

The Economic and Environmental Impact of Non-nuclear Policy in Taiwan

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Abstract

The Taiwan government as the goal of 2025 non-nuclear homeland is taken into account and the commitments of international carbon reduction are taken into account, the government said it has promoted the new energy policy by initiating the energy transformation and the reform of the electric power industry and driving the autonomous greening in response to the rapid changes and challenges of political and economic environment at home and abroad as well as the energy environment. Can industrial development. This article explores the economic and environmental implications of non-nuclear policy. Also, the potentiality and practicality of harnessing Taiwan are discussed.

Keywords: *Non-nuclear; Economic, Environment*

1. Introduction

Before the Fukushima nuclear accident, the pressure to cut CO₂ emissions brought nuclear power into the spotlight. After the accident, however, people in Taiwan have seriously considered non-nuclear options since, much like Japan, Taiwan faces threats of devastating earthquakes and tsunamis.[1] Taiwan lacks energy resources and highly depends on import, so it is a top priority to develop clean, sustainable, and independent energy and achieve the balance among energy security, environmental protection, and industrial competitiveness, and reduce CO₂ emissions through various strategies. Taiwan relies on imports for more than 97.9% of its energy in 2016, which leaves the island's energy supply vulnerable to external disruption. In order to reduce this dependence, the Ministry of Economic Affairs' Bureau of Energy has been actively promoting energy research at several universities since the 1990s. As of 2016 (Fig 1), in Taiwan, oil accounts for 48.93% of the total energy consumption. Coal comes next with 29.36%, followed by natural gas (indigenous and liquefied) with 13.66%, nuclear energy with 6.25%, biomass and waste with 1.12%, and energy from other renewable sources with 0.6% (Fig2).¹

The Taiwan government has been active in promoting energy efficiency, and set a target of energy efficiency of 33% by 2025. This target is higher than Japan's commitment to APEC with the target of 25%-26% efficiency. Taiwan is preparing for the age of high oil prices, and is proactively developing clean energy, such as solar and wind power and biofuels. The efforts would help reduce Taiwan's reliance on imported oil, while contributing to the reduction of greenhouse gases.

The government aims for renewable energy to account for 15% of the nation's energy by 2025. It would amount to 8.45 million kilowatts, capable of producing 28.7 billion kilowatt hours of electricity. Wind-generated power could create as much as 8.9 billion kilowatt hours of electricity by 2025, comparable to 2.3 times the capacity of Linkou's thermal power plants. Many domestic companies are now beginning to work on the development of solar energy, and conservative estimates are projecting that 1.2 billion kilowatt hours of electricity will be produced through solar power by 2025.

2. Nuclear power and policy background of Taiwan

2.1 Now of nuclear power situation

Taiwan imports 97.5% of its energy, which is vital to the rapidly industrialising economy. Energy demand 'Date obtained at: Energy Statistical annual Reports. Bureau of Energy, Ministry of Economic Affairs. Energy Supply and Demand Situation of Taiwan in 2016. grew at 3.5% per year over 1992-2012, and in 2012 half the demand was for electricity. Over that period, LNG imports grew eight-fold, mostly for electricity. Electricity production grew at 4.4% per year 1992-2007 then levelled off, and per capita electricity consumption was 10,715 kWh in 2015.

Nuclear power has been a significant part of the electricity supply for two decades and now provides one-quarter of base-load power and has been 16%

overall. Total power generated in 2015 was 258 TWh gross, nuclear providing 36.5 TWh, coal 115 TWh, oil 12 TWh, LNG 81 TWh, hydro (including pumped storage) 7.5 TWh, biofuels and waste 3.6 TWh, solar and wind 2.4 TWh. Generating capacity in 2015 was 48.7 GWe, with 16.8 GWe coal, 16.1 GWe LNG, 5.1 GWe nuclear, 4.7 GWe hydro (including pumped storage), 0.65 GWe wind and 0.84 GWe solar. There has been a concerted program to develop capacity under the Renewable Energy Development Act of 2009, and by the end of 2013, 3.76 GWe (peak) was installed. The Ministry of Economic Affairs (MOEA) target is 9.95 GWe by 2030. In 2013 the capacity factor for offshore wind was 38%, for onshore wind 28% and for solar PV 14%.²

2.2 Non-nuclear policy

The government pointed out that the energy transformation and the reform of the electric power industry should be coordinated by both long and short term strategies to ensure the supply of electricity. At the same time, we should actively promote energy conservation and expansion of renewable energy and promote such measures as energy conservation, energy conservation, energy storage and smart system integration in an all-round way. Emerging green energy industry development and promote green employment, leading the industry and the common people toward non-nuclear homeland.

The Executive Yuan said the new energy policy specifically includes:

i. stabilize open source and expand demand management to ensure power supply:

(i) Short-term: the replacement of traditional thermal power plants with high-efficiency units on schedule; the promotion of symbiotic generation of electricity and electricity to urgently increase the purchase system during the summer months; the promotion of Date obtained at: Energy Statistics Handbook 2015 (May 2016) and Energy Statistical Annual Reports diversified demand response measures including time tariffs, planned reductions and required The amount of bidding, etc. ; fire power generation unit status and the annual maintenance schedule of the overall inspection and other measures.

(ii) Long-term: increase energy efficiency, reduce the average annual growth rate of electricity demand to 1.0%; expand renewable energy development to reach 20% of total generating capacity in 114 years; complete the "third natural gas receiving station" as soon as possible and build natural gas offloading And storage equipment to expand the use of natural gas; actively carry out coal-fired power plant

replacement for ultra-supercritical high-efficiency generating units and other measures.

ii. to promote the maximization of energy saving, improve energy efficiency, reduce electricity demand Growth: In addition to seven technical strategies such as technology research and development, demonstration and use, incentive subsidies, industry promotion, audit and guidance, education and publicity, mandatory norms, etc., to promote energy conservation In addition, the Ministry of Economic Affairs is planning to promote the "New Energy-Saving Campaign" and jointly promote the transformation of low-carbon energy in China by taking the lead of the government, industry response and participation of all people.

iii. actively diversify and promote clean energy development:

(i) Gas Power Generation: To speed up the completion of the "Third Gas Station" and to build additional natural gas offloading and storage facilities to expand natural gas use and low-carbon natural gas generation.

(ii) Coal-fired Power Generation: Actively carry out replacement of coal-fired power plants for ultra-supercritical high-efficiency generating units.

(iii) Renewable energy: expand its development to reach 20% of its generating capacity in 114 years. The development process will consider both viable and cost-effective technologies and adopt phased development to gradually promote the development of domestic green energy industries.

iv. to speed up the layout of energy storage, to strengthen the stability of power grid:

(i) While increasing the renewable energy target, we have also taken the development of energy storage technologies to improve grid stability, such as large-scale energy storage systems and pumped-storage power plants.

(ii) The Ministry of Economic Affairs is now assessing the improvement of existing pumping power plant equipment and increasing power system FM capacity to meet the demand for storage of large quantities of renewable energy in the future.

v. to promote smart grid and smart meter construction:

(i) Smart Grid: In response to the demand for green energy feed, the future will gradually increase the

feeder capacity of the Green Power Development Area in Central South China.

(ii) Smart meters: At present, the construction of high-voltage users has been completed. In the future, communication technology will be solved as soon as possible and the development and verification of product modules will be carried out. Follow-up and with the promotion of time power prices, low-voltage power users and densely populated urban areas will be Wisdom meters preferentially construct objects and regions.

vi. cultivate system integration, export the foreign system market, expand independent green energy industry.

vii. To complete the electric law revision law and review the tariff mechanism to provide the market structure and legal basis necessary for energy transformation:

(i) Electricity law repair law: the current plan is to separate the plant network to promote the goal, the division of integrated electrical and power generation industry and the sale of electricity industry to open up, on behalf of the input, in order to gradually open up the user purchase option.

(ii) Review of tariff mechanism: The Ministry of Economic Affairs is currently reviewing the new tariff formula and considering all the amendments to the current tariff formula, including the scope of the cost items, limits on the price increases and reductions, the establishment of a stable electricity tariff mechanism, etc. Included in the review.³

Date obtained from:
https://www.ey.gov.tw/News_Content2.aspx?n=F8BAEBE9491FC830&s=5DC876427A861AE2

3. Economic Impact

To support sustainable development, reduce CO₂ emissions and its own internal energy supply, the development of renewable energy and adjustment of the industrial structure should be a critical strategy for Taiwan.[2]Meanwhile there are moves to further liberalize Taiwan's electric power market, reducing the monopoly control of Taiwan Power Co. (TaiPower) with its legacy commitments to nuclear power and fossil fuels, in a bid to promote green entrepreneurial initiatives and innovation in the power sector.[3] The administration is making a heavy commitment of resources to promoting seven sectors of the economy as the key to transforming Taiwan's industry, that is, the 5+2 Industrial Innovation Plan, one of plan is Green Energy.

4. Environmental Impact

The transition to a low-carbon energy economy will remain a cornerstone of national energy policies of countries committed to the climate change accord for decades to come.[4]

Given that the COP 21 agreement requiring the global efforts for reducing greenhouse-gas emissions, replacing nuclear power plants (which is a zero-emission generating source) that have decades of operational lifespan left with other zero or low-emission options, will require unnecessary investments that could be put to more productive and effective uses.[5]

5. Conclusions

Be a responsible government must provide relevant information fully and transparently to the people in the whole country, including the current government's planning direction for the realization of non-nuclear homeland and possible changes in energy supply and demand, industrial restructuring and lifestyle changes after the abolition of nuclear weapons. Problems and Challenges All kinds of information are loyally presented, providing references to all Chinese and making sensible judgments.

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APPENDIX

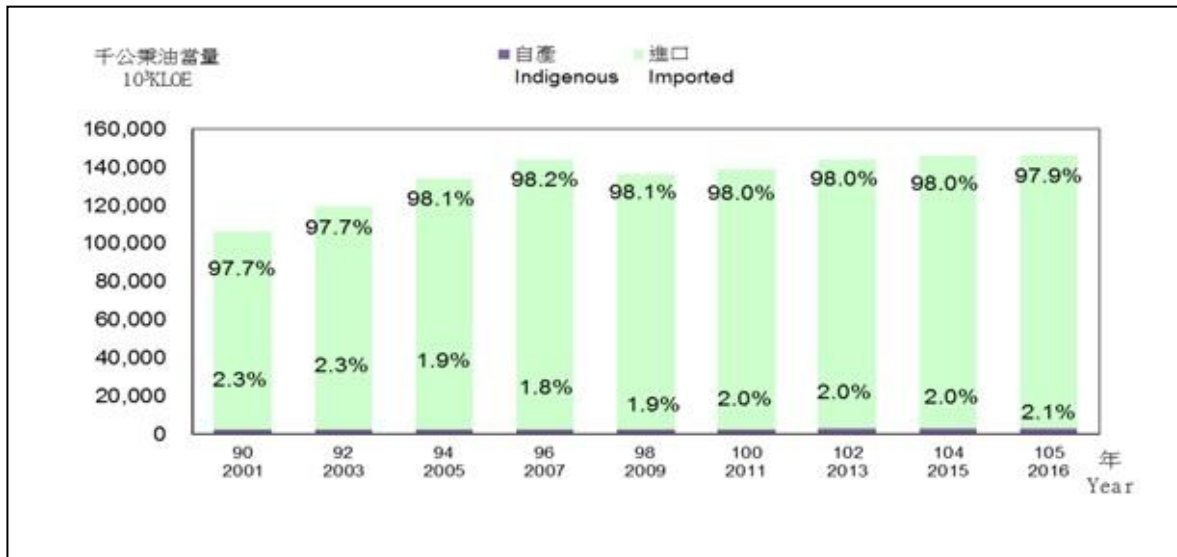


Fig.1 Energy Supply (by Indigenous & Imported) Source: Bureau of Energy (2016)

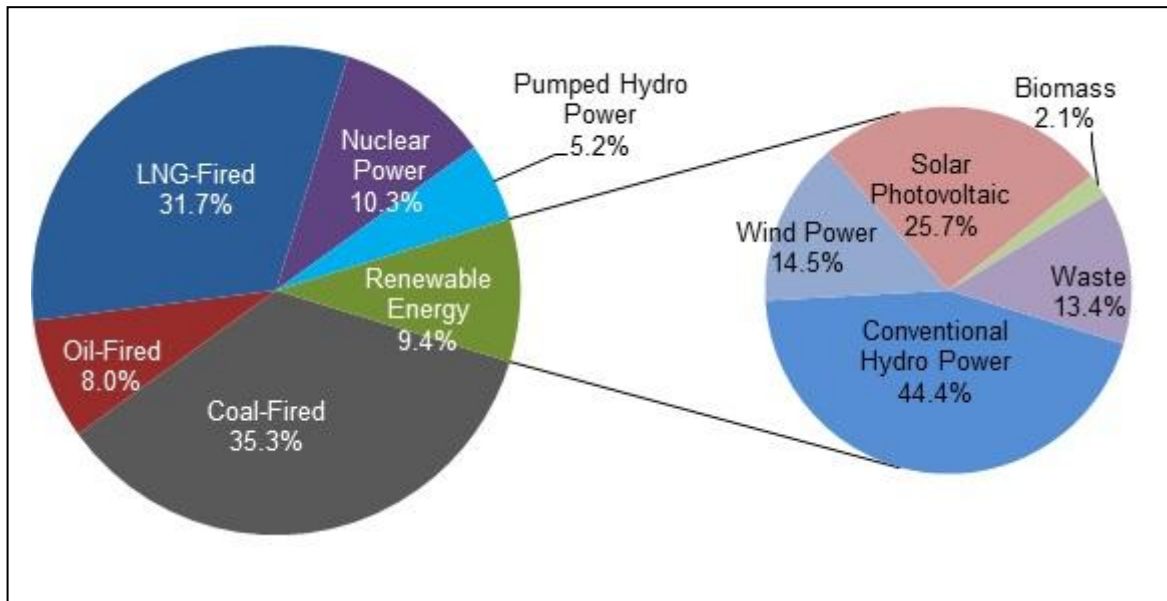


Fig2. Structure of Installed Capacity (by Fuel)Source: Bureau of Energy (2016)