



CHANGING ENERGY DYNAMICS IN THE WESTERN HEMISPHERE:

Impacts on Central America and the Caribbean

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POLICY BRIEF, APRIL 2014

Central America and the Caribbean are potentially great beneficiaries of the energy revolution in the Americas and rapid progress in energy technology. Renewable sources such as solar, wind, and geothermal are becoming competitive, particularly in areas remote from existing electric grids. Vast quantities of inexpensive natural gas are also coming onto the market from sources easily accessible to the region, including Colombia, Trinidad and Tobago, and in the near future, Mexico and the United States. These alternatives offer a greener alternative to thermal power generation from oil-fired plants. Central America also benefits from the Sistema de Interconexión Eléctrica de los Países de América Central (SIEPAC), a regional energy grid that enables the trading of electricity across the six states in the region and allows new energy sources to be shared.¹ In addition, the Caribbean states have explored the use of geothermal energy and of undersea pipelines to use Trinidad and Tobago's natural gas export capacity.²

Nevertheless, Central America and the Caribbean have the highest electricity costs within the Western Hemisphere, along with the highest dependency on oil as an energy source. These are also the regions with the lowest average GDP per capita in the Americas. Yet, with the exception of Trinidad and Tobago, a major natural gas producer, the region is a net energy importer.³

Many countries in the region depend on subsidized financing from Venezuela to pay for oil products

through the regional mechanism known as Petrocaribe. Although Central America and the Caribbean face quite different problems on the energy front, in both cases geography, market fragmentation and politics compound the cost problem in energy production and delivery. The two regions have historically bridged the gap between low income and high energy costs with subsidized access to oil from regional producers. Subsidized oil was first provided by Mexico and Venezuela through the Acuerdo de San José beginning in 1980, and more recently by Venezuela alone through Petrocaribe beginning in 2001.⁴ Acuerdo de San José ceased operations in 2005, and Petrocaribe is increasingly in trouble due to declining production in Venezuela, exacerbated by its economic woes and the higher priority it assigns to oil deliveries to China and Cuba.⁵ Continued Central American and Caribbean dependence on Petrocaribe is not beneficial in the long run. It creates disincentives for the adoption of new technologies and investment in new sources of energy, and makes Central American and Caribbean states politically dependent on Venezuela for their energy security, and therefore vulnerable to political pressure.

The power asymmetry between the oil exporting and consuming countries is particularly acute in this region, and it is compounded by the financial incentives provided by Petrocaribe. Subsidized financing has led to rising levels of debt owed to Venezuela by the 18 member states. Petrocaribe allows member states to finance 40 percent to 60

percent of their imports from Venezuela over 25 years at interest rates between 1 percent to 2 percent whenever the world price of oil exceeds \$50/barrel. With the exception of a brief window in 2009, oil has been above the price point since May 2005.⁶ As a result, in some countries cumulative oil import debt as a percent of GDP is as high as 50 percent,⁷ and PDVSA estimates that one third of the Caribbean's foreign debt will be owed to Venezuela by 2015.⁸ Petrocaribe is also not in Venezuela's long-term interests, since it reduces its oil revenues at a time when it is facing its own economic crisis.⁹ In fact, Venezuela has already altered the terms of the subsidies for its exports to Petrocaribe. Venezuela proposed doubling the interest rate to between 2 and 4 percent for newer members Guatemala and Honduras, as well as financing a smaller proportion of the oil it sells to Petrocaribe.¹⁰ Citing these changes in financial terms, Guatemala withdrew from the pact in November 2013. Other Petrocaribe members such as Honduras and the Dominican Republic indicate that deliveries have become unreliable or fall below agreed to amounts.¹¹

Under the present energy matrix, simply shifting from subsidized rates directly to market prices for energy would make Central American and Caribbean economies less competitive to trade pressure from other regions. This issue will become even more salient if the United States is successful in negotiating the Trans-Pacific Partnership and the Trans-Atlantic Trade and Investment Partnership. Decreased competitiveness for regional businesses and enterprises will only contribute to the growing attraction of illicit markets and trafficking operations across the two regions, both of which are associated with high levels of violence and corruption.

Given that existing regional solutions to high energy costs are under stress, what alternatives are available to Central America and the Caribbean?

1. *New sources of petroleum and petroleum products*: It is possible that the North American energy renaissance will provide sufficient energy at reasonable prices to the region, particularly

in the form of refined products. Some analyses of future oil prices suggest prices closer to \$85-\$90 per barrel. The volumes of oil flowing out of Canadian and U.S. shale oil fields are already driving the export of refined products from Gulf refineries and creating pressure to lift the restrictions on crude oil exports. In the long run, Mexico's energy reforms may result in the availability of additional crude and refined petroleum products in the Caribbean basin. However, in even the best case, paying the full market price of oil without subsidized financing will entail a very significant rise in present costs in Central America and the Caribbean.

2. *Alternatives to Petrocaribe*: It may be technically feasible to set up new regional supply arrangement to cushion price shocks experienced by Central American states. This would most likely need to involve regional multilateral financial institutions and Mexico, Colombia and the United States as the other major suppliers of petroleum products in the Caribbean basin. This would hedge against relying on a single source that may experience financial volatility and supply unreliability. It would also diminish the political vulnerability of participating oil importing states by shifting from a single source model to a multilateral model. Such a model, however, would maintain the disincentive to invest in new technologies and to transition to a more efficient and green energy production matrix. It would also have to overcome toxic relations between the United States and Venezuela.
3. *Liquefied and compressed natural gas (LNG and CNG, respectively)*: Natural gas is relatively inexpensive and available for export from Peru and Trinidad and Tobago. In the not too distant future, it will become available in increasing volumes from Colombia, Venezuela, and the United States. Recent studies by the Inter-American Development Bank show that liquefied natural gas and compressed natural gas are feasible alternatives from a technical

and economic point of view for Central America and the Caribbean, resulting in cost reductions to consumers of 15 percent to 20 percent.

In Central America, this will require investing in new gas-fired electricity generation and either interconnections to the gas pipelines of Mexico or Colombia, or the development of an LNG or CNG offloading facility at a regional port. Panama currently provides the lowest cost options for sea-borne LNG or CNG. In the Caribbean, this will require additional investment in pipelines or ports, power generation infrastructure, and possibly vehicle retrofits to use natural gas.¹²

4. *Further electric grid integration:* Central America already has an integrated grid through SIEPAC, but for it to become a source of lower cost energy for this region, it needs to draw on Mexico's grid to the north or connect to Colombia's to the south. Both interconnections would provide the region access to lower cost electricity. Projects to accomplish this have been planned and partially financed, but are not yet a reality.
5. *Improved energy efficiency:* Both Central America and the Caribbean have a considerable way to go in ensuring the integrity of their electrical power grids and efficiency in power generation, transmission and use by consumers. Electricity theft or losses to unmetered end-users, which increase the cost for paying customers, are problems across the region. New energy efficient appliances used in homes and businesses as well as better monitoring of the end-user base could be as important as any single investment in additional power generation capacity.
6. *Renewable energy sources:* Wind, solar, biomass, and geothermal power generation are becoming increasingly affordable and some technology options have reached grid parity in terms of the cost to the consumer. Renewables can be installed as large-scale power generation facilities, such as dams or wind farms, but some technologies are also efficient on a small

scale that is suited to distributed power generation at consumer sites. Distributed small-scale installations also offer the opportunity to develop microfinance alternatives for consumers.

In the long run, it makes sense for Central American and the Caribbean states to transition to an energy infrastructure that combines improved efficiency, use of renewable energy sources, and natural gas power generation to reduce demand for oil. High Central American and Caribbean energy production costs have been a focus of international attention for years, yet progress has been slow. Since 2009, the Energy and Climate Partnership of the Americas has been exploring connectivity among small island states in the Caribbean and has worked to facilitate shifts to renewable sources of energy.¹³ Connecting the Americas 2022 brings together the OAS, Inter-American Development Bank (IDB) and World Bank with a goal to facilitate public-private dialogue.¹⁴ Both the World Bank and IDB have focused considerable research effort on this issue, releasing a series of technical recommendations in the past decade on how Central America can move towards a more cost effective and sustainable energy matrix. Most recently, at the 2014 North American Leaders Summit President Obama, President Peña Nieto and Prime Minister Harper called for a meeting of their respective energy ministers to discuss engagement with Central America and how North American countries can potentially supply this market.¹⁵

The obstacles to achieving such a transition are not technical, but rather political and financial. These include:

1. *Regional disputes:* Central American and Caribbean governments have been slow to create a regional market, despite the creation of some regional infrastructure, particularly SIEPAC in Central America. Ongoing disputes over border issues, security, and migration among some states in the region impede regional cooperation. However, there is also a mismatch between the preferred option for new power

generation alternatives at the domestic level and what makes sense for the region. For example, El Salvador and Guatemala would benefit more from interconnectivity with Mexico's energy grid, while Costa Rica and Panama would benefit from connections to Colombia. Disagreements therefore arise over where to site new power generators, port infrastructure, or pipelines.¹⁶

2. *Regulatory asymmetry*: Divergence in regulatory frameworks across Central America and the Caribbean discourages foreign investment in the energy sector. There is also a need for more integrated electricity planning in Central America.¹⁷ For example, even though a regional electricity market (Mercado Eléctrico Regional) began to function in Central America in 2013, this has not yet translated into a common regulatory framework for energy investment in the region. Foreign investors would benefit though from the resulting economies of scale.
3. *Meager state regulatory capacity*: State capacity is especially important if these regions are to implement energy efficiency measures. In other parts of the globe, deployment of energy efficiency technologies has relied on incentives from power companies to help end users finance the change to new products. However local energy producers benefit from the high cost of energy, which they pass on to consumers. These business owners are often highly influential members of the local political and economic elite, and as such, can discourage governments from taking action.
4. *Financial disincentives for change*: The subsidies and financial benefits from Petrocaribe discourage consideration of alternatives by governments. The existing framework is the lowest cost alternative currently available compared to market solutions. Shifting towards alternative energy production matrices requires the assumption of financial risks by regional governments in the form of loans or investments,

as well as political risks in leaving Petrocaribe and potentially displeasing Venezuela.

Overcoming the obstacles to high energy costs in Central America and the Caribbean and implementing a new energy framework will require both short-term and long-term policies. In the short term, the risk is the region's vulnerability to changes in Petrocaribe's financial terms and supply reliability. Given declining oil production and the growing economic crisis in Venezuela, this risk cannot be dismissed. Any new solution should focus on assuring energy supply and price stability for Central America and the Caribbean. There are a number of physical and financial hedging strategies that could be used, although some are quite complex and may pose a challenge to state capacity.¹⁸ The regions have many potential partners among energy producing states, such as Brazil, Colombia, Mexico, Trinidad and Tobago, and the United States. Multilateral financial institutions, especially the IDB and World Bank that have long studied this issue, are best positioned to advise on possible financial alternatives. Regional institutions such as SICA and CARICOM may provide a framework for consultation on a new financing mechanism to hedge against volatility in energy prices. Historical models such as the Pact of San José may provide lessons learned for how to combine these elements. Such a multilateral approach would have an added advantage of reducing the vulnerability of the participants to political pressure from any single energy-exporting state.

However, a short-term plan to hedge against price shocks does not solve the long-term problem of dependence on a limited range of energy sources, and perpetuates disincentives for the adoption of new technology. Transitioning to a new regional energy production matrix will require that the design of the short-term hedge against energy price instability create incentives for long term investments in a less costly energy production infrastructure. That means that country participation in a short-term hedging mechanism should be linked to long-range planning, financing and implementation of

the infrastructure to use natural gas, renewables, and energy efficient technology. This should include incentives for existing power producers and consumers to participate in and support the transition to a new energy matrix.

In an era when many overseas development assistance programs are under pressure, most of the new energy infrastructure will have to be built by the private sector or by governments supported by lending from multilateral development banks. To achieve economies of scale, a long-term plan should lead states in Central America and the Caribbean to develop more compatible regulatory structures and investment frameworks. This would encourage the private sector, both within each state and abroad, to assume the costs (and profits) of implementing an alternative energy matrix. It will also require governments to invest in building up regulatory and oversight capacity so that one private monopoly is not simply replaced with another, but rather with a new competitive energy infrastructure.

Given the extended timeframe required to build a new energy matrix, the possibility of an integrat-

ed approach may prove beyond the reach of the present Central American and Caribbean governments, even with the international encouragement they have already received. However, there are still opportunities for individual governments and enterprises to invest in new energy sources such as natural gas-fired plants, geothermal, solar, and wind. Particularly in Central America, where SIEPAC makes it possible to sell electricity to consumers in neighboring states, countries with good business investment climates or support from multilateral institutions might simply forge ahead and make cheaper energy available to their own consumers and others in the region. This would create a competitive dynamic where consumers in other countries put pressure on their own governments to make cheaper energy accessible, overcoming the resistance of entrenched business elites. The result might not benefit from the same level of economies of scale as would be available through greater regional integration, but such actions would still benefit consumers, begin to break the region's dependence on oil imports, and reduce their vulnerability to external financial and political pressure.

ENDNOTES

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