# Understanding Alberta's Wind Discount and Lower Capture Rates

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We explained in last week's post that all generators in Alberta are paid the hourly determined Pool Price (per MWh) for the electricity that they generate and deliver to the grid in any given hour. This Pool Price in Alberta changes each hour of a day depending upon the principles of supply and demand. For example, Pool Prices are higher during the hours of the day when electricity demand is the greatest– the so-called peak periods of the day when businesses and consumers are using the most electricity. Pool Prices are also lower during the hours of the day when lower-cost generators are able to generate and offer their power into the Power Pool at lower prices. Accordingly, the hour of the day in which a generator delivers electricity to the grid is sometimes as important as the quantity of the electricity being delivered, with generator aggregate revenues being a function of both the hourly Pool Price and the quantity of electricity generated and delivered to the grid in any hour.

A statistic used in Alberta to describe how good a generation facility is at getting high Pool Prices for its electricity is "capture rate". Capture rate (%) is the percentage of the average Pool Price in a period (say over a calendar year) that a generation facility receives for the electricity that it generates. For example, let's say that the the average Pool Price in Alberta was $100/MWh – we know that is a far cry from the $23/MWh average Pool Price so far this year, but makes for easier math for illustrative purposes – one could then take a particular generation facility and calculate the average Pool Price that it received in that same calendar year for the electricity that it generated and delivered to the grid. Let's say that was $90/MWh. We would then say that the capture rate for the generation facility for that calendar year was 90%.

Interestingly, Alberta wind farms have, on average, consistently experienced a lower capture rate than other forms of generation. For example, between 2008 and 2015, on average, wind farms earned approximately $18/MWh less than the average Pool Price in Alberta, with the average Pool Prices earned by the wind farms being 30-35% less than the average Pool Prices. This is generally referred to as the Alberta wind discount. Why does this negative correlation with Pool Prices occur for wind in Alberta?

There are generally two reasons given for this negative correlation and the low capture rate for wind in Alberta. First, wind farms generally generate more of their electricity in Alberta during off-peak periods when Pool Prices are low. In other words, the wind often blows at times of the day (night versus day) or the year (summer versus winter) when

Pool Prices are lower in Alberta. Second, the majority of wind farms in Alberta are concentrated in southern Alberta. For example, almost half of the total wind capacity in Alberta is located in the Pincher Creek area. Wind generation has a negligible variable cost to generate so it is offered to the Power Pool at a price (actually $0 as wind farms are price takers) that always results in it being dispatched. The net result is that a large quantity of wind generation in southern Alberta comes online simultaneously when the wind blows in southern Alberta. This concentration of supply puts downward pressure on the Pool Prices for those hours and results in those wind farms receiving a lower Pool Price.

It is very important to note, however, that not all wind farms are located in southern Alberta and suffer the same discount. For example, we have seen a study that shows that, among the different Alberta wind farms, the capture rates vary by as much as 20%. This is because different areas of the Province have different wind patterns, plus, not all wind farms are located in southern Alberta and therefore do not suffer the same downward pressure on Pool Prices caused when the wind blows in that area of the Province. Thus, the wind discount varies among wind farms depending on where a particular wind farm is located in Alberta.

To date, the AESO has maintained that it will not consider the projected wind discount or capture rate for a wind farm in this year's 400 MW Renewable Electricity Program (REP). We suspect that the AESO did not want to have to create the meteorological models that would be required, and have to be defended by the AESO, if capture rate was factored into this year's REP. The net result of the AESO's decision to ignore capture rates is that this year's REP will likely result in the AESO over paying for renewable electricity. Proposed wind farms in southern Alberta will not have their lower capture rates work against them in this year's REP. Nevertheless, we suspect that in future REPs (for the balance of the 5000 MW that has been committed to) this will change and the location of wind farms will be a component of Alberta's REPs such that the projected capture rate of a wind farm will be factored into the design of the REP. This will encourage more geographic diversity for Alberta wind farms which will, in turn, increase the average capture rates for wind farms in Alberta.

We should note for solar developers who may be reading this post that solar is, unlike wind, positively correlated to Pool Prices in Alberta. The sun shines in Alberta when the hourly Pool Prices are higher. Therefore, the capture rates for solar projects in Alberta are well above 100%. As such, solar farms will also be prejudiced in this year's REP if capture rates are not factored into the decision-making process. Further, the complementary nature of solar and wind in respect of Pool Price correlation is leading some developers to consider pairing wind and solar together on generation sites in Alberta. Finally, the high capture rate for solar is also leading small scale solar micro-generators to criticize the way in which they are currently compensated for their generation under Alberta's existing microgeneration rules – though that discussion is beyond the scope of this piece, it may warrant a separate posting by AlbertaPowerMarket.com in the future.

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