Colombia's early steps to becoming a regional energy hub

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Colombia has traditionally been a leading advocate of economic and political integration in Latin America, even as it struggles internally with a civil conflict that has brought grief to its population over the last half century. The country has been proactive in the creation of all the regional economic integration bodies, including the Latin American Energy Organization, OLADE – one of the economic integration bodies that Colombia has supported and used as a lever to promote the energy integration of the continent, and its own role in the process.

Notwithstanding its complex geography, which has made it difficult to develop a modern road transport infrastructure, the energy sector has been able to integrate the country with an efficient network for electricity and gas transmission and distribution, and has maintained a working electricity interconnection with Ecuador and Venezuela. The electricity and gas production and distribution networks have evolved within a regulated environment that is open to private investment, coexisting with a relatively balanced presence of the State in all stages of the value chain.

Colombia's vocation as a regional energy integration hub comes naturally from its geographical location and its rich endowment of energy resources. The country has one of the world's largest untapped potentials for hydroelectricity, the largest coal resources in Latin America, a sizeable potential for oil and gas production, and a well-run and well-regulated combination of electricity, gas, and petroleum markets. Given its geographical location (with multiple frontiers between energy-rich and energy-poor countries) it is a potential transit route for Venezuelan hydrocarbons to other countries in the region, the Pacific Ocean, and the Asian markets. It also benefits from a well-established positive attitude towards political and economic integration.

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In fact, the country has led many energy integration initiatives, not only through the various political bodies of the region (CEPAL, OAS, OLADE, CARICOM, among others) but also involving some minor but strategic interconnections across the borders with Brazil, Ecuador, and Venezuela. It has also been involved in some more ambitious regional projects – such as the electric interconnection with Central America, a submarine cable to Dominica, an oil pipeline connecting Venezuela with the Pacific Ocean, a private-led regional gas market initiative for Central America and the Caribbean islands, and a gas pipeline from Venezuela to Central America. Some of these projects have matured at different speeds and materialized to various degrees, while others remain beyond commercial grasp at present.

A closer look beyond political integration initiatives towards specific regional integration projects, their justification, status, and challenges, may shed some light on the issues that are preventing deeper energy integration in the region, and highlight the conditions that could facilitate the process in the future. To this end, a number of key initiatives merit attention in the areas of: electricity interconnections and bulk sales; gas pipelines and gas supply agreements; transnational crude oil pipelines; and the corporate presence of Colombian energy companies in the region.

Electricity interconnections and trade

Colombia's privileged position in the promotion of electricity integration with its neighbours stems from a combination of geography, endowment, policy, and managerial capacity. According to the World Energy Council's website, Colombia has an estimated hydroelectric potential of 1000 TWh/yr, of which around 20 per cent (200 TWh/yr) are estimated to be technically feasible. Current installed generation capacity is 9.3 MW, generating 46,000 GWh in 2012, about a quarter of the technical potential, according to the Mining and Energy Planning Unit of the Ministry of Mines and Energy (Plan de Expansión de Referencia, Generación – Transmisión, 2013–2014), and 64 per cent of total capacity.

After an energy crisis led to rationing back in 1992, the electricity industry was privatized and regulated, with special focus on generation and distribution. The national grid company ISA was partially privatized and became a model state company with a diversity of assets in Argentina, Bolivia, Brazil, Central America, Chile, Ecuador, and Peru. Local generation companies have also diversified regionally, most notably the regional State Company EPM from the Antioquia department.

The Central American interconnection project

An ambitious plan to connect the Colombian grid system to the Central

American Interconnection System, SIEPAC, involving six countries in the region from Panama to Guatemala, with a future proposed interconnection with Mexico, has been promoted by the Colombian government with the backing of the national electricity grid company, ISA, and the electricity and gas regulator, CREG, among other public and private organizations. ISA has been a shareholder of the company that owns SIEPAC since 2005, with 11.1 per cent of ownership. Notwithstanding the complexities of the project, not just from a political perspective but also from the multiple regulatory systems involved, Colombia has persevered in its commitment. The most formidable obstacle to this project has been Panama's reluctance to allow the construction of high-voltage transmission lines across the Darien rainforest. Not only have environmental concerns been argued, but also, and less publicly, the widespread fear of opening a spillover gap for Colombian violence or drug trafficking.

Submarine electricity transmission cable to the Dominican Republic and Puerto Rico

In 2008, a joint examination of energy supply alternatives to the Dominican Republic and Puerto Rico included oil products, gas, coal and interestingly enough, the direct supply of electricity through a submarine cable with a transmission capacity of 1 GW. This idea stems from the relatively short distance (slightly more than 600 km) between the northernmost tip of Colombia's continental territory and the island of Dominica. With proven technology at hand, such an option would be competitive with other alternatives. The project has not yet reached the feasibility stage, but has raised the profile of Colombia as a hub for integration of the region with the Caribbean islands.

Gas pipelines and supply

The current gas reserves of Colombia (approaching 8 trillion cubic feet, tcf) and its geological potential have raised the prospect of opening the international markets beyond the supply of local needs, considering that the domestic market has reached a state of relative maturity. A policy of restrictions to gas exports was lifted in 2010 to open the international markets to domestic gas; this offered increased incentives to the development of additional reserves and, particularly, to risky investments in new exploration.

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Gas interconnections and seaborne projects

In 1973 Chevron discovered the giant fields of Ballena-Chuchupa in the north-eastern department of Guajira in the Colombian Caribbean coast, with an estimated 5 tcf of original gas in place. Those resources did not have a ready market at the time and the government, Ecopetrol, and Chevron (the field operator) promoted an ambitious initiative to develop a market for that gas. The first stage was a massive development of the domestic market. The field has been contributing about 80 per cent of Colombia's domestic needs – in 2014, after 30 years of production, this is in the order of 900 million cubic feet per day (mcf/day). In the early 1990s another giant system of gas was discovered, in central Colombia at Cusiana and Cupiagua, with more than 7 tcf of estimated total reserves. These two fields represent more than 90 per cent of the total reserves discovered.

In October 2007 a gas pipeline connecting the Guajira fields with Maracaibo in western Venezuela was inaugurated. The pipeline was built by PDVSA Gas, as it was in Venezuela's interest to use as much gas as Colombia could provide, in order to enhance their oil production in the region. Under a bi-national agreement, Colombia would export approximately 100 million cubic feet per day on average until 2011, at which time the pipeline flow would be reversed and the vast reserves of gas in eastern Venezuela, estimated at 195 trillion cubic feet, would be made available to Colombia. In 2011 Colombia agreed to continue supplying gas indefinitely, as Venezuelan gas has been slow to gain access to the country's western provinces, due to continued delays in the construction of the necessary transmission infrastructure. Despite some intense political tensions between the two governments, at no time has the Colombian government suggested a suspension of gas supply, even when President Chávez ordered the mobilization of troops to the Colombian border in March 2008.

Earlier on in 2000, and just before its collapse, Enron was close to obtaining government approval for a project to build a gas pipeline from the Guajira fields to Panama. However, a political battle within Colombia (between Congress and the Minister of Mines and Energy) at the time, and the subsequent collapse of Enron, prevented the materialization of the project.

Small-scale seaborne LNG

In 2013 a new era of small-scale seaborne LNG commerce was inaugurated following approval of the construction of an export liquefaction terminal at Coveñas and an import regasification terminal in Cartagena, with capacities of 100 mcf/day and 400 mcf/day respectively.

The rationale behind these apparently contradictory simultaneous export and import projects is that the opening of exports would optimize the production profile of existing fields and encourage new exploration and development activities, while the construction of the import facility would provide a reliable source of fuel to the thermal plants in the north in case of seasonal shortages (due to low rainfall or, in future, by the gradual exhaustion of the currently producing fields). On the market side, the growing need for alternatives to Venezuelan heavy fuels (which come at a high political cost) as energy sources in Central America and the Caribbean would get a boost if a ready source of cleaner and less expensive gas at a small scale was present in the region. In the meantime, the growth in demand in Asia, following the Fukushima events, has given rise to attractive prices that have supported a multiyear purchase agreement to back the financing of the export facility.

Crude oil pipelines

Colombia and its crude-producing neighbours have traditionally relied on their own crude transport infrastructures to ship crude oil to their traditional markets, but a number of factors – recent geopolitical shifts in demand and supply, internal security problems in Colombia that have affected crude oil transport pipelines, and even pragmatic reasons of trading economics – have justified some strategic cooperation projects to transport crudes across borders:

Pipeline from Venezuela to the Pacific

A long-held desire of the Venezuelan government – to build a pipeline across Colombia to the Pacific Ocean to gain access to the Asian markets – is gradually becoming feasible. Following an initiative by the Colombian National Hydrocarbons Agency (ANH) a Canadian hydrocarbons transport company, Enbridge, undertook the promotion of a 760 km pipeline from the Colombian Eastern Llanos region to the port of Buenaventura on the Pacific. The project has attracted the attention of Ecopetrol together with that of other significant producers involved in this area; these bodies have acquired shares in OAP, the project promotion vehicle (the name OAP relates to the company's acronym in Spanish). The first pre-feasibility studies have produced encouraging results as the pipeline would be a state-of-the-art design to transport, initially, 250,000 barrels per day of heavy crudes that are increasingly being produced in the area; it would easily accommodate Venezuelan heavy oils.

As the OAP project continues to make progress, the pipeline transport of Venezuelan crudes to the Pacific moves closer to becoming a reality, as a substantial existing pipeline that runs from the central producing region of Colombia to the Caribbean Sea (parallel to the Venezuelan border) could readily reverse its flow midway, from the Arauca Region to connect with the OAP at its start.

Ecuadorian pipeline connection

Two pipelines run to the Pacific Ocean along the Putumayo River, one on each side of the border between Ecuador and Colombia. Both pipelines transport crude to the ports of Esmeraldas and Tumaco respectively. With Colombia's production in the region outstripping the transport capacity of its Trans Andean pipeline and Ecuador's heavy oil transport pipeline (OCP) having excess capacity from just across the Colombian border, a project to build a transnational interconnection (with an initial capacity of 20 kb/d and an estimated 200 kb/d of final capacity in the short term) was agreed under a recent binational Memorandum of Understanding of May 2014. This project represents a major breakthrough, after many years of fruitless discussions, and has given way to a new era of energy cooperation between Ecuador and Colombia.

Corporate presence in other countries in the region

Colombian companies have made important inroads into the region. ISA (the high-voltage grid company) has won competitive bids to run transport grids in Peru, Bolivia, and the Sao Paulo state in Brazil, among others. The Energy Company of Bogotá has invested in the gas transmission grid in Peru, while the Public Company of Medellin (EPM) has entered the wind generation market in Chile. Promigas, a gas transmission and distribution company, has an important presence in Peru and Celsia, a generation company, is taking the first steps towards internationalization in Costa Rica and Panama. There is growing evidence that the relative maturity of the Colombian energy markets is motivating local energy companies to look for growth opportunities in the region.

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An integrating force in the region

Beyond the practical and business justification of the energy integration projects that make technical and economic sense, energy integration initiatives in Latin America have been fraught with misunderstandings and tension. A number of projects in other parts of the continent have turned into political weapons or have failed to serve their intended purpose when internal markets fell short of expectations. This has been the case with the gas pipeline systems that developed in the Southern Cone, as the Morales government in Bolivia unilaterally renegotiated its gas export agreements with Brazil, Argentina suspended its exports to Chile when Bolivia cut its exports to Argentina, and local production could not supply the internal market.

Not visible in the negotiations, or made public at difficult times, is the presence of vested interests that could be affected by the alternative integrating projects that could bring more affordable energy to the region's consumers. Among these are the opportunistic populism of some political groups or the private interests behind the procurement and distribution of more expensive fuels or generation assets.

Notwithstanding difficult relations with its neighbours, Colombia has never threatened to cut electricity or gas supplies, even under the tensest circumstances, and has always honoured its energy supply commitments. The contractual relationships with its neighbours have always been governed by commercial arrangements made by independent energy or gas companies, free from political interference. Not even when political tensions with Ecuador or Venezuela reached breaking point has Colombia given the slightest hint of using energy supplies as a bargaining weapon.

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Colombia's continuously growing presence is a consequence of the solid financial position of the energy companies that are searching for growth opportunities, as their domestic markets reach a state of relative maturity. Having a business-like attitude to their expansion into nearby markets, supported by competent technical and managerial teams, these companies are gradually gaining the confidence to participate in growing numbers of direct negotiations or calls for competitive bids, and have proven to be trustworthy and reliable.

Another set of obstacles that the country needs to overcome, in order to realize its potential to contribute energy solutions to its neighbours, is represented by the new wave of environmentalism and community activism. This has emerged in opposition to key energy development projects, including coal mining, petroleum extraction, and the construction of new hydroelectric dams.

Notwithstanding the difficulties, the picture that emerges from Colombia's combination of a strategic geographical location, a rich endowment of natural energy resources, a pragmatic political attitude towards political and economic integration, and a pool of financially strong and well-managed energy companies, is one of a gradual positioning of itself as a reliable hub for energy integration, at the crossroads of the north-western corner of the South American subcontinent.