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Inter-American Dialogue's Latin American Energy Advisor

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Q and A: What Accounts For the Drop in Price of Wind Power?

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In a Brazilian energy auction last month, companies agreed to sell power at the world's cheapest rates for wind energy, leading some analysts to speculate that developers will have difficulty fulfilling those contracts, Bloomberg News reported Aug. 31. Recently completed auctions in Peru and Uruguay similarly saw prices for wind power fall significantly, and the Uruguayan government is now considering purchasing four times as much energy than expected from wind farms. What accounts for the dramatic drop in price for wind power? Is the trend likely to continue in these countries and elsewhere? Will companies have trouble fulfilling the contracts?

A: Maria Gabriela da Rocha Oliveira, head of Latin America Research and Analysis for Bloomberg New Energy Finance:

"Today, there is general over-capacity of wind turbine manufacturing on the global market. This, combined with the growing role of Chinese makers of less expensive equipment, has helped drive down costs. Within this context, Latin American governments have launched so-called 'reverse auctions' or tenders for power contracts from project developers. Long popular in Latin America, reverse auctions have proven effective in bringing down prices for new electricity capacity. They create fierce competition among developers who bid aggressively to secure power purchase agreements in frontier markets. Tenders have succeeded in reducing costs, but still have to prove their effectiveness in actually getting substantial amounts of new inexpensive capacity built. To complete a project that will sell power at \$62 per megawatt-hour in Brazil (below the cost of a new natural gas plant), developers must either get exceptional performance from their turbines or source less expensive equipment and capital than currently available. Both will be a major challenge. Winners of contracts in Brazil's auction last month were, for the most part, players with unproven track records of wind project development or operation. We found that 32 out of 78 projects contracted have implied equity returns below 10 percent, which raises concerns over the viability of these very low bids. Some 45 percent of the total 1,292MW of tendered wind capacity present serious non-deployment risk and are unlikely to be commissioned by 2014—unless there is a dramatic step-change in equipment costs or efficiency."

A: Roberto Brandão, senior researcher in the Grupo de Estudos do Setor Elétrico (GESEL) at the Universidade Federal do Rio de Janeiro:

"Two factors explain low wind energy prices in Brazil's 2011 power auctions. First, as wind energy investments have lost momentum in the United States and Europe, there is now fierce competition for new market opportunities. Prices for wind turbines, the most expensive item in a wind farm, have gone down steadily. Innovation in project setups is the second factor. Actually, price reductions for small turbines have led to new project setups. The projects that have dominated 2011 power auctions use very tall towers, large blades and small wind turbines. This cheap setup can generate at full capacity in almost all wind conditions, leading to estimated capacity factors of around 60 percent in the best sites, contrasting to 35 percent in wind farms currently operating in very good wind sites. Attractive power contracts that provide developers with a fixed monthly revenue, and government-induced cost reductions also account for low wind energy prices. Nonetheless, cheap prices have come to stay as economies of scale can provide further cost reductions in the near future. In Brazil, wind energy is now competitive with medium-size (300MW) hydro projects and gas fired power plants. Lower prices will increase demand for wind farm equipment, increasing production scale and further reducing costs."

A: Steve Sawyer, secretary general of the Global Wind Energy Council:

"The factors involved in the drop in the price for wind power are a) continued steady improvement in the quality and efficiency of the technology; b) great wind resources in many parts of Latin America; c) a 'buyer's market' for wind turbines globally, i.e. an oversupply which drives down prices; on top of that, particularly in Brazil, major players are cutting budgets to the bone to get a share of what will be South America's largest market, and the 'jumping off point' for the development of the industry in the southern part of the continent; d) the general downward price pressure on turbines through the emergence of major manufacturers in China in particular; e) the expectation of low cost financing from state-backed institutions, particularly BNDES in Brazil. It's impossible to say precisely where the 'bottom' is, but I believe that we're near it. No doubt they will have difficulty fulfilling the contracts. Although at least in the case of Brazil, the costs of not fulfilling the contracts are substantial, so most will get filled. As one manufacturer said at Brazil Windpower 2011 in Rio, 'the margin for error on some of these projects has been cut nearly to zero.' "

A: Jaime E. Luyo, director of the Institute for Competitiveness and Sustainable Development in Lima:

"Latin America is one of the regions with the highest renewable energy resources, but it is only exploiting a very small fraction of them. For example, less than 0.5 percent of the wind potential in Peru is currently being exploited. In addition, wind farms usually have a plant factor somewhat greater than 50 percent due to less variability in wind speed than in other regions. This is the main reason why the price is less than \$70/MWhr. In Brazil, the price is lower because Brazilians are manufacturing components for wind turbines. Other factors include this decade's continuous economic growth that is correlated with the growth in electricity demand and the opposition to large hydro plants by environmentalists. Prices will be around \$60/MWhr in the

coming years, assuming no devaluation of the dollar, and the companies will not have trouble fulfilling the contracts. Regional energy policy is moving towards sustainable development."

A: Juan Roberto Paredes, renewable energy specialist at the Inter-American Development Bank:

"Electricity from wind has already been produced in other countries cheaper than the prices we are experiencing in Latin America. In regions like Texas, contract prices between \$50- 70/MWh are not the exception, including tax incentives. Additionally, we have to understand that production costs should decrease with a higher wind resource availability and therefore capacity factor. It is no wonder that prices in Brazil are found in that range, as capacity factors are much larger than the average in Europe or the United States. In addition to the wind turbine cost drop observed in recent years, one important factor also needs to be considered, and that is access to cheap financing, which is key for a very capital-intensive industry in countries where additional risks (political, technical, regulatory, etc.) contribute to increased production costs. These aspects may explain the high gap in prices for wind generation between Brazil and other countries in the region, even with auction systems, being more than twice the average price reached in Brazil (\$61/MWh). Brazilian developers benefit from local development banks and access to favorable credit lines, highlighting the importance of state support and the role of financing institutions. Of course, the auction system itself induces greater competition, which translates into falling rates, but poses additional technical risks as (inexperienced) plant operators are obliged to deliver a certain amount of energy, tending to oversize their turbines at the expense of plant lifetime. Only time will show if this bet pays off."

A: Timothy Stephure, associate director for Latin America energy at IHS Emerging Energy Research:

"In the Brazilian auctions, winning contracts came in, on average, 25 percent below levels seen the year prior. The dramatic decline in winning auction bids across Latin America is the result of several changes that have rippled through the global wind power markets. The primary catalyst for lower prices has been increased competition from wind turbine original equipment manufacturers (OEMs). By the end of 2011, the number of turbine OEMs that will have local manufacturing capability is expected to more than double from 2010 with GE, Enercon, IMPSA, Gamesa, Alstom and Vestas all with operational or under-construction facilities. Over the next few years, even more competition is eyeing the Brazilian wind market with at least 10 OEMs currently qualifying for subsidized BNDES financing by demonstrating that they will meet a 60 percent local content requirement. These turbine OEMs are competing for orders in a market with just over 1.2GW of installed capacity and a wind pipeline through 2014 of just under 5GW of capacity. OEMs, faced with declining orders from mature markets in Europe and the United States, are rushing into Brazil not only to supply domestic demand, but also as a base to serve other growing markets in the region. Another factor in bringing down prices is incremental technological improvements in turbine technology. The latest generation of wind turbines using larger rotors, higher towers and lighter designs has resulted in improved capacity factors that averaged 47 percent in the 2011 auctions. The rate of price reductions will be difficult to maintain as margins are already cut to razor thin levels."

The Advisor welcomes reactions to the Q&A above. Readers can write editor Gene Kuleta at gkuleta@thedialogue.org with comments.