

Taiwan's Energy Security Challenges

From geopolitics to environmental issues

By Floriano Filho

Taiwan faces multiple energy security challenges. While the relationship with mainland China is a difficult one, the island almost exclusively relies on imports. To cope with international political instability, the Taiwanese energy policy has been under continuous revision and updating.

Following months of riots and destruction in Hong Kong, the geopolitical relationship with mainland China dominated the 2020 elections debate in Taiwan and the news reports covering that entangled issue. Re-elected President Tsai Ing-wen claimed the “one country, two systems” policy sported by continental China was a clear fail. For her Hong Kong, instead of being a model for Taiwan, represented a warning. There was yet another development involving China perceived as having impacted the Taiwanese center-left party landslide victory in the latest presidential elections. The new aircraft carrier Shandong was set on sail through the Taiwan Strait just two weeks before the voting. Shandong is mainland China's second aircraft carrier and the first one built by the Chinese naval industry. In December 2016 the Liaoning, China's first aircraft carrier, had already broken through the “first island chain” and looped around Taiwan before transiting the Taiwan Strait on its return home.

Ms. Tsai and her Democratic Progressive Party (DPP), which are against unification with mainland China, incorporated those hostile events into their campaign strategy. Based on the narrative surrounding those occurrences, they incontestably defeated the mayor of Kaohsiung, pro-China opponent Han Kuo-yu, of the main opposition Kuomintang party (KMT). Nearly 8.2 million Taiwanese citizens voted for the DPP candidate. According to the Central Election Commission, it was the highest-ever count for a presidential candidate since 1996, when the Republic of China held its first presidential election by popular vote. The predominance of the Democratic Progressive Party's claims of Chinese belligerence during the elections dwarfed another fundamental campaign issue: clean energy and, more specifically, nuclear energy. Yet, in the context of Taiwanese debate about energy security policy, nuclear energy still occupied some space during the campaign. Both KMT's candidate and People First Party¹ Chairman James Soong criticized the government's energy policy and the handling of the controversial non-binding 2018 referendum that voted to retain nuclear power.

Geopolitics and nuclear issues in Post-War Taiwan

The interaction of geopolitics and nuclear issues goes back to a sensitive and defining time in Chinese history when the communists were advancing fast to take Beijing from the Nationalists. Even before departing for Taiwan, Generalissimo Chiang Kai-shek, leader of the Nationalist Chinese Party KMT, established the Atomic Energy Commission following the end of World War II. The entity has been in continuous operation until the present day as an independent government agency of the Executive Branch. The Atomic Energy Commission is responsible for atomic safety, development, and regulations. It also conducts research related to the nuclear sector.

The Pacific Proving Grounds became an important frontier for nuclear testing soon after the end of World War II. In 1958, the Taiwanese government started to build a nuclear research reactor at Hsinchu's National Tsing-hua University. However, what began as supposedly having educational and training purposes became an enormous covert nuclear weapons program. Despite the Republic of China 1970

¹ The People First Party is a liberal-conservative political party in Taiwan.

ratification of the Nuclear Non-Proliferation Treaty and the 1976 agreement in which Taipei, under U.S. pressure, committed to dismantling its nuclear weapons, an underground program was later revealed by a military dissident. He was directly involved in the program and secretly worked for the CIA, later defecting to the US.

Taiwan's nuclear energy development

The world's oil crises in the 70s compelled Taiwan's first phase of nuclear energy development. Four nuclear power plants with eight reactors were planned and construction subsequently started. In the 1980s, following President Chiang Ching-kuo's death, President Lee Teng-hui shuttered the weapons program, as Taiwan sought to develop nuclear cooperation internationally. Taiwan's nuclear programs were re-oriented to nuclear power and away from sensitive nuclear activities. Republic of China nuclear power plants use imported enriched uranium and are subject to International Atomic Energy Agency inspections. The push to build new nuclear power reactors in the early 90s was conducted by the Atomic Energy Commission and Taipower². Both institutions wanted all nuclear resources channeled into nuclear power only under civilian authority. Taipower, in particular, knew how sensitive nuclear activities had negatively affected the imports of key equipment and materials from the United States for nuclear power reactors. In 2008, the total installed nuclear capacity was 13.5 percent of Taiwan's installed electricity generation capacity.³

² The Taiwan Power Company is a state-owned electric power industry providing electricity to Taiwan and off-shore islands of the Republic of China.

³ According to M. Lee, by 2007 three of those nuclear power plants already produced "38.96 TWh of electricity, accounting for 19.3 percent of the total electricity generation and 7.97 percent of primary energy supply in Taiwan. In 2008, the total installed nuclear capacity was 5144 MWe or 13.5 percent of Taiwan's installed electricity generation capacity." Lee reminded that the cost of nuclear power of NT\$0.63 per kilowatt-hour (kWh), including a contribution for nuclear waste management and the decommissioning of plants, is significantly lower than producing electricity with fossil-fueled power plants. See Lee M., "The Past, Present and Future of Nuclear Power in Taiwan", in Yi-chong X. (eds), {Nuclear Energy Development in Asia. Energy, Climate and the Environment Series}, London, Palgrave Macmillan, 2011.

Energy Policies and Politics

The Taiwanese government proposed and approved the fourth and latest nuclear power plant in 1980, but its construction only started in August 1999 in New Taipei City. In response to the complicated Taipower management of Lungmen Nuclear Power Station's bidding and construction process, the first Democratic Progressive Party -led government, after 55 years of KMT continuous rule in Taiwan, canceled its construction in 2000. The Progressive Party adopted a "nuclear-free" energy policy, and the Legislative Yuan passed an Environmental Act in 2002 confirming that policy. Some two years later, however, global events would again tilt the scale towards nuclear energy. One was the rise of fossil fuel prices amidst continuous Middle East tension, international growing demand, particularly from China, the declining value of the US dollar, diminishing petroleum reserves, and financial speculation. The other was the effectiveness of the Kyoto Protocol, committing signatory countries to limit and reduce greenhouse gas emissions. Since the use of renewables was still limited, the broader adoption of nuclear energy could reduce the use of coal and fossil fuels. In 2008, having won the elections, KMT came back to power and began to support nuclear energy usage as an efficient source for economic growth while guaranteeing a "low-carbon homeland." The project was restarted in 2011, but following Japan's Fukushima Daiichi nuclear disaster, Taiwanese environmental groups called again for a national referendum on what became one of the major public debates between the two rival Taiwanese political parties.

While still negotiating political support in the Legislative Yuan,⁴ the then KMT-led government finally proposed a referendum in 2013 asking if the fourth power plant construction should go on. However, the opposing parties were so divided about the issue that Democratic Progressive Party members barricaded the Legislative chamber, provoking a scuffle that eventually led to the referendum being withdrawn. In 2014, the government decided once again to stop the plant construction and wait for more popular support. The Democratic Progressive Party was elected again in 2016 with the promise of implementing a "nuclear-free homeland" by 2025.

⁴ The **Legislative Yuan** is the unicameral legislature of Taiwan.

The first woman to be elected as president of Taiwan and the second president from the Democratic Progressive Party, Tsai has committed her government to decommission the six operable power reactors at the time their 40-year operating licenses expire. The phase-out policy was passed into law with an amendment to the Electricity Act.

Being a relevant source for power supply, Taiwan has “four operable nuclear power reactors—two each at the Kuosheng and Maanshan plants—which account for around 15% of the island's electricity generation”⁵. Unit 1 of Chinshan, Taiwan's oldest plant, has been taken offline and will be decommissioned. The operating license of unit 2 expired in July of 2019. Later the nuclear share fell to approximately 10% of total electricity supply, which is still relevant in the context of Taiwanese gross generation, that has been growing at an annual pace of 2.65% for the last 20 years compared to an annual rate of 2.32% of domestic consumption.

However, a 2018 survey conducted by the Risk Society and Policy Research Center showed that 44% of Taiwanese wrongly thought nuclear energy was the main power generation source. In reality, according to the Taiwanese Ministry of Economic Affairs' Bureau of Energy, petroleum products (48,28%), coal (29,38%) and natural gas (15,18%) had in 2018 a much higher participation as energy sources than nuclear energy (5,38%). The lack of appropriate information about the energy circumstances seems to be paradoxical when we consider that Taiwan has one of the highest internet penetration rates in the Indo-Pacific region. Thus, one could argue not for information scarcity, but rather information excess. Dickey argues that Taiwanese national security goes beyond energy security and has been suffering from a disinformation strategy executed by the Chinese government.⁶

That might also explain how Taiwanese politics reached the current level of polarization, not restricted to, but also including energy issues such as nuclear power. Therefore the campaign for the 2020 elections reflected the extent to which contrasting public policy views have been shaping the Taiwanese public sphere. Tsai's plan to phase out the fourth nuclear power plant by 2025 intends to achieve a mix of 50 percent

⁵ See “Taiwan Government Maintains Nuclear Phase Out”, in *World Nuclear News* (<https://world-nuclear-news.org/Articles/Taiwan-government-maintains-nuclear-phase-out>).

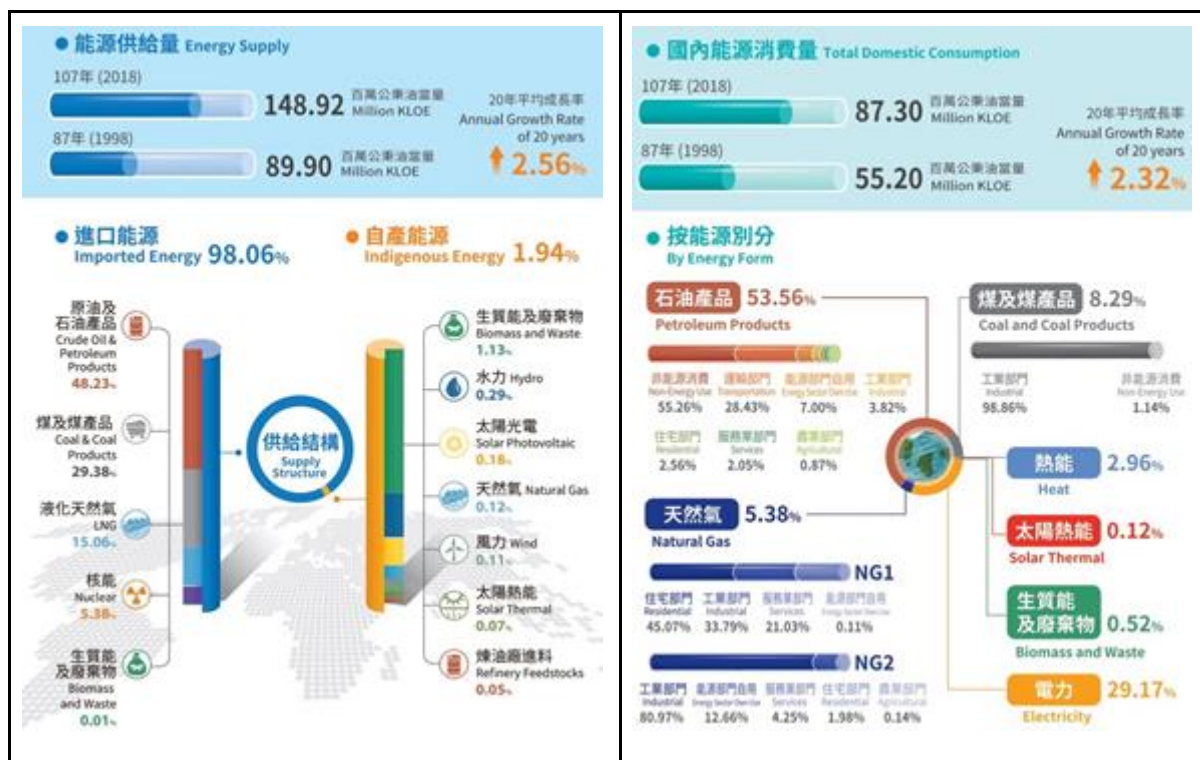
⁶ Lauren Dickey, “Confronting the Challenge of Online Disinformation in Taiwan”, in Yuki Tatsumi, Pamela Kennedy, and Jason Li (eds), *Taiwan Security Brief: Disinformation, Cybersecurity, & Energy Challenges*, Stimson Center, 2019.

natural gas, 30 percent coal and 20 percent renewable energy by that time, according to The Central News Agency, Taiwan's national news agency.

Fossil Fuels Reliance and the Role of International Trade

That promise seems hard to be achieved if one examines today's Taiwanese energy mix and the global conditions that might prevent a radical and quick transformation of the *status quo*. Given the country's dependence on fossil fuels, it would not be realistic to expect a dramatic change of its energy matrix in a short period. Energy supply and environmental sustainability are paramount for economic development. That is an even more obvious reality in places with scarce mineral resources such as Taiwan, where total energy import dependence rose from 94.42% in 1988 to 98% nowadays. Besides the challenge presented in terms of energy security, Taiwan has been exposed to price fluctuations and intricate negotiations in the global energy market.

Figure 1 Energy Supply and Domestic Consumption in Taiwan



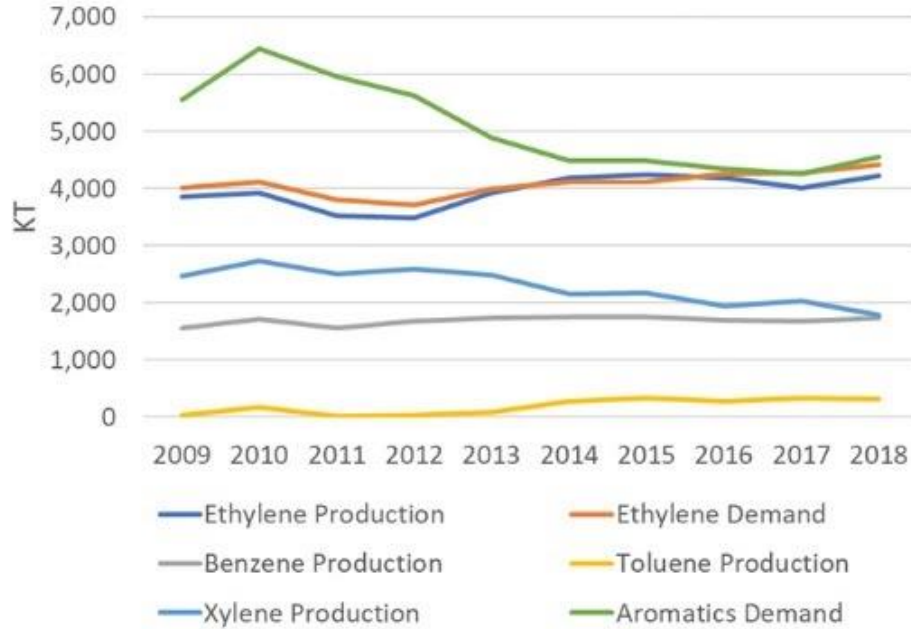
Source: Energy Statistics Handbook 2018, Bureau of Energy, Bureau of Energy, Ministry of Economic Affairs.

To cope with the continued economic pressure from energy supply and demand, climate change, internal social forces, exchange rates, foreign trade, and international political instability, the Taiwanese energy policy has been under continuous revision and updating. That also includes geopolitical diplomacy as in the exclusive economic zone dispute for the oil-rich South China Sea and Spratly islands with the Philippines, Malaysia, and Vietnam.

In order to guarantee affordable and sustainable energy prices, the Taiwanese Executive Yuan relies on subsidies for fossil fuels, particularly for agricultural production, street lighting and fuel freight, like many other governments around the world. That balance between mostly imported supply and rational demand goes beyond a simple quantification of fuels in barrels or containers. It entails complex trade relations with other countries, particularly China and Australia, that supply the bulk of coal consumed in Taiwan and import a good amount of Taiwanese added-value goods. Moreover, almost 86% of Taiwan's crude oil in 2015 came from Persian Gulf countries. Smaller portions were sourced from Africa and from countries elsewhere. In the case of the Chinese Petroleum Corporation, which dominates Taiwan's petrochemical trade and industry together with the Formosa Petrochemical Corporation, crude oil imports in 2018 came from the Middle East (49.94%), the US

(31.06%), Africa (4.39%), and Southeast Asia (3.34%). The remaining 11.27% comprised other countries such as Brazil and Ethiopia.

Graph 1 Taiwan Petrochemical Industry 2009 - 2019



Source: ener8 market data and Petrochemical Industry Association of Taiwan (PIAT), as shown at www.ener8.com/taiwan-petrochemical-industry-outlook-2019/, with minor editings by the author.

On those accounts, international trade networking and policy making have become a paramount strategic tool for Taiwan to face its lack of natural resources, as is also the case of South Korea or Japan, for example. The comparison with the Japanese case is particularly interesting given their similarities in energy endowments. The two archipelagos, despite their quite different dimensions, are characterized by natural resource scarcity, forcing them to import virtually all the energy commodities they use. Sharing a common history (Taiwan being a former colony of Japan between 1895 and 1945), fossil fuels dominate their respective electric generations. Nevertheless, Japan has adopted a nuclear policy that reflects its dominating conservative Liberal Democratic Party led by Shinzo Abe, by abolishing the previous government’s nuclear phase-out policy.

The need for energy commodities, thanks also to the exponential economic growth in Asian countries, goes well beyond Japan and Taiwan. Asian Pacific markets were the destination for almost 70% of global liquefied natural gas trade in 2018 according to reports by the International Gas Union. China and South Korea were responsible for close to 80% of that increase. “In January 2019, China announced plans to increase its liquefied natural gas intake capacity four-fold over the next two decades,

with ambitions to have 34 coastal terminals with a combined annual import capacity of 247 million tons by 2035”.⁷ By comparison, in 2017 the total global liquefied natural gas trade was 289 million tons. The region also hosts some of the world’s leading liquefied natural gas exporters. In 2018 Australia, Malaysia, the United States, and Indonesia were, respectively, the second, third, fourth and seventh world’s largest exporters. Dupuis adds that the Asia Pacific region now accounts for more than 40% of global primary energy consumption:

“While global energy demand is expected to increase by around a third by 2040, according to the 2018 BP Energy Outlook, Asia is set to contribute to a bigger proportion of that growth. With rising prosperity driving energy demand in the fast-growing developing economies of China, India and other emerging markets in Asia, the region is expected to account for two-thirds of the growth in global energy consumption.”⁸

Figure 2 Global Imports Through the South China Sea, 2016



Source: China Power Team, Center for Strategic and International Studies (CSIS).

Taiwan’s case has been used as a good example to demonstrate a causal effect between trade variables and energy consumption since the archipelago’s dependence on imported energy is almost 100%. In a 2012 article, Hu *et al.*⁹ examined the

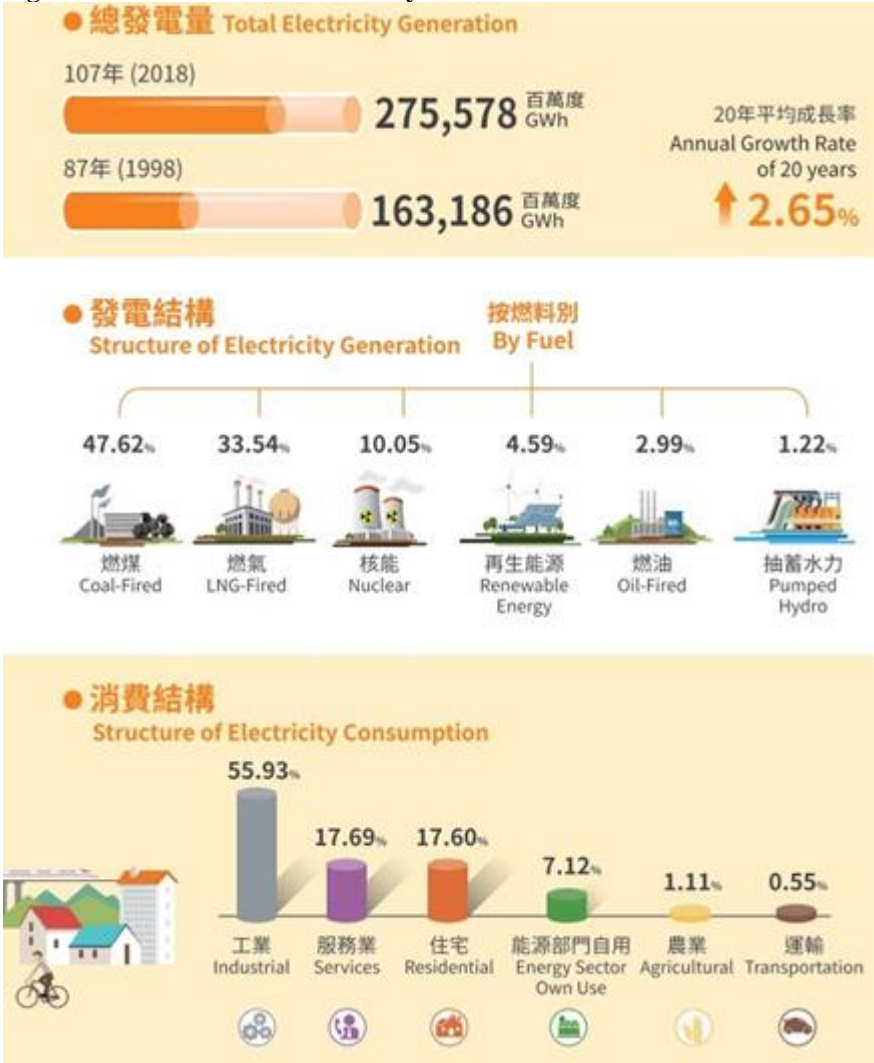
⁷ Dupuis, N., *Asia Grows as A Crude Oil Price Maker*, 2019 (www.ft.com/brandsuite/cme-group/asia-grows-as-a-crude-oil-price-maker/index.html).

⁸ Dupuis, *Ibid.*

⁹ Hu, J.-L., Chang, T.-P., Yeh, F.-Y., & Yang, T.-C. “The Linkage between Imported Energy and Trade in Taiwan.” *ISRN Economics*, 2012, pp. 1–11 (doi.org/10.5402/2012/816964).

relationship among four variables of energy consumption (total energy, oil, coal, and natural gas) and five trade variables (total imports, total exports, and export values of the industrial sector, heavy-chemical industry, and non-heavy-chemical industry). In general, they found that export-related variables responded positively to total energy consumption and oil consumption, which might be causing Taiwanese economic growth. Presenting Taiwan as an input-driven economy, the paper shows causal linkages between coal consumption and industrial sector production (in other words, the greater the latter, the greater the former). That is not the case when the industrial sector is separated into the heavy-chemical industrial sector and the non-heavy-chemical industrial sector. In the case of natural gas, the study found that its increased consumption would probably cause more development of the non-heavy-chemical industry.

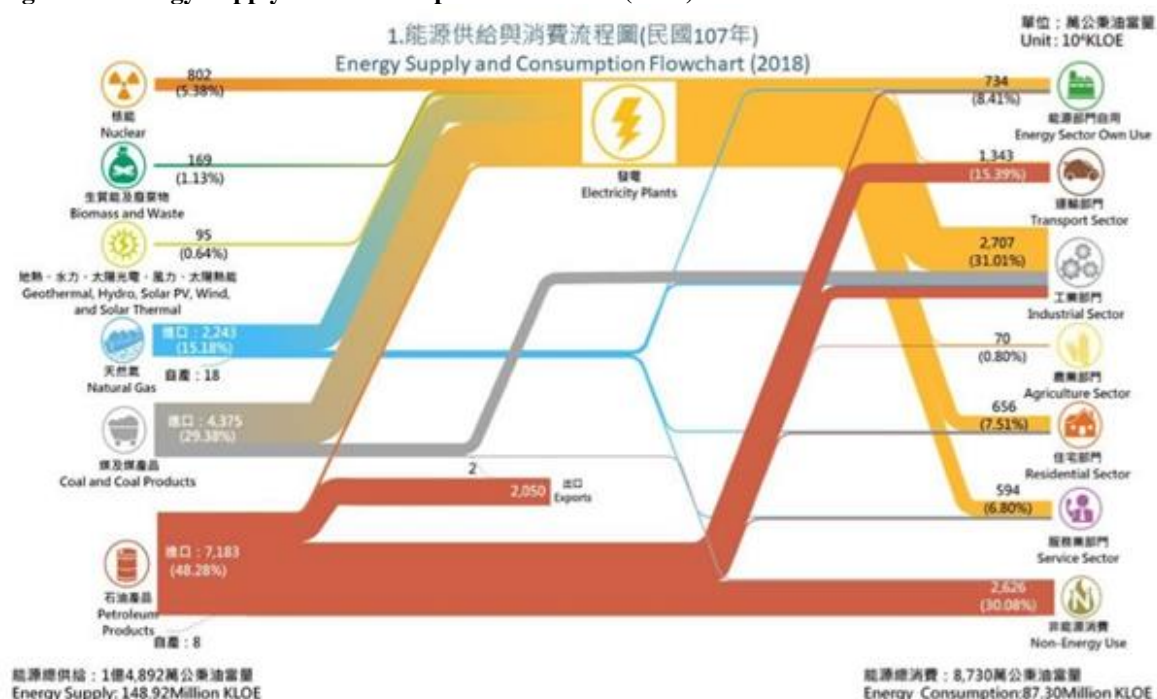
Figure 4 Growth of total Electricity Generation in Taiwan until 2018



Source: Energy Statistics Handbook 2018, Bureau of Energy, Bureau of Energy, Ministry of Economic Affairs.

Given those findings, Hu *et al.* proposed the term “trade-energy policy” to combine Taiwan’s energy and international trade policies simultaneously, incorporating the realms of national security, economic development, and global warming caused by carbon dioxide emission. That new policy, they claim, could help in rebalancing conflicting interests between, for example, coal demand expansion, CO2 emissions, and sustainable growth. The reliability of energy commodities supplied through international trade is also fundamental for providing electricity not only for residential use but especially for industry, which consumes most of the power generated domestically. Taiwanese *per capita* power capacity of 1.74 kW is bigger than China’s 1.2 kW but smaller than the US’ 3.1 kW. Obviously, considering the much bigger territorial and industrial sizes and populations of those two other countries, their total electric power capacity¹⁰ is much larger than Taiwan’s 275,578 GW, which in the global ranking comes between Spain and Indonesia.

Figure 5 Energy Supply and Consumption Flowchart (2018)



Source: Bureau of Energy (BOE), Ministry of Economy.

Although there is a domination of coal (47.62%) and liquefied natural gas (33.54%) for electricity generation, nuclear (10.05%) participation cannot be

¹⁰ China with some 7,111,800 GW and the US at 4,460,800 GW.

minimized. At the same time, it should be noted that the industrial sector consumes well beyond half of that production, with services and residential occupying the second and third positions respectively. In other words, coal and liquefied natural gas are critical for Taiwan's industrial and services sectors in the context of an economy that depends on its exports of integrated circuits (US\$ 57.9 billion); refined petroleum (US\$ 21.1 billion); LCD's (US\$16.8 billion); telephones (US\$10.6 billion); semiconductor devices (US\$8.26 billion); and printed circuit boards (US\$5.97 billion). The top export destinations are China, Hong Kong, US, Japan and Singapore.¹¹ However, in order to keep the sustainability of the energy matrix, it is also important to guarantee other sources used for electricity generation such as nuclear or viable renewable technologies. That is even more obvious when one considers, on the one hand, the environmental impact given the levels of pollution and particle emissions caused by coal firing; and, on the other, a combination of hot weather, infrastructure damage from typhoons and other natural disasters, and the promise to phase out nuclear power that has caused uncertainty in the electrical system.

Taiwanese Hopes with Renewable Energy

Since the approval of the Framework of Chinese Taipei's Sustainable Energy Policy in June 2008, energy policy has shifted towards increasing energy use and production efficiency. The emphasis was placed on adding value to increasing energy use. While trying to reduce to some extent the external dependence and to strengthen the pillars of sustainable development, the aim was to reduce the levels of carbon and of polluting energy supply and consumption. That framework was followed by a set of laws and regulations such as the Renewable Energy Development Ordinance (2008), the Energy Management Act (2009) and the Greenhouse Gas Reduction Act (2015). In November of 2011, the "Robust Nuclear Reduction" policy had already been promulgated for gradually reducing dependence on nuclear energy. It focused on energy saving and carbon emissions from the supply perspective. Hence, efforts involving renewable energy in Taiwan long precede Democratic Progressive Party's arrival in 2016. President Tsai's government, though, took it to a higher priority level.

¹¹ More precisely: the industrial sector consumes 55.93% of the production, services 17.69% and residential 17.60%.

So much so that energy safety, the green economy, environmental sustainability, and fair burden-sharing have been outlined as the four core aspects of Taiwan's progressive energy policy.

In May of 2018, Premier Lai Ching-te presented a Cabinet special report on energy policy to the Legislative Yuan. One of the attempts has been to gradually replace nuclear-generated electricity with shares of solar photovoltaic and offshore wind power. Taipower announced an investment equivalent to U\$17 billion for developing renewable energy until 2025. The KMT government had already invested its hopes on solar power through incentives for residential photovoltaic panels. In 2009 the Renewable Energy Development Act had foreseen a feed-in tariffs system for solar and wind power, promoting the installation of electric generation capacity that is fueled by renewable energy sources. However, the planning of Taiwan's national energy development pathway faces severe challenges beyond mineral scarcity, such as unexpected events like the 1999 Jiji earthquake that curtailed Taiwanese investment in the hydroelectric sector. There are also a number of conflicts among its economic, environmental and energy development objectives when considering greenhouse gas emissions reduction, nuclear-free homeland, industrial restructuring, and renewable energy development (Chang, 2010).

It does not seem prudent to imagine that President Tsai's landslide electoral victory in 2020 will imply a totally independent status in relation to mainland China. Mutual benefits from trade and investment between the parties have been growing for more than 10 years and should continue to increase despite the geopolitical tensions and heated narratives reflected on the media coverage. The economic stakes and complementary interests, be them bilateral, regional or international, are simply too high to be ignored. Moreover, the Democratic Progressive Party's election will not mean a solution to address the energy security policies either. In fact, the decision to quit nuclear energy poses huge challenges in terms of sustainable energy supply, cleaner environment, and less dependence on imported energy resources. So far, Taiwan has been facing the reality of replacing nuclear power with higher polluting sources such as coal since renewable energy sources are not expected to turn into a viable alternative at the necessary scale any time soon.

Trade policies in the energy sector so far have proven successful in terms of guaranteeing a surplus of resources for power and fuels. They are fundamental for running and developing the domestic economy, and for keeping a functional foreign relations structure. The partnership with countries like the US, Japan, Singapore,

Malaysia, Australia and others in lesser scale have been paramount for Taiwanese interests in the face of difficult circumstances when dealing with mainland China. Given the complex global dynamics, both in political and economic terms, and the numerous associated variables, Taiwanese industrial and trade policies such as the New Southbound Policy seem to be having a limited effect. The relationship with the giant next door seems to be the biggest challenge Taiwan has to face, but it is definitely not the only one. Besides resource scarcity, the archipelago has to deal with an aging population that is even more evident in the face of a considerable exodus of younger workers who are leaving the islands to search for opportunities abroad. The continuous update of industrial and trade policies, including in the innovation and IT sectors, besides energy diplomacy, seems to be indispensable for Taiwan to achieve the energy security that is basic for any country or entity that aspires to be sovereign and to accomplish economic growth and social development.

Further Reading:

- Albright, D., & Stricker, A., *Taiwan's former Nuclear Weapons Program. Nuclear Weapons on-demand*. Washington DC, Institute for Science and International Security, 2018.
- Chang, S., Chen, T., & Hou, J., *Energy Security and Electricity Supply Planning in Taiwan – An Application of Multi-objective Programming Model (MultEEE)*, Taipei, 2010.
- Chu, W.-W., *Taiwan's Petrochemical Industry since Economic Liberalization*, Taipei, Academia Sinica, 2003. (idv.sinica.edu.tw/wwchu/petro2002_revised.pdf).
- CPC Corporation, *CPC Corporation Annual Report*, Kaohsiung, CPC Corporation Taiwan, 2019
- Dickey, Lauren, "Confronting the Challenge of Online Disinformation in Taiwan", in Yuki Tatsumi, Pamela Kennedy, and Jason Li (eds), *Taiwan Security Brief: Disinformation, Cybersecurity, & Energy Challenges*, Stimson Center, 2019.
- Dupuis, N., *Asia Grows as A Crude Oil Price Maker*, 2019 (www.ft.com/brandsuite/cme-group/asia-grows-as-a-crude-oil-price-maker/index.html).

- Freschi, N., *Taiwan's Nuclear Dilemma*, 2018 (thediplomat.com/2018/03/taiwans-nuclear-dilemma/).
- Hu, J.-L., Chang, T.-P., Yeh, F.-Y., & Yang, T.-C. "The Linkage between Imported Energy and Trade in Taiwan." *ISRN Economics*, 2012, pp. 1–11 (doi.org/10.5402/2012/816964).
- Hu, M.-C., & Mathews, J. A., Taiwan's Green Shift – prospects and challenges. *The Asia-Pacific Journal: Japan Focus*, vol. 14, issue.19, no. 2, 2016 (apjpf.org/2016/19/Hu.html).
- I-chia, L., *Nuclear Power Debate: Scrapping plant would ruin Taipower: Duh*, 2014 (www.taipeitimes.com/News/taiwan/archives/2014/04/29/2003589160).
- Lee M., The Past, Present and Future of Nuclear Power in Taiwan, in Yi-chong X. (eds) *Nuclear Energy Development in Asia*. Energy, Climate and the Environment Series. London, Palgrave Macmillan, 2011.
- Ling, F. H., *Recommendations for Taiwan's Energy Policy*, 2017 (topics.amcham.com.tw/2017/02/recommendations-for-taiwans-energy-policy/).
- Ngerng, R., *No Consensus, Mass Confusion After Taiwan's Energy Referendums*, 2018 (international.thenewslens.com/feature/bluewave/110314).
- Stalmans, R., *Taiwan Petrochemical Industry Outlook*, Taipei, Ener8, 2019 (www.ener8.com/taiwan-petrochemical-industry-outlook-2019/).
- Suzuki, T., Nuclear Energy Policy after the Fukushima Nuclear Accident: An Analysis of "Polarized Debate" in Japan, *IntechOpen*, 2019 (www.intechopen.com/online-first/nuclear-energy-policy-after-the-fukushima-nuclear-accident-an-analysis-of-polarized-debate-in-japan).
- Tan, F., *Taiwan's CPC to start building third LNG terminal by mid-2019*, 2019 (www.reuters.com/article/us-ceraweek-energy-cpc-taiwan/taiwans-cpc-to-start-building-third-lng-terminal-by-mid-2019-idUSKBN1QT2MT).
- Tatsumi, Y., Kennedy, P., & Li, J., *Disinformation, Cybersecurity, and Energy Challenges*. *Taiwan Security Brief*. Washington DC, Stimson, 2019.
- World Nuclear Association, *Nuclear Power in Taiwan*, 2019 (www.world-nuclear.org/information-library/country-profiles/others/nuclear-power-in-taiwan.aspx).

- World Nuclear News, *Taiwan government maintains nuclear phase-out*, 2019 (world-nuclear-news.org/Articles/Taiwan-government-maintains-nuclear-phase-out).
- Ya-chuan, H., & Lin, K., *Taiwan's uranium reserves to be disposed of in 2 years: minister*, 2017 (focustaiwan.tw/business/201711060025).
- Yeh, J., Tsai, *Han clash on energy, referendums in presidential debate*, 2019 (focustaiwan.tw/politics/201912290010).

Published in booksandideas.net, 15 May 2020.