

ASIA EDGE PROJECT



Securing the Mekong Subregion's Future through Transitioning to Renewable Energy

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E nergy demand continues to grow in the populous and economically vibrant region of Southeast Asia, even as the need to address climate change and CO₂ emissions becomes clearer. Energy profiles, security, and management in the subregion are diverse and unequally distributed, but one commonality is rapidly growing demand for energy. Experts estimate that electricity demand will double from 2010 to 2040.¹ To match this growth, some \$1.7 trillion of cumulative investment in energy supply infrastructure to 2035 is required, including 60% in the power sector, with these power needs increasingly met with renewable and sustainable energy sources. The coming energy transformation in the Mekong is important, and getting it right is essential for the subregion's sustainability, resilience, and security. The transformation to sustainable and clean energy is not only an imperative to growth but increasingly also a condition for national security.

China's energy transition is dominated by geostrategic concerns and should be considered as a part of its foreign policy. This essay argues that progress in energy security for Southeast Asia is more complex than just being a "by-product" of geopolitics and provides recommendations for the parties involved to make a lasting and meaningful contribution to the Mekong. Energy security is a critical need of the lower Mekong countries (Cambodia, Laos, Myanmar, Thailand, and Vietnam), which are all developing economies with young and expanding populations and fast-paced urbanization. Energy security determines their economic and industrial capacities, which in turn will affect their national resilience. Lower Mekong countries themselves are not passive receivers of external funding and initiatives. Some countries within this subregion are also playing increasingly important roles in shaping the energy security of the region, and not always constructively. Transparency

and accountability need to apply to the Mekong actors themselves, too, rather than just serving as a channel to constrain China. The essay concludes by examining the role that outside powers can play in helping the Mekong subregion achieve its energy goals, particularly by supporting regional countries' efforts to move beyond hydropower.

Why Is Mekong Energy Security Unique?

The Mekong Delta is also known as the "rice bowl" of Southeast Asia, and the river itself is fundamental to the region's economies. Take Vietnam as an example: the rice cultivation along the Mekong (or Song Cuu Long in Vietnamese) constitutes over 50% of the country's rice exports and nearly 75% of its fishery and fruit exports, accounting for 16% of the country's overall GDP. The delta sustains the livelihood for 20% of Vietnam's population.² Located at the estuary of the river, Vietnam will be most affected by the human-made and climate change–induced effects on the Mekong Delta, and hence is the most interested in preserving the balance of river management and cooperation of the Mekong countries.

Environmental effects on the Mekong will not only be felt among Southeast Asian countries but also affect the global food market, especially the supply of rice and seafood. This rich transboundary river is a global natural heritage, and its ecological vulnerabilities to climate change are profound. Poor management is not just about the massive scale of intervention affecting fish migration and the general ecosystem in this mighty river. Hydroelectric dams, for example, also change the natural condition of sediment flow as well as rocks and pebbles in the water, all of which erode the riverbank. Upstream water storage impoverishes the downstream fish migration and reduces the fertility for agricultural cultivation of the delta. Studies suggest that completing all eleven dams on the downstream of the Mekong River, while installing additional dams on its tributaries, will result in trapping 96% of the Mekong's sediment behind the reservoir walls.³ China's upstream dams already block more than 50% of the river's sediment flow.⁴

Rising energy demand is the key reason for construction of these projects. From 1990 to 2015, electricity production in the Mekong subregion increased at an average annual rate of 8.2%. This is around twice the growth rate of the ten Association of Southeast Asian Nations (ASEAN) member states and three times the world growth rate. It is estimated that this trend will continue, with energy demand in the Mekong increasing by 66% by 2040.⁵

On top of the pressing development agenda and urgency to respond to growing climate change risks and sustainability goals, countries in the region are facing economic contraction from the Covid-19 pandemic. This is likely to further complicate effective energy strategies that are tailored to individual countries' demands, are balanced, and consider ecological sustainability. Energy infrastructure often depends on foreign investment, and the technology, quality, standards, planning, and geographic location are influenced by these external investors. All of these factors may pose risks to the lower Mekong countries' energy security as well as national resilience, potentially becoming a national security issue. Greatpower competition has resulted in more attention to the Mekong, which raises the possibility of more investment and international standard setting in energy and resource governance. But this also adds another layer of political, strategic, and diplomatic challenges for the Mekong countries to address.

Sharing Natural Resources with China

China, which is the world's largest energy consumer and shares the Mekong with significantly smaller neighbors, has been active in seeking to expand its leverage in this security frontier.⁶ China began building dams in 1984 with the Manwan dam in the southern province of Yunnan. Completed in 1993, the dam's primary purpose is to provide hydroelectric power for the industrial needs of Kunming, Yunnan's capital. The Dachaoshan and Jinghong dams were later built downstream from Manwan and extended the hydropower to external markets in Laos, Thailand, and Burma. Already concerns arose about the effect of this alteration to the river on downstream water and fish. There are over one thousand indigenous fish species in the Mekong River, and commercial fishing in the Lower Mekong Basin, a fishery estimated at \$800 million in 2000, was affected by the dams.⁷ Building cascades of dams in the upper Mekong River (which in Chinese is called Lancang) and Yangtze River, as well as on their tributaries, is part of a Chinese strategy to achieve economic and energy security. Premier Wen Jiabao pledged that by 2020 20% of China's energy would come from renewables, with hydropower leading the way.8

China has built eleven dams in the upper river and is financing six dams in Laos and Cambodia, sparking criticism of these frequently disruptive projects. Dam construction has caused human displacement as well as environmental degradation. For example, the Mekong River's water levels have dropped to historically low levels, and there are major concerns for human security across the region.⁹ In 2016, China established the Lancang-Mekong Cooperation Mechanism, another multilateral initiative, which has identified water management as a priority area of cooperation.¹⁰

Brian Eyler has noted that by 2040 Chinese energy demand will increase by 90%, which is equivalent to the current consumption of China and the United States together.¹¹ The energy thirst was fueled by China's large population, but even now that the country no longer fears an energy deficit, it is still investing in hydropower dams in neighboring countries. Energy security has become almost secondary as dams gain geopolitical in addition to economic importance. Eyler also has noted that "the hydropower lobby has nearly unlimited power at the local level, and it's become too strong in Beijing."¹² His research suggests that China's dam developers have achieved the political clout of China's offshore oil companies.

Hydropower dam construction and operation are not just a matter of energy security strategy; they are a highly politicized issue with geopolitical implications.

China's investments in railways and dams have been most successful in Laos, where they constitute nearly 80% of FDI but also generate debt. Laos's debt to China is estimated at 47% of its GDP.13 Any delays in implementing the projects would further inflate the costs, hindering the expected return. Given the economic toll of the Covid-19 pandemic, Laos is prone to further overextending itself through more loans from Chinese banks.14 The country is trying to offset its dependence on Chinese loans with investments from Vietnam and Thailand. Cambodia's ruling elite, on the other hand, shows less inclination to diversify and is politically more comfortable with Chinese influence. Hydropower dam construction and operation are thus not just a matter of energy security strategy; they are a highly politicized issue with geopolitical implications.

Beyond the unsustainable hegemonic behavior of resource usurpation, tensions arise when China sends armed police boats to patrol from the upper Mekong through the Laotian and Cambodian sections of this transboundary river every month. While this started after a smuggling incident that killed a dozen people over a decade ago, this practice will remain a concern because it could be turned into an instrument of coercion rather than law enforcement. China has managed to convince Laos, Myanmar, and Thailand to join the patrols, leaving Vietnam in an even more precarious position given its sustained pressure on the "other" front—the disputes over the South China Sea.¹⁵

Mekong Countries' Uneven Energy Strategies

The Mekong subregion's energy strategies remain incoherent and independently decided by individual countries, despite the fact that these strategies are largely focused on hydropower and thus reliant on a shared resource—the Mekong River. In the past, the Mekong River Commission has attempted to formulate a coherent hydroelectric energy policy that takes into consideration the region's environmental and human security, but with little success. Individual states' hesitation to relinquish their rights to set energy policy has gradually eroded the MRC's relevance and instead created more space for individual actors and donors—in particular, China.

The rapid increase in energy demand at a time when regional coal and gas supplies are being depleted will transform several net-exporting countries into net importers. Hydropower remains the main source of energy, particularly for mainland Southeast Asia. Myanmar, Cambodia, and Vietnam all have large rivers originating in the Himalayas (besides the Mekong, the Red River and Irrawaddy River) and rely on hydroelectricity for more than 50% of their electricity production.¹⁶ As for Laos, it depends almost exclusively on hydroelectric dams to generate electricity.

While many countries in Southeast Asia have large and diverse potential in renewables, including wind, solar, photovoltaic, and biomass, these energy profiles are not even throughout the region. The ASEAN Power Grid was initially proposed to develop bilateral electrical interconnections between the different ASEAN member states. The ASEAN Plan of Action for Energy Cooperation in 2014 accelerated the implementation of the power grid and the development of multilateral interconnections for an integrated single market. This market would allow efficient use and sharing of resources, further integration of renewable (especially hydropower) energy, electricity trade across borders between neighboring countries, and greater access to energy services in the region.¹⁷ But the implementation of the plan remains slower than anticipated and primarily bilateral rather than multilateral due to the complexity of the region's energy governance. Moreover, the diverse economic profiles of ASEAN members are reflected in the energy politics of the region. Economically less developed countries like Laos, Cambodia, and Myanmar remain energy exporters, while more developed countries like Singapore, Thailand, and Malaysia are mainly energy importers.

Laos, for example, is one of world's poorest countries and has bet its economy on hydropower almost exclusively. Its national policy is to become an energy hub-the "battery of Southeast Asia"-based on the surplus power it can generate from dams and sell to neighbors. Despite domestic criticism and concern from the expert groups of the Asian Development Bank (ADB), Laos has constructed and planned more dams, which have not only created environmental issues but also displaced communities. Detailed calculations show that the country could only generate a net income of \$700 million over 50 years from its hydropower exports.¹⁸ Poor construction quality, rushed projects, and the natural conditions of the sites all present the risk of overtopping caused by floods or structural failure. In 2018, for example, the Xe-Pian Xe-Namnoy dam collapsed, costing multiple lives and displacing thousands of people. Aside from human costs, dam failure may also result in a loss of power-generating capacity, causing extensive disruption within the grid infrastructure network and supply problems, effectively worsening the energy security of the country rather than improving it.¹⁹

Hydropower development in Myanmar and Cambodia likewise seems to be following an upward trend, with both countries only having a handful of solar and wind power plants planned in the next decade. In fact, Cambodia's last energy development plan included no solar projects. Myanmar is expected to see a spike in the number of approved hydropower projects for construction in the next two years, while Cambodia is expected to see peak hydropower development in the 2020s, although it has postponed the Sambor and Stung Treng dam projects.²⁰ The situation in Myanmar remains unclear after the February 2021 military coup. As the violence continues, the country's economic and energy future will be affected by this political crisis.

By contrast, hydropower development is on a downward trend in Thailand and Vietnam. Thailand, for example, does not seem to have invested in any new dams within its borders. Although Vietnam is continuing to invest in more hydropower projects, its most recent power development plan shows that number will decrease in coming years. Importantly, Vietnam does not consider large-scale hydropower as a form of renewable energy. Thailand has continued, although on a smaller scale, to develop hydropower projects in neighboring countries. While China has received the most criticism for construction of dams, the investments from countries such as Vietnam and Thailand in hydropower development receive little scrutiny. For example, Thailand has partnered with China and South Korea on several hydropower dams in Laos.²¹

As these examples show, limiting criticism to China may not capture the full reality of infrastructure development in the Mekong subregion.²² That being said, funding from China for dam construction still eclipses that of other states, while it added the most hydropower capacity with the installment of 8,540 megawatts (MW).²³ As the region's number one investor in hydropower development, China dominates the power market.

External Powers' Engagement

The nature of other powers' engagement in the Mekong Delta differs significantly and has been evolving over the years. Japan does invest in large renewable energy projects, including hydropower, and South Korea has started to invest in select countries. However, U.S. involvement has been limited to issues related to good governance mechanisms, sustainability, and human security. For example, the United States' Lower Mekong Initiative (LMI) was given new impetus under the Trump administration, with recent meetings focusing on sharing water data and strengthening governance of transboundary rivers. At its inception in 2009, the LMI was used to promote the funding of several renewable energy projects, many of them in Vietnam. The initiative gradually lost momentum under the Obama administration, but by 2018 it seemed to have regained its strategic relevance. At the 10th LMI Ministerial Meeting in 2019 the United States pushed for "a results-oriented way forward" and promoted the need for better regional water governance.²⁴ A similar vision was advanced in the first Mekong-U.S. Partnership meeting a year later.²⁵

Under the United States' "free and open Indo-Pacific" strategy, Southeast Asia is identified as the epicenter of U.S.-China competition. Washington recognizes China's growing influence, particularly through the Belt and Road Initiative. As a counterproposal, the United States, Australia, and Japan unveiled a new infrastructure initiative called the Blue Dot Network that aims at providing quality infrastructure as an alternative to China's Belt and Road Initiative. From the private sector, General Electric has partnered with Vietnamese companies to support wind energy projects by supplying the largest wind turbines in Asia.²⁶

South Korea has emerged as an important actor through the ROK-Mekong initiative launched in 2011. India's Mekong-Ganga cooperation initiative has also re-emerged from the shadows, with the adoption of a new Mekong-Ganga Cooperation Plan of Action 2019-2022 and a proposal to invest \$1 billion in connectivity projects. Australia, which in the past has provided development aid to the region, also recognizes the strategic importance and a sense of urgency to act in the Mekong Delta. Under the Australia-Mekong partnership, the Morrison government is playing a more meaningful role through a new commitment of AU\$232 million toward enhancing the Mekong's environmental resilience, providing scholarships to emerging leaders from the region, and improving cybersecurity, among other goals.²⁷ The initiative seeks to partner with Japan, Thailand, and others to promote high standards in water governance, provide construction reviews, and engage in other forms of cooperation to strengthen the region's resilience.²⁸

The Way Forward: Beyond Hydropower

Southeast Asia needs no more hydropower generation. What it needs is greener, safer, and cheaper renewable energy. Take Vietnam as an example: to fulfill the demand of its young and urbanizing population, Vietnam needs to at least triple its energy capacity by 2030. Its options are to import power or rely on coal. Coal is not preferred because of air pollution, but importing an energy source like hydropower from neighboring countries will mean further exploitation of the Mekong River. This is an outcome that Vietnam, as the most downstream country, wishes to avoid.²⁹ That leaves the country with the option of pursuing a balanced mix of solar, wind, and biomass. A recent study shows that the leading drivers of change were the government's recognition and commitment to energy security, paired with the rapidly growing public demand for environmental protection.30 Vietnam's plans for transiting to solar energy are already taking shape and stand with its neighbors. Within a year, it has the highest installed capacity of solar power in Southeast Asia, generating 16,500 MW at the end of 2020. Vietnam also installed more than 9,000 MW of rooftop solar during 2020-more than Laos has installed in hydropower capacity in fifteen years of dam building-which suggests that Vietnam is in a unique position to influence its neighbors to reduce threats to the Mekong Delta.³¹

While Laos's and Cambodia's energy development is almost entirely driven by foreign investment, Vietnam's growing energy demand and forward transition to renewables make it both a market and a potential model in reshaping the energy infrastructure in the Mekong subregion. Vietnam can negotiate power purchases that prioritize solar, wind, and biomass over hydropower and reduce downstream risks of excessive dam building. Vietnam's energy leadership is also demonstrated through sharing its experience in transitioning its own energy mix.³² Specifically, as chair of ASEAN in 2020, Vietnam focused on making the Mekong River a regional priority.³³ This marked a change in the ASEAN-wide security agenda and elevated the importance of the Mekong.

Conclusion

Many extraregional powers, particularly the United States, Japan, Australia, and South Korea, have come to recognize that the Mekong subregion is essential to sustaining greater Southeast Asia's resilience. While most analysis indicates that strategic competition between these external actors is driving infrastructure development in the Mekong subregion, the preliminary findings in this essay suggest that in many instances that infrastructure development is guided by the Mekong countries themselves, in collaboration with multilateral institutions such as the ADB or the Economic Research Institute for ASEAN and East Asia under Japan's leadership.

Moreover, the Mekong states' growing demand for energy infrastructure is driving strategic competition

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in the region between China, Japan, the United States, and others. For instance, Thailand was the first country to suggest the creation of the Lancang-Mekong Cooperation Mechanism to China in 2012. The growing regional demand for investment partly motivated the launch of South Korea's Mekong-ROK Comprehensive Partnership for Mutual Prosperity in 2011. The region's increasing institutional linkages with China appear to have influenced Japan's promotion of "quality infrastructure" in its revised Tokyo Strategy 2015.³⁴ In recent years, the United States has also renewed its focus on influencing government policies in the Mekong. The Mekong-U.S. Partnership has been continued under the Biden administration and is committed to supporting the region's response to climate change.³⁵

High-quality energy infrastructure is imperative for Mekong countries, whose energy security is fundamentally also their national security. Given its vulnerability to climate change, the region needs to transition quickly to more sustainable energy strategies. Since wind and solar sources are variable and intermittent, there is a need for more advanced technology to predict electricity production. Hydrogen is another clean and low-carbon energy source, and there is a need for more technical advice for development of this alternative. However, amid the economic contraction caused by the Covid-19 pandemic, the financing of sustainable energy infrastructure has become even more challenging. Ensuring technologically sound, resilient, and affordable implementation will be key for a successful transition to high-quality standards.

In addition to stable investment in renewable energy and clean technologies, the Mekong countries need to develop roadmaps to redesign their energy plans. Political commitment is a prerequisite of such transition. A sustainable and well-tailored energy strategy is essential for transitioning to cleaner energy and securing the Mekong subregion's economic, political, and social resilience. ~

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