

Power in Southeast Asia: Cubs on a Growth Spurt

With bright economic growth prospects, the region is redefining its power sector



Courtesy of ABB.

Southeast Asia, with an increasingly affluent population of 600 million, must kick investment in the power sector into the next gear to meet expected demand for electricity. According to a study from Accenture, the region's economy is projected to grow by \$735 billion by 2020. Over this period, ASEAN's most dominant economies, Indonesia, Malaysia, Thailand, and the Philippines, collectively referred to as tiger cubs, will need to boost their generation capacity and improve their connectivity in order to facilitate this economic growth.

Adrian Koh, assurance partner at Ernst & Young, comments that despite barriers to entry, those familiar with the region are making commitments: "Southeast Asia has provided a slight sparkle to the gloomy global economic weather of recent years. Because of this, there are people extremely willing to invest in the region; there is enough liquidity, especially from the Chinese and Japanese, who have been here long enough to understand it well... Governments as well as gen-cos, are looking at cost transformation because people

are unhappy about rising prices. It does not help that tariffs and the cost base are not transparent in this part of the world. There exist real regulatory risks for potential investors – the model works for now, but will it be changed?"

Recent events suggest the model is changing, albeit slowly. Changes in regulatory structures often take decades to fully implement. For example, Singapore, the most liberalized market in the region, is still defining the future of its retail market a decade after legislation deregulated the power sector. The Philippines is currently in the messy process of liberalizing its power market, it has shed state-owned gen-cos and is introducing full retail contestability.

Thailand, Malaysia, and Indonesia, continue to exert a great amount of state control over their power sectors. In Malaysia, state-owned Petronas supplies gas to a number of private power generators at a subsidized rate. Following incumbent Prime Minister Najib Razak's victory in May 2013's elections, cutting back on fuel subsidies is reportedly high up on the fiscal-reform minded prime minister's agenda. In Thailand,

EGAT, the Electricity Authority of Thailand, accounts for approximately half of Thailand's generation, with IPPs playing an increasingly prominent role, especially as the country looks to diversify its generation mix beyond gas. In Indonesia state-owned PLN, Perusahaan Listrik Negara, controls 90% of generation capacity in the country. The government is grappling with how to generate and deliver electricity to an increasingly affluent archipelago of 243 million people spread across 922 inhabited islands. Presently, Indonesia's electrification stands at approximately 70%, one of the lowest in the region. All three of these countries are looking at diversifying their generation mix to quickly add desperately needed generation capacity.

Evolving Strategies to Fuel Growth

According to a study from the Boston Consulting Group (BCG), ASEAN's power sector, both in generation and transmission

Courtesy of ABB.



and distribution, will need around \$500 billion of investment as regional demand increases from 656 Twh in 2010 to 2,414 Twh by 2030. “It [investment] is unlikely to come fast enough; the sheer size of investment required means IPPs will have a larger role as state-owned utilities do not have the all the resources,” comments Klaus Langner, partner and managing director at BCG’s Singapore office.

In previous decades, Thailand, Indonesia and Malaysia, were able to rely on ample gas export revenues to help offset subsidies for their domestic markets. However, as domestic demand increases and their own gas reserves decline, these countries are faced with the decision of either continuing fossil fuel subsidization, at great cost to the government, or phasing out subsidies, to the chagrin of the average consumer. Malaysia and Indonesia both faced widespread backlash when cutting back fuel subsidies were discussed earlier this year, while generators are turning increasingly towards coal to diversify away from gas and keep costs under control. According to an analysis by BCG, by 2030 50% of Southeast Asia’s power generation will come from coal, compared to 30% in 2010.

The fuel-source mix in the region’s fastest growing economies will be an interesting dynamic to keep an eye on in the coming years. While advocating a “diverse portfolio” for clients, John Gustke, managing director of Black & Veatch’s Expanded Scope Business for Energy in Asia, sees coal and fossil fuel generation as the most practical option at the moment for a few of Southeast Asia’s key countries: “The energy supply mix must be structured to make use of all available resources. In countries like Indonesia and the Philippines, practical reasons demonstrate that coal and other



John Gustke, managing director,
Black & Veatch's Expanded Scope
Business for Energy, Asia.

The advertisement features a large image of a traditional-style house with a red roof and white walls, topped with numerous solar panels. Above the house is a yellow rectangular logo containing the Yingli Solar logo and the "OFFICIAL SPONSOR" text, next to the FIFA World Cup Brasil 2014 logo. Below the main image are two smaller images: one showing a vast field of solar panels under a clear sky, and another showing a large, modern stadium with a distinctive curved roof, likely the Maracanã in Rio de Janeiro. The background of the entire ad is a blue gradient.

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fossil fuels are the energy source of choice for the foreseeable future. Thailand has a high reliance on natural gas fired generation and is seriously considering additional coal plants due to concerns about gas supply interruptions."

According to Dr. Bart Lucarelli, founder of Roleva Energy, Thailand needs to turn towards cheaper and more accessible coal in order to make up for the increasing limitations of gas resources: "[Thailand] is now in the unenviable position of relying on natural gas-fired, combined cycle gas turbine (CCGT) plants, to provide 70% of its electricity needs, at a time when gas reserves in the Gulf of Thailand are rapidly depleting and Myanmar is starting to focus on using its energy resources domestically."

As it appears coal is likely to assume the throne as the dominant fuel source in the region, there are undoubtedly environmental concerns both within the power industry and amongst the general public. Given the developing nature of these markets, weak environmental regulations and enforcement must be improved. Although companies have a duty to act responsibly, it is up to the governments of each respective country to ensure that emissions standards are met: "Ultimately, the direction is set by a country's leaders. Often, we find that strong government support can springboard the adoption of emerging energy solutions," says John Gustke of Black & Veatch.

Perhaps nowhere is this point more pertinent than in Indonesia, where the state utility, PLN, plays a dominant role in delivering power to the largest country in the region. Gustke sees Indonesia as a key market for Black & Veatch as the challenges the market presents reveal themselves: "Indonesia's state utility estimates that every

1% growth of gross domestic product could require electricity growth between 1.2% and 1.5%. Currently, Indonesia has a total power generation of more than 30 GW (28,462MW at end of 2011), and with current economic growth rates would need at least an additional 7 GW per year, just to keep pace with year-on-year demand. Further, this need for investment does not factor the current grid catch-up requirements, or the complication of distributing energy across 6,000 inhabited islands in which a significant portion of the country is without regular power. Opportunities to help build the sector's infrastructure abound. What is interesting is not the fact that the country needs this major infrastructure development. The challenges and opportunities rest in how this infrastructure will be delivered – who will build it, what technology is deployed and how it will be funded?"

The Philippines has been ahead of the curve in offloading state-owned generation assets and introducing regulatory reforms into the industry. With recent strong GDP growth figures at hand, President Benigno Aquino, has the opportunity to leverage this into attracting needed infrastructure investment. Gavin Barfield, director of energy consulting at Pöyry, believes that policies need to be improved in the often bureaucratically inefficient Philippines: "To promote further investment the Philippines should focus on lowering the barriers for creating new generation such as access to long-term Power Purchase Agreements (PPAs) with creditworthy off-takers and the approvals needed for new build. The newly introduced Retail Competition Open Access will benefit consumers, but may make it even more difficult for generators to secure PPAs with retailers as their volume is more variable and they are likely to contract for less, relying on the spot market for the difference."

As the Philippines needs to continue its reforms, Aaron Domingo, managing director of Meralco Powergen Corporation, points to the region's most mature power sector, Singapore, as an example for both regulatory and operational excellence. Meralco Power Generation purchased a stake in the nearly complete \$600 million gas-power station in March 2013 on Singapore's Jurong Island. "A potential model for regulatory reform is Singapore where the rules are clear-cut and the enforcement mechanisms are firmly in place. There is no

Power Seraya power plant in Singapore. Courtesy of Siemens.



room for ambiguity and red tape resulting in faster transaction processing time."

In forward-thinking Singapore, the situation is the exception to many of the region's trends, as many generators are concerned a slew of recent investments coming online will create significant overcapacity in the country's gas turbine-dominated market. With imported piped natural gas from neighboring Indonesia and Malaysia expected to decline, the Energy Market Authority committed to building and owning the world-scale Singapore LNG terminal to supply local generators and create a regional hub for gas trading. As Singapore has no fuel subsidization or domestic natural resources, generators are at the mercy of international market forces for determining their operating costs. According to Tonny Leemburg, senior vice president and head of energy, fossil division at Siemens Singapore, fuel costs account for 80% of generator's operating costs.

Singapore LNG began commercial operations in May 2013 and is initially focused on supplying domestic demand before the terminal undergoes several planned phases of



Tonny Leemburg, Senior Vice President, Head of Energy Fossil Power Generation, Siemens Pte Ltd.



expansion in the coming decades. To begin with, the Energy Market Authority has entered into an exclusive supply contract with BG Singapore Gas Marketing, but plans a wider range of suppliers as the terminal expands over the coming decade. Dr. Anthony Barker, general manager of BG, explains the changing dynamic of fuel security in the Lion City: "Regionally, Malaysia and Indonesia are now focusing on meeting domestic supply demands, reducing the amount of gas available to Singapore in the longer term. To ensure the city-state is able to meet its long-term energy requirements, Singapore secured access to the global energy market through the LNG terminal. LNG is currently cost-competitive to PNG, but prices vary as a result of indexation to the price of oil. At the moment, Singapore long-term LNG is priced at a discount to PNG. When pipeline contracts are up for renewal, LNG presents a competitive alternative which previously did not exist."

While the fuel-source issue appears to be evolving away from imported PNG and towards LNG, Singapore's major power producers, including Tuas Power, Senoko, Keppel Energy, Sembcorp, PowerSeraya and PacificLight Energy, have another concern arising: overcapacity. Many new projects have come online over the last year or are planning for new capacity to come online in 2013/2014. Conventional wisdom amongst gencos is that these new investment have satisfied consistent, yet small demand for the foreseeable future. According to Yu Tat Ming, CEO of PacificLight Energy, investment options are now limited in Singapore in the wake of the investments over the last five years: "I believe with the new capacity coming on-stream both this year and next

A photograph of two men in hard hats and safety vests standing in front of a large industrial building, possibly a power plant. One man is wearing a white shirt and a yellow vest, while the other is wearing a grey shirt and a yellow vest. They are both smiling at the camera. In the background, there are tall industrial structures and a clear blue sky.

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year, there will be a period of consolidation. Through the LNG vesting scheme, the government has incentivized the initial uptake of LNG in order to provide a base load for the LNG terminal that Singapore has recently brought on-stream. This has led to a flurry of investment in power generation that may not be repeated. As a land scarce country, it has become increasingly difficult to find a suitable sea front site to build new plants. On the demand side, we are still predicting 3-4% long-term annual increases in tandem with the economic growth of Singapore."

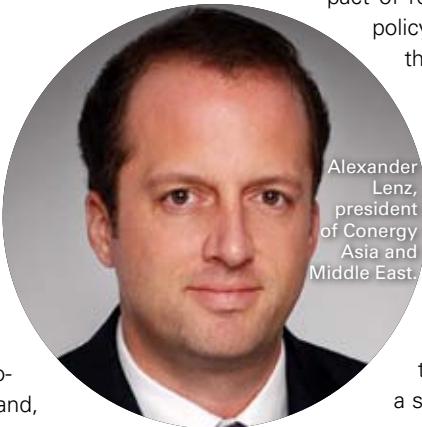
Tonny Leemburg of Siemens contends that the claims of overcapacity in the local market are overstated. When approached from a technical point of view, he believes that overcapacity will allow inefficiencies to be weeded out of the market, creating a more robust system: "There are what I call 'wrong megawatts' in the market with old, inefficient, and partly oversized steam turbine power plants... There is idle power in the system and these 'wrong megawatts' will probably be phased out by 2020. Given the essential high reserve margins, robust growth as well as the 'wrong megawatts' in the market, I do not think overcapacity is a major issue. Yet generators are scared of overcapacity in the market. I think this fear will lead to greater competition and help drive energy prices down. Given Singapore's high price of electricity, this is what the government wants to achieve and ultimately more competition and more efficient generation is healthy for the market."

Renewables: Developing a Nascent Market

Given the often opaque and slowly evolving regulatory frameworks in place, it is unsurprising that ASEAN countries lag behind in implementing effective renewable energy programs. Recently, governments have set lofty targets in the four tiger cub countries, with feed in tariffs introduced in Malaysia, Philippines, and Thailand, while Singapore endeavors to build an image as a renewable energy innovation and manufacturing hub. Despite these efforts, only Thailand, at 30th position, registers on Ernst and Young's Renewable Energy Country Attractiveness Index, which quarterly ranks the top 40 renewable energy investment environments. "Every country is almost at the same state of not being totally on board with their commitment to cleaner energy, i.e., they want to pursue these opportunities but are faced with structural issues e.g., weak policies, archaic electricity market structure, subsidized electricity prices, poor grid reliability, lack of grid connection codes, etc," observes Dr. Sanjay C. Kuttan, regional manager SEA/ managing director, DNV Kema Clean Technology Centre.



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Alexander Lenz,
president
of Conergy
Asia and
Middle East.

Southeast Asia has many natural advantages to developing renewables. Thailand, Cambodia, and Laos all enjoy significant hydro potential, while Indonesia has approximately 40% of the world's geothermal reserves. Furthermore, solar radiation in the region is often very favorable. Despite natural advantages, the regulatory frameworks renewables compete under in

Southeast Asia create a very controlled environment that, in actuality, breeds uncertainty as incentives for renewables must be calculated in tandem with electricity subsidies already in place in eight of the ten ASEAN countries. "Although markets that rely on government incentives create positive growth, they can also lead to market distortions. Taking the case of solar, the setting of appropriate subsidy levels in a timely manner is very difficult to manage due to changing system prices, which are then followed by subsidy cuts. This situation can result in subsidies that are either too high or too low which then influences decision-making on the investor's side. As

such, the investors' decision criteria for system selection will tend to favor satisfying short-term objectives and sometimes jeopardizes overall long-term goals," comments Alexander Lenz, president, Conergy Asia & Middle East.

According to William IY Byun, co-founder of Singapore-based consultant Asia Renewables, the divergence between words and action lies in the motivations of policymakers: "The public sector and the financial community have different objectives in regards to renewable energy projects. For NGOs and governments, an interest in the social and environmental impact of renewable energy or an interest in sustainable policy drives these projects. As a result, a lot of these projects may seem cute and fuzzy, but may not be profitable enough. At the moment, non-economic factors drive most of the investment in renewable energy."

Although many of these small renewable projects may not be bankable there is logical justification for their development: they are a means of providing power to otherwise unconnected communities. For example, in remote locations in Indonesia and the Philippines, providing a solar or wind project to complement a diesel or gas generator set provides potential relief of logistical issues and subsequent fuel shortages for small, decentralized generators. For projects of this nature, governments, local communities, the power industry and the financial sector need to take a more comprehensive view according to Dr. Kuttan of DNV: "Renewable energy project economics should not be judged solely on a dollar per kilowatt-hour basis, but instead on their total economic value to a community. If projects are measured by this total value to the community, projects are definitely worth their while i.e., system level economics. The mindset (policy makers and financiers) needs to change to include a more comprehensive cost-benefit of renewable energy based electrification of smaller communities outside of the large

cities in the Southeast Asian communities. However, until such time, I would have to agree that many renewable energy projects are not bankable due to lack of economies of scale unfortunately."

Industry experts agree that in many cases, renewable projects have been too small to have a significant impact and to be considered attractive investments by the finance sector. "Financing will remain an issue as most local financial institutions are unwilling to provide financing for the projects. In cases where financing is provided, the costs of borrowings are high as these financial institutions impose high interests to compensate for the risks they foresee in an unfamiliar industry," says Angie Koh, business development director of Yingli Solar.

Nevertheless, there are some positive signs for solar, particularly in Thailand, as falling global PV prices leave the solar industry optimistic that grid parity is achievable in transparent markets. However, the opaque structures currently in place, despite some incentives, are making grid parity more difficult to realize. "Electricity



Residential Rooftop St Helier Street, Singapore - 5.2kW. Courtesy of Yingli Solar.

subsidies prevent consumers from wanting to invest in solar systems; once governments remove them, people will come to see solar as a cheaper alternative," says Angie Koh.

Despite the challenges, new projects are coming into the region. Yingli Solar, the world's largest PV manufacturer, has recently won a contract to supply 10.27MW of panels to Amcorp Power of Malaysia, which will be the largest solar plant in the

country upon completion. Thailand is certainly the hottest area of activity, as its Small Producer Program (SPP) has created an environment where coexistence with conventional generation is possible and the government has raised its target to have 3 GW of solar capacity installed by 2021. In July, Canadian Solar announced it will supply 91 MW to seven projects for Soleq Solar in Thailand, while Conergy has secured 80 MW of orders in Thailand.

Regional Collaboration and Integration

The 10 member states of ASEAN are increasingly exploring and implementing programs toward regional integration. One such program is the creation of an ASEAN grid, which was outlined in a 2007 memorandum of understanding. However, there are physical and political issues that must be overcome before such a grid becomes a reality. Some see physically connecting the Philippines and Indonesia to a broader grid

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Solar Power Plant Lopburi, Thailand - 1.5MW.
Courtesy of Yingli Solar.

as prohibitively expensive, especially considering these countries run on separate grids around population centers, and infeasible. On top of these physical challenges, expected capacity shortages will disincentivize the creation of such a grid according to Klaus Langnard of Boston Consulting Group: "All these countries, with the exception of Singapore, are capacity short. An international grid is useful when one country has excess capacity that another country needs, but

that is not the case in Southeast Asia. The Indochina grid, however, exists because there is a rationale behind it: Laos and Cambodia supply hydropower to Thailand. This grid could expand to Vietnam, but I do not see countries like Indonesia and the Philippines connecting with the mainland anytime soon."

Like Langnard, Sandra Seah, partner at ATMD Bird & Bird, also sees the ASEAN grid as having some significant hurdles to overcome, although she sees the situation's challenges as the unresolved and difficult legal and political implications of such a grid rather than a physical, demand-side perspective: "To put together an ASEAN grid would need political will that I am not sure exists at the moment. Technology should not be a problem, but the cross-border regulations will be incredibly difficult to manage. For example, suppose a gen-co in Malaysia causes some sort of disturbance to Singapore's grid – how will we go after them? Issues like this will have to be explored thoroughly. Coal generators in Indonesia would not be subject to the same environment regulations as gas generators in Singapore. Governments may not have to legislate very heavily on foreign gencos, however, because the cross-border grid connections would largely be private ventures."

Despite slow progress, Bambang Hermawanto, chairman of the ASEAN Power Grid Consultative Committee, sees encouraging signs that a grid will be pieced together: "Currently, there are 16 projects in place that make up pieces of what will eventually become an ASEAN grid. The first phase of the grid is based on bilateral agreements. There are no institutions in the region that could control the grid, so the success of the common grid depends on bilateral agreements between neighboring countries. We have a long way to go, but these agreements will make up the core of the ASEAN grid."

The ASEAN grid is reflective of many of the trends surrounding Southeast Asia's power industry. The border of Southeast Asia's jigsaw puzzle, the structure that will make up the cornerstone of the industry, are still being defined, at a time when a stronger framework would yield a clearer picture of the industry's future. Despite this challenge, investment in the region remains bullish because of the incredible economic transformation the region is undergoing. Policymakers and decision makers need to catch up or risk hindering the full potential of this transformation.

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