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FEATURED Q&A

Are Chile's Green Hydrogen Goals Within Reach?

Energy and Mines Minister Juan Carlos Jobet (R) said last month that Chile is committed to replacing two million cubic meters of diesel annually with hydrogen. // File Photo: @JCJobet via Twitter.

Q **Chile's push for green hydrogen development will be huge, Energy Minister Juan Carlos Jobet told Bloomberg TV in November. The minister recently said the country is committed to replacing two million cubic meters of diesel used annually in mining with hydrogen, which could help Chile's mining industry to reach carbon neutrality 10 years before other economic sectors. How far advanced are Chile's green hydrogen development plans, and what are the most significant hurdles it is facing? How likely and how soon might the South American nation become an exporter of green hydrogen and related products, and which countries are the most likely export destinations? How does green hydrogen factor into the platforms of the two presidential candidates—far-right José Antonio Kast and leftist Gabriel Boric—who will face off in the second-round vote on Dec. 19?**

A **Sergio Bitar, nonresident senior fellow at the Inter-American Dialogue and former Chilean senator and minister of mining, education and public works:** "Green hydrogen (H2V) will become a new principal sector to diversify Chile's sources of growth. The goal of the new national strategy is to invest $5 billion by 2025, allocate five gigawatts of power to electrolysis and export about $2.5 billion worth of green hydrogen by 2030. Is it possible? Chile has two advantages. First, it has abundant renewable energy, especially solar, at a low price, enabling Chile to reach a production cost of $2 per kilogram of H2V by 2025, and $1.50 by 2030. That would be among the lowest production costs in the world, and would displace blue and gray H2, which

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Venezuela Sees Oil Funding Majority of 2022 Budget

Despite U.S. sanctions, Venezuela's government expects that income from crude oil exports will finance more than 60 percent of its national budget next year.

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OIL & GAS

Pemex to Receive Cash Infusion to Address Debt

Mexican state oil company Pemex will sell between $700 million and $1 billion in dollar-denominated bonds as part of an effort to shore up its finances.

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RENEWABLES

Peru to Revamp Royalty Structure for Oil Sector

Peru is seeking to attract investors interested in helping the Andean country reach self-sufficiency and move toward the use of renewable sources by updating its royalty model for the oil industry, Energy and Mining Minister Eduardo Eugenio González said Wednesday.

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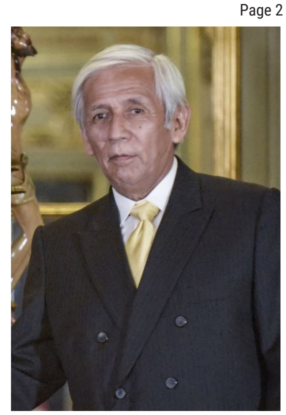

González // File Photo: Andina.

OIL AND GAS NEWS

Peru to Revamp Royalty Structure to Attract Investors

Peru is seeking to attract investors interested in helping the Andean country reach self-sufficiency and move toward the use of renewable sources by updating its royalty model for the oil industry, Energy and Mining Minister Eduardo Eugenio González said Wednesday, Reuters reported. "The new regulation will add dynamic royalties that will vary depending on prices and zones. We are also preparing separate regulation for exploration and production to better regulate the influence of (energy) projects over communities," González said in a speech in Houston, Reuters reported. González said Peruvian President Pedro Castillo's administration is seeking to make investments that are respectful and mindful of the environment and communities throughout the country, state news agency Andina reported. While Peru is a prominent gas producer, social conflicts and delays in environmental permits have hindered oil exploration and output, Reuters reported. Peru imports approximately 200,000 barrels per day (bpd) of fuel, meeting an overall consumption of an estimated 250,000 bpd. The Andean country plans to replace a portion of its fuel imports once a new Petroperú-run refinery that will produce 95,000 bpd is inaugurated in 2022. González also said Castillo's administration is planning a competitive auction to sell renewable energy projects next year.

Venezuela Expects Oil to Finance More Than 60% of Budget

Despite U.S. sanctions, Venezuela's government expects that income from crude oil exports will finance more than 60 percent of its national budget next year, Reuters reported Monday. Official documents seen by the news service did not specify production targets or price-per-barrel estimates. Allies such as Iran have helped Venezuela increase output this year, and it sells an average of 500,000 barrels per day despite Washington's oil sector sanctions in place since 2019. "The government is developing a series of negotiations that point toward the loosening and then elimination of sanctions," the budget proposal states, according to Reuters. Oil income will be equivalent to $8.2 billion by government calculations, with a total budget next year of more than $13 billion in spending. This year oil income financed about 29 percent of the budget, bringing in only around $1.3 billion through August, according to the report. State oil company PDVSA's crude production rose to a daily peak of 904,000 barrels in November and averaged some 830,000 bpd for the month, a level not seen since early 2020, In Freight News reported Saturday. More than two thirds of cargoes last month departed for China and other Asian countries, while an average of 77,000 barrels per day of crude, jet fuel and gasoline were shipped to longtime ally Cuba, according to the report.

Pemex to Receive Cash Infusion to Address Debt

Mexican oil company Pemex will sell between $700 million and $1 billion in dollar-denominated bonds as part of an effort to shore up its finances, Deputy Finance Minister Gabriel Yorio told Bloomberg News this week. On Monday, Mexico's government announced a rescue plan for the debt-laden state company that includes a $3.5 billion cash injection. In a statement, Pemex said the proceeds of the capital injection would be used to fund liabilities. With a total debt load of $113 billion, Pemex is the world's most indebted oil company, according to Bloomberg. Mexico's government also said Monday that it will require Pemex to reformulate its current 2021-2025 business plan, which was approved this March, "to prepare Pemex for the challenges the energy sector will face in the following years." The government also called on Pemex to implement financial mechanisms and structures to allow for public sector

NEWS BRIEFS

Latin America Ethanol Sector Outlook Positive Next Year: Fitch Report

The São Paulo office of Fitch Ratings said Wednesday that Latin America's sugar and ethanol outlook is positive for next year. The ratings agency noted in a report that favorable sugar hedge positions taken by producers in Brazil, the region's largest producer of the fuel, should offset negative factors weighing on the industry, such as increased production costs on their businesses. Moreover, relatively high international oil prices next year should make the domestic ethanol market attractive for Brazilian issuers, the report added.

Colombia's Ecopetrol Lays Out 2022 Investment Plans

Colombian state oil company Ecopetrol said Thursday it expects to invest between $4.8 billion and $5.8 billion in 2022, with production targets of between 700,000 and 705,000 barrels of hydrocarbons per day. Around 70 percent of the total investments for the year are expected to be allocated to projects in Colombia, and the remaining 30 percent in the United States, Brazil, Peru and Chile. The plan includes investments of about $200 million in water management projects, $50 million in decarbonization projects and $6 million in green and blue hydrogen pilot projects.

Trinidad & Tobago Plans More Bidding Rounds Next Year: Report

Trinidad and Tobago plans to launch bidding rounds for onshore and shallow-water areas next year, Minister of Energy Stuart Young told Reuters in an interview Tuesday. The rounds would follow last week's launch of an auction of 17 deepwater oil and gas blocks. The report cited BP, Royal Dutch Shell and BHP Billiton among the companies interested in the auctions.

co-investment in exploration and extraction projects "to ensure the availability of a robust production platform," among other changes. For the most part, capital markets welcomed Monday's announcement. "Pemex's liability management transactions are credit positive because they reduce debt and refinancing risk," Moody's Investors Service said in a statement, Reuters reported. Last week, Pemex announced it is replacing finance chief Alberto Velazquez Garcia with current risk management head Antonio López Velarde. The move was the first C-suite shift at Pemex undertaken by the administration of leftist President Andrés Manuel López Obrador.

POWER SECTOR NEWS

Brazil Sees Record Growth in Wind Power: Aneel

Brazil's government said last Friday that the country had broken its record for the expansion of wind power plants in one year, energy regulator Aneel said in a statement. The expansion of installed capacity of electricity from wind power in Brazil reached 3.05 gigawatts this year through November, the biggest increase since 2014. Wind power plants currently provide 20.1 gigawatts of installed power, accounting for more than 11 percent of Brazil's energy matrix. In related news, Aneel last week approved new regulations for the operation of hybrid power plants in the country, PV Magazine reported. Resolution 954/2021 defines what hybrid projects are and establishes the rules for permitting and contracting the use of transmission systems, as well as what kind of tariffs the plants will have to pay for using the grid, according to the report. Hybrid facilities allow for combinations of different generation sources, including solar, wind, hydroelectric and thermoelectric plants. Aneel director Elisa Bastos said the implementation of hybrid plants will bring a potential gain in efficiency and cost. "Hybridization allows for an increase in the power plant's energy production by

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are cheaper today. Second, Chile has great potential for applying H2V to copper mining, where the country is the world leader. Sixty projects have been designed or launched so far, and 20 of them would be operating by 2025. The next stage will be to expand production for export. The world market for green hydrogen will expand enormously in order to reach net zero emissions by 2050. Achieving this requires reducing solar and wind energy costs, making electrolysis cheaper and achieving technological advances in fuel cells. Next would be building and expanding the infrastructure for H2V transportation and storage. Australia, Germany, Japan, France, Norway, South Korea, the United States and China are the main countries prioritizing innovation for the export of such technologies and equipment. Chile has a tremendous opportunity. It will depend on the country's ability to produce H2V cheaply, and also on its international alliances for strengthening its national technological capacity."

A **Marcelo Mena Carrasco, director of the Center for Climate Action at Pontifical Catholic University of Valparaíso and former Chilean environment minister:** "Many have rushed to call the recent climate conferences failures. Indeed, in terms of climate finance, governments have yet to fulfill the promise of $100 billion to be delivered to countries that are most affected by a changing climate they have not caused. Countries that depend on exporting fossil fuels have balked on language that speaks strongly on the need to phase them out. Yet, the most exciting progress on climate action is occurring outside of the negotiations. The Glasgow Financial Alliance for Net Zero, for example, has committed to finance $130 trillion by 2050. The International Energy Agency recently projected that 95 percent of new electrical power installed will be renewable, largely from solar and wind. These trends have been present in Chile for more than five years. Recent trends there can shine a light on what is to come. The country has committed to net zero by 2050 and depends on green hydrogen to reduce emissions from their energy intensive copper production. Chile's super cheap solar power can make this hydrogen the most competitive in the world. Recent auctions for solar PV at roughly $13/MWh project a positive outlook for this to materialize sooner rather than later. However, stronger signals are required. Increasing the price on pollution is an effective way to bridge the gap between dirty diesel used in mining trucks and clean and green hydrogen. Larger subsidies should also accelerate the transition to a brighter, safer and sunnier future."

> **"Chile's super cheap solar power can make this hydrogen the most competitive in the world."**
> **— Marcelo Mena Carrasco**

A **MK Vereen, program assistant for the Energy, Climate Change and Extractive Industries Program at the Inter-American Dialogue:** "As the cost of renewables has plummeted in the last decade, investments in green hydrogen have skyrocketed. Chile's inexpensive, abundant solar and wind energy make it a highly attractive location for green hydrogen production. A year into the execution of the National Green Hydrogen Strategy, the Chilean government is working to expand domestic green hydrogen production and use. By 2034, Chile is predicted to produce the cheapest green hydrogen in the Western Hemisphere. With more than 60 green hydrogen projects already underway in the country, investments are taking off. However, technological and political barriers cloud the future of the industry,

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optimizing natural resources, such as the sun and wind, as well as transmission networks," Bastos said in a statement. "As these plants can take advantage of the complementarity between different sources of energy generation, they can deliver more energy with less investment in grid expansion," he added.

POLITICAL & ECONOMIC NEWS

Venezuela's Borges Leaves Guaidó's Opposition Gov't

Venezuelan opposition figure Julio Borges, who has been serving as foreign minister in the U.S.-backed government of opposition leader Juan Guaidó, announced Sunday that he is leaving his post, the latest indication of fractures in the country's opposition government, Reuters reported. The move came just weeks after allies of President Nicolás Maduro trounced the opposition in local and regional elections, which international observers have seen as stacked in favor of the ruling party, on Nov. 21. "The [interim] government makes sense as an instrument to get out of the dictatorship. But at this moment, in our way of seeing it, the interim government has been damaged," Borges said in departing from Guaidó's cabinet, Reuters reported. "Instead of being an instrument to fight the dictatorship, the interim government has become a kind of ... caste." Borges, who lives in exile in Bogotá, is a member of the First Justice party, which is part of Guaidó's coalition. Neither the party nor Guaidó's office commented immediately on Borges' departure. Borges officially resigned from his position as foreign minister in Guaidó's government on Tuesday. On Sunday, Borges said that the interim government should "disappear" and only serve to manage foreign-based Venezuelan assets such as U.S.-based refiner Citgo. "We can't be an interim government that wants to perpetually stay in power and is turning into part of the problem, rather than the solution," said Borges, The Wall Street Journal reported. Guaidó's approval rating has fallen to about 15 percent, roughly

ADVISOR Q&A

What Does Next Year Hold for Peru's Economy?

Q Peruvian Finance Minister Pedro Francke announced on Nov. 23 that key sectors, including farming and manufacturing, are demonstrating positive growth trends. Both the Peruvian government and Moody's Investors Service are projecting possible economic growth of 13 percent in Peru for this year, an increase from the country's previous forecast of 10.5 percent. What can be expected for the Peruvian economy in 2022 given these trends, and will economic gains lead to quality job creation in the country? Which sectors are expected to perform best in the coming year, and which will continue to struggle? What must the Peruvian government do to achieve its goal of a 4.2 percent deficit reduction, one of the largest in Latin America?

A Alfredo Thorne, principal director at Thorne & Associates and former Peruvian finance minister: "Peru's economy had a superb third quarter performance against all odds. While most had expected the economy would sink on the back of increased political risk, it outperformed and expanded 11.4 percent over-year-ago (OYA) and 13.5 percent quarter-over-quarter, with Q3 being the best quarter since the economic reopening in the second half of 2020. We now forecast the economy to expand 13.3 percent OYA in 2021 but are unsure if this good performance will extend into 2022-23. The most recent rapid growth in the third quarter was explained by three positive shocks: the vaccination rollout reaching 67 percent of the population with at least one shot; the reopening of the service sector accounting for about 65 percent of the economy; and strong self-construction of houses by middle- and low-income households that translated into a big push on the expansion of private investment. There were also two other factors: the commodity price boom and fiscal stimulus. It is unlikely that these drivers will extend into 2022-23. We forecast that real GDP will stall in the final quarter of 2021 and grow 2.7 percent and 2.6 percent OYA in 2022 and 2023, respectively. Political brinkmanship has turned more severe and hit the economy, as demonstrated by the drop in business confidence and the tightening of credit conditions. Also, inflation has accelerated. Last year, Congress distributed about 10 percent of GDP in forced savings to consumers, and the government handed out cash transfers to about half of the population. Global headwinds are also significant: the external pull effect from commodity prices is losing steam; China, Peru's main trading partner, is decelerating; and new Covid-19 infections may hit the global economy. Finally, the government has used up its fiscal buffers and has little room to undertake countercyclical policies."

> **"We forecast that real GDP will stall in the final quarter of 2021 and grow 2.7 percent and 2.6 percent OYA in 2022 and 2023, respectively."**
> **— Alfredo Thorne**

EDITOR'S NOTE: More commentary on this topic appears in the Q&A of Tuesday's issue of the daily Latin America Advisor.

NEWS BRIEFS

Colombia's National Police Confirms Killing of FARC Rebel Dissident Leader

Colombia's national police director confirmed on Tuesday that Hernán Darío Velásquez, known as "El Paisa," was killed in a drug trafficking dispute in the Venezuelan state of Apure, Reuters reported. A former member of the Revolutionary Armed Forces of Colombia (FARC), Velásquez had reportedly been in Venezuela for more than two years in an effort to form a new faction called Segunda Marquetalia, which U.S. President Joe Biden's administration recently designated a terrorist group.

Honduras Plans Partial Recount of Votes in Congressional Races

Electoral authorities in Honduras on Tuesday began a recount of some of the ballots for congressional seats from the country's Nov. 28 election, following allegations of fraud and inconsistencies at a number of ballot boxes, Reuters reported. Leftist former First Lady Xiomara Castro defeated conservative Tegucigalpa Mayor Nasry Asfura for the presidency, but her ability to push through her agenda will depend on the balance of power in Congress. Castro's Liberty and Refoundation Party as well as the allied Salvador Party accuse the ruling National Party of "inflating" its votes.

Chile Sees 35% Rise in Copper Exports

Chile's copper exports totaled $4.92 billion in November, a 35 percent rise as compared to last year, the country's central bank announced Monday, Reuters reported. High prices for the metal drove the increase and helped Chile to post a trade surplus of $834 million for last month, despite a rise in imports. Overall, the country's exports rose 30 percent year-on-year in November to $8.4 billion, while imports increased 57 percent to $7.58 billion.

the same as Maduro's, according to a Datanalisis poll in October, the newspaper reported. Borges announced his departure just days after Brian A. Nichols, the assistant secretary of state for Western Hemisphere affairs, reiterated the support of the Biden administration for Guaidó's government. "We support the interim government's important work to forge a path to democracy and end Venezuela's humanitarian crisis," Nichols said in a posting on Twitter. The opposition has "had plenty of failures that don't inspire confidence in their leadership," Vanessa Neumann, who served as Guaidó's ambassador to the United Kingdom, told the daily Latin America Advisor in a **Q&A** published Nov. 29. Among them, it has had "no common goals and objectives, other than to take posts away from the Chavistas," it has "never defined why people should vote for them" and it is "completely disunited." The opposition also does "not reflect the electorate" and has been plagued by "blatant misogyny," Neumann told the Advisor. Also on Sunday, Maduro named a former foreign minister of his government, Jorge Arreaza, to be the ruling party candidate in Barinas state, where officials plan to run a re-do of its Nov. 21 gubernatorial election, the Associated Press reported. On Nov. 29, Venezuela's Supreme Court barred Freddy Superlano, the opposition candidate who had claimed victory in the gubernatorial election, from taking office. The race is symbolically significant to the ruling party as Barinas has been a party stronghold and the home state of late Venezuelan President Hugo Chávez.

El Salvador's Bukele Announces Purchase of Additional Bitcoins

Salvadoran President Nayib Bukele announced last Friday that the country had purchased an additional 150 Bitcoins, following the drop in the digital currency's value, Reuters reported. Bitcoin's value is down approximately 30 percent since its record high on Nov. 10. In September, El Salvador became the first country in the world to use Bitcoin as legal tender. Bukele has said Bitcoin will promote financial inclusion, facilitate remittances and attract investment to the country. However, the International Monetary Fund has cited concerns about price volatility in recommending that El Salvador cease using the cryptocurrency as legal tender. [Editor's note: See related **Q&A** in the June 15 edition of the daily Latin America Advisor.]

Peru's Congress Rejects Attempt to Impeach Castillo

Peru's Congress voted down a motion to impeach President Pedro Castillo with a 76-46 vote on Tuesday, Reuters reported. Right-wing parties launched the impeachment effort in October after investigators found $20,000 in a bathroom of the presidential palace that allegedly belonged to Bruno Pacheco, the former presidential secretary, Al Jazeera reported. Conservative former lawmaker Keiko Fujimori, whom Castillo defeated in the country's presidential election last June, pushed the impeachment effort. However, the attempt appeared to lose momentum after Castillo held talks over the past several days with various political parties. "The issue of vacating [the presidency] is slowly being deflated," Vice President Dina Boluarte told reporters on Tuesday before the vote. After Congress rejected the attempt, Vladimir Cerrón, the founding leader of Castillo's Perú Libre party who has recently clashed with the president, welcomed the vote. "The impeachment motion failed, fascism failed, the parliamentary blow to democracy failed," he said in a posting on Twitter. Hundreds of supporters of Castillo as well as those in support of impeaching him took to the streets of Lima on Tuesday before the vote, Al Jazeera reported. In a **commentary** published Monday in the daily Advisor's Dialogue Continues section, Gino Costa, a former member of Peru's Congress, said Castillo has a complicated road ahead. "Citizen support is also key for the president. However, polls show a rapid erosion of his popularity. His saving grace is that Congress ... is even more unpopular. There is no doubt that the political landscape for the coming months and years will be highly uncertain and highly unstable."

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especially with regard to exports. As Chile lies geographically far from green hydrogen markets, and transportation is technologically complicated, its ability to export the fuel will depend on extremely low production costs and investments in transportation infrastructure. However, the electrolysis technology required to break off hydrogen atoms from water is expensive, and the cost must continue to fall for industrial projects to meet low-cost projections. Moreover, frequent droughts reducing water available for electrolysis, combined with high domestic demand for the fuel, could reduce excess fuel supply available for export. Politically, while there are many important green hydrogen regulations, incentives and tax structures currently being drafted in Chile, a new president and constitution in 2022 could disrupt these plans. Boric and Kast both certainly support green hydrogen development, but Boric favors creation of a national green hydrogen company and hopes to pursue far greater state involvement than Kast."

A **Ezequiel Fernández, research director at Balanz:** "We are still at a nascent stage, with minimal local production of green hydrogen. However, Chile is the Latin American country with the best delineated and most ambitious hydrogen strategy by far. Minister Jobet is initially focusing on replacing diesel with hydrogen at mining sites and on the production of green ammonia as both processes are already close to making financial sense. There are strong linkages to domestic industries, and there is no need to wait for dramatic reductions in electrolyzer costs. Siemens, Engie and Anglo American have already embarked on advanced pilot projects in these areas. The promise is to scale up, begin exporting by 2025 and reach green hydrogen costs below $1.50 per kilogram by the next decade. Not only could this transform Chile into an exporting powerhouse, but it would also break it free from decades of energy dependence. It is not an outlandish dream. Solar power in Atacama could drop to $10/MWh eventually, but other countries have announced similar strategies and the process is inexorably tied to politics. We believe that José Antonio Kast would act mostly as an enabler, regulating but leaving the job to market forces. Alternatively, Gabriel Boric's team favors direct government involvement and has even cautioned against the past experiences with copper and saltpeter. One way seems faster, the other promises higher social gains. Chileans will tell us what they hope for in a couple of weeks."

> **"Siemens, Engie and Anglo American have already embarked on advanced pilot projects in these areas."**
> — Ezequiel Fernández

A **María Isabel González R., general manager of Energética in Santiago:** "There are disadvantages to green hydrogen. For example, a significant amount of water is required for its production. In northern Chile, where solar energy is abundant, water is very scarce. Producing one ton of hydrogen through electrolysis requires an average of nine tons of water. Although desalinated seawater could be used, this would imply additional costs and entail environmental impacts that are not small. Another disadvantage is the distance from our country to the most promising markets that would be consumers."

The Advisor welcomes comments on its Q&A section. Readers can write editor Gene Kuleta at **gkuleta@thedialogue.org**.

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