



Institute of
the Americas

NATURAL GAS IN CENTRAL AMERICA: Seizing benefits and overcoming challenges

OCTOBER 2, 2013 • SAN JOSÉ, COSTA RICA

The arrival of natural gas is imminent in Central America. The cleaner burning fuel will be a driver of energy sector diversification, bringing with it important economic and environmental upsides echoed a succession of speakers at the Institute of the Americas' 2nd Annual Forum on the Prospects for LNG and Natural Gas in Central America.

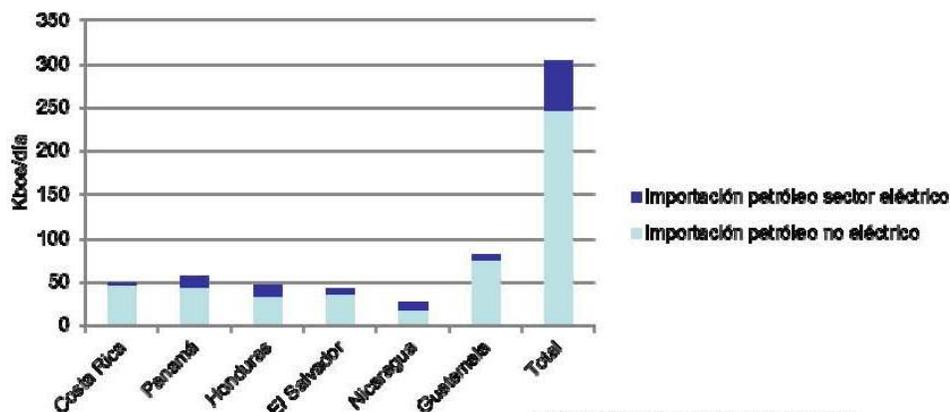
As the region faces growing energy demand and costs soar, speakers agreed there were four primary reasons in favor of incorporating natural gas, starting with Central America's electric sector:

- economic benefits gained from a reduction in the region's reliance on expensive petroleum imports and fluctuating global oil prices
- environmental benefits derived from the lower emissions of natural gas versus petroleum or coal-fired generation
- diversification of the region's energy matrix and the opportunity for natural gas to support greater renewable energy deployment
- the global natural gas boom that has created new sources of supply and an increasingly globalized natural gas market

Yet for a region characterized by small and diverse markets, the experts agreed that no one solution will be adequate, at least in the short term. Instead, several options should be considered and lessons learned from other small and emerging economies. As one speaker summed up "small markets need small solutions".

Rising Demand and Rising Costs

Central America is facing rising demand for energy across its economy, with the transportation sector and electric generation driving the upward trend. In the last two decades this demand has been met increasingly by imported petroleum products, with deleterious environmental and economic impacts. The region's electric power generation mix has gone from two-thirds hydropower in 1990 to just over 40 percent today. Thermolectric power's contribution has increased from 30 to over 50 percent in that same time.



Nota: 'petróleo' incluye crudo y derivados

Source: IDB

The increase in petroleum imports has occurred alongside a rise in global oil prices, putting pressure on national budgets across the region. According to figures compiled by CEPAL, Central America spent over \$13 billion on petroleum imports in 2011, up from \$3 billion in 2000. Over the last three years, the region has spent on average \$10 billion per year on petroleum imports. Not surprisingly, these imports have drastically impacted the region's balance of payments and caused unnecessary drags on national treasuries across the isthmus. These costs are felt by Central America's consumers who pay some of the highest electricity prices in the Western Hemisphere. And with the region's electricity demand forecast to triple by 2030, these problems will only become more acute.

Panelists at the Forum agreed that natural gas could alleviate many of these pressures across Central America, with the power sector the most obvious catalyst for broader distribution across other parts of the region's economies. The World Bank estimates some 20 percent of the region's electricity could be natural gas-fired by 2030, up from virtually none currently. The IDB has a bit more optimistic outlook with roughly 27 percent of the region's power generation gas-fired by 2027. Although during discussions it was noted that the biggest driver of demand – and the largest upside in terms of displacing imported petroleum's economic impacts – in coming years will be the transport sector, the relative ease of introducing natural gas through existing infrastructure makes the power sector the obvious anchor for natural gas deployment in the region. Transport and industry will benefit from natural gas and other sources in later phases.

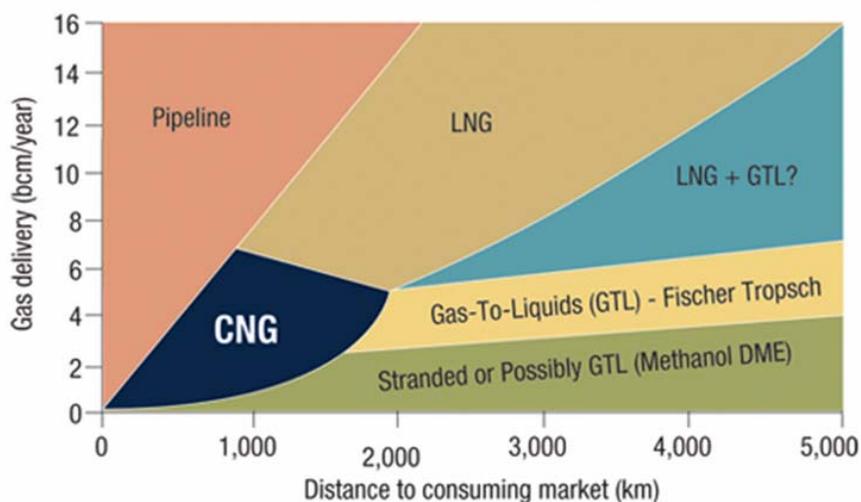
In economic terms, natural gas could ease public budget pressures, particularly if the region is able to take advantage of low prices in the United States. According to Wärtsilä, liquefied natural gas or LNG imports from the US could produce savings of \$37 million per year based upon their analysis of a 150MW power plant and assuming a Henry Hub price of \$5.

Speakers highlighted the importance of multiple solutions as countries transition from petroleum to gas-fired generation, including combined cycle plants. In many cases, existing fuel oil and diesel plants can also be converted to accommodate natural gas.

Diversity of Supply

One theme that coursed through almost all of the day's discussions centered on the changing nature of the global natural gas market. While the energy revolution in the United States – which has seen an enormous jump in unconventional natural gas production – remains relevant, speakers noted that natural gas supply options had markedly expanded across the hemisphere. Central America could look to its neighbors for natural gas exports, and not just the United States but also Canada, Trinidad & Tobago, Colombia and Peru. And this does not count the exploitation of significant natural gas reserves in Venezuela or the unconventional resources in Argentina and Mexico. The development of natural gas reserves for export in this latter group of countries is arguably still some ways off but important to consider in a longer term analysis of potential supply sources.

Efficient Options for Monetizing Natural Gas



Source: IDB

Speakers underscored the benefits a diversity of suppliers had brought to other nations that had undergone a similar transition. Spain, for example, sources one-third of its supply via pipeline from nearby Algeria and the remaining two-thirds are shipped from LNG suppliers as diverse as Egypt, Qatar, and Trinidad & Tobago. The benefits of diversity include security of supply, while greater flexibility and competitiveness also ensures lower prices over the long term. Plugging into the global natural gas market would bring key energy security improvements and benefits in Central America.

The Panama Canal expansion project could further foster a diversity of supply and lower the cost of natural gas, in particular from Trinidad & Tobago or the United States to Pacific markets. Once the expansion is complete, in 2014, over 80 percent of LNG tankers

will be able to pass through the canal, both opening Asian markets to Latin American natural gas producers and expanding landing options for Central American countries on both the Atlantic and Pacific coasts. Currently, the canal can accommodate fewer than 10 percent.

The Case for Natural Gas in Costa Rica, Panama & El Salvador

During the course of the Forum and in varying presentations, government officials from Costa Rica, Panama and El Salvador embraced natural gas as an important asset for their nations and particularly in their respective electric matrices.

Take Costa Rica, one of the region's most important proponents of renewable energy and "green development." Costa Rica has a formal policy goal of carbon neutrality by 2021. But due to the complexity of developing sufficient renewable resources, particularly large-scale hydropower, state power company ICE has focused on natural gas as an option for meeting the nation's roughly 4 percent annual power demand growth and emission reduction targets of 6Mt of CO₂.

Costa Rica's minister of energy and the president of ICE concur that it will be difficult for the country to meet its carbon reduction targets and long-term power supply without natural gas. Moreover, with delays affecting some large-scale renewable projects, the national government has developed an alternative plan in which liquefied natural gas or LNG imports will replace petroleum in the provision of the firm power necessary to support the country's predominantly renewable-based electric matrix.

Panama and El Salvador also underscore the urgency and desire of the region's energy policy makers to seize the natural gas opportunity for their countries.

In Panama, efforts have focused on the first stage of natural gas use in the country's power sector, with industrial, transport and residential sectors to follow. The nation's first natural gas import project was auctioned in early 2013 and counts a 400MW power plant set to initiate in 2017.

The Salvadoran government is actively pursuing natural gas-fired power as a mean to diversify the country's energy matrix, both increasing the contribution of renewable generation and reducing reliance on petroleum imports. In 2013, fuel oil and diesel comprised 40 percent of the country's electric generation; a figure the government hopes to reduce to 18 percent by 2018. Under the terms of a just-concluded power supply auction of 350MW organized by the government together with electric distribution companies potential bidders were prohibited from submitting fuel oil or diesel projects.

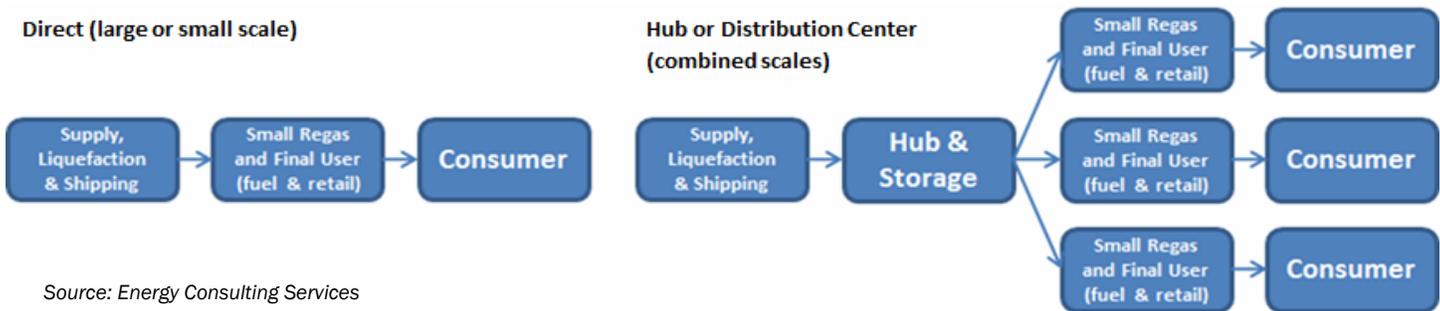
Small Markets need Small Solutions

The potential for natural gas is not an entirely new concept in Central America. However, the region has historically struggled with the issue of scale. Central America's small national markets have simply been unable to develop anchor projects of a size and scope to justify the large and intensive capital expenditures required for traditional LNG supply and distribution infrastructure.

But there has been significant evolution across a wide range of infrastructure options for delivering natural gas to market. Indeed, with major technological advances markets such as Central America now have access to more effective and appropriate solutions. A traditional regasification terminal with over 500MW generation capacity requires over \$500 million in capital expenditure; compared to less than \$100 million for a 50 – 150 MW mini terminal; to much lower capital needs for regasification barges and floating storage and regasification boats (FSRU).

Central American importers need not be constrained by LNG either, with compressed natural gas or CNG an option that has achieved some success in small markets near supply sources. LNG and CNG have their advantages and disadvantages, but while LNG has been the popular choice historically, smaller markets are considering CNG as a valid alternative for both power generation and transport, particularly in countries near natural gas suppliers, such as in the Caribbean.

Indeed, the good news for the region is that several solutions exist. Examples of projects in Norway and Indonesia, as well as closer to home in the Dominican Republic offer a variety of small-scale and hub-and-spoke concepts that establish the capacity for landing natural gas in the region. Moreover, technology has developed options that are adaptable to rising demand and flexible location, with equipment at small-scale hubs more easily transported to a new location if required. The overall investment is also far lower, making natural gas more accessible than under traditional scenarios. These technological advances should not be underestimated and particularly their relevance in advancing the discussion of how Central America will tap into the global natural gas market.



Other possible hurdles in the near future arise from the fact that rising global demand is not being met by supply, leaving Central America to buy natural gas in a sellers' market. As a result, Central American buyers unable to compete with long-term contractors will find themselves dealing on the more expensive spot market.

While the plethora of new, small scale solutions is a positive outcome for Central America, panelists noted that the most cost effective option remains a regional market. That is, to utilize existing infrastructure connecting the national grids – SIEPAC – and supporting ongoing efforts to develop a regional electric market. However, speakers concurred that current institutional and regulatory hurdles – including the gradual development of a regional regulatory framework – make smaller, national solutions more likely in the short to medium term.

Beyond the Electric Sector

Central America's electric sector is an important anchor but as evidenced by many of the discussions it is just the first step toward a wider deployment of natural gas in the region's transportation, industrial, and residential sectors. The transportation sector in particular has received a lot of attention in other countries as vehicles run on compressed natural gas gain importance. Natural gas is also an important contributor to hybrid and bi-fuel (natural gas plus diesel or gasoline) vehicles. Along with vehicles for personal use, natural gas-powered fleets such as buses, trucks and ferries, as well as light and heavy machinery are being considered by policymakers and multilateral institutions in the later phases of natural gas deployment in Central America. In most places the infrastructure, such as refilling stations, needs to be in place before any significant progress can be made. Brazil and Peru, which have had some early success in this area could provide lessons for Central America.

In any case, speakers agreed that there are steps that both the public and private sector must take to foster investment and mitigate risk. At the government level, a priority is to develop a regulatory framework that facilitates natural gas imports and distribution. In countries with a significant private sector input this process must connect all the actors in the natural gas supply and distribution chain – from producers to distributors to consumers.

Conclusion

The outlook for natural gas is ever more positive in Central America. In terms of energy security, economic development, and as a cleaner fuel source for the region's energy matrix, natural gas holds great allure.

The so-called "golden era" of natural gas has sent ripples across the energy world, and the boom in natural gas and unconventional development offers significant opportunities for Central America. Monumental changes on both the supply and demand side have advanced important discussions across the Isthmus as to the role for natural gas. But work remains with regards to defining the most appropriate technology choices for the region. And government and regional officials must redouble their efforts to create and implement the most rational policy framework for natural gas and possibly LNG development for the region's electric generation, transport, and industrial sectors.

The good news is that increased attention on natural gas by policymakers and business leaders alike augurs well for overcoming hurdles in the near term.

This report is based on discussions during the 2nd Annual Forum on Prospects for LNG and Natural Gas in Central America, held on October 2, 2013 in San Jose, Costa Rica.

The Institute of the Americas' Energy Program works to foster a deeper understanding of the most critical energy issues facing the Western Hemisphere. For more information and upcoming events, follow us on twitter [@IOA_Energy](https://twitter.com/IOA_Energy) or visit: www.iamericas.org/energy