SUMMARY CONFERENCE REPORT

The annual Madrid Energy Conference was launched in 2019 with a clear objective: Foster cross-continental energy transition and investment discussions. Under our framing statement of, “Where Europe and Latin America meet for energy dialogue,” participants helped us create a unique forum for energy thought leaders, policymakers, regulators, and investors from both sides of the Atlantic to discuss and advance the collective effort to ensure more energy and less carbon.

Representatives from over 20 countries in the Americas and Europe, and more than 80 companies and institutions met in Madrid this year. Participants explored opportunities and challenges associated with hydrogen, natural gas, and how to balance energy security and climate change goals.

Throughout the event, speakers issued a resounding call to action—accelerate cooperation to support the energy transition and reliable, affordable energy solutions.
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This report is based upon summaries prepared by Daisy Alfaro, Ezra Kraus, Gordon M. Magne, Maykent Salazar, and Ana Zapata, graduate students at the University of California San Diego’s School for Global Policy and Strategy (GPS). We greatly appreciate and recognize their tremendous efforts to capture and synthesize our wide-ranging discussions. We also would like to reiterate our gratitude to John Gerretsen for his generous donation that enabled their attendance and participation. Final editorial oversight of the report by Kirsten Froede, David Voght, and Jeremy M. Martin.

Special thanks to Rita Oliveira and Diana Rodriguez of the Institute of the Americas along with John Padilla and Patricia Ventura of IPD Latin America for their invaluable contributions.
Latin America’s Sustainable, Secure Energy Future: An Outlook

Panelists took the stage to debate the state of the energy transition in Latin America, focusing on where consensus exists and gaps and doubts remain. Issues such as high inflation, heavy debt loads, increasing social demands, and faltering political commitments stood at the forefront of the discussion. The panel provided clear definitions of challenges and opportunities, prompted the audience to think about environmental justice and legacy industries, and primed the forum for profound dialogue.

Some of Latin America’s key energy transition challenges include political and economic instability. Panelists pointed to inadequate regulatory frameworks and national policies that are prone to politicization and imbued with political ideologies as issues that can harm the region’s chances of driving investment and reaping the economic benefits of powering the energy transition.

But the region has the desire to garner opportunities in key transition segments like green hydrogen, critical minerals, and natural gas. By promulgating strong regulatory structures, stable investment opportunities, and long-term commitments, the region could secure significant long- and short-term benefits, not just for governments but also for citizens.

Latin America can achieve a just transition through sensible government-deployed solutions. But decision-makers and stakeholders must consider demographics. For example, one panelist noted that 81% of Latin America’s population lives in cities. As such, national, regional, and city governments should focus on funding and providing safe, clean, affordable public transport.

Further, 1% of Latin Americans still need energy access, and 15% have no access to clean cooking. Community-driven, sustainable solutions must be implemented to bring all population sectors along. Energy burdens are high throughout the region. Regulation must address current conditions and context to ensure that the roughly 20% of citizens who reside outside cities have affordable access to energy.

The region’s environmental justice and legacy industries must be considered. In
that context, panelists focused on three key areas to watch going forward:

1) The region's governments tend to concentrate on the power sector when making commitments. In fact, they should shift toward transport, technology, and efficiency to ensure that all industries are included in the conversation and have government-based incentives to change.

2) Infrastructure and regional power system integration will be costly and unlikely at the current pace. Electric vehicle charging station challenges illustrate the problem. One panelist suggested that rather than focusing on EVs and grid infrastructure, governments should spend on basic needs to support increases in electrification of transportation.

3) The oil and gas sector is vital to Latin America. While the transition moves countries away from oil, natural gas will remain in the matrix for quite some time. As a panelist noted, the region has a competitive advantage in the carbon intensity of its natural gas. Governments should leverage this advantage.
Energy Transition and Energy Security—How LAC and the EU Can Work together to Stabilize Markets

This panel was held under Chatham House Rules.

From left to right: Jeremy Martin, Institute of the Americas; Sue-Ern Tan, Shell; Laura Rejon, Repsol; Enrique Rodriguez Flores, EIB
Technology Deep Dive – Solar

This panel focused on a key technology: Solar. They explored its current state, recent advances, and trends. The panel was quick to highlight the huge potential for developing solar technology in Latin America as well as the challenges and opportunities that must be addressed.

Latin America has enormous potential for the deployment of solar technology due to its low installation density and favorable laws. However, regulatory challenges must be addressed to fully realize this potential.

Mexico provides a prime case study to examine the challenges the solar industry can face. Panelists pointed out that the country’s story lays out several globally relevant challenges that the energy transition presents. Mexico’s successful build-out of relatively significant renewable energy capacity, including a series of power auctions to support clean energy targets, led to serious imbalances between generation and transmission, causing congestion issues throughout the grid. Some regions had substantial renewable capacity, others less so. This imbalance gave the current government reason to halt further renewable project development and shift focus back to strengthening state-owned companies and legacy fossil fuel generation.

Mexico’s renewables market has faced significant challenges since 2019, as the energy regulation agency (CRE) has been hampered in its decision-making and permitting processes. Market participants also require a more efficient relationship with the electrical system operator (CENACE). The paralysis has created a dilemma for the country, as it needs to address technical issues to increase the penetration of renewables in the energy mix but lacks clear political will. Moreover, the lack of encouragement for private investments further hinders progress in the market.

Panelists agreed that Chile, on the other hand, has been quite successful in promoting renewable energy, particularly in solar photovoltaic power plants. But Chile has also moved on to new challenges as it enters the second stage of its energy
transition. Chile enacted a climate change framework law in 2022 that established a legal mandate to become carbon neutral. But the country has not offered regulatory certainty, which is a must for deploying more solar power.

Chile is also striving to establish an agenda based on four pillars aimed at totally decarbonizing the electricity sector. These pillars include storage, transmission, updated regulatory systems, and incentives for renewable projects. Panelists agreed that Chile must boost infrastructure to achieve its energy transition goals. Solar power plants will be critical to energy security; photovoltaic technology can lead the way in this effort. To advance the second half of Chile’s energy transition, its Ministry of Energy must help address the need for technology, modernization, storage, and infrastructure.

Moving beyond Mexico and Chile, panelists examined constraints that the solar industry faces in general. Technological and regulatory issues top the list, followed by questions of whether the region is prepared for the expected solar industry boom. Solar industry experts agree that their sector has experienced significant development, with multiple factors contributing to its growth. But the returns on renewable projects have decreased significantly over the past 10 years, leaving no room for error.

The high penetration of renewables is complicated by the old mix of energy sources, and the need to develop projects such that the resources bring electricity to the places where it is consumed. Decentralizing energy is essential in this regard. Panelists identified grid development as a crucial factor to avoid putting the energy transition at risk. Furthermore, the utility scale and power plants provoking citizens’ "not in my backyard" mentality has led to delays and problems in grid transition. Photovoltaic technology is mature, and the industry has witnessed improvements in the market. Increasingly large solar panels have recently been developed, with the standard growing from 350 watts to 600 watts in just three years.

Panelists debated the role of the private sector to spur action. While it may not have the power to impose its agenda, corporate commitments to clean energy play a significant role in the transition of energy matrices in Latin America. For example, a large U.S. manufacturer impacted the Mexican government’s energy policy by threatening to leave the country if it was unable to procure clean energy sources. This example underscores a larger narrative that should be considered in the context of the United States-Mexico-Canada Agreement and the ongoing dispute settlement focused on energy: the increasing need for a market-driven element in Mexico.

Private companies are careful in choosing where to invest, leading to clean energy becoming a market driver rather than a mere imposition.
From left to right: Claudio Rodriguez, Holland & Knight; Carla Medina, Asolmex; Carlos Relancio, Galp; Alex Santander, Ministry of Energy, Chile
Trends in Major Infrastructure: Electrification of Transport and Grid Reliability

Panelists delved into the critical need to establish robust infrastructure to support a cost-effective shift toward a cleaner energy mix in Latin America. They highlighted China’s efforts in the renewable energy and transportation sectors to address the region’s affordability issues.

Latin America’s reality demands that consumer purchase costs be considered alongside energy production costs when promoting electric vehicles.

China has made important investments in Latin America’s renewable energy and transportation sectors, sending 470 electric buses to Colombia at the end of 2022. Bogota also has its first hydrogen-powered bus.

It was suggested that Argentina could seek lower emissions by electrifying public fleets as part of its decarbonization efforts. That approach has proven to be the easiest and most affordable way to reduce emissions and provide a public good.

Participant Poll

Is “electrifying everything” a feasible concept in Latin America?

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Like most of Latin America, Argentina’s population is concentrated in urban areas, and those cities tend to be spread apart. The vast distances between urban areas means more emissions associated with travel and makes electrification of inter-city travel with today’s technology more challenging.

Electric vehicles in Argentina can also cost twice as much as internal combustion engine (ICE) vehicles, and the grid capacity to connect them is lacking.
Panelists suggested electrifying public transportation as a good starting point and encouraged Latin American countries to take inspiration from regulatory frameworks of countries that have developed their electric transit systems.

Panelists also explored grid reliability as another key issue. Latin American countries must invest in more transmission capacity and the improvement of existing transmission networks to increase efficiency and reliability, particularly given the millions of people in the region without access to electricity.

As electricity demand is expected to grow in the coming years, all players must examine the lack of solid partnerships that could help create a viable energy development business model in Latin America. Panelists discussed how long-term storage technologies must be incorporated and natural gas considered a temporary backup solution. Building the infrastructure necessary for a reliable grid is crucial to the region's successful energy transition, with the mantra of "no transition without transmission."

From left to right: Rodolfo Martinez, Iberdrola; German Ranftl, Edenor; Carlos Moreira, EDP; Alvaro Villasante, GEB; Jeremy Martin, Institute of the Americas
Regulating Volatility - Keeping Up with Market Disruption

The panel began with an assessment of economics and efficiency in driving regulation. Indeed, panelists noted that from an economics perspective, governments used to be concerned only with efficiency. But affordability has become a central factor and the concept must now be included in any regulatory discussion.

Most Latin American countries are middle income and have a notable gap in energy access. The challenge, therefore, is not only a matter of affordability, but also of hardship. Regulation can and should play a role in solving this dilemma. It can help address the inequity in continuity of electricity supply. In some jurisdictions, affluent areas suffer minimal power service interruption while less privileged areas suffer frequent, prolonged outages and service issues.

Panelists highlighted that market disruption existed prior to the war in Ukraine and before the surge in energy prices. There has been a mismatch in public policies, particularly those that relate to decarbonization, following the Paris Agreement, as well as in the way electricity and gas markets are organized in Europe. The need for market reform has become more apparent with the need to bring greater consistency, efficiency, and equity to the process.

Participant Poll

Is regulating volatility a euphemism for subsidies?

Yes 40%
No 30%

Is there a market without subsidies? 30%

Public policies are much more complex now than they were 25 years ago when industries were liberalized. We have a common energy law space, and we must operate within that space. Politicization is often set forth as a criticism of regulatory practices, but, panelists explained, politics
(and thus politicization) is a prerequisite for good regulation.

Regulators cannot ignore public policies in terms of energy and climate, nor can they ignore the politics of regulation because they constantly evolve and vary from country to country. In a similar way, cooperation is a crucial component of regulating volatility. We cannot talk about energy transition without talking about network integration. Therefore, it is important to strengthen the network not only on the transmission side, but also on the distribution side.

Finally, panelists urged regulators to plan with an eye toward the long term and thus foster and implement a framework that is stable and resilient to short-term volatility.
Ensuring a Diverse Market of Renewables Developers in Latin America

This unique discussion focused on current market conditions for renewable development in Latin America and the Caribbean and the challenges developers face throughout the region. The panel convened experts from various backgrounds in the renewables space (project developers, investors, and policy analysts) to share their experiences and insights to better understand current opportunities and identify what creates a healthy ecosystem for renewables development.

Many investors are troubled by Latin American governments’ tendency to set aggressive, tight, impractical deadlines. This model creates unnecessary challenges for developing projects, and deadlines vary from country to country.

Moreover, each government tends to be concerned with different project aspects. For example, the Chilean government asks about mining rights; the Mexican government asks about capacity guarantees before 2024; the Colombians care about commercial operation dates. While these distinctions are not in themselves inefficient, agency capacity issues prevent most governments from being responsive in their review process. The silence leaves developers guessing as to why they are not awarded connection capacity.

Participant Poll

Can a version of the U.S. Inflation Reduction Act (IRA) be replicated in Latin America?

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<td>No</td>
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Transmission is also an issue. Competition to connect to transmission points is so high that governments often look for projects that are well advanced before awarding any bids to connect to the grid. This approach creates unnecessary risks for developers who have already financed projects. To address this issue, governments could...
enable a process to make development more responsive and cost-efficient.

From a developer’s perspective, uncertainty creates one of the biggest hurdles. There are always variables, but unstable rules are the most harmful to investors and development, as Mexico demonstrates.

Despite this hurdle, developers can convince most governments that a project is worth supporting, but that effort can cost time. To convince the government that a proposed project solves a key problem, investors and developers must engage the right stakeholders and find common ground, particularly in a nationalistic environment.

The Caribbean presents a different set of challenges. Developers come to the region considering it an aggregate market but what might work in one country is not necessarily going to work in another. Instead, investors must think at the national level and frame projects in a more country-specific way. Any large project will require specific government support.

Caribbean governments tend to be more focused on climate resilience, which could allow for funding through international institutions and foreign aid. As with Mexico, there are two crucial considerations for developers looking to work in the Caribbean. First, they must build relationships and gain buy-in from all parties. Second, they must seek to understand and build political will, as governments have limited political capital.

Auctions are another point of contention. In the past decade, governments throughout Latin America have utilized auctions to garner investment and expand renewable energy capacity. In the last few years, the strategy has yet to prove to be fruitful or expansive; most governments have begun to turn away from the mechanism. But panelists indicated that auctions still have a role. They also emphasized that auctions should serve more as a price signal for developers and foster quick connections to the grid rather than as a new project development tool.

Though renewable projects are capital-intensive, there are always ways to be more flexible and agile in the project development process. Capturing and leveraging the growth in capital flowing to the Caribbean must not be overlooked; developers should explore ways to make riskier investments, given the international funding available. Small-scale developers have reason to be optimistic: there will always be niches in these markets—there will be projects for everyone and room for their success.
From right to left: John Padilla, IPD Latin America, Camilo Serrano, Atlas Renewable Energy; Wazim Mowla, Atlantic Council; Juan Carlos Badillo, AtZ Investment Partners
Panelists from the wind industry examined the past, present, and future of wind power in Latin America. They argued that wind power is thriving like no other renewables market in the region, with Brazil being a significant contributor to this success in the last 12 years.

Brazil's wind power industry is relatively new, but its success has been remarkable. Wind power has been the most competitive energy source in the country since 2017, when it became cheaper than hydropower. Brazil has added approximately 4GW per year of installed capacity, placing it sixth in the world. Brazil has also become competitive in the wind auction market and in energy in general. Other Latin American countries are following its model.

Panelists agreed that wind power takes more time to build and permit, and that other issues may arise. But once everything is in place, the returns are higher, and it is possible to capture higher revenues. They recommended onshore wind as the best bet, though its development involves a long waiting game that requires convincing local communities and environmentalists.

Financing wind projects is also a significant challenge in Brazil. Interest rates are high, and there is a dearth of transmission lines for onshore wind.

Brazil's wind industry has strong financial support and policies, which have helped it develop a robust supply chain in a volatile market. But there are concerns about the sector's future, given emerging limitations to the Brazilian market and the country's economic performance over the past decade. Therefore, the panelists argued, industry must look to other areas for expansion, like green hydrogen and green ammonia, and shorter-term development opportunities.

Panelists also considered wind technology development in other Latin American countries, including Mexico, Colombia, and Chile, and the challenges those countries present. Chile has transmission limitations and has missed targets associated with its wind power projects. Supply chain
competition varies by country and can be limited.

Panelists agreed that offshore wind is attractive, especially in countries like Uruguay, Colombia, Brazil, and Chile. But onshore wind should be developed first. Wind has more inherent value than solar because solar only generates energy at specific times of the day. Thus, market participants must possess a solid understanding of power markets and flexibility options to successfully deploy solar.

Overall, the panelists agreed, Latin America’s wind industry has shown great success, but challenges remain. Transmission capacity and grid access are crucial. With offshore wind on the horizon, the industry has promising opportunities for further growth and development.
Natural Gas and LNG: Integration 2.0

Panelists explored the role of natural gas and how it can be best leveraged in the energy transition. Global events have demonstrated that gas is still a must, and cooperation will be key.

Russia’s invasion of Ukraine was a geopolitical and energy black swan. The concept of energy security pre-dated the invasion, but the incursion brought the reality into high relief, particularly for Europe, whose gas supply has been closely tied to Russia. The war highlighted energy fragility. Independence and flexibility have taken on new meaning.

In the wake of Russia’s invasion of Ukraine, panelists noted, the United States became the largest exporter of natural gas and LNG to Europe, overtaking Russia as the number one source. There are ongoing projects around the world, but particularly in the United States, where the objective is to continue to sustainably commercialize natural gas for the long-term. Panelists emphasized that Latin America could also become a global gas exporter over the next decade.

Renewables have a broader significance beyond energy alone. They must play a role in addressing global volatility such as food and financial crises. It is crucial for all sectors, including agriculture and transport, to actively engage in decarbonization efforts. Across the globe, alliances are emerging to drive a fresh approach to natural gas and its environmental impact.

The Ukraine incursion has disrupted gas markets, which may not be able to react quickly or keep up due to lack of investment. The needs of European markets, in the long term, will be price based.

It is important to think outside of the box when considering how and where to source natural gas. Venezuela has large reserves of natural gas. There are also projects involving Trinidad and Tobago’s infrastructure linked with Venezuela’s resources. These projects should not only be considered from an energy security perspective, but also as a way to end one of the globe’s worst gas flaring and venting cases in Venezuela. Investing in Venezuela
is a very complicated process, but there is interest in such an opportunity given that Venezuelan gas is inexpensive, abundant and can be utilized for export.

Before 2005, the LNG business was represented by onshore liquefaction and regasification plants. After 2005, market flexibility emerged—when to buy, how much to buy, and where to buy. Floating storage units, a newer development, also act as a form of insurance. For example, Brazil and Argentina have been able to buy LNG cargos on the spot market. Flexible floating LNG units have enabled that success.

**Participant Poll**

**What is missing for LNG to truly be a global market?**

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<tr>
<td>Infrastructure</td>
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<tr>
<td>Uptake of small scale/ modular solutions</td>
<td>24</td>
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<tr>
<td>Upstream natural gas investment/ development</td>
<td>20</td>
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<td>Paris Agreement commitments</td>
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<td>Cost inflation</td>
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It bears noting that LNG is flexible by nature. From 2015 to 2022, Brazil imported 20 cargos per year, and in 2021, it took almost 42. It is impossible to predict whether this will be the case in the future because of weather variables, climate change, economics, and demand.

LNG and petrochemicals markets are global. In the United States, it has been difficult to finance LNG projects even with the low cost of gas. As such, governments must consider every available gas and petrochemicals source and figure out ways to develop it.

Country risk becomes even more complicated when sanctions are added to the mix. Because of this variability, the global market must find some sort of balance by looking at every opportunity and moving on the ones that make sense. The waiting game no longer applies. If Europe wants to avoid another energy supply crisis, it must act now—project development can take time.

The region holds potential for liquefaction projects, but investment, country risk, and credibility must be managed. If natural gas is to be part of the energy transition, Europe, as a major player, has a great opportunity to lead the way by setting standards. And to get to these standards, regional integration in Latin America is a must. Such action will ensure that natural gas continues to be available.
From left to right: Silvana Coria, Edenor; Gabriela Aguilar, Excelerate Energy; Marta Gonzalez, IGU; David Voght, IPD Latin America
Meeting Demand Growth: Guatemala's Electricity Supply Tender

Panelists explored the current state of Guatemala's energy market, highlighting various aspects such as tenders, macroeconomics, regulatory framework, energy transmission and distribution networks, technical institutions, and renewable energy generation.

Guatemala’s stable economy and energy regulatory framework make it an ideal destination for nearshoring. The country has been growing due to its prudent macroeconomic policies. Its energy system operates on free market principles and a stable energy regulatory framework. And rating agencies have upgraded Guatemala's score from stable to positive. The country’s privileged geostrategic position and robust energy transmission and distribution networks make it an attractive destination for investors. The country has the most robust energy transmission network in Central America, and its distribution network has expanded by more than 25% in the last 16 years.

The panel noted that Guatemala has strong technical institutions with long-term vision and planning. The country's energy market has a variety of agents, including generators, transmission firms, distributors, traders, and large users. Over the last 25 years, Guatemala’s energy demand has grown an average 3.4% per year, and the country's load factor has become more efficient. The energy subsector has received more than US$ 10 billion in private investment over the last 25 years, and renewable energy-based power generation grew more than 26%. Distributed generation has grown by more than 100% in the last seven years.

Guatemala has made an international commitment to become a zero-emission country. It currently seeks to reduce emissions by 11% from 2005 levels with its own funding and by 22% in 2030, though to reach this target panelists acknowledged the need to leverage outside support.

Guatemala has sought to reduce electricity supply costs and diversify energy generation sources, prioritizing renewable resources and promoting e-mobility.
The country plans to implement a law that incentivizes renewable energy projects and provides an extension plan for the 2022 - 2052 generation plan.

Panelists discussed Guatemala’s long-term electricity tenders, PEG-1, PEG-2, PEG-3, and the ongoing PEG-4, which have generated 235 MW of capacity and energy. The country also has an upcoming tender, PEG5, which would satisfy its 1,000+ MW long-term demand with COD 2030. That power will come from geothermal, natural gas, offshore wind, green hydrogen, and energy storage technologies.

Panelists also pointed out Guatemala’s specific incentives to facilitate its energy transition, including tax exemptions for renewable energy projects and other opportunities for electric, hybrid, and hydrogen vehicles, electric transportation system imports, assembly, and manufacturing. The country has new technical rules for electric vehicle charging stations and storage. And future transmission projects like an interconnection with Belize, reinforcements in the transmission lines, and a second interconnection with Mexico are on the table.
The keynote address explored balancing climate goals, the role of oil and the importance of providing access to energy for the 1 billion people around the world living without it.

Before the 1970s, when the IEA and OPEC were created, there was no international governance. Such controls only appeared after crises emerged. The IEA covered 70% of energy consumption around the world and OPEC about 60% of production. Things changed when emerging economies began to assume a more predominant role in energy.

Over time, the three pillars of energy became a trilemma. Trilemma means that one must choose one or two out of three questions. But it is hard to choose because all three are important. Sometimes people do not consider security of supply and prices as important and tend to focus only on one part of the problem. When Covid and the war in Ukraine hit, people realized that supply is not guaranteed.

In the last several years, we have been focused on the reduction of CO2 emissions, with little success. CO2 emissions are 55% higher today than they were in 2000, and they continue to rise—a sign that we have not been doing a very good job. To counteract this trend, we must modernize the security of the supply system.

Although some analysts claim that in 50 years oil will not be here, and we will have a different kind of energy, 83% of the energy that the world consumes is oil, gas, or coal. Oil will be around for a while. The question is for how long and what the barrels will look like.

Adding a dimension of complexity to the issue of energy security is global energy poverty and the fact that one billion people around the world lack access to energy. Unfortunately, many companies have not been investing in the oil sector for the last five years. Regulation may be to blame. We must demand a responsible transition that is transparent and stable. As such, the target should be climate change and not electrification.

Electrification will be part of the future, but it’s not possible to provide this to the entire
world, at least not without investment and cooperation. International cooperation is very important, and conferences are a way to work in that direction.

Countries must continue to work on ESG because security is part of the business. Environmental and social responsibility, and good governance should be business objectives. Gas and synthetic fuels are very important for the future. Digitalization and big data are also very important, as changes in technologies will drive investment. For this reason, policymakers should set targets and let companies do the work.

From left to right: Jeremy Martin, Institute of the Americas, Pedro Miras, World Petroleum Council; David Voght, IPD Latin America.
Accelerating Transformation and Decarbonization in the Oil Industry and Hard to Abate Sectors

Panelists discussed the decarbonization of the oil and gas sector, the advent of hydrogen as a possible means for replacing oil and gas, and the role of Carbon Capture and Sequestration (CCS) in the energy transition.

Oil and gas have played a significant role in Latin America’s identity for much of the 20th century. With some of the largest oil and gas reserves in the world, the region has a long history with fossil fuels. This relationship has often driven its politics and economics.

The advent of hydrogen could be a means to replace those fuels, aided by Carbon Capture and Sequestration (CCS).

As the oil and gas sector remains a strong, prevalent part of Latin America’s energy production, decarbonizing the sector and improving production efficiencies are paramount. The region can deploy technologies that already exist to reach those goals. In fact, modernized production methods in Guyana and Brazil have already cut emissions per barrel to half of typical world production.

Participant Poll

When will technologies crucial for the energy transition (CCS, H2, SAF) become commercial and scalable?

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<td>1-5 years</td>
<td>6%</td>
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<td>Not in my lifetime</td>
<td>3%</td>
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Electrifying production processes in the feasible parts of the supply chain is proving to be a strong approach. Norway’s Equinor has been an industry leader in carbon
efficiency, making strides in platform electrification and having one of the lowest upstream emission intensity levels. Recognizing these possibilities for increased decarbonization of the fossil fuel sector is pertinent to Latin America because oil and gas will be an important economic resource for the foreseeable future.

Panelists agreed that oil and gas firms should diversify their means of energy production, not only for environmental concerns, but also to diversify their portfolios and increase their market share.

Outside of oil and gas, panelists explored the challenges that abatement within the steel and cement sectors present. The European Union’s Emission Trading System (ETS) is crucial and will be a driving factor in the near future as heavy industry will be forced to pay for carbon emissions. This arrangement could influence energy trade with Latin America. Companies will have to look to engage in CCS to help alleviate the cost of carbon emission. But CCS is still expensive and capital intensive. There are still unresolved issues, like the transport and proper storage of sequestered carbon.

On the policy side, legislation remains a large barrier for CCS. Legal guidelines are unclear or confusing in many countries, and companies need clarity to make large investments. Aside from proper regulatory standards, permits may take seven or more years to acquire—a significant hindrance to large investments. Panelists remarked that CCS will be difficult to achieve without subsidies because carbon is essentially a waste product, making it difficult to set such activity as viable in a contemporary business model. It then falls to government interests to sequester carbon. Schemes for taxing oil and gas companies to fund sequestration efforts may help sort this issue.

And while hydrogen could help push the decarbonization of heavy industry (for example, it could power furnaces for steel production) it will only be one piece of the puzzle—not a universal alternative.

Infrastructure and grid constraints prevent complete electrification in Latin America. Such an achievement is unlikely anytime soon. But green fuels, including hydrogen derivatives, could make an impact. The ability to scale hydrogen will challenge its viability and overall reliability, at least in the near term. Hydrogen is difficult to transport and will play larger roles in domestic markets, a plus for Latin America due to the large potential in the region.
From right to left: Schreiner Parker, Rystad Energy; Steve Freeman, ERM; Adam Bott, SLB
Envisioning Hydrogen Markets - Flows between Latin America and Europe, Certification, and Derivatives

The panel focused on the promise of potential green hydrogen flows from Latin America to Europe and shared a deep dive into the elements shaping hydrogen markets. They began with an overarching comment that set forth the push-pull between future demand from European markets and future supply hubs in Latin America.

Hydrogen has captured the world’s attention as part of the energy transition. As European countries seek to decarbonize and meet international and national goals, some hard-to-electrify industries, including cement, steel, freight shipping, and heavy-duty vehicles, will demand clean fuels like green hydrogen to power industrial processes and fleet operations.

Demand from refineries and industries throughout Europe can be viewed through the lens of existing demand in Spain’s energy parks. Industry predictions suggest that by 2030 the region will require 130 million tons of hydrogen. Various tests on hydrogen mixing in recent years, and existing demand for fertilizers, have pushed activity forward. But major questions and challenges remain in terms of infrastructure adjustments and the scale of projects to push for a competitive hydrogen import market, including the risk of stranded pipeline assets for oil and gas companies.

Participant Poll

What is the key hurdle for green hydrogen?

- Offtake and demand side 36%
- Commercial scale 33%
- Transportation 27%
- Infrastructure 3%

European offtakers must provide clear signals to Latin American hydrogen producers. The demand is unmistakable and
the opportunity for strong partnerships between the two regions is great. But to make them a reality, there must be progress on the regulatory side.

Hydrogen standards should be consistent throughout the EU. Production processes on the other side of the Atlantic could respond accordingly. For example, the complex technical aspects of transporting hydrogen through pipelines that will have to cross multiple borders, and the risk of chemical changes to the H2 molecules in that process can make meeting inconsistent standards more difficult. Panelists agreed that Europe’s rules of the game are becoming clearer, which should lead to a more rapidly developing market for off-takers and more opportunity for Latin America to cash in on its exports.

On the other side of the equation, panelists representing the potential of Latin American green hydrogen, spoke of Chile and Uruguay’s ability to meet Europe’s demand as they uniquely possess an immense amount of renewable potential and low domestic demand for electricity. Excess renewable capacity can be utilized to help meet Europe’s demand for clean hydrogen and provide economic opportunities for the producing country.

Uruguay has committed to produce hydrogen for export with efforts like green bonds, partnerships inked with Germany, and 70-year long term commitments to offer flexible deals from 500 - 320,000 tons of hydrogen per year for off-takers.

Chile has also committed to becoming a major green hydrogen producer. The country is already using domestically produced green hydrogen in its northern mining projects and for blending projects in its residential communities.

Chile’s 2020 green hydrogen strategy goals target the production of 200 kilotons of clean hydrogen by 2025. The country’s challenges lie in ministerial coordination, land use, and translating the industry into simple numbers that communities can understand to gain social license to operate. Overall, Chilean green hydrogen production is likely to take hold, and the country will be open to cooperating with its neighbors and across the Atlantic to power the global energy transition.

Given the potential and need to match supply and demand, the stakeholders from both sides of the market will continue to need opportunities to meet and discuss their visions, build consensus over what the future might hold, and identify key hurdles to be resolved to unleash cross-continental commerce. The challenge is not competition but cooperation.
From left to Right: Griselda Lambertini, CEARE; Ignacio Horvath, ANP; Alex Santander, Ministry of Energy, Chile; Ana Maria Vidaurre, CEPSA; Marc Vignal, Solar Turbines
Funding Projects - Access to Capital & Sustainable Investment

During the discussion on project funding, finance experts emphasized key issues such as access to capital and sustainable investment. They highlighted the global nature of funding while emphasizing the importance of local considerations. They also underscored that development initiatives play a crucial role by offering guarantees and competitive structures to secure financing.

Attitudes toward project funding vary from country to country. Mexico is uncertain in terms of development, while Colombia has made real financial progress despite its inflation and recession. And the EU is providing funding for critical development projects as Latin America faces unique challenges related to financial equity.

The impact of the current financial crisis is complex, and there are no universal lenders. The lack of power purchase agreements (PPAs) and their varying quality plays an important role in Latin America. Lenders are looking for bankable PPAs, and only high quality PPAs are likely to attract new investment.

CAF, The Development Bank of Latin America finances projects across the region. Because the bank’s capital markets activity is in hard currency, it has dollars to lend. CAF recognizes the need to support markets in local currency but finds it more difficult to raise local funding because of market dollarization and loss guarantees.

As for technology, the panelists discussed how the deployment of CCS or hydrogen technologies requires the implementation of reliable and effective solutions. The EU is scaling projects via cooperation and analysis advancement, while in the U.S. lenders are looking to further understand these emerging opportunities and how they might fit within their asset portfolios.

When it comes to financing renewables, batteries and technology components also matter, and PPAs do not exist for everyone; merchant financing is essential. The panel noted the lack of financing for isolated batteries and quantifying the additional hours.
Panelists agreed that regulatory considerations play a crucial role in financing projects. Insufficient regulatory frameworks in Latin America have prompted the launch of initiatives to establish overarching standards for the region. Successful project development will demand less burdensome regulations. In some instances, obstacles can be avoided by securing a favorable Power Purchase Agreement (PPA).

No one in the EU is considering 100% contracting, and merchant exposure is key. Latin America should consider this approach. Foreign currency is also key, and BBVA has been mobilizing local investment in countries like Mexico (in pesos), Peru (soles), Colombia (pesos), and Brazil (real). U.S. dollar projects have been discussed in Chile and Uruguay.

Panelists concurred that local investment in Latin America must be mobilized to build renewable energy capacity. Greater capitalization and consensus are essential to compete with China. There is plenty of funding, it is just a matter of getting it to the right place. Internal returns depend on the country and currency, asset life, agile comparison in terms of the region, and decompression. Deploying this kind of capital is very complicated. Panelists concluded that short-term, not long-term investing is a must because of carbon complexity. Players can then select the best approach to development projects given financing and scale.
From left to right: John Padilla, IPD Latin America; Ignacio Andino, CAF; Victor Manuel Fernandez, BBVA; Jose Luis Alvarez, Voltiq
One of the most significant cross-cutting themes for the energy transition is risk management. Some might argue that overall risk represents one of Latin America’s greatest challenges with the energy transition. This panel explored strategies for alleviating the issue and leveraging the energy transition to move all of Latin America toward self-sufficiency and equity. The discussion examined risk not only in terms of economics but also through the lens of social welfare, environmental protection, and income distribution, noting that sustainability is key to economies.

Many Latin Americans recognize that with the advent of the global energy transition came a renewed focus and dependence on their region’s resources. This dynamic gives Latin America an opportunity to rewrite structures of production and income to incorporate the region’s economically challenged classes.

Panelists pointed out that minerals are a crucial part of Latin America’s contribution to the energy transition, though only if they are extracted and processed sustainably. In addition, panelists believed that minerals can also serve as an important part of responsible investing and ensuring the energy transition will make Latin America more equitable. Much of this industry is still nascent, with its structure and regulation yet to be determined, which means opportunity.

Minerals like lithium will require large swaths of land in rural areas. Companies will have to work with local stakeholders to design proper practices for extraction. With the projected soaring demand of lithium, Latin American governments and citizens will have to make complicated and difficult decisions.

In many cases, “green” does not automatically signify an ideal development for communities. Opposition to green projects has arisen in many Latin American communities, due in a large part to firms’ lack of local consideration and inclusion.

Panelists discussed how mineral mining must take an integrated approach and devise proper standards. Governments and
mining firms must establish open communications. Illegal mining has emerged in some areas because these needs remain under-addressed. Many Latin Americans feel frustrated with the progress of green industries, especially mining.

Latin America lags in the race for procurement of resources for the green revolution, and panelists stressed that there will be no progress without stakeholder collaboration. The most equitable and, in tandem, the most efficient way forward is the incorporation of governments, businesses, and society.

Ensuring the support of rural communities must be paramount for businesses when proceeding with new projects. Panelists noted that the power of public sentiment should not be underestimated.

Companies are discovering that ESG is not about simply fulfilling an arbitrary requirement. The fulfillment of ESG requirements is now an important indicator of success and winning over customers. Businesses are realizing that a focus on equity from both endogenous and exogenous perspectives can lead to success in sustainability, equity, and profit.
Moving the Ball Forward

This year’s conference attracted a superstar roster of thought and business leaders in the energy transition space. As participants discussed the latest trends, lessons learned, and challenges in the transition, they also acknowledged the importance of international fora, like the Madrid Energy Conference, that help reveal synergies, opportunities, strengths, and needs—and ultimately move the ball forward. As one participant noted, the challenge with the energy transition is cooperation, not competition.

The idea of an energy transition is at its core about continuing to power and energize our modern economies in a more sustainable manner. The need to reduce our carbon footprint figures heavily in policymaking and regulation of what we collectively call the energy transition. Greater efficiency of our energy systems, but also how we use and consume energy is integral. Affordable, reliable, sustainable and accessible energy is key. No value is more important than another.

When it comes to understanding the energy transition, there are certainly catch-phrases that can help to explain how to solve our energy and climate challenge. Many appreciate and understand the call to action for infrastructure: without transmission there is no transition. But we are also facing a critical mineral dilemma, as well as affordability and accessibility issues...
for millions across the globe. We must not oversimplify any of these challenges and how to surmount them.

As our conference panels and thought leaders implicitly cautioned us: there is no silver bullet and there will not be a wholesale elimination of any energy product in the near-term, nor will any new energy vector be commercialized as our principal source.

Questions around the competitiveness of molecules and electrons exist for sure. Those with lower cost and investment requirements, but also lower emission profiles will increasingly be favored.

Technological innovation, which is central to the energy sector, will continue to be a major driver of how and on what pathway our energy matrices evolve in a Net Zero world.

There is no dissension in the need for industry, citizens, and governments to be better stewards of our natural resources and secure ways to produce and harness them in the most inclusive manner. This is not a new phenomenon. But perhaps we have become more adept at understanding what is at stake for our economies and future generations. In a divergent world, we need energy convergence and cooperation.