

The Panama Canal Expansion and Energy



The Panama Canal, and Panama for that matter, have been at the center of our hemisphere's commerce and transportation for well over a century. Indeed, long before the Canal was a twinkle in Ferdinand de Lessep's eye, the Isthmus served as the key transit point for those seeking to cash in on the gold rush in California. Ships leaving Panama's Pacific Coast were the destination for a stream of people from the East Coast and Europe. Their use of Panama as an East-West passage quickly made Panama and its new railroad a strategic location.

The Panama Canal, "the path between the seas" as author David McCullough coined it, opened in 1914 after a half century of fits and starts, military action and Panama's declaration of independence from Colombia and ceding of land and management to the United States. Fast forward over 100 years and the Canal remains a crossroads for global commerce, and one that has been managed by the Republic of Panama for over 16 years since the US handed over control at the end of 1999.

On June 26, Panama inaugurated the long-awaited new set of locks and expansion of the Canal. With opening of the massive project, the Canal has officially moved into a new era. Energy, and more specifically the transportation of oil and natural gas, are critical pieces for the Canal's new epoch.

As the shale revolution swept across the United States over the last decade and an abundance of oil and natural gas wealth built, the Canal's expansion held great hope to again provide a critical East-West point of passage, this time for natural gas supplies – Liquefied Natural Gas (LNG) -- aimed at Pacific markets. But there is more to the Canal's expansion when it comes to energy. The impact on oil and petroleum product transportation and how the Canal itself will manage energy and sustainability issues, primarily water, are evermore critical.

Panama Canal Expansion

A feat of engineering and marvel of human ingenuity, the

original design and size of the Panama Canal and its lock system was nevertheless overtaken by global trends toward larger and larger vessels. In recent years, the Canal became increasingly constrained by its design, size, as well as maintenance requirements of the aging locks. All of these constraints occurred as global seaborne trade has surged and with a major trend towards massive vessels, many (known as Panamax) of which were at the size limits of the Canal and beyond (Post-Panamax). A series of commissions, studies and analyses pointed to a new, or third set of locks larger than the current locks, as the optimal long-term solution and thus the expansion of the Canal was conceived.

The expansion project was approved by almost 80% of Panamanians in a national referendum in 2006 and formally launched in 2007. Originally the timing for the opening of the new set of locks was to coincide with the 100 year anniversary of the Canal in 2014. However, that deadline became unfeasible and the expansion project was not completed until June 2016. Indeed, the expansion was inaugurated far beyond

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schedule with an inordinate amount of disputes over the cost and its design, materials and how it would operate not to mention the backdrop of a downturn in global shipping. Questions about the merits of the project and how it was being managed and built swirled. But Canal controversy is nothing new. For the last few decades, the Canal has been a lightning rod for criticism. There were concerns over the role of Chinese operation of ports on each end of the Canal, as well as much hand-wringing over how Panama would manage the Canal once the US passed control.

But after almost 10 years and over \$5 billion there is ample room for criticism and bets against the success of the expansion are to be expected given the *sturm und drang* of bringing the project to fruition. Moreover, the Canal has historically been a magnet for controversy and dire predictions, particularly since the Carter-Torrijos accord in the late 1970's and handover to Panamanian stewardship in 2000.

The expansion did, however, serve to double the capacity of the Canal. The new set of locks have added an entirely new lane of traffic and one that is far larger and with deeper navigational channels than the original design and thus allow larger ships to transit. Indeed, the Canal now handles a larger

size of ships called New Panamax which are about one and a half times the previous Panamax size and can carry over twice the amount of cargo.

Natural Gas and Liquefied Natural Gas

In late July, the Maran Gas Apollonia transited the newly expanded Panama Canal with a cargo of LNG from the United States' Gulf Coast. Two more LNG tankers followed close behind with one cargo confirmed for Mexico and the other for Asia. The expanded Canal now makes it possible for 90% of global LNG tankers to pass through the Isthmus; up from only 6% for the Canal's existing lock system. The US Energy Information Administration (EIA) estimates that as many as 550 tankers will transit the Canal each year by 2021.

That the first LNG cargo passage through the expanded Canal was from the United States should not be surprising. Indeed, the debut of US LNG export capacity along the Gulf Coast was in almost perfect alignment with the long-awaited Canal expansion and its impact on shipping times from the US to the Pacific Coast of Latin America and considerably reduced costs for LNG exporters from the US Gulf Coast to reach Asian buyers. LNG exports from the US began in February, when Cheniere Energy opened its Sabine Pass terminal in Louisiana. The EIA estimates that by 2020, US LNG export capacity will reach 9.2 billion cubic feet a day. At that point, the US will be the globe's third-largest LNG producer, behind Australia and Qatar.

In many ways, the Panama Canal expansion project is essential for the continued development of the globe's LNG industry by opening access to a transportation shortcut to almost the entire fleet of LNG tankers. And as the old axiom goes: time is money. Indeed, the expanded Canal will cut the round trip voyage from the US Gulf to Asia to about 20 days, compared with 31 days through the Suez Canal or 34 days around Africa's Cape of Good Hope. The EIA calculates the shorter transits through the expanded Canal translate to savings of up to \$3.2 million per full trip versus the Suez Canal or \$2.8 million per full trip versus circumventing the Cape of Good Hope in Africa. Additionally, the expanded Canal means shorter sail times from Trinidad and Tobago, another key exporter of LNG, to its destination markets such as Chile. It also increases the potential for Peru to reach the Atlantic natural gas market, moving their LNG trade beyond its current contract with a project on Mexico's Pacific coast.

The Panama Canal can also play a role in the global shipping industry's transition from fuel oil and diesel to natural gas. More stringent emissions controls coming into effect should

result in a rising demand for LNG as a maritime transport fuel. 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. The move would further entrench Panama's role in the new LNG market, both in the region and the world.

Just as the global shipping industry is concerned with questions of emissions, the shorter transits for LNG tankers as they deliver natural gas from one side of the world to the other will also greatly reduce carbon emissions – from transport and as the fuel replaces dirtier sources of power generation at its destination, particularly in Asia where increased access to natural gas supplies from the Americas could lead to less coal consumption.

While the cost savings and shorter voyage times through an expanded Canal are fairly concrete, there is a great deal of debate as to whether the combination of US LNG export capacity and Canal expansion has actually come too late to truly disrupt global LNG trade patterns.

Many point to the waning price differential between the US and Asian markets as having altered the upside that the Canal expansion was thought to offer LNG. Demand in Asia for natural gas has tailed off and prices remain persistently low on a global scale while the once highly sought after Japanese market has seen natural gas prices more than halved in the last year or so. These issues are certainly worthy of continued assessment and surely ones that industry will need to manage with or without the expanded Canal. Of course, the concept of a global natural gas market and the intersection of prices between the Atlantic and Pacific basins has also been long predicted but never consummated.

Crude Oil and Petroleum Products

As with the impact on LNG trade, it is clear that the economics of shipping crude oil and petroleum products improve as vessel size increases along with distance traveled. But in terms of the Panama Canal expansion, it is important to distinguish between crude oil shipments and that of petroleum products.

The EIA estimates that crude oil shipments will not be greatly affected by the Canal expansion nor will it have a major impact on the current trade patterns which have historically seen petroleum-related traffic go from the

Atlantic to the Pacific. The lack of upside for crude oil shippers stems from the nature of the business and transport that usually occurs on what are called Very Large Crude Carriers (VLCC) or Ultra Large Crude Carriers (ULCC) both of which are too large to pass through the Canal -- new and old locks -- when fully laden. And as the EIA notes the majority of the petroleum-related traffic through the Canal will be petroleum products rather than crude oil.

The expansion of the Canal should offer a boost, however, to transportation of petroleum products such as LPG, diesel and gasoline. At the same time, the EIA in a briefing on the expanded Canal and its impact indicated that the waterways heretofore size limitations had created bottlenecks for US propane exports to reach markets in Asia.

Shipments and LPG trade may be impacted in some fashion as the carriers – Very Large Gas Carriers or VLGC's - used to transport LPG will be able to pass through the expanded Canal. This eventually will moderately increase exports to Asia. It bears mentioning that China is currently the second largest buyer of US LPG and that exports of US LPG to China and Japan have previously accelerated in 2015 and at the start of 2016. The expansion of the Canal will surely enhance transport of this resource from the United States to Asia.



Water Management

Water has always been a critical element for the successful

and sustainable operation of the Canal. Indeed, as the expansion project unfolded great debates and worries over water consumed the project and the Canal Authority. Currently the Panama Canal's lockage uses water from Gatun Lake, the country's main source of potable water as well as principal source for Canal water supplies.

Annual rainfall in Panama is quite high, but with the increasingly extreme nature of weather patterns caused by global warming, Panama's rains have not been guaranteed and have come late in recent years. Indeed, just this year the Panama Canal Authority was forced to implement measures to reduce water consumption, in some cases forcing ships to adhere to weight limits on repeat voyages. This year's issues underscored the imperative nature of using water in a sustainable manner for the continued and successful operation of the Canal – both old and new lock systems.

The expanded Canal dramatically shaves time and money off key transit routes and voyages from the US Gulf to Asia

The need to be increasingly better stewards of water (and the entire Canal ecosystem) prompted the design of three water-saving basins as part of the expansion project and new navigation routes and locks. The system in place in the expanded Canal lock system is called "Water Saving Basins" and employs a major recycling and conservation effort to reuse water taken from Gatun Lake while also reducing the amount of water dispersed into the ocean.

According to the Canal Authority, the massive basins represent a surface area of 25 Olympic-size pools and with the use of high-end technologies each is able to reuse 60% of the water use per lockage, which increases savings efficiency by 7% more than the existing Canal locks. In addition, each vessel transit will only use 200 million liters of water instead of 500 million used in the old locks.

But despite these recycling efforts, Panama's man-made Gatun Lake will still need to provide twice the amount of water to operate both the original and new locks of the Canal. These are challenges that must be continually considered and met head on by the Canal Authority and entire Panamanian government in order to insure the continued and sustainable operation of the Panama Canal and its expanded waterways, as well as to meet the country's potable water requirements.

Conclusion

After several years of what became a very challenging major infrastructure project, the Panama Canal expansion opened to commercial traffic on June 26 effectively doubling its capacity with a new set of locks and an entirely new lane of traffic with deeper channels. But it is the impact and what the expansion means for global energy supplies and the transportation of oil and natural gas that have emerged as critical pieces.

The expansion of the Canal has been long-awaited by many in the LNG industry. In many ways, it's opening immediately confirmed how essential it is for the current state of LNG trade. The new lock system opened access to a transportation shortcut that practically the entire global fleet of LNG tankers can utilize. The expanded Canal dramatically shaves time and money off key transit routes and voyages from the US Gulf to Asia when compared to alternate routes such as through the Suez Canal or around Africa's Cape of Good Hope. But it also has important upside for LNG traders from Trinidad & Tobago as well as Peru. Lastly, in the post-Paris Accord world of emphasis on emissions reduction, the expanded Canal also can play an important role in the global shipping industry's transition from fuel oil and diesel to natural gas and the latter's rising demand as a maritime transport fuel.

But with all of the clear-cut results in place being derived from the Panama Canal expansion, there remains an overhanging doubt as to whether it has occurred a tad late to serve as the major disruptor of global LNG trade patterns that many predicted.

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