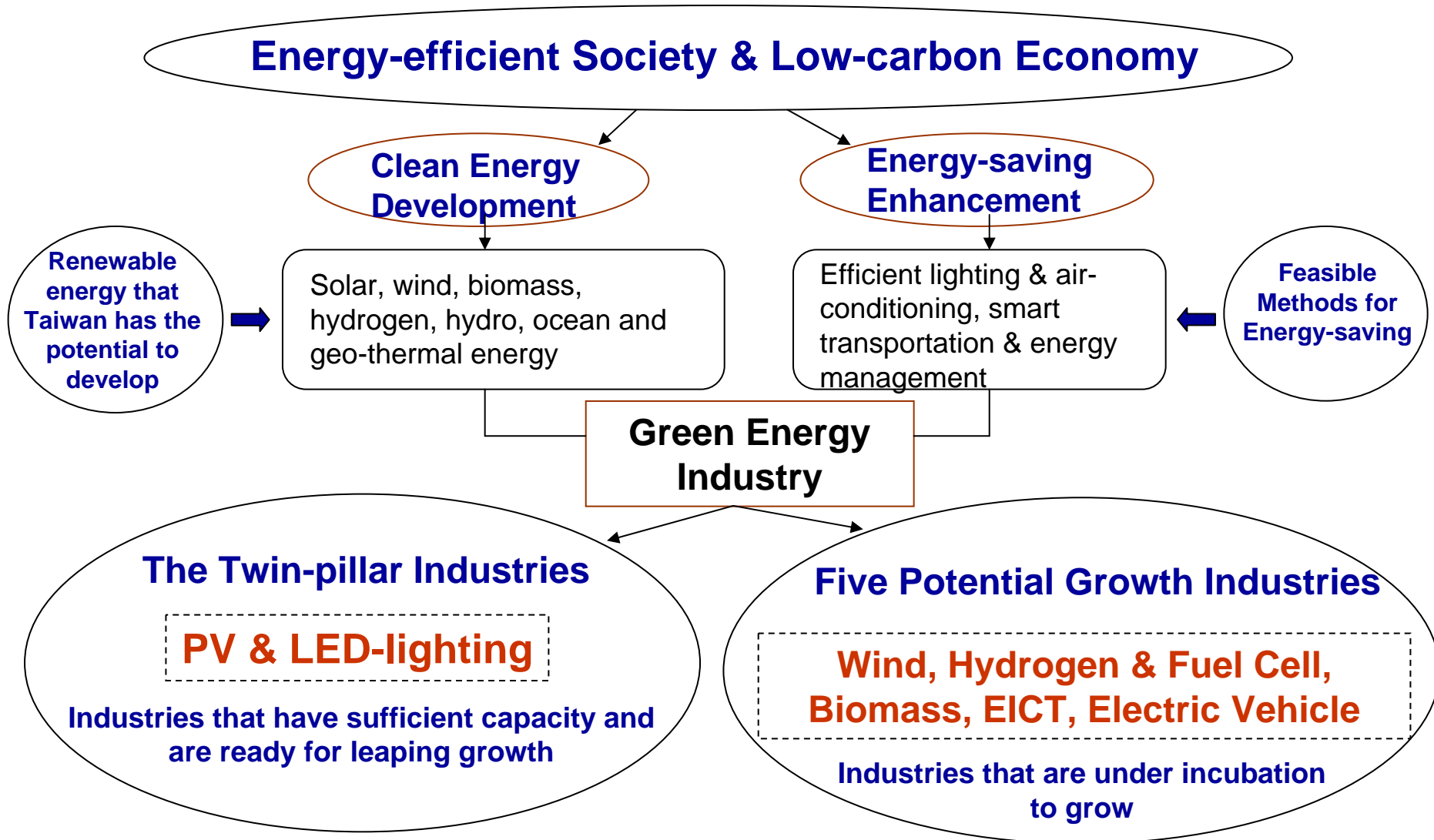
▶ Ocean Energy



Renewable Energy Development Act

- ▶ **Approved by Congress on June 12, 2009**
- ▶ **Goal: 10,000 MW**
- ▶ **Utilities operating grid obligated of grid connection and buying in of renewable electricity**
- ▶ **Feed-in tariffs for renewable electricity announced every year**
- ▶ **A special-purpose Fund to be established**
- ▶ **15 Rules related to REDA have to be completed and be effective in December 2009**

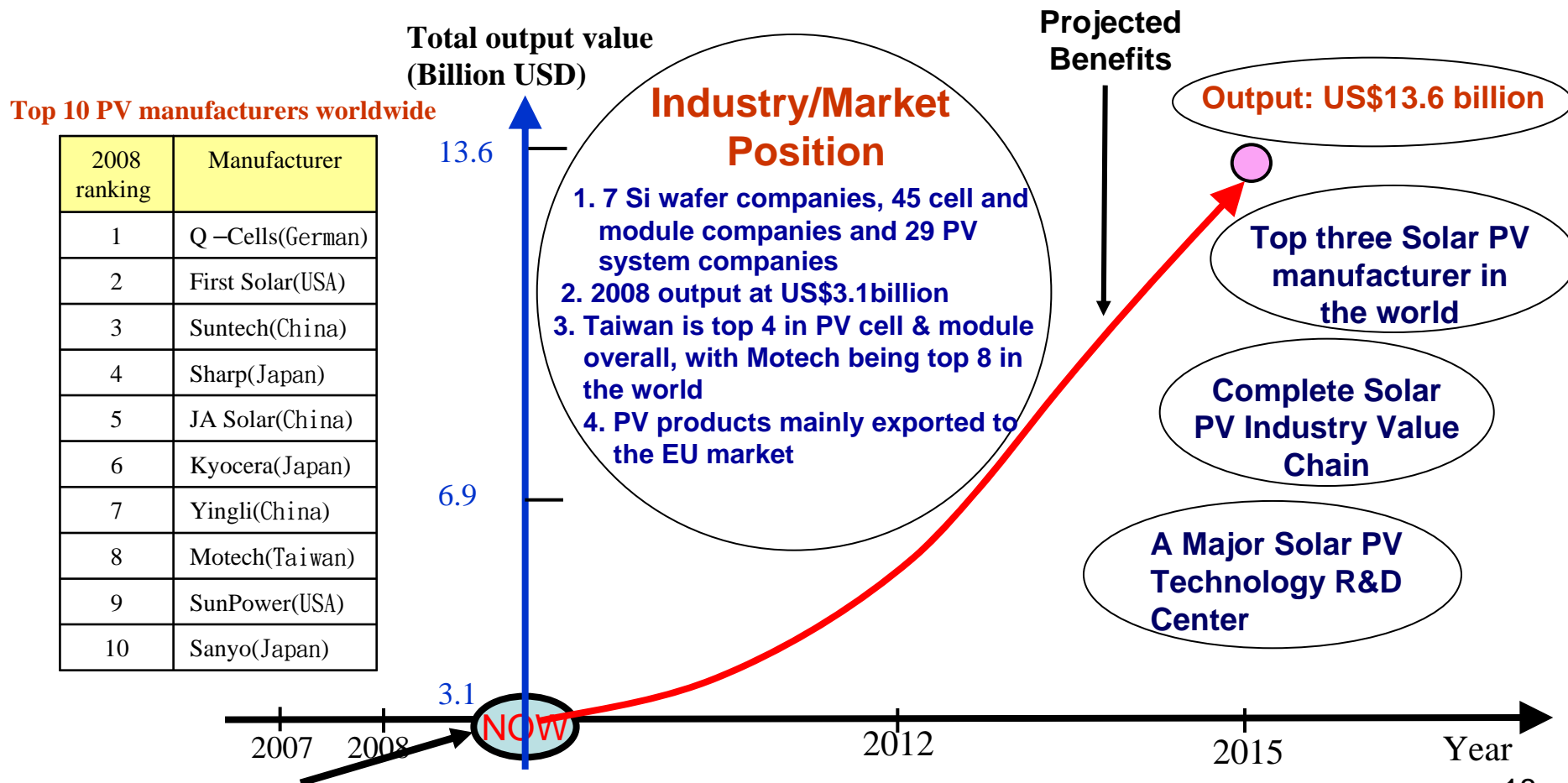
III. Dawning the Green Energy Industry Program



Key Green Energy Industries for Development

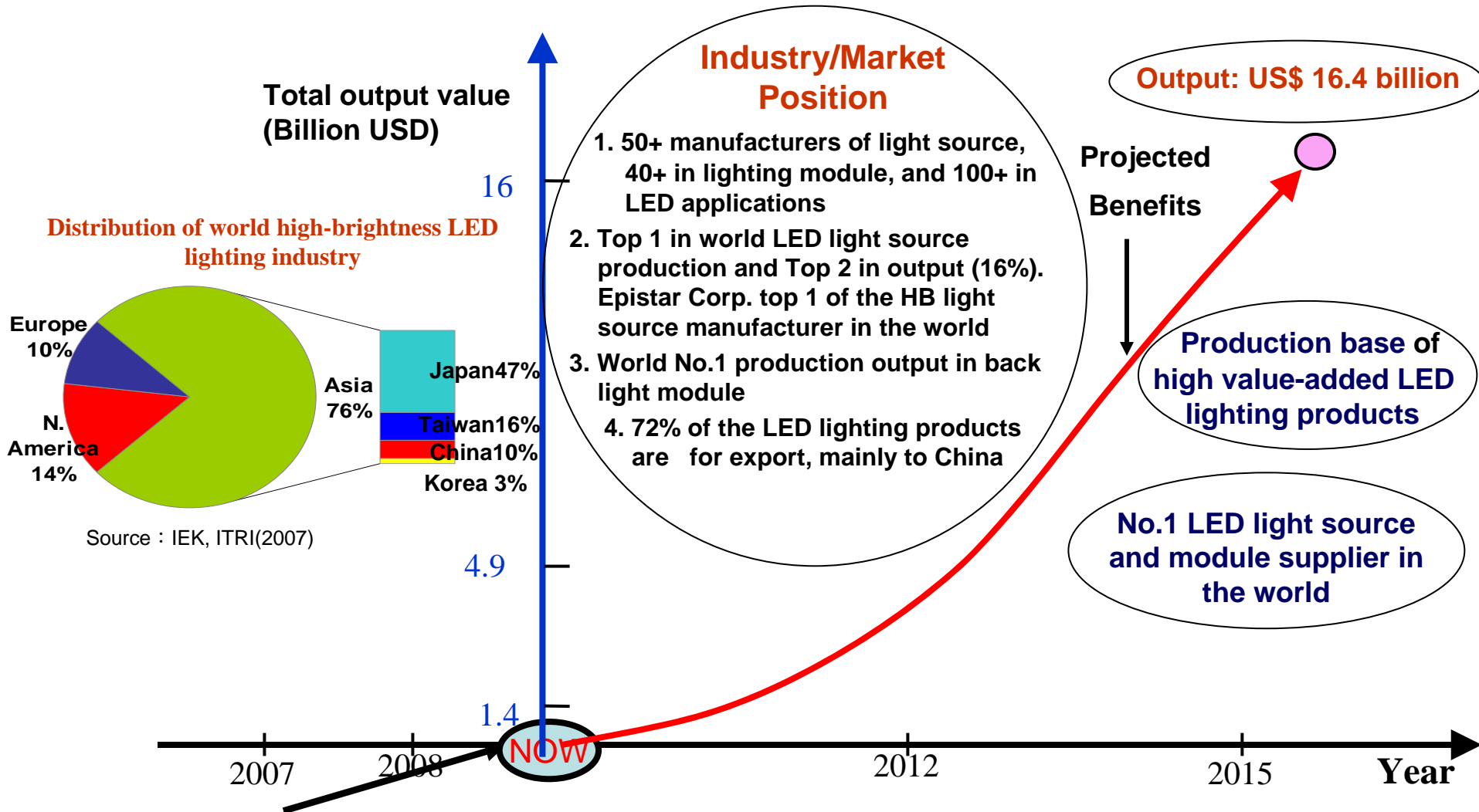
1. Solar Photovoltaic Industry

Current Status and Vision



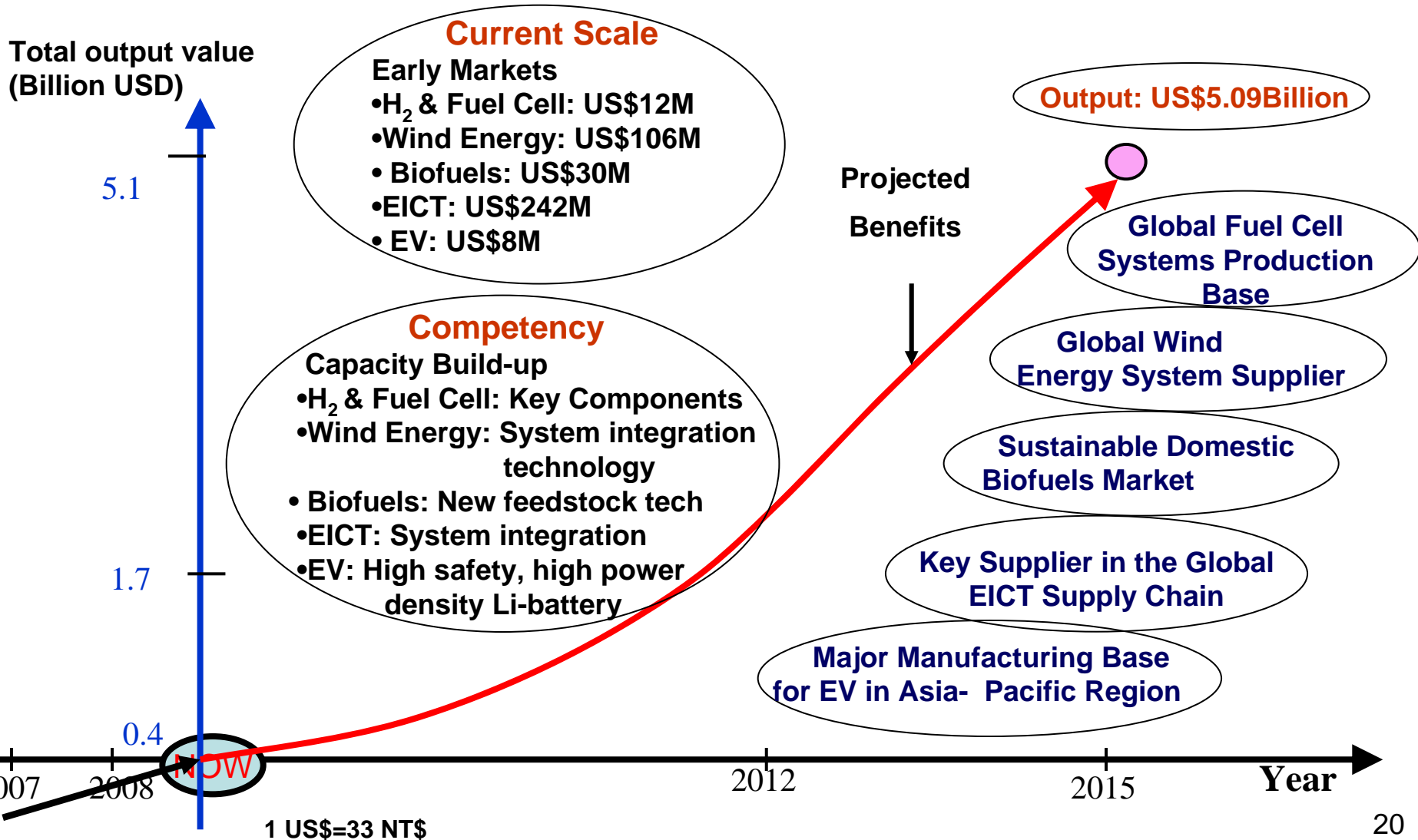
2. LED Lighting Industry

Current Status and Vision



3. Potential Growth Industries

Current Status and Vision



IV. Closing Remarks

- 1. Reasons for promoting renewable energy:
mitigating climate change, reducing impacts of
high energy prices, ensuring energy security***
- 2. Accelerating promotion: demonstration at early
stage, stable government policy, sound legislation
framework***
- 3. Developing renewable energy industry while
promoting the harnessing of renewables for
improved social welfare***
- 4. International cooperation welcomed to facilitate
bilateral benefits***

**Thank You
for Your Attention**

