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General Scoping Comments and Areas of Concern

Additional submitted attachment is included below.

4 December 2023

To: Drew Bohan, Executive Energy Director, California Energy Commission

Leonidas Payne, Project Manager, California Energy Commission

Mr. Eric Knight, Manager, Siting and Environmental Branch

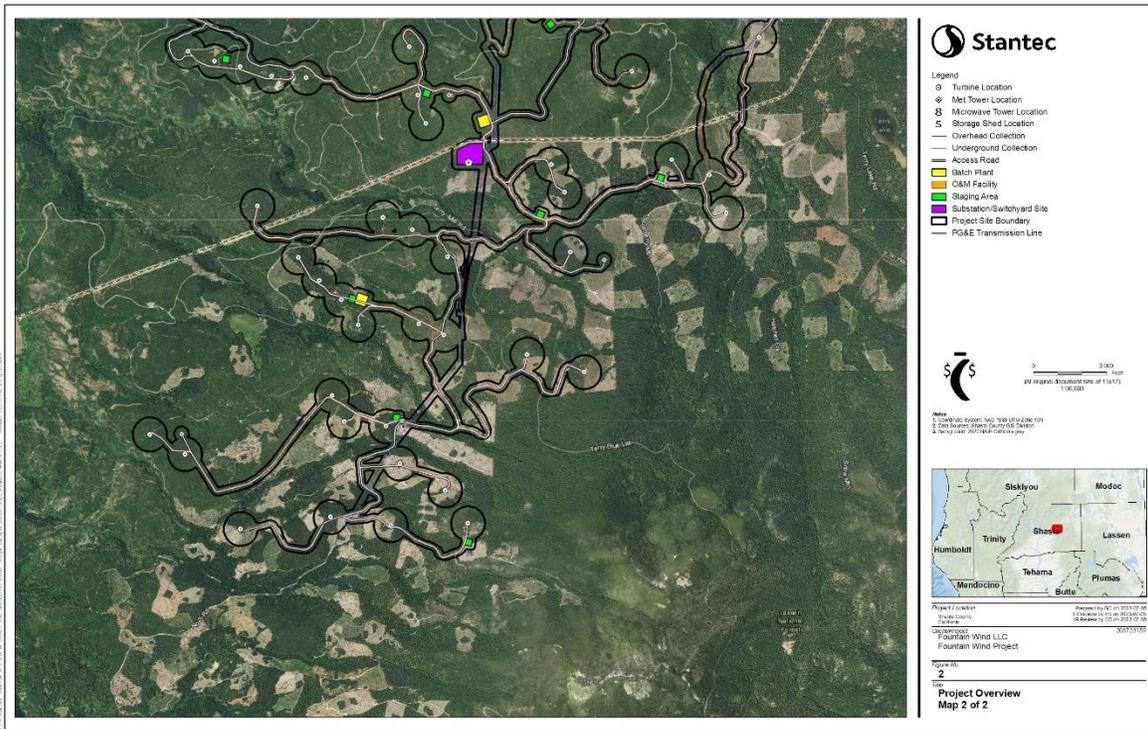
Subj: General Scoping Comments and Areas of Concern for the Fountain Wind Project

Dear CEC Staff,

Please find below additional scoping comments regarding various areas of concern.

Wake Effect:

Further effects of turbine wake, in addition to the previously docketed discussion of wake impacts to the power generation of the nearby Hatchet Wind Development, is that of self-interference. It is obvious from the suggested turbine laydown provided by the applicant, as shown below, that there is likely to be multiple cases of self-interference.



Unlike the Hatchet Ridge project where all the turbines are facing the prevailing winds without any of them being downwind of another, the Fountain Wind laydown has many turbines placed such that some are close enough to be impacted by the wake effect with possible further interference in the induction zone forward of the turbines, in the direction of the wind. Ref (B) indicates that wind speeds at turbine hub height can be reduced by 50% or more at 3 turbine rotor diameters (1600 ft) and still reduced by up to 5% at 5 rotor diameters and beyond (2700 ft plus) downwind due to the wake effect and energy extraction and this effect was noted for significantly smaller turbines of only 2.5 MW. Even upwind, in the induction zone, there is significant wind speed reduction up to 3 rotor diameters (1600 ft) away although without much of the turbulence seen downwind in the wake. Any reduction in windspeed will cause a significant reduction in power output because of the power curve and the cubic relationship

between power output and incident wind speeds. The wake effect will wander horizontally and vertically such that the downwind turbines do not have to be directly in line downwind with the wake producing turbines to be impacted. The turbine wake effect can extend as far as 10-15 rotor diameters behind a turbine and of course the larger the rotor diameter the further the effect will be seen both downwind and upwind.

In addition to the turbulence caused by the turbines themselves, there is the natural turbulence of a complex forested environment. There is a reason why industrial wind developments are not placed in forests. In 2017 the US Department of Agriculture published a report Ref(C) in which they examine the types of land that industrial wind developments are typically found in. Of the over 49,000 wind turbines in the US at that time, only 0.37% (181) are in evergreen forests, with another 0.10% (51) in mixed forests. Standard industrial wind energy development guidelines recommend avoiding trees (forests) because they are a significant known source of turbulence that impacts efficiency by reducing blade lift, even with suitable wind speeds, and causes excessive wear and strain on the turbine components. Additionally, the complex topography of the site with the many ridges and valleys increases the natural turbulence and is one of the reasons for the extremely tall turbines of this project. The taller height is needed in an attempt to reduce the impacts of this natural turbulence. The presence of the turbulence adds to the inefficiency of this project and further illustrates why this is just the wrong place for this project and technology.

The co-interference effect should be modeled for all proposed configurations to determine a more accurate capacity factor so that the overall efficiency of this

project can be better quantified and compared to alternatives. The lack of efficiency, evidenced by a probable low-capacity factor, along with the power reduction interference to the existing Hatchet Wind development, behooves the CEC to look deeper into the net greenhouse gas reduction as well. Other alternative energy sources are much more attractive and suitable given the probable low net output and inefficient operation of this project. Additionally, the increased turbulence and co-interference as well as the interference with the Hatchet Ridge project will have a direct impact on turbine longevity and will contribute to component failure and possible turbine fires of both wind projects.

The wake effect is also one of the major dangers to aerial operations near the turbines in addition to the massive physical obstruction they impose. A 50% reduction in wind speed 3-5 rotor diameters from the turbines, that moves around horizontally and vertically, would cause extremely unsafe conditions for any aircraft in their vicinity. The aerial firefighting aircraft fly near stall speed when dropping retardant or water so a sudden pocket of dramatically reduced airspeed could cause significant loss of altitude and attitude control in an aircraft already pushing the limits of safe operations to fight a wildfire. There are very valid and scientifically defensible reasons, the aerial firefighter, Mr. Jim Barnes, testified at the scoping meeting that they would let the fire burn through the turbine field before they attempted to drop retardant. Other significant turbulence effects include wind shear at the upper and lower regions of the wake which is centered about the turbine hub. If all went well, and coordination with the turbine operators occurred before aircraft arrival on the scene, the turbines could possibly be shut down, but in the likely event that they were not, then it would be an “accident waiting to happen” as Mr. Dave Wadel testified at the

recent scoping meeting. Even with the turbines shutdown they will cause turbulence downwind from them albeit to a much lesser degree than when operating, but there is no way to reduce the massive physical obstructions the turbines impose, which on its own merit still eliminates one of the most effective firefighting tools we have.

A further discussion of alternatives.

As mentioned in previously docketed submissions, biomass and solar are two viable and well-suited renewable energy technologies for this area, particularly biomass. In addition to the alternatives that could be constructed in this area, there are other alternatives to producing the same or more green energy in other locations throughout the State. There are other wind resource areas (WRAs) that could be developed or repowered, as also previously identified, especially offshore. There are numerous older less inefficient turbines that could be repowered in the Solano, Altamont, Pacheco, Tehachapi, San Geronio, and East San Diego County WRAs.

Another viable alternative the state should promote is distributed solar. In a recently enacted counter productive green energy ruling the CPUC blocked rooftop solar for farms, schools and many renters within the State as reported in a November 17th article by Solar Rights Alliance, www.solarrights.org. The December 1, 2023 article “California’s rooftop solar policy is killing its rooftop solar Industry” written by Jeff St. John on www.CanaryMedia.com points out how the CPUC’s Net Metering 3.0 (NEM-3) decision has resulted in a 77% to 85% drop in rooftop solar since April 2023. They state: “17,000 jobs have or will be lost by

the end of 2023 due to NEM-3. The massive job loss represents 22% of all solar jobs in California,” they further stated: “But over the past two years, residential and commercial solar installers added more clean capacity than all utility scale solar projects in the State...” Per California Distributed Generations Statistics, www.californiasdgstats.ca.gov rooftop type solar produced nearly 15.9 GW of peak power (reported 10/31/2023). Why, if clean energy is truly the goals and not the profits of large utility scale power generators or distributors like PG&E and others, is the CPUC allowed to make the rate and placement rulings they have? The State should be doing all it can to promote rooftop solar and local storage not discouraging it. They should be placing them on all public buildings and parking spaces, etc., long before they consider locating projects like Fountain Wind in the highest fire hazard rated forested lands like ours.

Greenhouse Gas Reductions.

Greenhouse gas reduction calculations should include all aspects of energy usage for the development of this project such as the following:

The nearly 50K vehicle trips identified by the applicant. The massive amounts of concrete, with its extremely high greenhouse gas production. All materials used to manufacture the turbines should be accounted for. Including the mining, refining, and component manufacture, and transportation. Transportation of all components and all aspects of turbine construction and site development should also be accounted for. The operation of three concrete batch plants and the temporary use of fossil fuel generators to run the various operations including cement production, etc. All site preparation and road clearing operations.

Permanent and temporary loss of carbon sequestering trees and shrubs. Large quantities of carbon released from the temporary and permanent disruption of the soil biome including the large amounts that will never recover because of the permanent changes to the local forest environment. Since the Burney Water District will not be supplying water to this project, all well drilling operations and materials should be included in the calculations. The wasted fuel from the disruption in traffic flow with the many vehicles likely to be idling during road closures or traffic control operations for material transport should be included in the calculations. All maintenance and operational activities and materials should be included in the calculations along with all consumables used such as grease, oils gas and other fuels. Calculations should also include all decommissioning operations including material transport and disposal.

When examining the net benefit, a reasonably low capacity-factor should be used due to reasons previously mentioned such as the effects of turbulence, wake, and other environmental factors. The probable rate of 20-25% curtailment by the California Independent System Operator (CAISO) should also be factored into the net benefit calculations. The reduction in power output of the nearby Hatchet Wind should be accounted for in the calculations. The possibility of further reduction of as much as another 20-25% from the shutting down of turbines during various times of the year to reduce cumulative impacts of Hatchet Wind and Fountain Wind on migrating birds and bats and other wildlife. There is also the matter of Red Flag warning days and whether Fountain Wind would continue to operate during those times. We frequently lose power during Red Flag warning days because of the Power Safety Power Shutoff (PSPS) events instituted by PG&E. It would be prudent that when we are undergoing a PSPS event, the Fountain

Wind project would also shut down because of the many miles of overhead collector lines and other possible sources of ignition it presents. In 2019 PG&E had 23 days of PSPS in this area. That's approximately 6.5% of the year. Although they've been reduced since then they do still occur. These periods of safety power shutdown should be accounted for in the overall calculation of plant efficiency and greenhouse gas reduction. All the many issues and inefficiency noted above are reasons why this project needs to be located elsewhere.

This project, in this location, is also in conflict with Cal Fire's Climate & Energy Program and the strategies it lays out. Strategies that are recognized by the Governor's Climate Action Team reports, as well as AB 32, the California Global Warming Solutions Act. AB32 recognizes our forests as carbon sinks and calls for forest management practices that maximize the potential for them to absorb carbon.

CAL Fire's strategies include forest conservation to avoid the loss of forest lands to developments such as will occur with this project's plan to permanently destroy several thousand acres of forest. CAL Fire's Plan calls for the prevention of conversion of our forests to other uses, to protect the existing carbon stored in standing trees, and to maintain the land's inherent capacity for sequestering maximum amounts of carbon. Not all lands and climates within our State are suitable for growing big trees as our local forests are. Our local forests are carbon sinks that maximize carbon sequestration unlike grass or desert lands. The forested lands of Shasta County should be preserved for what they do best, grow big trees and sequester carbon, which is another reason this project should be located in less carbon rich and beneficial lands.

Additionally, there is the problem of what time of year the power from this project would be generated which also adds to its overall inefficiency because of the likelihood of increased curtailment when its producing at peak capacity. The nearby hatchet Ridge project produces the least amount of power from June-September, per the CEC's Staff Report on Wind Energy in California, and so would the Fountain Wind project. This project would produce the least amount of power when it was needed the most (the late spring and hot summer months) and the most amount of power when it was needed the least, leading to larger quantities of power that would likely be curtailed by CAISO.

Ultimately, if you calculate the impacts of an out-of-control wildfire, that this project will likely lead to, then it would be obvious that this is the wrong project for this area and that there would be a net deficit in greenhouse gas reduction on that basis alone. Even without the wildfire issues, there are better places for this type of project that would have greater efficiency and less impact to an existing high functioning carbon sequestering environment.

Water/Hydrology Issues.

As mentioned previously the Burney Water district is not supplying water to the project so the only other listed alternative is to drill several wells. This could lead to serious hydrological impacts and should be examined closely. Large quantities of water are expected to be used during construction operations for concrete production, dust abatement, etc. Ground water level issues could arise, especially during drought years, from deep well pumping operations. Forest health could be impacted from lowered water table levels. Water availability at lower elevations

in surrounding areas could also be impacted. Blasting and ground disturbance operations should be analyzed for impacts to springs in and around the area. The large quantity of herbicides necessary to keep the roadways and power line routes clear of various types of vegetation should be examined for impacts to water quality. The large amounts of runoff and sediment flow from all the soil disturbance during construction, operation and maintenance activities should also be considered. The natural filtering effects of thousands of acres of undisturbed forest soil, flora and fauna will be lost due to this project and will have a direct impact on water quality. Existing aquatic life will likely be greatly impacted as compared to an undisturbed or rarely disturbed area. The project proposes to use as much as 5,000 gallons of water per day during regular operations per the project description. This is equivalent to 60 persons on a regular basis. At least 50 acre-ft of water will be used during construction. All the applicant's estimates for water usage should be examined closely for accuracy and impact.

GPS and RF Communication Issues.

The applicant has suggested that a list of Global Positioning System (GPS) determined locations for the Wind Turbines be given to areal firefighters so that they can avoid them. The FAA will also require this for all project Turbines and meteorological towers. Analysis of the possible impacts by the wind turbines on a real-time GPS solution for the user on the ground or in the air needs to be completed. The turbines are a probable cause of interference due to signal multipath, blockage, and roto-blade modulation effects. Various studies have shown that the large metal turbine towers will reflect the GPS signal causing

multipath. Even non-conductive towers, such as those constructed from concrete, can reflect the GPS signals causing nearby multipath and inaccurate solutions. Ensuring an accurate GPS solution is vitally important for any first responder operations in or around the project, particularly for firefighters, who may need to report their location during firefighting and emergency operations, should they become trapped amid a wildfire with poor visibility or need to locate other trapped victims by GPS determined locations.

Another vitally important area of analysis that needs to be thoroughly conducted is that of the impact of the Turbines on Land Mobile Communications. The previous analysis in the EIR conducted by the county only looked at the fixed Land Mobile transmitting sites within two miles of the project area but did not consider the impact on field personnel who would be operating two-way radios within and/or near the project area during emergency operations such as firefighting. The county's previous EIR incorrectly concluded that if the transmitter was no closer than 425 meters of the turbine it would not be impacted. No reference was cited in the EIR for this number. The 425meters is comparable to numbers given in a paper published by the Naval Post Graduate School which looked at the "The Electromagnetic Interference of Wind Turbines." The NPS study recommended a stay-clear-of zone of 450 meters because of significant interference to Land Mobile Communications for a single turbine tower only 230 feet tall. Fountain Wind will have 48, 610-foot-tall towers, more than 2.5 times as tall and 48 times as many as the NPS study, so the impact will be much greater than noted in the study. This previous deficiency is noted here because ConnectGen has used much of the previous EIR studies and data as part of its opt-in application.

Also, because of the need to ground the Turbines to aid in reducing lightning damage they act as large RF sinks causing broadband RF signal attenuation. The towers essentially short the skywave signals to ground. HF and VHF frequency fading, time dependent fading, Doppler spread, depolarization, signal reflection and refraction and interference can be expected. This interference with emergency radio communications in a high fire hazard zone combined with the increased probability of a fire caused by the project and its impact on aerial firefighting capability is just another reason why locating this project in the forested lands of Shasta County would be irresponsible at best.

GRID Issues.

The applicant has repeatedly stated that they do not connect to the Round Mountain substation and only connect to the Cottonwood Substation's 230kV bus and therefore, avoid the problems of thermal overload and dangerously high voltage that exist at the Round Mountain Substation as identified in the CAISO 2018-2019, & 2020-2021 Transmission Plans.

However, as identified in the CAISO Transmission Plans, the problems at the Round Mountain Substation spreads out **across** all PG&E's grid. The 230kV bus at the Cottonwood Substation is directly connected to the Round Mountain Substation and is especially impacted by the existing problems at Round Mountain.

The 2018-19 CAISO Transmission Plan states: *Having high voltage on the 500 kV system will result in high voltages on 230 kV and to some degree the 115 kV and 60/70 kV lower voltage networks. High voltages across the PG&E system have*

been observed in real-time and planning studies under light load conditions, that poses ongoing challenges for system operations. (Pg. 82)

The more recent 2020-2021 Transmission Plan has also identified reliability issues and needed upgrades required to the Cottonwood/Round Mountain 230kV bus as follows:

On pages 90&91:

...Cottonwood 230 kV bus overloads the underlying 115 kV and 60 kV network connected to the Cottonwood substation under the peak load scenario in the near term.

...Round Mountain 230 kV bus overloads the Round Mountain – Cottonwood 230 kV Line under the peak load scenario in the near term.

The CAISO is recommending protection upgrades at Cottonwood 230 kV and Round Mountain 230 kV substations to address overload under P5-5 contingency.

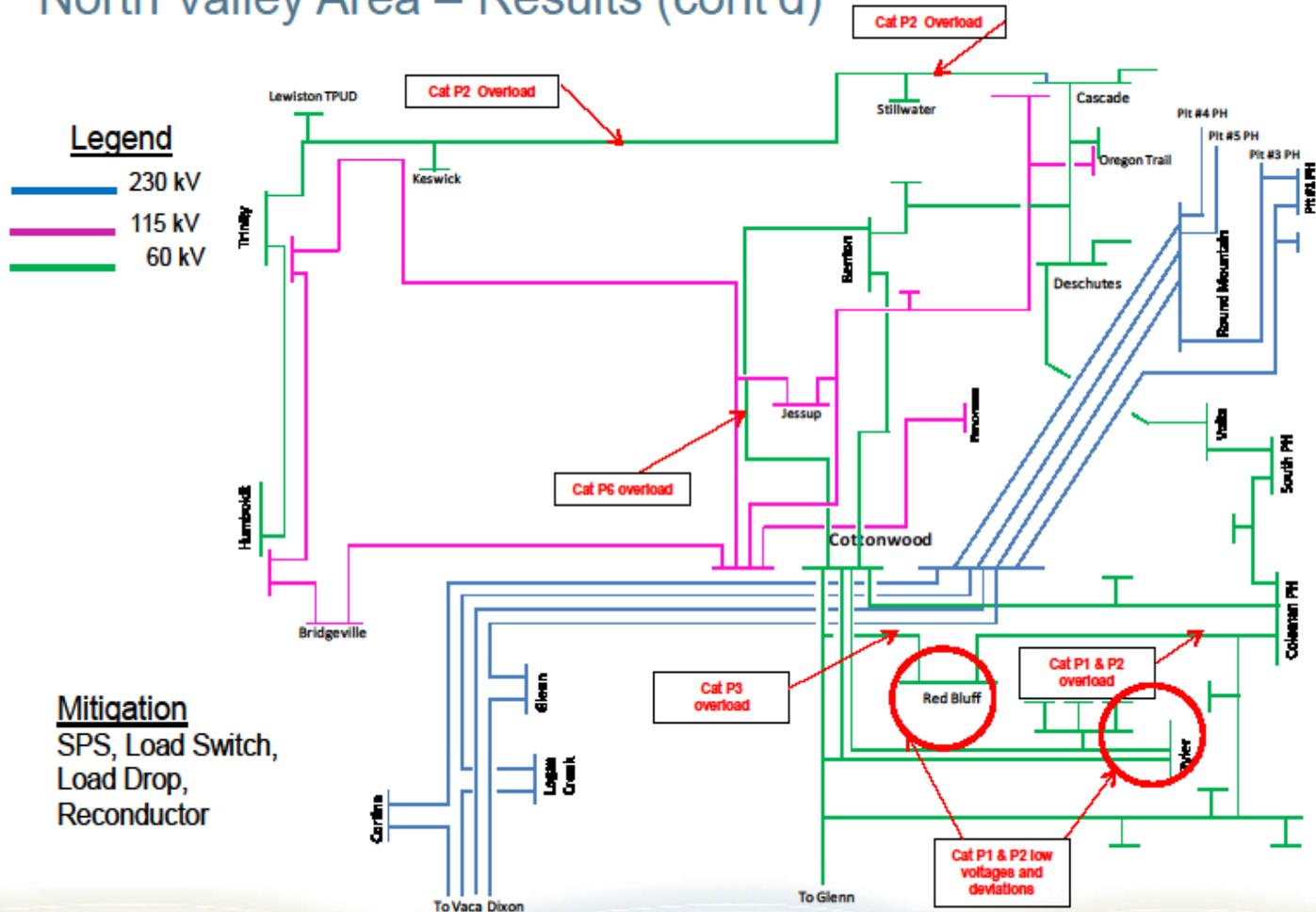
On pages 191, 192 &220:

The deliverability of renewable and energy storage resources in the Northern California zone is limited by the thermal overloading of the Round Mountain to Cottonwood E. 230 kV line...

Solar resources interconnecting to Round Mountain 230 kV bus is subject to curtailment in sensitivity 2 portfolio due to normal loading limitation of the Cottonwood-Round Mountain 230 kV line...

It's known that even when PG&E and the CPUC were saying the grid was safe, it wasn't, as demonstrated by the Camp, Kincaid, Zogg, Dixie and many other fires; how much more unsafe is it when they are admitting to their being known safety and reliability issues? Adding the unpredictable power of the Fountain Wind Project will just add to the problem which won't be rectified until 2025 at the earliest.

North Valley Area – Results (cont'd)



The various issues identified above are by no means exhaustive. Many other areas of concern have recently been docketed by various letters from other agencies, such as those from the CDFW, and private citizens that should be examined closely. How the CEC could possibly complete a CEQA review in 270 days is unclear and will likely lead to many areas with inadequate analysis since they require multi-year data collection and monitoring to be valid. Reliance on old studies from 2016 or before is sloppy science and should not be done. There are also the many submissions during the County led CEQA process that you should

request and examine closely. Issues related to coal deposits, landslides, flooding, deer migration and fawning areas, blinking lights, and more were commented on once before during the Environmental Initial Study (EIS), two Draft EIRs, and the two Final EIRs. And although the number of turbines has changed over the years and the footprint slightly altered, it is still the same project and most of the comments still apply. In fact, even though the applicant submitted an updated project description they are still using old graphics for the turbines and other features. The project was always up to whatever number was apropos at the time, up to 100, 72, or 48. And much of the data submitted by the applicant is taken directly from the previous County led effort. Please take the time to thoroughly address those same issues. In doing so, you will no doubt draw the same conclusion the County did, that this is simply the wrong project for this area and rightly uphold the County's previous denial and general prohibition of these types of developments within the County.

Sincerely,

Joseph Osa

References:

- A. TN251663_20230817T153946_fwp_project_description
- B. Citation: Alaoui-Sosse, S.; Durand, P.; Médina, P. In Situ Observations of Wind Turbines Wakes with Unmanned Aerial Vehicle BOREAL within the MOMEMTA Project. *Atmosphere* 2022, 13, 775. <https://doi.org/10.3390/atmos13050775> Academic Editor: Stephan Havemann
Received: 18 March 2022 Accepted: 4 May 2022 Published: 10 May 2022
- C. USDA. Wind Energy Land Distribution in The United States of America, Office of Energy Policy and New Uses Office of the Chief Economist United States Department of Agriculture, July 2017
- D. CAISO 2018-2019 & 2020-2021 Transmission Plans