An Energy Roadmap for Peru: Fundamental issues for the new government to consider

On July 28, Peru’s new president will take office for a period of five years. Regardless of the outcome of second round voting on June 5, whoever wins will have to move swiftly on several fronts including energy. What challenges face the new administration with regards to the energy sector? What are the problems that must be resolved urgently? What are the issues that demand attention but also require careful design of the most rational solution?

Electricity

The new administration will inherit a system with robust electric supply. It appears fairly certain that the new government will not face restrictions or shortage of supply of electricity at the level of the National Electric Interconnected System, or SEIN.

According to projections from Interconnected System Operator, or COES, there will be sufficient generating capacity to meet demand through 2025, even if there is no significant increase in power generation projects outside of those currently in development. In many ways, this electric supply balance is due to a combination of slowing demand growth and an aggressive program of private investment launched to satisfy annual rates of 10% demand growth. But there was also a major decision taken to tender the construction of two large power plants in Ilo and Mollendo with the purpose of enabling the construction of the Southern Natural Gas Pipeline project by creating two large off-takers for the natural gas and hedging against the possibility of insufficient natural gas demand along the route of the pipeline.

Clearly, under these circumstances and marginal costs, there are huge challenges for development of generation projects. Therefore, the impetus fell upon the Peruvian government to promote projects for thermal and hydro generation outside the general framework, charging the entire cost of development through a transmission toll structure. Projects totaling 1200 MW of new hydroelectric plants and 800 MW of new thermal power plants for cold reserve and a large number of small renewable energy plants have all been developed using the transmission toll scheme subsequently impacting end user costs and causing price increases.
The role of the Southern Natural Gas Pipeline must also be mentioned and the foregoing discussion of the government’s decision to boost the project’s viability by tendering natural gas fired generation projects totaling 1500 MW, and with guaranteed financing through the transmission toll structure. The power projects are far and away the primary natural gas consumers in the area. (Additionally, the government sought to keep natural gas prices in the south on par with those in Lima by way of the same toll subsidy system, but with regards to natural gas transportation). By most technical and economic analyses, the cost of this infrastructure development cannot be paid by the marginal costs of the system and has to be covered by other means; hence, the most recent and future increases in electricity rates. The foregoing underscores the trend of increasing costs for developing new generating capacity (and therefore the end rate for consumers) as opposed to the marginal cost and contracts with non-regulated consumers.

What can the new government aim to do with regards to this complicated price issue? The reality is, for a variety of reasons, there is little of substance the next administration can do in the short term. Largely, because any major changes would jeopardize and postpone the development of the Southern Natural Gas Pipeline project. However, there are measures of an “energy literacy” nature that should be considered. The new government can make an effort to openly address the issue and explain to the population the true costs the development of sustainable energy infrastructure across the nation and what is entailed in the complex energy sector.

It is also fairly clear that there are prescriptions the new government must avoid, beginning with the regulatory framework. The new administration should not embark on a series of regulatory changes intended to lower tariffs by any means whatsoever without taking into account the effects on investment in the long term. Avoiding tweaks such as that of the outgoing Humala government when they withdrew from the calculation of electricity tariffs the effect of exchange rate variation is important.

Hydroelectricity

Peru has long been known to hold significant potential for hydroelectric development. A study conducted in the 1970’s with support of the German Cooperation Fund (GTZ) identified a theoretical potential of 200,000 MW and a technical potential (feasible development) of 58,000 MW. However, the current system counts only 5% of that potential.

Most agree that Peru’s energy sector and generation base should be provided by hydroelectric plants supplemented by natural gas and non-conventional renewable energy sources. Therefore, a critically important task facing the new government is to develop a new regulatory framework designed to navigate the thorny issue of attracting investment in new generation capacity with a totally decoupled marginal costs of the cost of infrastructure development. This is particularly relevant for development of increased hydroelectric capacity in Peru. Even unconventional renewable energy with its dramatic cost reduction of the last few years still remain above the US$15/MWh, the aforementioned average marginal cost in the Peruvian system.

In conceiving and implementing a new regulatory design, the government must consider how to confront the problem that the State is the only distributor and therefore its regulated customers are those who must assume the high prices that are ultimately the funding sources for new hydroelectric plants. For instance when revising the framework for hydroelectric concessions, the only way to compete with long-term contracts with these distributors is by applying for funding at Pro Inversion (Private Investment Promotion Agency in Peru). Thus, non-regulated and regulated customers of private distributors have to bear this cost.

In order to affect this level and nature of regulatory changes, there must be an amendment to national law. Therefore, a regulatory overhaul of this manner should be done at a deliberate pace and by gaining input and insights from all stakeholders of the regulatory system, and inasmuch as possible through a consensus building process.

State Electric Companies

An often unmentioned but extremely urgent and worrying issue is that of Peru’s state-owned enterprises in the electric sector. Of particular importance to highlight for the next government is the case of distribution companies. State electric generating companies face similar limitations but the problem is less urgent.

Electricity distribution in Peru is owned by the state except in the city of Lima and Department of Ica; that is, most of the country. The electricity distribution business is a long term and stable enterprise, but most often one with modest returns. Nevertheless, significant investments are required to meet network growth driven by new demand, and the repowering of core systems. Moreover, and precisely because of the other elements, the maintenance and replacement of thousands of kilometers of distribution lines is urgently needed. By most accounts, the firms are not making sufficient investments nor is adequate attention being paid to the needs of the state-owned companies. Critics underscore that it is the state ownership nature of these firms that counter their abilities and skill sets, but especially the resources, to meet all of the needs adequately.

State distribution companies face a series of challenges: 1) they are very inefficient in procurement of goods and services due to the dense and complicated regulation for State purchases; 2) they have all activities supervised by the...
Office of the Comptroller General of Peru, which on far too many occasions has shown only a desire or intention to monitor compliance with the administrative rules but not with the aim or intention of efficiency or favorable outcome for the company; 3) investments are impacted due to the need to be approved by a central system which adds red tape and delays and sometimes makes certain investments impossible; and, finally, and perhaps most relevant 4) these companies are prohibited from assuming debt in the medium or long term and thus are seriously constrained and must finance their long-term investments with cash flow.

In many ways, the urgent situation of the State distribution companies is much like that of other state-owned enterprises. The financial situation is not surprising given their reliance on resources solely through the rate set by the regulator, Osinergmin. The State distribution companies are constrained by the restrictions, limitations and controls that befall most public entities and those funded solely by the central government.

The consequences of these challenges and constraints are obvious: poor quality of service due primarily to the lack of maintenance, strengthening and expansion of networks, and unmet demand. In many cases, the distribution companies are not able to meet all requests for new supplies which undermines the economic development of their service areas. The State distribution company performance indicators and statistics are far below those of private distribution companies.

Given that the causes of problems with the State distribution companies are structural and not temporary, the situation will continue to worsen and gradually reach a breaking point. The most straightforward solution would be to continue the privatization process, that is to privatize the State distribution companies.

Proponents of this position point to distribution in Lima, which accounts for about 60% of domestic demand, and where distribution was privatized and remains privately owned. In Lima there is 100% coverage and according to many indicators better quality of service. Moreover, the rate is regulated thereby alleviating fears of a private operator given monitoring and oversight by Osinergmin for quality of service; compliance is very strict and applies equally to public and private distribution.

The privatization of the currently state-owned distribution companies should, however, include one important change from previous privatizations: The government should consider that instead of selling assets, the investment in the companies would be managed and delivered through a concession system for an appropriate period that would incentivize investment and allow for cost recovery (30 years or more).

The current and near-term political and economic context may not permit privatization of the distribution companies and the above recommendation may prove too tall an order for the new government in the beginning of its term. Therefore, an additional remedy should be considered, call it Plan B for overhauling the desperate situation of State distribution companies.

The second best option, or Plan B, is to significantly improve the management of these companies and remove them from unnecessary controls mandated by their State ownership. There is precedence in Peru for such measures. This is exactly what was done with the so-called Distriluz Group of companies, which are the four distribution companies privatized in 1999 but then returned to the State. Upon their return to State ownership and control, and by agreement of the board of Pro Inversion (COPRI now), they remained exempt from some of the more onerous rules of the State such as the Procurement Law and National Public Investment System (SNIP).

A quick review of these companies’ performance indicators and results, both technical and financial, demonstrate their superior management and efficiency when compared to other State distributors. The recommendation therefore is that these benefits, status, and measures would be extended to all state owned electric companies. Long-term debt would not require the approval of the MEF as is currently the case, but rather simply the company’s board of directors. Moreover, there would be one board of directors comprised of high-level full time directors whose profiles would insure that they are totally free of both national and regional political interference and thus the companies would conceivably be managed with criteria of efficiency and profitability.

Regional Interconnection

This is an issue that will demand the new government to craft an immediate and definitive position in terms of its energy policy and vision: Does Peru wish to be an exporter of energy? Or is the aim of regional interconnection and integration merely to seek lower prices? Or is the policy goal that of a more inward and resource nationalist posture...
that seeks self-sufficiency and thus sets aside regional energy interconnection for a future date?

Up until now, Peru has generally been in a position of reacting to initiatives from neighboring countries and not necessarily a well-thought out or proactive posture. The existing interconnection with Ecuador was the result of a joint promotion of Colombia and Ecuador; Peru had not decided whether it was fully interested or whether it found the interconnection with Ecuador beneficial.

In 2012, at the time of the interconnection project with Ecuador, most analyses pointed to Ecuador as a net importer in the short and medium term as the country was experiencing shortages and a bleak investment outlook for new sources of supply. Peru had large surpluses and a lack of cogent plans for how to deploy them. Beyond the fairly theoretical net profit benefit of hydrological complementarity between the two countries (the rainy season in one matched the dry season and drought in the other) no additional or crucial upsides for Peru were identified. However, this complementarity would only serve if both countries have surpluses at particular time, which was not the case. Peru embarked on the project that culminated in the construction of the 220 KV Zorritos -Machala transmission interconnection line. Regrettably, since its construction, it has had very little use since, other than for emergencies. Not only did this not benefit either nation, it is far from the definition or rational for regional interconnection and energy integration.

It is important to note that much has changed when it comes to the current context for regional interconnection. Ecuador has launched an aggressive program to build new hydroelectric generation capacity and 500KV transmission lines. Ecuador is no longer a net importer and by 2017 will have a significant seasonal electric export capacity. At the same time, as outlined above, Peru has over-capacity (reserve 40%) in its electric system and low marginal costs. It bears repeating that the current supply capacity and prices are not a result of energy policy vision seeking to create export capacity, but rather for the reasons enumerated before.

Therefore, interconnection with Ecuador appears to only make sense to take advantage of the hydrological complementarity. To seize that opportunity, exports would take place during Peru’s rainy season and imports during drier and/or drought conditions to reduce natural gas consumption and thus prices in the system. The infrastructure is close to being in place for such a scheme, with the design of a new 500KV interconnection transmission line almost ready. Finalization of the transmission line is pending approval of a new regulatory framework applicable for Colombia, Ecuador and Peru.

When it comes to additional opportunities for Peru in the region, there has also been significant discussion surrounding using the current power surplus to export to Chile and thus help alleviate the crisis of low prices that currently afflicts Peruvian generators. For some time, cost differential and high prevailing power prices in Chile added to the economic justification for interconnection between Chile and Peru.

The reality on the ground in Chile has evolved and casts doubts over the perceived cost differential. Chile’s energy sector has moved beyond where things stood a few years ago when the country was on the verge of rationing and marginal costs for electricity were on the order of US$180/MWh. This situation no longer exists. Indeed, there is little danger of rationing and there is an abundance installation of new renewable energy capacity mainly through wind and solar plants. Marginal costs have been greatly reduced and are now on the order of US$80/MWh. The opportunity to build new capacity with cheap energy in Peru to export to Chile has passed. It may be an unpleasant message for policymakers and the incoming government to hear, but today’s reality points to that fact.

Finally, with regards to the posture of the new government toward regional interconnection, a serious review of the bill presented by the outgoing government to Congress should be conducted. An assessment of the rationale and need for the bill must occur and particularly with regards to some of the financial and price elements that would further jeopardize the economic upside for Peru’s electric exports to its neighbors.

Oil and Transportation Fuels

When it comes to oil, the incoming administration will face the same structural problem as all of its predecessors: Peru does not produce enough oil to meet its internal demand and consumption.

Crude oil production in Peru is roughly 85,000 barrels per day/8PD. However, infrastructure issues and problems with
the only existing pipeline have caused production to drop to an estimated 46,000 BPD. This is far below the current demand in the market. Diesel consumption alone is 135,000 BPD. Even with high oil prices, the country was unable to attract sufficient investment in its oil sector to increase exploration and to boost production.

Given the continued low price environment, volatility of commodity prices and severe cuts of investment by oil companies across the world, this is not the right moment to spend time or energy on trying to balance Peru’s oil supply and demand through domestic oil production. It would behoove the next administration to avoid the mistakes of the last several governments and successive ministers of energy and mines who worked tirelessly with the aim of increasing investment in Peru’s upstream with the goal of enhanced domestic oil production. The focus on reducing dependence on imported oil and its enormous price variations is reasonable but demands deeper examination.

For starters, what segment of the economy is the primary consumer of oil? It is not for electric generation as less than 1% is consumed for power generation. Rather it is the use as transport fuel for the preponderance of consumption of oil and oil products. Primarily, it is freight and passenger vehicles, i.e., trucks and bus fleets that consume the largest portion. And that makes it harder to develop replacement options and thus why previous governments have continued to assign high priority to solutions that would achieve increased domestic production.

Given the demand profile for oil products in Peru and understanding the current international context for upstream investment and challenges of Peru’s social and environmental situation, the new government should consider how to rationally and reasonably substitute the use of oil in the energy matrix. One possibility that is frequently discussed as an alternative source is the “gasification” of the energy matrix of Peru, that is to substitute oil and oil products with natural gas.

As has been demonstrated in Peru and several other markets, substituting natural gas for oil in terms of electricity generation is quite feasible and useful. However, it is much more complicated when it comes to transportation fuel substitution. There are massive infrastructure requirements for the more diffuse use of natural gas for transportation that would require an enhanced national pipeline network across the country, as well as service stations in all passenger and cargo routes to resupply gas. One infrastructure alternative to the gas pipeline network given its high cost and insufficient initial demand, would be the use of virtual pipelines or liquefied natural gas (LNG), and the possibility of a network of regasification stations along major highways and roads. Pursuing this alternative would require careful consideration of the investment framework and would demand design of a financing scheme and plan for replacement of diesel engines or acquisition of new units.

Beyond substituting oil with natural gas, the other possibility the next government should analyze and consider is to skip a step in the evolution of transportation fuels and consider electric vehicles. As discussed above, Peru’s electric sector is robust and there exists a sufficiently reliable electrical network throughout the most populated areas of the country. In addition, battery recharging facilities and use of a modular battery model could be deployed.

Regardless of the policy option sought, the new government should prioritize an oil and transportation fuel policy and make careful decisions in order to execute the new policies and corresponding process.

Natural Gas & Massification

Natural gas has been at the center of energy policymaking and the vision for Peru’s energy sector for several years. The outgoing administration made the “massification” or mass use of natural gas as the core of its energy policy and thus launched a series of concessions for pipeline projects, power plants, and trucking and distribution networks. However, the vision did not properly consider the need to generate natural gas production over the long-term and the scale of volumes which, in turn, would justify and incent exploration investment required to increase the amount of proven reserves in Peru.

The Southern Natural Gas Pipeline project was concessioned in order to expand the country’s natural gas transmission and move natural gas from the Camisea fields to the south.
The project has caused a great deal of hope and expectations with regards to the economic development opportunities the pipeline will create.

Considering the high social and political expectation related to the Southern Natural Gas Pipeline project, the new government must complete the project as expeditiously as possible including the contracts for supply of natural gas to power plants being built in the south. Moreover, as part of the broader strategy the new government needs to assess the current climate for upstream and natural gas E&P in Peru. To continue to have natural gas serve as the core element of Peru’s energy vision, steps must be taken to ensure much-needed investment in exploration to increase reserves.

There is an additional element the new government must consider when discussing the concept of “massification” of natural gas. While lacking in overall clarity on some levels, the initiative was launched early during the Humala administration with great support from across the political spectrum and society. However, the goal of replacing energy sources with natural gas was never entirely clear as to what energy source was being replaced. Realistically, it was not biomass, charcoal, firewood or kerosene that was being replaced but rather liquefied petroleum gas (LPG). Replacement of LPG presents several challenges, including structural and fiscal elements. For example, LPG has a subsidy scheme and also counts an extremely well-developed and extensive distribution network of private firms. This obviously does not preclude the massification alternative, but is a factor that must be properly considered and understood as the program is redefined by the next government.

The new government must assess how to manage social inclusion elements and the aim to bring natural gas through distribution networks to all Peruvians, but particularly low-income families in order to provide them with a cheaper fuel to replace their current energy source. Moreover, how to attain the goals of the massification effort and what level of infrastructure and how to finance it must be seriously reevaluated in order to create a feasible and rational policy for the massification of natural gas in Peru. It appears that the new government should pause the massification initiative until answers to these questions and a more clearly developed vision is able to be created. Taking stock of where the initiative stands is a priority for the new government’s energy policy and vision.

**Conclusion**

The new government in Peru will need to move quickly and decisively on several pending issues, most notably completing the touted Southern Natural Gas Pipeline project, as well as confronting the challenges and issues at state-owned electric companies and pausing the “massification” of natural gas initiative in order to take stock of how to best manage it to succeed. A longer term but critical piece of a broader energy policy and vision must consider how to address the supply-demand imbalance of oil and oil products. This paper set forth some options focused on substituting the use of oil products for transportation fuels. Detailed assessment of either the use of natural gas or electric vehicles to substitute the use of oil in Peru is required and a well-defined and attainable policy framework must be created.

The good news is that the new government will have much to build upon given the overall high performance and capacity of the nation’s electric sector. Indeed, the next administration should not have to worry about electric outages or insufficient supply should the economy have a strong recovery. According to the system operator COES, there will be sufficient generating capacity to meet demand through 2025.

We urge whoever takes power in late July and their economic and energy team to seriously consider these fundamental issues and this roadmap for fostering a new energy horizon in Peru.