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How Latin American green hydrogen could become ‘very competitive’

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Interest in Chile and Latin America’s budding green hydrogen industry [is growing](#) as new international players evaluate opportunities in the region and early-stage projects are created.

One such player is Australia’s CWP Global, a well-established developer with over 1.5GW of renewables in operation and big plans for growth into the green hydrogen business.

BNamericas spoke with Andrew Dickson, development manager, green hydrogen and ammonia at the firm, about its plans for Latin America, the region’s potential and challenges, and the expected size and scope of the future international green hydrogen market.

Dickson recently announced the firm’s arrival in Chile at a webinar organized by Fundación Chilena del Pacífico, an organization tasked with supporting Chile’s economic insertion into the Pacific basin.

With partners CWP is developing two mega-scale hydrogen and ammonia projects in Western Australia: the Asian Renewable Energy Hub and the Western Green Energy Hub.

While the first would install 16GW of wind and 10GW of solar capacity and is expected to produce some 1.75Mt/y (million tons per year) of green hydrogen or 9.9Mt/y of green ammonia, the second seeks to install 50GW of renewable capacity to produce 3.5Mt/y of hydrogen or 20Mt/y of ammonia.

BNamericas: What do you see as some key factors Chile must address in terms of policy to attract international investors and get them to commit the necessary funds to grow a large hydrogen industry?

Dickson: This is a new industry globally and there is competition between countries for the markets for hydrogen and ammonia. So speed and scale are very important. For projects to commence, developers need to secure land rights. This is a challenge in parts of Chile at the moment. Obviously, approval for these projects is very complex. Certainly, in Australia we have major project status and this gives us priority as we work through the approvals process and helps us remove roadblocks. This would be very useful in other jurisdictions.

It’s very important not just to focus on export but also to create local demand and local supply chain capabilities. The opportunity to replace diesel with hydrogen derivatives; to blend hydrogen into gas pipelines; [to spur] local industrial use of hydrogen and ammonia; these things are all important to create the foundation. Also, the cost of capital is very important because these projects are very big and capital intensive. So geopolitical stability is very important to have low cost of capital.

At the moment, it’s a transition time in Chile. First things first, there are things that need to be resolved politically before that stability will be there. At the moment it’s challenging and that creates risk for developers and financiers. Hopefully Chile can resolve these issues and then become very competitive.

BNamericas: Besides Chile, which other countries in Latin America are you interested in and what kind of opportunities do you see emerging for CWP Global in the region?

Dickson: We are a global company and are pursuing projects globally. We started this work in Australia and have two big projects there. We are very active in Africa and have several projects there. Latin America is also very interesting to us and we are present in Argentina, Uruguay, Paraguay, Brazil and Chile. Our vision is to develop large-scale projects to compete globally. Chile is very interesting to us, particularly for export projects. We think the northern hydrogen valley, which is more solar based in Atacama region, is better suited to supply local markets. Whereas the southern projects in Magallanes will be more export focused. That’s where we think the main export projects will be but those projects really need scale to be competitive globally.

BNamericas: What comparative advantages and disadvantages does Latin America offer in terms of hydrogen compared to other regions you develop projects in?

Dickson: Firstly, Latin America has exceptional renewable energy resources: wind, solar and hydro, with very high capacity factors compared to many other regions. This is the number one attractive point. There's also a lot of land for potential projects. Ideally, Latin American projects could be very competitive, with their low cost of electricity, construction and labor when compared to other regions.

However, there are also disadvantages. The political and economic atmosphere in the region is not fully resolved and creates uncertainty and risk. These projects are very big and complex so regulation and permitting is not ready for the large projects yet. The cost of debt in these economies is high compared to some other regions due to the geopolitical risks. Another disadvantage for Latin America is that some of the offtake markets are further away than places like Australia. Our projects there are mainly looking to markets in Asia, and Latin America is further away. The cost of production will probably be cheaper but the cost of transport will definitely be more expensive, and we don't yet know whether that will be a big problem or a small problem.

BNamericas: When you talk about Latin America's great resources, how big is the difference compared to other regions?

Dickson: For wind, a good project in Australia will have a capacity factor of 50%, but the best locations in Chile can reach 60-70%. In many parts of the world, we use wind and solar together. In northwestern Australia we have excellent nighttime wind with daytime solar and together that achieves a high capacity factor. In the northern and southern hydrogen valleys in Chile, the focus will probably be on either wind or solar, as they are both strong in one but not the other. The capacity factor is important, but I think Chile should not be complacent about that because wind and solar together in other countries can match more or less the very good wind in southern Chile, for example.

BNamericas: On that note, do you think it's viable to build large-scale projects with only solar or only wind?

Dickson: It depends on how cheap solar gets over time. Solar is now cheaper than wind and it's still getting cheaper. The issue is that the upstream infrastructure, wind and solar, are fairly inexpensive, but the downstream infrastructure, the desalination, air separation, ammonia synthesis, electrolysis, those are very capital intensive. So, you want to use those as much as you can. This is why capacity factor is so important. You want high utilization of the expensive infrastructure. That is why the right wind or solar, or ideally both, are so important.

BNamericas: You've said in the past that Chile should focus on encouraging the installation of large-scale hydrogen projects more than on smaller ones. Why are larger projects more beneficial at an early stage?

Dickson: Big projects can't be built big initially because the market isn't ready for large-scale projects yet. It does make sense to consider small early steps. However, we think in time small projects will be sub-economic compared to the best megaprojects around the world. And big projects can start small and grow big. There are many giant projects under development in the world and smaller projects could be left behind.

There are very large economies of scale from big projects, partly from upstream [wind and solar generation], but the main factor for success is a low globalized cost of energy, we need the very cheapest energy. Also, these projects are unique because they are combining variable upstream, wind and solar, with downstream infrastructure that normally has been steady state. At the moment, ammonia synthesis is done with fossil fuels and all of the technology is designed to operate steady state, and so the challenge is how to combine variable upstream with steady-state downstream.

More scale gives more flexibility to manage that challenge. Bigger projects have more ammonia synthesis plants, a combination of big ones and small ones, and they can mix to match the variable upstream with the downstream, and to have the most efficiency.

Also, these projects need port and loading infrastructure, which is very expensive so more export volume amortizes those costs over more product, and therefore it's cheaper. Regulatory approvals are very complex and time consuming so it's actually better to go through the process for fewer big projects than for more smaller projects. It takes a lot of time and energy, both for developers and regulators, and so obviously more smaller projects will slow things down for everyone.

For local supply, smaller projects can make sense. For export projects, however, it's better to go big. Our approach beyond Latin America is mega scale projects. Multi gigawatt. The challenge is in securing the land and getting underway. In southern Chile, we haven't started developing because we are still trying to secure land.

BNamericas: Can you tell me more about what kind of challenges you are facing in terms of land acquisition in Chile?

Dickson: It's different in the northern hydrogen valley, as you can have access to [fiscal land](#). In the southern region there's more private land. Those landowners are not necessarily sophisticated with these negotiations. It's a very difficult task for developers to educate in this regard and, at the same time, to compete with more and more developers. It's creating a situation where no one is really making progress because we haven't passed the first hurdle. The first thing we need is land security. This is costing the whole country, really, while it remains unresolved.

BNamericas: When do you expect the kind of megaproject you are working on in Australia to start producing hydrogen and selling to the international market?

Dickson: There is a lot of lead time for these projects because they are so big and also because the markets are not yet ready. We have two big projects in Australia, the most advanced is the Asian Renewable Energy Hub. We hope our first phase is ready in 2025 and first exports of product for around 2028. Our second project is two or three years behind that one.

Markets probably won't be ready at scale until the late 2020s at the earliest. This is the rough timeframe.

BNamericas: Where do you believe Chile's potential green hydrogen output could be most competitive around the world? And what do you see as the country's potential offtakers in the coming decades as the industry and a market develops?

Dickson: It depends on how cheaply the product can be produced and shipped. But ideally targeting markets both in Asia and in Europe, and not just countries, but sectors, like the shipping sector. The maritime sector could become the largest market for green ammonia. It's a very highly emitting sector and there's a very clear desire to decarbonize shipping. That could create a very big demand, bigger than power generation, we think, by 2050, that could be 400 or 500Mt/y. It's not about targeting just countries, but sectors. The key is creating competitive large projects with the least possible costs. We think Latin America can be very competitive and that is why we are active there.

BNamericas: Will the development of a large hydrogen industry put additional strain on the existing electric power infrastructure?

Dickson: One of the benefits of hydrogen is that it is a dispatchable load. The traditional approach with renewables is trying to squeeze them onto the existing grid. The more variable generation you have, the more challenging this becomes. The key is having loads that you can turn on or off when there's too much or not enough generation.

This is part of the beauty of electrolyzers. If there are periods when there's excess wind or solar, you can turn on the load to absorb that energy and produce hydrogen. It's possible to shift from having maybe 30-40% renewables in the power grid to having 300-400-500% renewables when compared to demand. It's a complete transformation in energy and hydrogen and electrolysis are a key enabler for more renewables on the grid.

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