

# Panama's Energy Sector: A New Era

**P**anama is thriving. The country is riding a wave of prosperity that has seen the nation become one of Latin America's fastest growing, at an average 8 percent annually. Even as global growth slows, Panama's economy is projected to expand at a rate of 5.5 percent over the coming three years. Energy demand is expected to keep pace at between 4.5 - 5 percent per year. Still, the rise in energy demand must be met by new investment, supply, and infrastructure. With the country's first natural gas power plant coming online in 2018, Panama is heading in the right direction.

As Panama moves forward, the government hopes to meet its energy needs by ensuring a diversified energy matrix that is stable, reliable, and affordable. Completing the interconnection with Colombia will further bolster the nation's energy security.

These policies are part of a much broader effort to re-balance the nation's energy matrix and to build a system that is open, transparent, and ultimately stable. As Panama's government embarks on its first long-term strategic energy planning process, issues of diversification, security, efficiency, and community engagement will come into play.

However, significant challenges remain. Panama's transition will take time, and the government recognizes that greater education and communication will be required. A better understanding of energy sources and resources, as well as the role of consumers in boosting energy efficiency, will go some way to supporting the government's eventual goals.

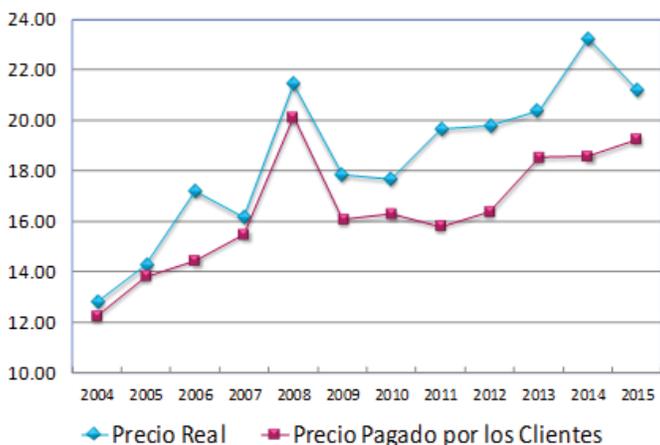
## Diversification

Panama's electricity matrix looks a lot like those of its Central American neighbors, with a dominance of hydropower supplemented by diesel and fuel oil. Climate change has made hydropower less reliable, while social movements have made large-scale projects more difficult to get through environmental and community consultation processes.

The downsides of relying on fuel oil and diesel-powered generation are also well known. Not only are they dirty and often expensive, but a reliance on petroleum products means consumers are at the whim of volatile global oil markets.

Panama is looking to change this outlook through diversification, primarily through increasing the role of natural gas as well as non-conventional renewable energy sources. Panama has been hesitant to set renewable targets but rather argues that allowing markets to balance the matrix will provide the best outcome for Panama's consumers.

Fig. 1: Average electricity price with and without state support in cents per kWh

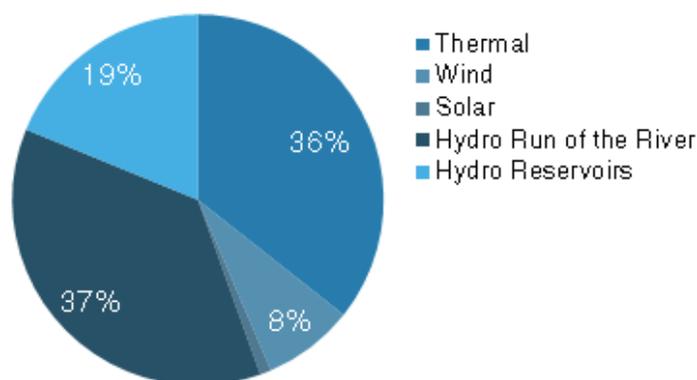


Source: Autoridad Nacional de los Servicios Públicos

As Panama's energy consumption has grown, so has the government's bill for electricity subsidies. Panama spent \$400 million in 2014 on subsidies, including consumers who could easily afford to pay the full price. The current low oil price cycle has allowed the government to gradually reduce support for all but the smallest consumers, who use less than 200 KWh, bringing expected savings of \$132 million in the second half of 2015 alone.

Diversification of the energy matrix also includes a larger role for energy efficiency, on both a household and industrial scale. Panama can look to the United States' experience in developing an energy efficiency market, including the certification of energy efficiency service companies. This would bring Panama in line with global trends. The International Energy Agency (IEA), ExxonMobil, and BP have all identified "energy efficiency" as a leading energy source in the coming decades.

Fig 2: Panama's power matrix 2014



Source: Autoridad Nacional de los Servicios Públicos

## Natural Gas

Panama's efforts to bring natural gas to the nation will finally be realized with the successful auction of 350MW in September this year. The bid round attracted 27 companies, with the winner Gas Natural Atlántico - a subsidiary of US-based AES Corporation - to begin supplying the Panamanian market by 2018. The company is sourcing its LNG from the Cameron terminal in the United States. The project, which is expected to cost \$800 - 900 million, has ambitions beyond the Panamanian market. AES anticipates the new terminal will receive 15 - 16 tankers per year, with 11 to supply the Panama market and the remainder to supply the AES project in the Dominican Republic.

Critics of the outcome have raised concerns around AES Corporation's dominant position in Panama's electricity market, which they argue is in violation of anti-trust regulations. The company was responsible for 21 percent of Panama's gross power generation in 2014, although all existing plants are hydropower, not thermal, which is an important distinction. The issue of open access to natural gas has also been

raised. The notion behind the concern is whether Panama has the framework in place to take full advantage of the opportunity presented by natural gas beyond the power sector. How the government regulates access to LNG will be subject to debate among policy makers, regulators, and the private sector as the country prepares for the second 350MW power auction later this year.

Beyond natural gas supply, Panama will also need to consider associated transport and infrastructure requirements as well as financing options that are attractive to potential investors.

Panama's switch to natural gas is not occurring in a vacuum. Geopolitics and volatility in the global oil markets only add to the increasing concerns around a dependence on fuel oil and diesel that is expensive, inefficient, and has serious detrimental impact on the environment. This is part of both a regional and global trend, as nations such as Panama look to natural gas to provide the firm power needed to ensure a balance between access, reliability, security, and a move toward greater renewable deployment.

## Renewables

As Panama moves away from diesel and fuel-oil generation, the nation is looking to boost the portion of non-conventional renewable in the power matrix. Currently, the mix is 36 percent thermal, 56 percent hydro, 8 percent wind and less than one percent solar. These figures are expected to rise. The government has issued over 800 MW in wind licenses, and Panama's first solar auction in February 2015 awarded 127 MW of solar PV contracts.

Unlike other countries in the region, the Panamanian government has preferred to let markets determine the renewable makeup of the electricity matrix, rather than set a specific target.

Panama's greatest solar potential lies in the interior of the country, outside Panama City, with distributed generation the main opportunity, rather than industrial sized solar farms. Panama's households in

industrial sized solar farms. Panama's households in particular should benefit from the plummeting cost of solar PV technology.

The downside to distributed generation is that its large-scale industrial applications are limited. Moreover, on the household scale, solar PV cannot power the level of air conditioning used in the tropical nation. With advances in energy storage and batteries, some of these barriers will eventually be overcome.

In spite of these obstacles, experts estimate that it is possible to add 500MW of renewable power under existing legislation.

Panama must also look beyond current renewable technologies to explore options that may be better suited to its unique climate and geography. Methods for harnessing the power of marine and river currents are still far from commercialization but may offer opportunities for growth.

The Development Bank of Latin America (CAF) is offering technical assistance in Central America and the Caribbean to pilot the use of deepwater cooling instead of air conditioning. Harnessing this technology could be particularly effective in coastal areas of Panama, where cooling buildings consumes 66 percent of power generation.

One theme that underscores energy discussions in Panama is the need for increased education and communication between the government and Panama's energy consumers. Myths around energy consumption and renewable power are prevalent across the spectrum, from individuals to the nation's largest industrial and commercial users. Energy efficiency and renewable technologies would likely be more rapidly adopted if they were better understood.

## Interconnection and Integration

The next step for Panama is to complete the Colombia-Panama Interconnection Project. The interconnection with Colombia promises to link Panama into a transcontinental system spanning Mexico to Chile. Panama is already part of the Central American interconnection - SIEPAC - and corresponding regional energy market, but with plans to expand transmission to the north and south, Panama sees enormous opportunities for stability and security in its own grid. The connection should also improve energy efficiency on both sides of the connection as it allows for a balancing of different climates and weather conditions, which particularly favor the more efficient generation of renewables.

When the project was first conceived, it was imagined that power would largely flow one way - from Colombia to Panama. However, as energy in Panama has become increasingly competitive, Colombia may also be in a position to import energy from its northern neighbor.

However, the project has been complicated by numerous environmental and community concerns. The area that joins the two countries - known as the Darién - is remote and fragile. The latest proposal addresses these concerns by routing the transmission cables via a 130 km submarine line. Still, Panama officials are confident that the interconnection will be completed by 2020.

SIEPAC is already up and running, and transactions have been increasing every month. Panama recognizes the importance of the market after it provided much-needed relief during a drought that hindered the country's hydropower generation capacity. Indeed SIEPAC as well as the Regional Electric Market have become a model for energy integration in Latin America, a region that has often struggled with access, affordability, and energy security.

## Panama Canal

Beset by cost overruns, delays, and strikes, the expansion of the Panama Canal is finally set to open in April 2016. The project, which is now 93 percent complete, is set to double the waterway's capacity by adding a third set of locks and a new Pacific access channel. The new locks system will also incorporate water-saving technology that will make the canal more efficient - and drought-resistant - than it is today.

Importantly, the expanded canal will be able to accommodate 92 percent of the world's shipping fleet. For the LNG trade, the expansion is particularly significant. The new route will cut an estimated 11 days off a trip from the Gulf of Mexico to Asia for the 88 percent of existing LNG tankers that will now be able to take advantage of the canal. Currently, just 8.6 percent of the LNG world fleet fits through the Panama Canal locks.

Panama hopes that producers on the Atlantic - including the United States and Trinidad and Tobago - will take advantage of the new access route to Asia. Several LNG export projects in the pipeline along the US Gulf of Mexico have been counting on continued demand - and high prices - in Asia.

At a regional level, the Canal could also prove a boon to Chile, which increasingly relies on LNG imports to meet its energy needs. The journey from Trinidad to Quintero, Chile, would be 6.3 days shorter via the Panama Canal than via the Strait of Magellan.

The Panama Canal can also play a role in the global shipping industry's transition from fuel oil and diesel to natural gas. Canal authorities are studying the possibility of building an LNG receiving terminal both for local power generation and with the aim of bunkering to provide LNG for ship borne propulsion. More stringent emissions controls coming into effect will result in a rising demand for LNG as a maritime transport fuel.

## Conclusions

Panama's booming economy has exceeded expectations and projections, creating opportunities across the nation. Thus far, the energy sector has managed to keep pace with this growth. Yet experts warn that improvements in existing infrastructure must be coupled with a significant expansion of capacity. The construction of Panama's first power plant is an important step. The success of a second 350MW thermal power auction, to be held later this year, will be equally significant.

A shift to natural gas is just one part of the greater energy picture. To bolster energy security, Panama must improve its energy efficiency, including through interconnection with Colombia and greater market integration with the rest of Central America. An increase in non-conventional renewables and innovative technologies such as deep-water cooling will also be necessary going forward.

With the Panama Canal expansion project nearing completion, the nation has positioned itself at the center of an evolving global LNG market. The economic potential is clear. Now Panama must ensure that its energy sector growth can be as sustained.

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*This report is based on discussions during the Panama Energy Roundtable, held on September 22 in Panama City.*

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