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**The Sun comes up in the West – how lack of subsidies helps renewables grow up in Latam.**

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Nowadays, Latin America finds itself at the forefront of solar PV development on our planet. Whereas the region started off with a mere 50 MW of installed PV capacity at the end of the previous decade, it has grown no less than 5 times faster than Europe over the last 5 years, and whilst the volume gets bigger, anno 2015 the region's growth rate is still double that of Europe.

Notably, the region spanning from Mexico to Chile nowadays comprises a total pipeline of no less than 40 GW, with around 1.5 GW already in operation and some 3 GW under construction as per October 2015. Around 25 GW are expected to be operating by 2020. Specialized analysts expect a CAGR of around 40% for the 2015 – 2020 period, representing some 4,000 MWp per year of installed capacity to be added as of 2018 when the region gathers momentum. Growth rates for the 2013 – 2015 period are at 200%, 300% and 250%, respectively, given the limited installed capacity where the region came from.

What drives this stunning growth that seems to come out of nothing and converts the region into the world's new champion of PV development? Certainly the tremendous drop in PV system prices causing its Levelized Cost of Energy (LCOE, basically the system's cost expressed in price/kWh produced, including WACC) to challenge the going wholesale electricity rates in countries across the region. Whereas the capex of a single axis tracker system in 2010 was around USD 5/Wp, current levels for utility scale projects range from USD 1.1 – 1.3/Wp, representing an LCOE in the Atacama desert, the world's sunniest place, of USD 60/MWh. Not more than the LCOE of a state-of-the-art clean coal plant, without taking into account the cost of carbon emission, by the way. Most Latin American countries

show excellent irradiation levels, though not as much as Chile, which place the technology at par or cheaper than most existing generation technologies except hydro power. Speaking of which: controversially, dependence on hydro power is the reason why Latam administrations are increasingly looking how to speed up PV's market penetration. The "El Niño" phenomenon, causing draught where it should be wet, and its sister "La Niña" doing the opposite, has already made politicians of countries such as Chile, Peru and Colombia very much aware of the necessity to diversify the energy mix. The phenomena cause electricity price volatility, making it hard for industries to predict their energy costs, and making it even harder for households to pay the energy bill. In Colombia, the wholesale price of electricity tripled between September 15<sup>th</sup> and 30<sup>th</sup>, 2015 following the ever lower water reserve levels in its hydropower base, which represents 70% of the country's generation capacity. Lastly, on a more positive note, Latin America's energy demand growth following its emerging middle class also consistently drives up the energy bill.

Having said that, the region also represents substantial differences depending on the country. The current strong markets for PV development are clearly Brazil, Chile and, interestingly, Honduras. On the longer run, whilst Honduras with its modest size will be rapidly saturated, Mexico will join the club as the expected biggest driver of Latam PV growth. By 2020, analysts expect the country to host about 50% of Latam market development. Each of those markets shows different drivers of its rapid development: whilst Brazilian politicians entertain the roll-out of its solar fleet to satisfy the needs of a growing population, which increasingly uses airco's, televisions and refrigerators, Mexico experiences high electricity prices because of an already huge demand. Chile's growth, however, is largely driven by the presence of its large mining industry, mostly located in the north, looking for a lower energy bill and more price stability. The recent Chinese downturn and its effect on demand for commodities produced in Chile (the country furnishes 30% of worldwide copper demand) might blur the outlook for miners' offtake.

Now, let's take a closer look at the current champion of Latam PV growth: Chile. Having experienced in Europe what regulatory risk can mean in reality, some developers of renewable energy projects expanded to Chile at the end of the previous decade, not only for its fundamentals, but also because of the mere lack of incentive schemes. Putting in place not more than a target for greening the energy mix by 2025, supported by an endemic green certificate system as a brave political token we'll probably never be able to agree upon on a worldwide basis, the country marked the future of renewable energies without even being aware of it. As the world's first privatized energy market back in 1982, and blessed with magnificent natural resources, but condemned to high electricity prices due to the country's location and configuration, it was the natural destination for rational renewable energy entrepreneurs who were conscious of the fact that Feed-in Tariffs did their job but probably would not hold forever.

The thing that developers in Chile were confronted with as their permitting processes matured, is the challenge of making their projects 'bankable' in a FiT-less environment. The obvious solution was the traditional Power Purchase Agreement, a document that in most countries had degraded into a 3-pager with a big annex with predominantly technical parameters relevant to interaction with the grid rather than a balanced and well-founded distribution of risk. The first projects in Chile, mostly wind farms, were therefore banked upon well-structured PPA's, involving bi- or multilateral institutions such as OPIC, the IFC and the IDB.

As the market progressed and the solar industry did a great job in scaling up module production whilst reducing cost, given Chile's aforementioned resources, a development boom started that has grown into what nowadays represents the mother of all pipelines: no less than 15,000 MW of development

projects in a national electricity system with a total size of about 18,000 MW installed generation capacity, spread over two main systems that are not yet connected. This makes project developers particularly attentive to structuring their projects in such a way as to distinguish themselves from their competitors – welcome to the free market. Making a solar project bankable therefore turns out to be not just a question of catching one of these hard-to-get classic PPA's. While some early-solar-movers did close bilateral PPA's, given the downturn in commodity markets, the Chilean mining sector turns out to be somewhat less of an offtaker than developers were hoping for, and therefore other solutions needed to be created. Some developers have therefore meanwhile structured their projects in a pure merchant environment, selling energy against the daily spot market rates. The first projects of this kind were financed again by the above mentioned multilaterals, and when they retreated because of having assumed sufficient risk on Chilean spot market prices, a limited amount of projects followed suit with the help of only commercial banks. EDF EN's 146 MWp "Laberinto" project was the first example. This sets their owners in pole position to negotiate power offtake with mining companies, the latter being in need of power, rather than a power point presentation. The dynamics of (partly) merchant projects force their sponsors to dive deeply into the dynamics of local electricity market behavior, modelling it accordingly, and structure their financings around it. The sheer complexity heralded the end of the standard excel model for solar PV where the only change used to be the local tax regime.

The Chilean government, again showing leadership, started contributing its fair share by offering special solar energy delivery blocks during the sunny hours of the day under the regular public tenders issued to foster a stable supply of power to SME's and private households. Developers meanwhile have enhanced their creativity by constructing semi-merchant revenue stability mechanisms such as bilateral Contracts for Difference, synthetic PPA's and floor mechanisms, one of the first examples being Chilean local utility SAESA offering an income-floor to a wind farm.

All these efforts to create 'topline security' are pushing the industry in the right direction. Renewables are becoming mainstream; increasingly we will witness financings that are starting with merchant 'tails' at the end of the tenor of contracted deals, but progressively debt structures will evolve to include larger merchant components. The main reason is the sheer need of debt: the size and growth of the market requires such amounts of debt that, if banks adopt too conservative a position, projects won't wait for them and alternative sources of finance will fill in.

Sponsors are giving profound attention to the actual energy market dynamics before they invest. This, in turn, leads them to challenge government administrators to shape their energy markets in such ways as to facilitate an increased participation of renewables in their local energy markets. Energy sales models tested in Chile will soon be seen applied in other Latin American countries, precluding accelerated growth across the region driven by new, yet bankable, business models.

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