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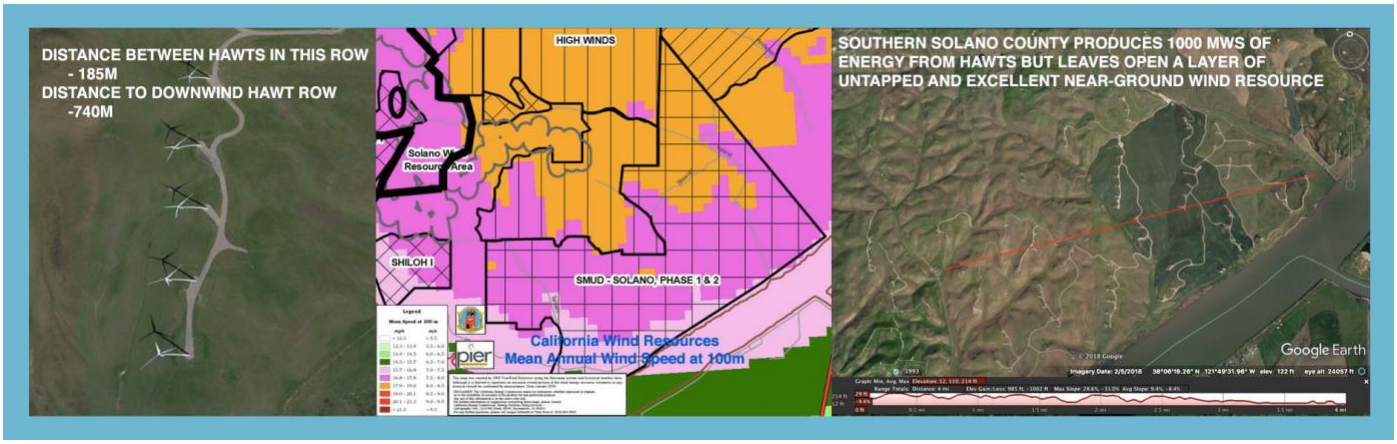
Negative wind shear documented in the Solano Wind Resource Area should be evaluated by the CEC

Additional submitted attachment is included below.

Negative wind shear documented in the Solano Wind Resource Area should be evaluated by the CEC

By: Kevin Wolf, kwolf@windharvest.com



"During mid-day and into the late afternoon, the wind shear exponent actually goes negative for a few hours indicating that the wind speed is higher near the surface than aloft." (Pg. 22 in a 2005 report to SMUD about their wind farms in the Solano Wind Resource Area ("Rio Vista Wind Energy Project – Final Data Report").

Figure 1 - The distance between HAWTs in this typical row in the Solano Wind Resource Area is 185m and the average distance to the downwind row being 750m.

The report to SMUD indicates that the wind shear exponent in their wind farm will be around 0.065 at 15m above ground level (agl). A wind farm in the Great Plains would have an exponent of around 0.15. Given the square function in the wind shear formula, the lower exponent makes a huge difference in what the near-ground wind speed is between the two locations

When using this unusually low exponent with the 50m agl wind speeds in the CEC's 2002 report "New Wind Energy Resource Maps of CA", the 15m above ground layer of wind moving over the tops of the Montezuma Hills should average between 15 and 18 mph. This is a truly valuable wind resource for turbines that operate well in near-ground turbulence such as Wind Harvest International's vertical axis wind turbines (VAWTs).

The California Energy Commission presently hopes to make major advances in the production of wind energy in the state by providing grants for R&D on super-tall turbines with 100-140m hub heights and blades tips reaching another 60m higher. These massive machines face obstacles that may prevent few if any from being installed in the state.

- Turbines at this height need to be carefully placed so they are not in the flight paths of migrating birds, because many of these species will be flying in that altitude and have not evolved to see and avoid these two dimensional rotating machines with blade tip speeds exceeding 150 mph.
- Super-tall turbines will also face pushback from people who object to the impact they will have on views for miles around.
- In other locations, aviation concerns will stop the tall HAWTs from being permitted because of their impact on radar and flight paths.

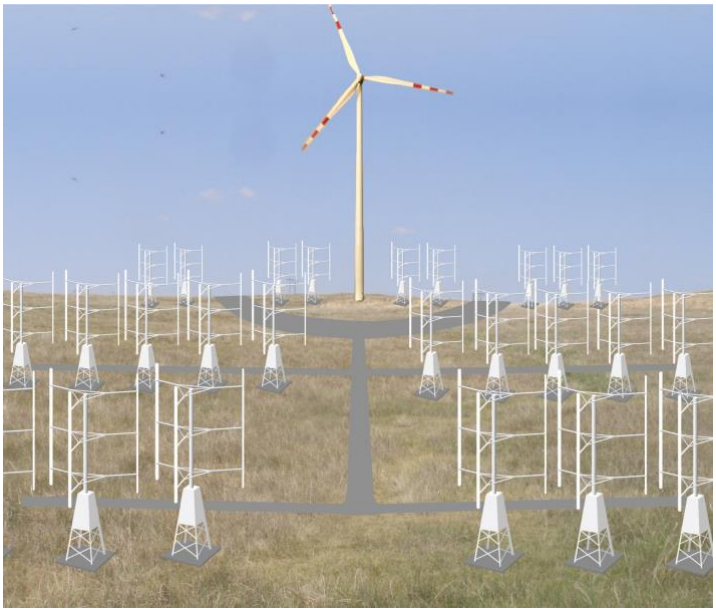


Figure 2 – Here is how three rows of Harvester VAWTs would look like with a distance of 70+ meters between each row and with the last row being directly under the HAWT rotor.

The potential to add a 1000 MWs of additional wind energy capacity by installing VAWTs beneath the already existing HAWTs in the Solano Wind Resource Area alone should cause the CEC to reconsider its current EPIC grant parameters that do not allow for the funding of research on the state's excellent near-ground wind assets or on the development of technology that can harvest it.

According to the CEC's 1985 Wind Atlas, all of the state's Wind Resource Areas have excellent near ground wind resources.

Figure 3 – The elevation profile shows the hills and valleys that run through the Montezuma Hills along the red line from east to west. The Sacramento River on the southeast corner lines up with the wind speed map in Figure 4. The wind should accelerate near the ground across each of the high points along the elevation profile.

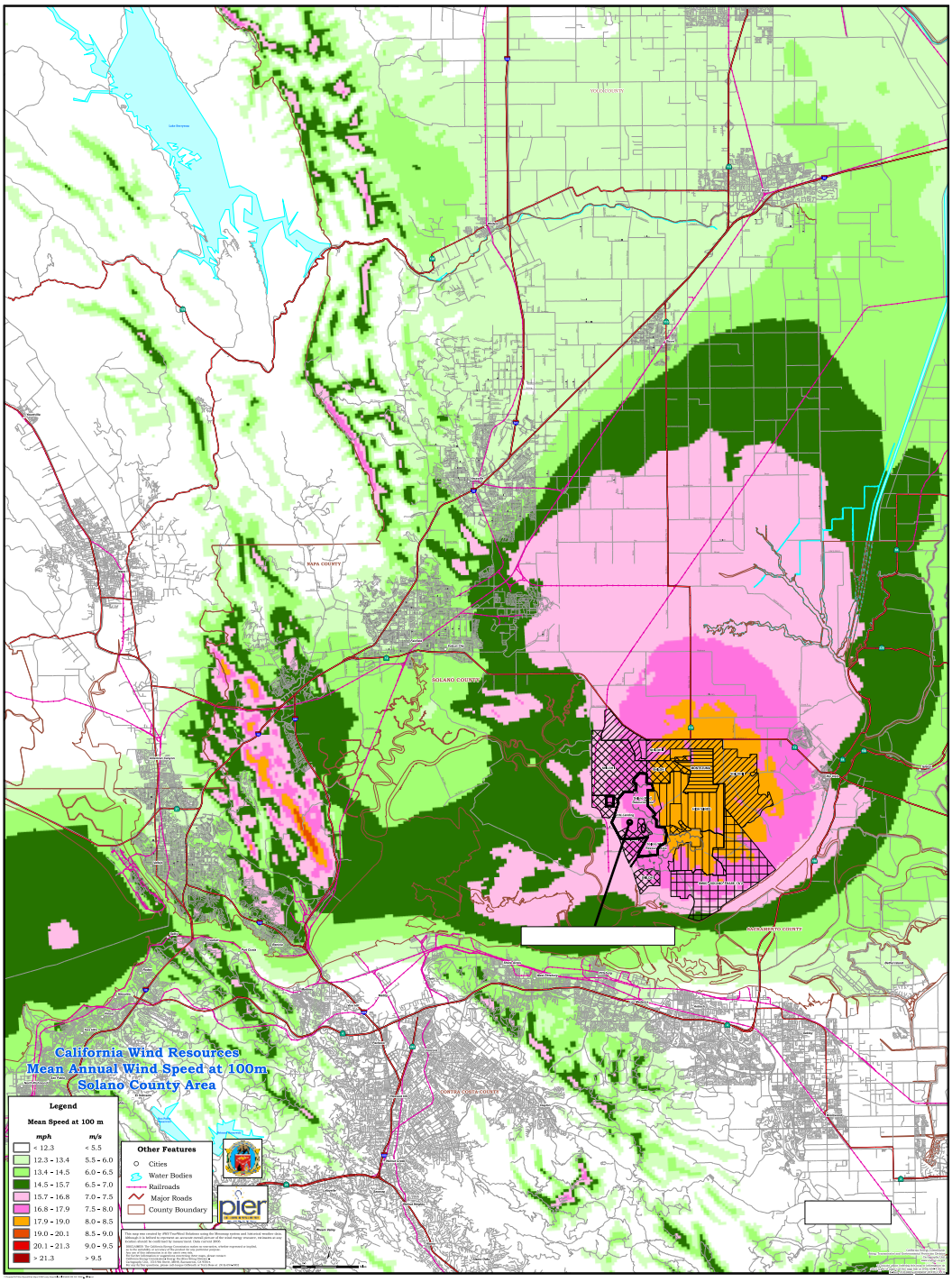


Figure 4 - This 100m above ground level (agl) wind speed map of the Solano Wind Resource Area was extrapolated from the 50m map that was developed by the CEC in 2002 using the 10m agl data from their 1985 Wind Atlas. When using a .065 wind shear exponent and the standard wind shear equation, it converts into 15-17 mph winds at 15m agl. Doing the same conversion with the 50m agl map and a .065 exponent shows 15.5 – 18 mph winds at 15m agl. The likely reason for the discrepancy is because the CEC probably used a higher wind shear exponent to extrapolate from 50-100m thus creating a distortion in the map. A resource this valuable to the future of the state's renewable energy goals should be further evaluated and accurately mapped.