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Why Taiwan's Sustainable Energy Policy Matters

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Scholarly Abstract

By establishing a series of similarities to the U.S., this study demonstrates the potential for Taiwan's recent progress on sustainable energy policy to influence American policymakers. An assessment of Taiwan's current energy situation is contextualized within its economic development and political institutions. Taiwan's energy legislation has already leveraged significant financial investment to reshape an economy increasingly focused on clean energy technology. In the future, Taiwan will continue to pursue aggressive energy legislation and the U.S. may draw inspiration from Taiwan's sustainable energy reforms.

Keywords: renewable energy, clean technology, carbon emissions, government policy

I. Introduction

The argument has been made in the United States and elsewhere, that individual national action on energy policy and climate change is irrelevant due to the rapidly growing carbon footprints of the world's large developing nations, such as China. Indeed, China continues to simultaneously concern and invigorate the world as its carbon dioxide (CO₂) emissions and clean energy investments grow exponentially. But the path taken by small nations to establish and achieve energy and climate change goals should not be overlooked as a guide to larger nations.

Although China's recent government policies targeting energy and climate change are often utilized as a benchmark for American inaction, a direct comparison between the two nations is inappropriate. China's massive economies of scale and authoritarian top-down planning are unique amongst the countries of the world and its government operates with a fundamentally different set of powers and constraints than the U.S. In contrast, the small island nation of Taiwan has a minimal absolute impact on global CO₂ emissions and energy use. However, energy policy reform occurring in Taiwan may serve as a desirable model for the U.S. Taiwan's economic, and political structures are similar to those of the U.S. and other developed western nations. Compared to America, Taiwan is confronted by equal or greater challenges in terms of energy security, fossil fuel dependence, CO₂ emissions, and energy pricing reforms. Operating within similar constraints, Taiwan has recently enacted legislation to transition to sustainable energy sources, increase energy efficiency, and lower CO₂ emissions. Thus, Taiwan can exert influence on global climate change by offering American policymakers guidance on sustainable energy reform.

II. Taiwan's Key Similarities to the U.S.

Unlike China, Taiwan is considered a stable nation that has already completed a meteoric period of economic growth and development. Taiwan's population shares a similar demographic structure with many Western nations and its nascent democratic political system contains many of the same advantages and disadvantages as the United States.

Taiwan developed in the image and partly due to the assistance of the U.S. The "Taiwan Miracle" witnessed incredible economic growth spurred by land reform, industrial output, and \$1.5 billion in USAID funding (Toledano, 1983). Over a thirty-year period from 1960-1989, Taiwan's economy averaged 9.5 percent annual growth (Tien, 1996). Regarding Taiwan's capitalist success, an effusive 1983 National Review article stated that, "The Republic of China (ROC) has the distinction of being the only country in the Far East that has fully adopted a Lockean, anti-mercantilist philosophy--the philosophy that made America great... The United States may ignore it officially, but the Republic of China on Taiwan is a symbol and a fulfillment" (Toledano, 1983). Over the past fifty years, Taiwan's breakneck growth has allowed it to move up the economic value chain. An economy once reliant primarily on agriculture gave way to manufacturing, and eventually the services sector. Today, Taiwan's economic breakdown resembles that of the U.S. (Central Intelligence Agency [CIA], 2010).

2010 Economic Sector Breakdown

	U.S.	Taiwan
Services	77%	59%
Industry	22%	36%
Agriculture	1%	5%

As a developed nation Taiwan's demographics largely reflect those of the U.S.: increasingly urbanized and wealthy. Seventy eight percent of Taiwanese live in urban areas, as do 82 percent of Americans (CIA, 2010). The Taiwan Miracle also made Taiwan one of the world's wealthiest nations. At \$35,800, Taiwan's 2010 per capita GDP (on a PPP basis) ranked just slightly below Germany and 33rd worldwide (CIA, 2010). Taiwan's similar trajectory of economic development and subsequent rates of wealth and urbanization lend themselves to high per capita consumption of energy. Thus, like the U.S., Taiwan is forced to address issues of energy efficiency and CO₂ emissions without compromising the luxurious, perhaps wasteful, amount of energy to which individual Taiwanese consumers are accustomed.

The striking similarity of its political structure and overall political climate to that of the U.S. reinforces the relevance of Taiwan's progress on energy policy. Taiwan's young and vibrant democracy has evolved rapidly in just 25 years of non-authoritarian rule and clearly drawn inspiration from the U.S. political system. Taiwan boasts free elections, implements its laws through a well-defined legislative process, and has an independent judiciary (Pascual & Bush, 2007). Taiwanese media is highly engaged with civil society, and freedoms of speech are generally protected. Although the country is governed by a semi-presidential system (a la France), the executive branch is still quite powerful. Like the U.S., a Taiwanese president is the nation's most powerful political figure, the head of state, and commander-in-chief of the armed forces. Taiwan's presidents are selected by popular vote, serve four-year terms, and remain limited by a two-term limit. Perhaps most similarly to the U.S., Taiwan's political

system functions primarily as a two-party system with highly partisan regional base of support. The Kuomintang Party (KMT) has held the North while the Democratic Progressive Party (DPP) has drawn support from the South.

While democratic reforms have encouraged the development of a just and stable society, Taiwan has also undergone a period of political polarization affecting its ability to strategically plan for the future. In their article, “The Four Faces of Taiwan Democracy” Pascual and Bush (2007) highlight the systematic issues afflicting Taiwan’s political system. The authors note that:

Formal democratic institutions may exist but they don't work well. The transition to democracy was successful but it has not been followed by a full consolidation of democracy. Regrettably, Taiwan's institutions—semi-presidentialism, the legislature, the party system, the electoral system, and the mass media—work together in a perverse way that rewards political gamesmanship over good policy. They reduce accountability, foster a zero-sum political psychology, promote policy deadlock, ensure suboptimal policy performance, and defer consensus on the rules of the game.

Taiwan’s sclerotic policy-making process results from a gulf of distrust and animosity that exists between the KMT and DPP parties. Taiwan’s politicians make the vitriol found in U.S. politics seem tame; in the past decade alone there have been several well-publicized physical altercations on the floor of the Taiwanese legislature (Wang & Yan-chih, 2010). Additionally, Taiwanese politicians engender similar criticism as their U.S. counterparts in regards to an election-cycle mentality hindering long-term strategic planning.

The Taiwanese media adds fuel to the fire of Taiwan’s partisan political environment. Though tightly controlled by the KMT during authoritarian rule, Taiwan’s media has undergone a rapid change during a period of intense commercialization and competition for viewership. However, as Huang Ching-Lung of the Brookings Institute argues, the liberalization of press freedoms has not translated into improved media quality. Huang (2007) observes that “the ensuing super competition resulted in the media moving toward extremes, satisfying popular whims, and getting deeply involved in the political battles between the two sides. Thus the media in general became an accomplice in the polarization of society.” Taiwan’s newspapers, magazines, radio broadcasts, and 24-hour news stations often overtly support the KMT or DPP. The marked uptick in Taiwanese media polarization and coziness with political parties has led Freedom House, which once assessed Taiwan’s media as the freest in Asia, to downgrade its assessment for a second consecutive year (Baum, 2011). Moreover, polarization of media outlets has increased over the past decade and eroded any semblance of public trust in their journalistic credibility.

In light of Taiwan’s political-media polarization, Pascual and Bush (2007) assess Taiwan’s political future. The authors assert:

We believe the problems here are mainly structural and systemic. One political camp or the other can be blamed for mistakes that each has made over the last decade to contribute to the current state of affairs. But political actors are acting within a structure that encourages these unfortunate types of behavior.

The current status as well as future prognosis for Taiwan's political atmosphere closely resembles that of the U.S. Advocates of legislative reforms often bemoan America's hyper-partisan political posturing and never-ending election cycles as roadblocks to pragmatic policymaking. In the U.S. media, networks have become more polemic in a similar quest for higher ratings. Together, U.S. politics and media have served to further divide American society and defer responsibility for planning its future. An acrimonious atmosphere has led both U.S. and Taiwanese pundits to proclaim their political systems broken and fundamentally at odds with the interests of their citizens.

Yet, in a political climate often more caustic than that of the U.S., Taiwan's warring political parties have still managed to enact multiple progressive energy policies. The KMT party, currently in control of Taiwan's presidency and legislature, has seldom been cited as an environmental activist. Yet the party is composed of industrialist technocrats able to see the strategic value of clean energy for Taiwan's continued economic growth and energy security. On the other side of the aisle, the DPP is supports sustainable energy legislation based on increased environmental protection and social justice. With unified economic, national security, and environmental concerns, Taiwan's political figures have temporarily surmounted political differences to act in the best interest of their constituents. It remains to be seen whether Republican and Democratic legislators in the U.S. will be able to do the same.

III. The Energy Situations in Taiwan and the U.S.

The challenges that Taiwan faces related to energy use and CO₂ emissions are as serious or perhaps even more so than those of the U.S. Taiwan continues to rely on a higher proportion of fossil fuel than the U.S. As a result, it lacks any semblance of energy security and ranks amongst the world's highest per capita CO₂ emitters. Like the U.S., a strong political lobby representing organizations with significant business interests in energy policy influences Taiwan. Taiwan's barriers to energy policy reform are also compounded by a model of artificially low electricity-pricing that interferes with transitioning to cleaner energy sources.

Taiwan, like most industrialized nations, promoted economic development at the expense of the environment. By the late 1980s, industrialization and high rates of car ownership led to tremendous levels of air, water and soil pollution. As it began its cleanup, Taiwan was roughly twenty years behind the U.S. in terms of environmental protections (Allen, 1990). Created in 1987, Taiwan's Environmental Protection Administration (EPA) has done an admirable job in reversing some of the worst effects of industrialization. Yet, Taiwan still relies on a higher percentage of fossil fuels than the U.S. Coal and oil comprise 81 percent of Taiwan's primary energy supply (Ministry of Economic Affairs [MOEA], 2010), compared with 58 percent in the U.S. (U.S. Energy Information Administration [EIA], 2009a).

Compounding the problem of reliance on fossil fuels is Taiwan's lack of natural resources and tenuous energy security. While U.S. politicians have emphasized the importance of energy independence for decades, America still produces approximately three quarters of its primary energy and its largest oil importer is Canada, hardly a hostile or unstable nation (EIA, 2009a). In contrast, Taiwan's 2010 share of its domestic energy supply fell to an all-time low of 0.6 percent (MOEA, 2010). Taiwan has largely exhausted its minimal sources of domestic petroleum, natural gas, and coal, leaving it dependent on

foreign imports for over 99 percent of its energy demand. Approximately half of Taiwan's primary energy comes from oil, the majority of which is shipped from the Persian Gulf and Western Africa. As a result, Taiwan's oil supply is exposed to dual vulnerabilities: regional instability in the Middle East and Africa and military conflict in the Taiwan Strait. Although cross-strait relations have enjoyed a recent thaw with the signing of the Economic Cooperation Framework Agreement (ECFA), China's growing naval presence is a constant reminder about Taiwan's diminishing energy security.

Despite its status as the 50th largest country in the world, Taiwan's overall energy consumption is 21st worldwide (EIA, 2010). Taiwan also ranks among the top twenty five nations for total and per capita CO₂ emissions (Carbon Dioxide Information Analysis Center [CDIAC], 2007). In a 2010 Climate Change Performance Index conducted by the German-based Climate Action Network, Taiwan ranked 47 out of 60 compared with its fellow high-emission nations and finished third worst out of all Asian nations surveyed (Burke, Bals, & Lindsay, 2010).

When discussing potential changes to the energy status quo, it is also important to mention the impact of lobbyists. Upon initial examination, it would seem that Taiwan and the U.S. differ greatly in terms of lobbying interests. The U.S. energy lobby, comprised of major oil companies and electric utilities, is consistently one of America's largest lobbying groups. Since 2000, the U.S. energy lobby has spent over U.S. \$2.5 billion to influence congressional politics (Lacey, 2010). In contrast, Taiwan's lobbying environment is fundamentally different due to nationalization of the oil and electricity generation industries. Despite some recent privatization reforms, Taiwan's energy and oil sectors are still dominated by state-run monopolies (Taiwan Power Co. and CPC Co., respectively). However, Taiwan does have a robust, private sector heavy-industry lobby that is greatly impacted by energy policy. Industry is the largest energy consumer in Taiwan; its share of total domestic energy consumption has grown from 44.5 percent in 1994 to 52.5 percent in 2009 (Bureau of Energy, 2011). Thus, Taiwan's heavy industry lobby ostensibly serves the same role as the U.S. energy lobby in opposition to progressive energy legislation on the grounds of reduced business profitability.

There is also a significant element of both the U.S. and Taiwanese lobbies that seek stronger legislation on CO₂ emissions and renewable energy sources. In 2005, U.S.-based Duke Energy publicly supported a tax on CO₂ emissions on the grounds of greater long-term certainty in the utilities' cost-analysis (Osborne, 2005). In 2009, several other large U.S. utilities including Exelon and Pacific Gas & Electric withdrew from the U.S. Chamber of Commerce due to the organization's strong opposition to global warming legislation (Sheppard, 2009). In Taiwan, certain organizations oppose Taiwan's proposed energy policy reforms because they do not go far enough. Taiwan's Business Council for Sustainable Development (BCSD), which includes most of Taiwan's largest industrial companies as members, noted opposition against the proposed GHG Reduction Act due to its limited scope and solely punitive nature (Huang, 2011). Taiwan BCSD Secretary General Niven Huang (2011) believes the legislation is hampered by its unclear ability to regulate the heavy industry and power generation sectors and an ambiguous time frame for a cap-and-trade system to emerge. Huang (2011) contends that Taiwan's GHG legislation should not exclusively utilize CO₂ legislation as a means of pollution control, but rather adopt a more holistic approach including pathways to invest in Taiwan's low-carbon economy and future global competitiveness.

Perhaps the most significant barrier preventing Taiwan from reducing its energy consumption and CO₂ emissions is its artificially low electricity price. Taiwan boasts one of

the cheapest electricity rates in the world (Low, 2009). From 1987-2007, the average electricity price in Taiwan decreased by seven percent (Liao & Lee). Over the same time period, electricity rates in the U.S. increased by forty percent (EIA, 2009b). In 2008, the state-run Taipower Company reported an average cost of NT \$2.3 (U.S. \$.076) per kilowatt-hour (Low, 2009), nearly three times cheaper than the average electricity price of the E.U. (Europe's Energy Portal, 2010). Cheap electricity discourages investment in energy efficiency and stunts the competitiveness of electricity generated by more expensive alternative energy sources. As a result, several overseas investors have declared their renewable energy projects in Taiwan unprofitable and some have withdrawn from the island altogether (Ferry, 2010). Even as Taipower faces deficits due to low electricity costs, reform does not remain an option ("No electricity price hikes," 2011). Just as raising the gasoline tax is anathema to any U.S. political campaign, hiking electricity bills in Taiwan remains politically poisonous and unfeasible.

IV. Taiwan's Sustainable Energy Policy Progress

Though it shares similar structural constraints with the U.S., Taiwan has made encouraging progress in enacting sustainable energy policy reforms. In recent years, Taiwan has taken several steps to identify short-term and mid-term strategic goals supported by legislation and financing.

In 2008, Taiwan's Ministry of Economic Affairs (MOEA) released the "Framework of Taiwan's Sustainable Energy Policy," a document outlining several measures that commit to modest short-term and mid-term goals in energy efficiency and CO₂ emissions reductions. The government has pledged to decrease energy intensity twenty percent from 2005 levels by 2015 and fifty percent by 2025 (MOEA, 2008). Furthermore, Taiwan aims to return CO₂ emissions to 2008 levels between 2016-2020 and to 2000 levels by 2025 (MOEA, 2008). Taiwan has also pledged double its share of renewable energy as a proportion of total installed capacity from eight percent to sixteen percent by 2025 (Sun, 2010). Taiwan has already developed most of its suitable hydropower sites (Hu, 2010), so the vast majority of renewable energy growth will come from the wind and solar energy sectors.

In order to achieve these goals, the government has unleashed several new policies. The most heralded has been the Renewable Energy Development Act (REDA). Passed in July 2009, REDA calls for a 6.5 gigawatt (GW) increase in renewable energy installed capacity, bringing Taiwan's total to ten GW within twenty years (Kuo, 2009). REDA importantly establishes a system of feed-in tariffs for electricity generated by renewable energy and compels Taiwanese utilities to purchase it. The Act also created a renewable energy development fund bankrolled in part by utilities that use fossil fuel and nuclear power generation. In addition to REDA, the legislature has passed a series of measures intended to transform Taiwan into a low-carbon country by 2020 (Shih, 2009). The government has called for the creation of two low-carbon pilot communities per city or county over the next two years with fifty percent of energy supplied by renewable sources. In five years, Taiwan aims to achieve six low-carbon counties or cities.

To support its nascent legislation, Taiwan has demonstrated its commitment through financial support for several initiatives. From 2010-2015, the government is preparing to invest U.S. \$1.47 billion to promote renewable energy and energy research and development. The government's plan is expected to leverage an additional U.S. \$200 billion in private investment while saving the country billions in energy costs and creating thousands of jobs

(Gates, 2010). Over the same period, the Ministry of the Interior has announced a U.S. \$100 million investment in green architecture. The plan is estimated to create 243,000 jobs in related sectors while reducing 3.82 million tons of CO₂ (“Government to promote,” 2010). The government has also invested U.S. \$260 million to develop Penghu Island into Taiwan’s first low-carbon pilot region. By 2015, over half of Penghu’s primary energy will be generated by renewable sources, cutting its CO₂ emissions fifty percent from 2005 levels (Yang, 2010).

Taiwan’s government legislation and investments in renewable energy and energy efficiency are routinely projected to create thousands of jobs and leverage private investment by a factor of ten. The passage of the REDA was predicted to spark a U.S. \$1 billion investment in renewable energy technology alone (Kuo, 2009). Strategic Taiwanese government investment in sectors such as solar, LED, and electric vehicles are part of a larger economic strategy to expand low-carbon industrial production from \$5 billion to \$35 billion in five years and create 110,000 jobs (Chan, 2009b). Thus, moderate energy goals have spurred the investment, innovation, and job creation that will drive Taiwan’s future economic competitiveness.

While the steps taken so far are impressive, two pieces of legislation currently under debate could amplify the impact of existing measures and elevate Taiwan to the status of a world leader in sustainable energy policy. Taiwan’s legislature is currently debating the passage of a domestic greenhouse gas (GHG) emissions act. Under current parameters, Taiwan’s EPA will manage GHG emissions permits and create performance standards. Ultimately, the law would implement an overall GHG emissions target and cap-and-trade system. Successful passage of the bill would bestow upon Taiwan the distinction of being the first country in Asia to enact a national cap-and-trade program. There has also been recent discussion surrounding a tax on CO₂ and fossil fuels. A lowering of both the corporate and income tax rates would offset the additional tax burden on fossil fuel consumers and proceeds would subsidize public transportation, low-income families, and energy efficiency research (Chan, 2009a). Annual revenues of Asia’s first potential carbon tax could reach U.S. \$12.4 billion by 2021 (Chan, 2009a).

When evaluating Taiwan’s legislation and investment in clean technology and low carbon projects, it is important to address scale and proportionality with the U.S. In terms of overall investment, Taiwan pales in comparison with its American counterpart. In 2009, the American Recovery and Investment Act, or “The Stimulus Bill,” allocated roughly U.S. \$50 billion to clean energy and another \$17 billion in energy efficient transportation (Wang, 2009). In 2010, the U.S. annual investment in clean technology increased 51% to \$34 billion, ranking it third in the world (Pew Environment Group, 2011). The U.S. also remains a powerhouse in sales of clean technology, coming in second place in the world (Van den Berg & Van der Slot, 2009). However, given the fact that the American economy is roughly 35 times the size of Taiwan’s, both nations’ clean technology investments and sales are more aptly compared when considered as a percentage of GDP. Taiwan’s \$1.47 billion investment plan is approximately 0.35 percent of its 2010 GDP while the U.S.’ \$67 billion dollar green stimulus investment is slightly higher at 0.45 percent. Weighted by percentage of GDP, Taiwan’s clean technology sales rank fifteenth worldwide, outpacing the U.S. in nineteenth place (Van den Berg & Van der Slot, 2009). In a 2009 report published by the World Wildlife Fund, Taiwan also claimed first place of all nations studied in solar PV sales as a proportion of GDP while the U.S. did not place in the top five for any of the clean technology industries surveyed (solar, wind, biofuels, and insulation) (Van den Berg & Van der Slot, 2009).

In regards to clean energy policy and investment, Taiwan and the U.S. seem to be moving in opposite directions. Due to recent legislation and investment priority, Taiwan has seized an opportunity to reorient its economy towards clean technology while the U.S. has stalled and lost a once commanding lead. In terms of five-year growth in clean technology investment, the U.S. came in eleventh place out of the G-20 nations (Pew Environment Group, 2011). Despite a surge in funding from the U.S. stimulus, an uncertain national policy environment persists to discourage investment. The U.S. federal government has not been successful in passing a national renewable energy standard, carbon tax, cap-and-trade or feed-in-tariff system, nor is any such legislation likely to pass under a divided government. Taiwan has successfully implemented some of these policies (renewable standard and feed-in-tariff), deliberated on others (carbon tax, cap-and-trade) and shifted its economy with strategic government investment towards a greater dependence clean energy for growth.

V. Conclusion

Due to its small population and murky political status, Taiwan is often overlooked in the realm of global affairs. But a rash of similarities with the U.S. in terms of economic, demographic, and political structure warrant its consideration in the field of sustainable energy policy. Taiwan's interrelated issues of unsustainable energy imports, fossil fuel dependence, energy consumption, and CO₂ emissions are compounded by obstacles such as the government's refusal to correct artificially low electricity rates. In spite of these negative factors, Taiwan has passed multiple progressive policies that address energy efficiency, renewable energy installation, and the promotion of its domestic clean technology industry.

The modest success of Taiwan's sustainable energy policy demonstrates the importance of setting short-term and mid-term goals, even if they initially generate sub-optimal outcomes. Indeed, Taiwan's short-term and mid-term CO₂ emissions and renewable energy targets are relatively conservative and fall well short of proposals pushed forth by the E.U. and other world leaders. However, Taiwan's modest goals have fostered important legislation and financial investment that provide important price signals to its burgeoning clean technology industry. Thus, Taiwan's sustainable energy policy is the beginning of a process of reorienting Taiwan's economy towards the energy technology sector, enhancing its economic competitiveness, environmental health, and contribution to global climate change initiatives.

The U.S. and Taiwan have a special relationship. Over the past 50 years, Taiwan has learned and benefited from the U.S.-style of economic, political, and cultural development. Perhaps it is time for America to learn something about energy policy from its ally off the coast of Fujian.

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