

***TAIWAN'S ENERGY ENVIRONMENT:
Sunshine and Fair Winds Ahead?***

**Commentary by Lotta Danielsson
Published by the Global Taiwan Brief
July 11, 2018**

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Reliable access to cost-effective energy has long been a concern in Taiwan, not only for the Taiwan government and populace, but also for the businesses operating there—particularly given the island's dearth of indigenous energy resources and with an economy dependent on energy-intensive industries like electronics manufacturing and semiconductor fabrication.

A secure, reliable, and stable power supply is critical, as unstable and costly power can be a drag both on industries and on the overall economy. Foreign and domestic companies want to continue successful operation on the island, and need reassurances that Taiwan will be able to provide them with the necessary energy resources in the short, medium, and long-term. Energy is also a national security issue for Taiwan, as the island relies on imports for the vast majority of its energy supply, with only [2 percent](#) derived from indigenous sources.

Generating capacity in Taiwan has been weakening, as older coal- and oil-fired power plants have been [decommissioned](#), while [nuclear](#) power plants have been mothballed or development halted. Meanwhile, as Taiwan's economy has continued to flourish, the demand for energy has also [risen](#) in both the commercial and consumer sectors. With soaring temperatures creating demand spikes, Taiwan has continued to set new records for peak electricity consumption, with several of those records coming during the [summer of 2018](#). This issue already came to a sharp head last summer, when 6 million households and numerous businesses experienced a power blackout, resulting in several hours of power rationing (for the first time since 2002) and a few production line stoppages. The August 15, 2017 blackout is [estimated](#) to have caused at least US\$3 million in losses for local businesses.

The 2017 blackout brought the many questions about Taiwan's energy future to the forefront. Will there be enough resources to meet both industry and residential demand? Are energy costs in Taiwan regionally and globally competitive? How can Taiwan balance the national security risk associated with its dependence on imported energy and its current reliance on fossil fuels with an unstable cross-Strait environment and an environmentally-conscious population with [no appetite](#) for CO₂ emissions?

The blackout also spotlighted the issue for Taiwan of reserve margins, the amount of spare capacity that the power grid has available at a given time above its current demand. The recommended reserve margin lies between 10-15 percent, but in August of 2017 Taiwan's spare capacity [fell to under 2 percent](#). Consistently low reserve margins increase the risk for additional blackouts and outages, since the system is unable to meet surges in demand or to compensate for generator breakdowns. The state-owned Taiwan Power Company (Taipower) appears to have been able to keep the reserve margin above [6 percent](#) during the summer of 2018, but that still falls far short of ideal levels.

Renewable energy appears to offer a potential solution to at least some of the questions about Taiwan's energy future, and

Taiwan has indeed been attempting to increase their renewable energy supply at least since the [Renewable Energy Development Act](#) was enacted in 2009. The current Taiwan government under President Tsai Ing-wen is now increasingly focused on actively developing green energy, increasing the share of renewables in total electricity generation, expanding natural gas availability—including by accelerating the construction of liquefied natural gas (LNG) receiving terminals, and revising the Electricity Act to help aid energy transformation.

Taiwan's current [energy supply](#) is a [mix](#) of fossil fuels such as coal (46.8 percent) and oil, along with natural gas (34.7 percent), nuclear power (8.3 percent), and renewable sources such as hydroelectric, solar, and wind (4.5 percent). The Tsai government has articulated an [energy policy](#) that is committed to a nuclear-free island by 2025, and thus Taiwan is pushing for an energy mix that year consisting of 30 percent fossil fuels, 50 percent natural gas, and 20 percent renewables, with nuclear energy completely phased out.

This is an ambitious goal, but Taiwan is at least partially underway towards this transformation. In 2017, power generation from solar and wind power hit a [record high](#). This past April, after a first-of-its-kind auction, Taiwan announced that it had [awarded](#) grid connection capacity to eleven offshore wind farms. In July, it apparently began [shipping](#) nuclear power rods from the mothballed Longmen Nuclear Power Plant back to the United States, returning the unused rods to the supplier. In August, it announced a [25-year deal](#) with US supplier Cheniere for a substantial annual supply of LNG starting in 2021. At the same time, however, Taiwan has also had to backtrack somewhat. In order to meet its short-term energy needs, a reactor at the Guosheng nuclear power plant was [restarted](#) in June this year.

In order to meet its goals for 2025, Taiwan needs to continue to encourage and fund innovative solutions to its energy problems. This is a challenge, as Taiwan's complex political status inhibits international energy cooperation, making it harder for Taiwan to learn from and acquire technology from other countries. Taipower is the energy behemoth on the island, but as a state-owned power company it is not known for innovation and flexibility. The company is also [losing money](#), thereby reducing its capacity for spending on research and development. In addition, increased reliance on renewable energy faces its own challenges, as power generation from wind and solar sources, for example, are intermittent and variable. Taiwan's energy infrastructure thus also needs an update -such as improving existing transmission lines and distribution networks, and making investments in grid upgrades.

The Taiwan government could set itself up for success by making regulatory and process changes. That includes improving slow and opaque approval processes and removing red tape, reducing rigidity in the government procurement process, and improving coordination among government authorities. The main government energy entity, the Bureau of Energy, is not high enough in the governmental hierarchy to be completely effective –restructuring the economics ministry into the “Ministry of Economic and Energy Affairs” has been on tap since 2010, but has not yet taken place. Taiwan should also continue to increase energy prices, which would not only help encourage conservation by compelling businesses and residents to curb power usage and invest in more efficient machinery, but would also improve Taipower operating margins. In its most recent White Paper, the Energy Committee of the American Chamber of Commerce in Taipei made [additional suggestions](#) to Taiwan on energy, including—among others—developing a *National Energy Plan*, involving outside experts in an advisory role, standing up an *Energy Czar* for cross-agency coordination, and encouraging more public-private partnerships (PPP) in the energy sector.



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As a global technology powerhouse, Taiwan is in a position to leverage its technology prowess to promote its renewable energy goals. It is already a leading producer of solar panels, and could develop and utilize new technologies to upgrade existing fossil fuel plants. It could also pioneer other technological innovations to improve its power distribution networks, with a recent example of the new [smart microgrid](#) installed on Penghu. The government can help by providing a regulatory structure that allows companies to take advantage of new energy technologies and by supporting programs that encourage developing new indigenous sources of energy. That includes increased use of biofuel and biomass (such as using pig waste for energy), promoting smaller and local hydropower systems, developing tidal and geothermal energy, expanding [pilot programs](#) for clean energy generating facilities in rural areas, and potentially even exploiting resources such as [methane hydrates](#) (natural gas trapped in ice) in deposits off the coast of Taiwan. Taiwan could also potentially take advantage of the government push for a circular economy—as expressed in the Tsai Administration’s 5+2 industrial innovation program—by promoting energy generation by waste heat and steam from the petrochemical production process, for example.

Taiwan is hoping to attract private capital to the island to help finance renewables projects, both for existing and new technologies, and it is already creating incentives. For example, the new Taiwan renewable energy credit ([T-REC](#)) now allows foreign companies to procure energy directly from local renewable energy projects, a positive step forward. Taiwan may also have to open up investments in additional sectors, however, such as allowing foreign investment in the electricity grid.

Taiwan’s energy needs are likely to continue to grow as its economy grows. The island has to make sure that it can balance those requirements against other similarly significant concerns, such as national security considerations and potential environmental impacts. If Taiwan can continue refining its energy strategy—agilely adjusting its energy policies to take advantage of new developments, encouraging innovative solutions, and creating attractive investments for foreign capital—it could allow Taiwan to meet its energy challenges into 2025 and beyond.

The main point: Taiwan faces serious energy challenges, with many questions raised by the 2017 blackout and record-breaking electricity consumption in the summer of 2018. Taiwan is actively attempting to permanently change its energy mix from nuclear and fossil fuels to green energy. The transformation is underway, but Taiwan can set itself up for success by making regulatory changes, by encouraging and funding innovative solutions, and by using its technology prowess to explore alternative energy resources.