

Energy and Low Carbon Society Policy in Taiwan

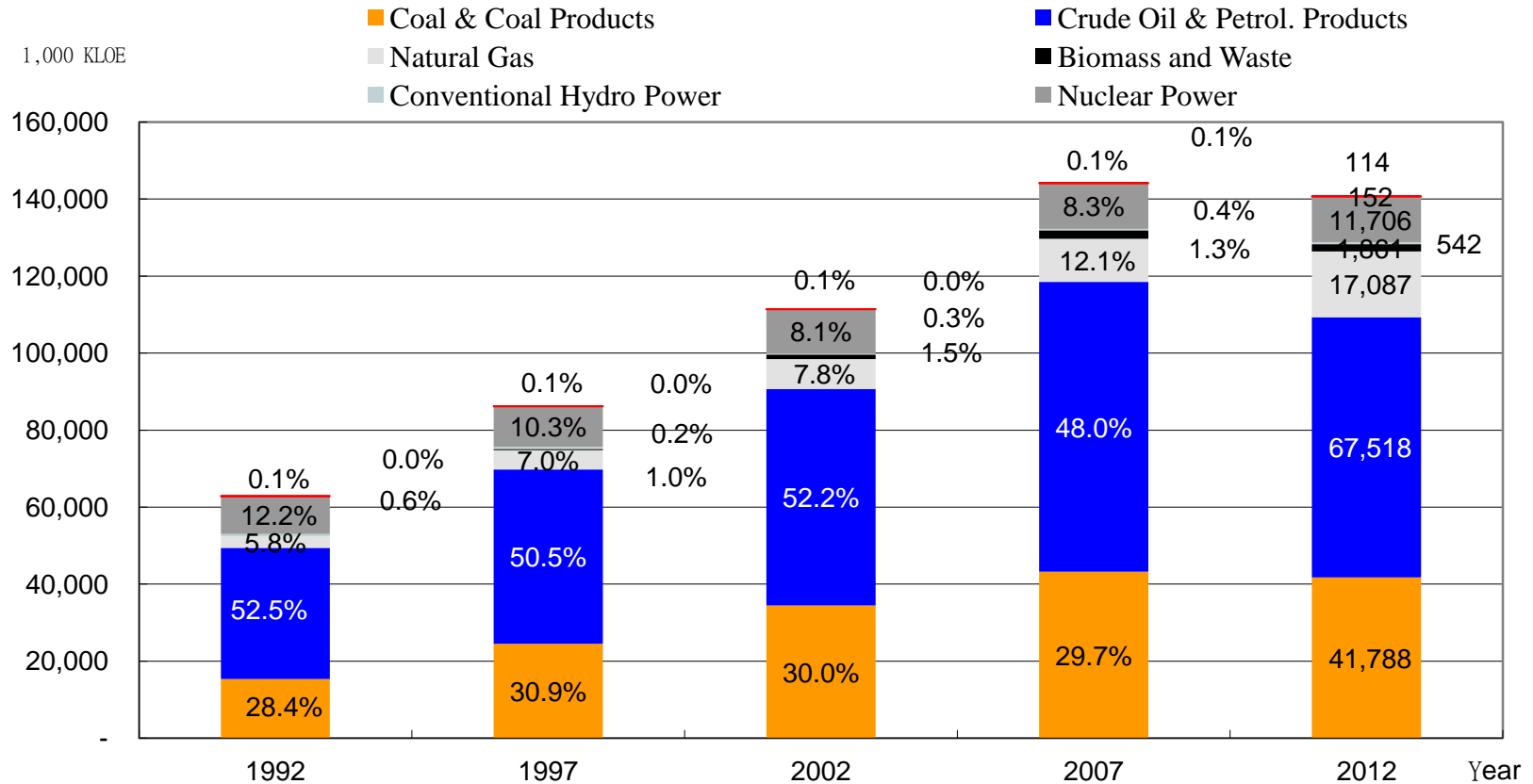


Chen Li-chun
Faculty of Economics
Yamaguchi University
Tel/Fax: +81-83-933-5526
lichun@yamaguchi-u.ac.jp



Energy Situation in Taiwan

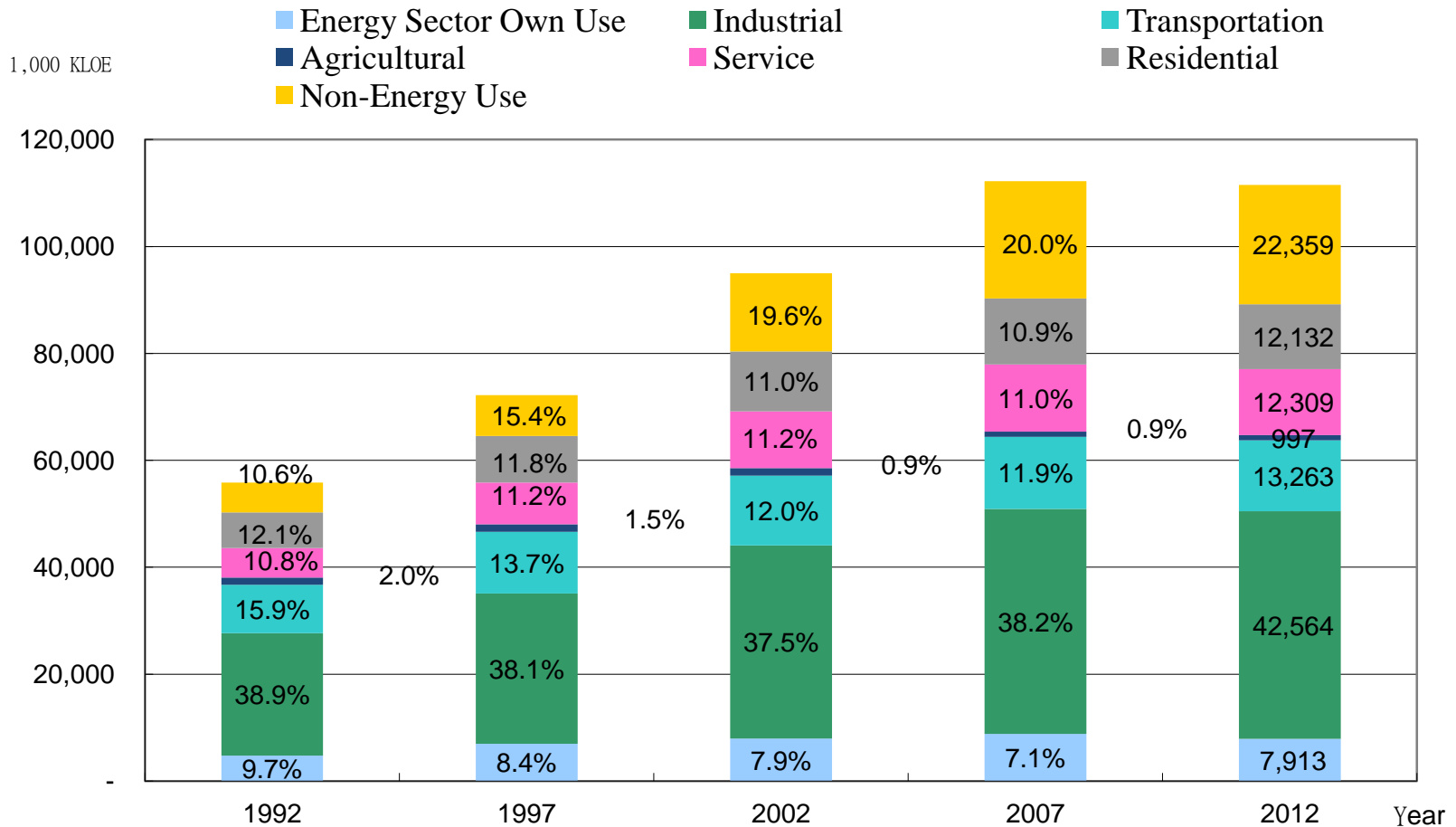
Structure of Energy Supply (by Energy Form)



Source: Prepared from BOE, MOEA (2013), *Energy Statistics Handbook 2012*.

Energy Situation in Taiwan

Structure of Total Domestic Consumption (by Sector)

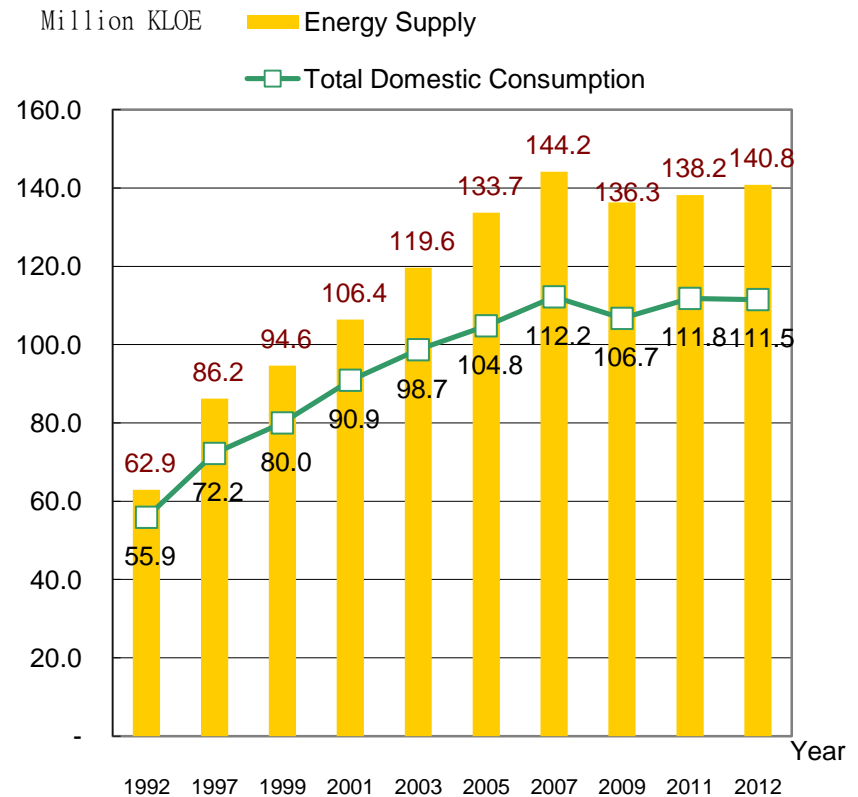


Source: Prepared from BOE, MOEA (2013), *Energy Statistics Handbook 2012*.

Energy Situation in Taiwan

- The energy consumption of 2012 totaled 111.54 million KLOE (kiloliter oil equivalent), of which 38% is for industrial sector, 12% for transportation sector
- Both service and residential sectors energy consumption are growing annually and represent 11% share, respectively

Energy Supply and Total Domestic Consumption

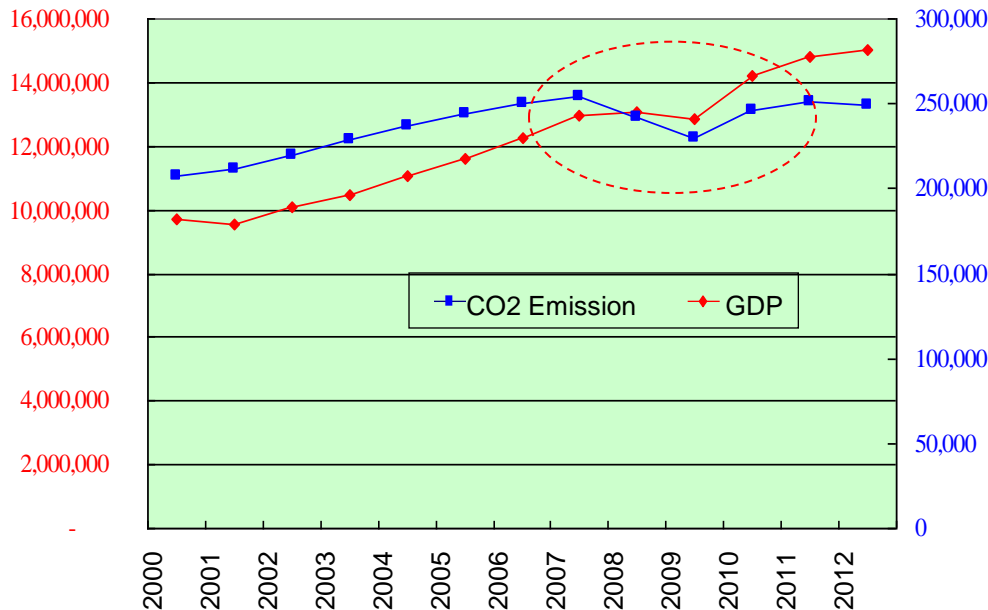


Source: Prepared from BOE, MOEA (2013), *Energy Statistics Handbook 2012*.

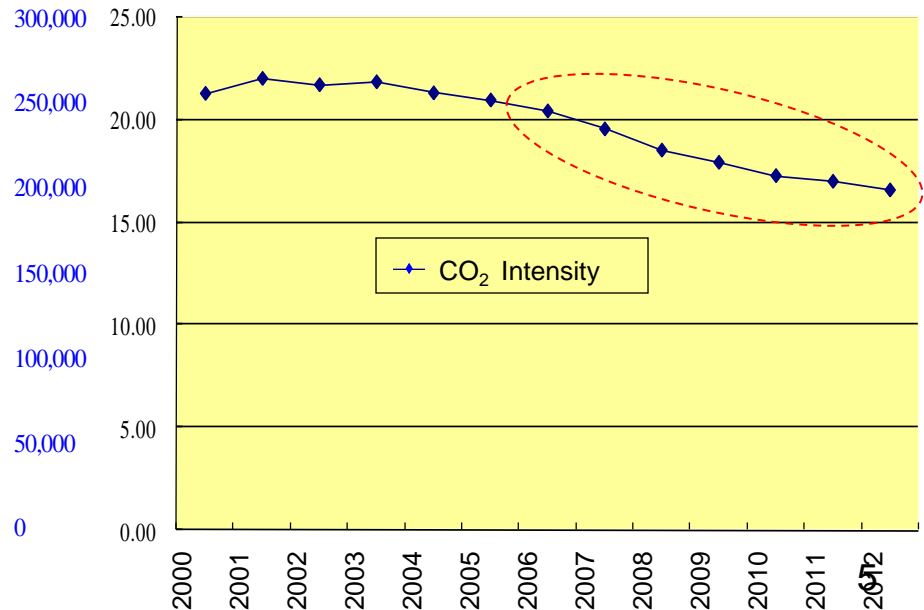
CO₂ Emissions in Taiwan

- ❑ The carbon emissions of year 2008 and 2009 for the first time in 20 years had negative growth for two consecutive years. However, compared to 2009, the CO₂ emission has grown by 6.2% because of the economic recover in 2010.
- ❑ CO₂ emission for producing one unit of GDP continues to decline (CO₂ emission intensity) which is an indication of gradual year-by-year improvement on the low-carbon energy structure and energy efficiency of Taiwan.

CO₂ Emission and GDP of Taiwan (2012)



CO₂ Intensity in Taiwan (2012)



Source : Prepared from BOE, MOEA (2013), *Energy Statistics Handbook 2012* & Bing-Chwen Yang (2013).

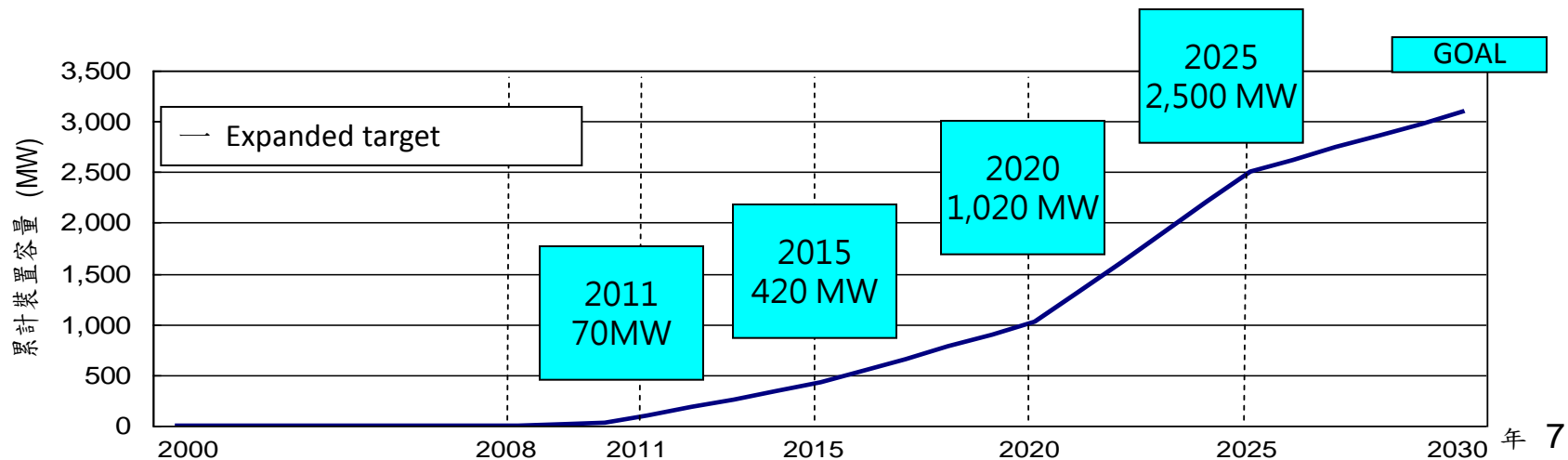
Installation of Renewable Energy

- The installed capacity of renewable energy was 3,683 MW in Dec 2012.
- Targeted renewable power generation capacity is 12.5 GW by 2030.

Energy Source	2012	2015	2020	2025	2030
On-shore Wind	621	866	1,200	1,200	1,200
Off-shore Wind	0	15	600	1,800	3,000
Hydro Power	2,060	2,052	2,112	2,502	2,502
Solar PV	201	492	1,020	2,500	3,100
Geothermal	0	4	66	150	200
Biogas	9	29	29	31	31
Waste to Energy	792	848	925	1,369	1,369
Ocean Energy	0	1	30	200	600
H2&Fuel Cells	0	7	60	200	500
Total	3,683	4,314	6,042	9,952	12,502
Percentage of installed capacity	7.7%	10.0%	10.6%	14.8%	16.1%

「Million Solar Roofs」 Program

- **Target - The solar roofs installed capacity achieve 3,100 MW before 2030**
 - **Roof type(3,000 MW) : Million unit solar roof (per 3 kW) ; 1 million ×3 kW = 3,000 MW.**
 - **Ground type(100 MW) : Installing the capacity of about 100MW.**
- **Strategies - slow to fast / ground after roof**
 - **Promote by the Feed-in Tariffs**



Source : Prepared from Bing-Chwen Yang (2013).

「Thousand Wind Turbines」 Program

- **Target –The wind power installed capacity achieves 4,200 MW before 2030**
 - **Onshore: Develop excellent wind farms first, and then develop secondary wind farms before 2015**
 - ✓ Install 800 MW before 2015, develop 400 MW secondary wind farms after 2015, there will be total 1,200 MW in 2020 (about 450 wind turbines).
 - **Offshore: Develop shallow-water area first, and then develop deep-water area before 2020**
 - ✓ **Complete the first demonstration offshore wind farm of Taiwan before 2015**; develop 600 MW shallow-water wind farms in 2020 (120 wind turbines).
 - ✓ Develop wind farm in business scale during 2021-2030 (total 2,400 MW, about 480 wind turbines in 10 years).
- **Strategies**
 - **Demonstration Incentives for offshore wind power systems.**
 - **To establish inter-ministerial coordination mechanism.**

Mechanism of Feed-in Tariffs

- Tariffs and formula should be reviewed annually by referring to technical advancement, cost variation, goal achievement status, etc. → **no depression system in place**
- Tariffs shall not be lower than the average cost for fossil-fired power of domestic power utilities.
- Current, only Solar PV tariff rates are set on date when generating equipment installations are completed. Other technologies have tariff rates set on the Power Purchasing Agreement (PPA) signing date. → **applied for 20 years**
- BOE announces PV capacity quota every year. PV systems > 30 kW are subject to a bidding procedure to decide tariffs. Developers proposing higher discount rates get the priority to get the quota.

Concluding Remarks

- **Actively promote the development of renewable energy, serve to enhance energy independence, reduce carbon emissions and strengthen energy supply sustainability. The promotion of “Thousand Wind Turbines”, “Million Solar Roofs” and other specific measures can reach the installed capacity of 12,502 MW by 2030, accounting for Taiwan's total installed capacity of the power system 16.1%.**
- **Review the domestic nuclear safety and energy policy due to Fukushima nuclear disaster in 2011 to increase the amount of renewable energy. It is expected to contribute Taiwan's total electricity consumption from 2.51% in 2010 of to 10.67% in 2030.**

Reference: Bing-Chwen Yang (2013),” *The Implementation, Achievement and Challenges of Renewable Energy Promotion and Low Carbon Technology in Chinese Taipei*”, APEC Workshop on Renewable Energy Promotion and Pricing Mechanism: Feed-in Tariffs (FIT), Renewable Portfolio Standards (RPS) and Others, 26~27 September, 2013.