

Tule Wind Farm Statement

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I represent the San Diego Renewable Energy Society that has about 180 members the last time I checked. We are a chapter of the American Solar Energy Society that has about 10,000 members nationally. We strongly support the Tule project and the substations necessary to connect this project to our electricity transport system. We also support substation development to connect future wind projects. Why do we act in the name of these many members and lend our credibility to these projects? We do so because we think the local impacts are acceptable compared to the overall goal of moving San Diego and the U.S. to a sustainable future and reducing the catastrophic impacts of global warming that are looming over the next decades and centuries. Our generation happens to be the one that needs to act so that future generations have a chance to live on a planet that we would recognize --- rather than one that would be so changed that we would have difficulty recognizing it in a century. Without our making many difficult choices, they will have few choices.

Without question, there would be impacts from the proposed Tule wind farm. The draft DEIS/R lists about 90 impacts that were studied. About 40 had no residual impacts, and another 40 or so were able to identify measures that could mitigate impacts without adverse residues. The remaining dozen or so would provide impacts either during construction or operation that could be reduced but not totally mediated. Things like changing the scenic vista, construction dust, noise and ground vibration, light glare, possible disruption to eagles and the quino butterfly. It looks like a careful job was done in these studies and the team that conducted the evaluation should be thanked.

Let's go back for a minute to put this project in context. The whole purpose of the Tule wind farm is to contribute to the goal of about 80% renewables by the year 2050 to help San Diego reach its climate change goals. (Currently the goal is 20% by 2010, and 33% by 2020 but the science indicates the need for 80% by 2050.) If this clean project were blocked along with the many other clean energy projects that are pending, then we would fall far short of our goals and the impacts would be many and varied.

We have already witnessed the early impacts of global warming. One is the persistent drought and the rapidly increased number and intensity of forest fires --- now called firestorms. About 15 people were killed and how many animals of all species were lost during the Cedar fire alone. It was only one of a dozen fires raging at the same time in 2003. Talk about impacts. This was caused by the persistent drought that aided the bark beetle in killing 80% of some tree species in San Diego County. This drought extends to the entire southwest and will cause water issues in San Diego over the decades to come. The warming will also cause earlier snowmelt in the Sierras, our natural water storage system, causing spring floods and overwhelming our current system of dams. Thus, less water will be available in the summer for crops and even impact urban water needs. Increase in air pollution is projected, as is a huge loss of wildlife species if business as usual continues. Some estimates are as high as 80% species loss by the end of the century. Rising ocean levels will definitely impact San Diego directly and indirectly. Besides coastal flooding, a major part of our water supply from the Sacramento River delta is already below sea level.

The loss of the Tule energy project and others in the eastern deserts will all contribute to these many and varied impacts from global warming. This must be balanced against some local and immediate impacts. The most obvious is the visual impacts of these very tall wind generators that are a real and tangible loss, to those who choose to live in the Boulevard area because of its remoteness and those who visit the area for that reason.

San Diego is blessed with an abundance of natural places to enjoy and restore oneself from the travails of urban life. San Diego has the largest State Park in the 48 (over 600,000 acres) as well as a major national forest, several other state parks, county parks, and preserves of all kinds. As the former president of the Volcan Mountain Preserve Foundation, I truly appreciate the need to set aside open spaces. As someone who hikes several times a week in these remote places, I know the value of these special places. So we have to commend San Diego County, the state and the federal government in the very credible job they have done in setting aside open lands for us to enjoy.

This existing and wonderful resource should be balanced with some land being used for other purposes that fulfill other needs. For example, we have a sizable land area dedicated to activities that totally trash the land, destroy all habitats, increase pollution significantly, and are terribly noisy every day --- not just during a year or two of construction. Off-road recreational vehicle areas have all these impacts but they meet a need. The need is recreational and meets some people's needs to "get away" with family and friends. This is seen as a reasonable use of the land in certain amounts even though it is total destruction in so many ways.

The Tule wind farm will have vastly less impacts than recreational off-road vehicle use. A wind farm actually only uses about 2% of the land in the wind farm designated area. This is mainly for the service road connecting each generator. Each generator uses an area similar to the size of a large residential house and the substation uses a few acres. Trying to balance different needs, we have found a way to allocate some land to off-road vehicle use. We should also find a way to use some land for clean energy projects that are vital to our future.

Meeting different needs implies that the conflicts and impacts of meeting these needs need to be balanced. Accepting some local impacts of a clean energy wind farm, to reduce or eliminate a host of local, county, state, national and global impacts likely to result from excessive carbon emissions, is a balancing act that we must deal with.

I must note that it is unfair that some of us have more impacts because of where we live than the rest of us who live elsewhere. I think that these local folks should be compensated for their local impacts. As far as I know, we ask them to accept these impacts such as the local visual impact, and we do not offer them any local compensation. They are asked to enjoy the benefits we all enjoy at large and to magnanimously accept their real, local impacts. There is a certain amount of inequity in this that has yet to be addressed. I enjoin the CPUC, CEC, BLM, San Diego County, other agencies, and the energy system developer to consider ways to try to balance impacts with compensation. Possibly something as simple as a reduction in energy bills for all those who can "see" the wind generators from their property. The amount of the compensation might be proportional to the distance from the Tule site. This seems

entirely fair and could be a modest expense since there are so few home sites that can see the proposed wind farm.

With this in mind, I must tell you that the proposed Tule wind farm will have visual impacts for me, and very strong impacts. I will see these large turbines as tangible evidence that we are finally moving in the right direction. That we are making the difficult decisions to balance the present with future needs and that these limited local impacts pale in comparison with the sum total of all the insults we will unleash on San Diego and the rest of the world if we continue business as usual. These slowly rotating kinematic sculptures will look absolutely beautiful to me. They will certainly make me smile. So the scenic vista will be diminished for some and augmented for others. How do you establish if this is a net positive or negative impact.

I know that some species will be disrupted during construction and some might be disturbed later. I also know that the project is required to avoid to the extent possible, by locating the turbines in a way to minimize impacts. I ask the parties that are responsible for the actual plant layout, to use the DEIS/R data to minimize impacts.

There will definitely be bird and bat kills resulting from the Tule wind farm. This project will generate about 3% of the electrical energy used in San Diego County. Even if 20% of our national energy came from wind farms, it would increase the current damage that we inflict on birds and bats by less than 1%. Is this acceptable? In the grand scheme of things, that looks like a very acceptable impact. But California has learned a lot about avian impacts over the past few decades as we have built wind farms and actually measured the avian impacts and learned about the siting specifics that led to impacts. We now have models that can help us understand what leads to avian impacts. These models would also allow us to mitigate these impacts by siting choices before construction. I know this understanding will be utilized in layout out the plant.

I have walked the nearby Campo wind farm and read the literature about wind farm noise. I found that I could not hear the woossh of the blades over the ambient wind sounds when I walked about 1000 feet from the turbines. It was a windy day and the wind farm was operating at rated power. I know that on quieter evenings, home occupants will be able to hear the woossh at a further distance if the ambient wind noise is lower. To avoid this, the siting decisions should keep the generators at least 0.5 miles from any homes.

There is concern that these wind machines will cause forest fires. As you know, this wind farm is not located in forest but in a rather arid location with little ground cover. However, older wind generators did overheat and start a fire, and some of them did cause ground level grass fires. As with noise, the fire issue has changed significantly in the current generation of wind machines. Each machine now costs 5 to 10 million dollars and needs to operate for over 10 years or so to pay back the investment. So there is a strong interest on the part of the wind farm owner to not have the machine burn up. So much for intent --- what about the specifics?

These machines are high above ground on a steel tower placed in the middle of a 70 by 70 foot gravel pad with a lack of vegetation around base of tower. The high voltage wires from the machines are underground, lightning protection devices on each tower, and temperatures inside the generators are monitored. Shut down is automatic when above normal temperatures are sensed. The data seems to show that lightning damage to newer machines is rare. However, I have unable to find comprehensive data on any ground fires caused by these newer machines.

This project will hook into existing transmission lines via the proposed substation. The fire danger of the existing transmission lines is neither increased nor decreased due to the creation of this wind farm. These existing high voltage transmission lines do not seem to have any history of starting fires. They are usually shut down if a fire comes close to them to avoid a short circuit to the ground that would damage the wires. The towers holding the wire do need to be washed to remove fire residues before turning the power back on. This situation would be exactly the same after the wind farm as it was before.

Although it was not considered in the draft Environmental Impact Report (DEIS/R), some people are concerned about property values dropping. A very comprehensive study of 25,000 residences showed there was an impact of wind farms on adjacent property values --- they increased property values. Ten wind farm projects in the US in seven states were identified. For each community adjacent to a wind farm, one was found without a wind farm that was comparable. Selling prices for homes were studied in each set of communities for 3 years before and 3 years after the wind farm was built. All this data was analyzed and gave the results of increased property values in the majority of the communities adjacent to a wind farm. More recent studies support these conclusions

Finally, some people point to the alternative of generating the clean energy solely by putting solar devices on buildings in the San Diego. They claim that there are no impacts of this approach since the buildings already exist within the urban power grid and there is no need to use transmission lines. Certainly seems like an attractive alternative. Is this really a viable choice?

Since I am representing the American Solar Energy Society, you can be assured that I support solar energy on buildings within the urban grid. This is an attractive member of the renewable energy portfolio and we support it whole heartily. Can it be the sole renewable option to the exclusion of wind farms, desert solar plants, geothermal, biomass plants including mining urban waste dumps? In a word, NO.

It is definitely a member in good standing of this team of options. The reasons that it can't be the sole renewable option are many and varied. When the amount of clean energy becomes more than a trivial amount, it is necessary to consider the operation of entire electric grid that is required to meet the needs of a city such as San Diego. San Diego is typical of cities in this county that runs 24/7. Rooftop solar is a mid day power source that operates on average at about 18% of its rated capacity. The engineers say that its capacity factor is 0.18 and it delivers 18% of the energy it could produce if it were to operate all the time.

The current mix of power sources in San Diego have a combined capacity factor of about 0.54 and they operate 54% of rated capacity on average. It is currently made up of a mixture of baseload, intermediate and peaking power plants. The peaking plants have a low capacity factor like fixed PV, but fossil peakers are used only during times of peak load as necessary since they are more expensive and polluting. Even though fixed rooftop PV has a low capacity factor, it cannot be dedicated to peak load. It produces power when the sun shines and typically reaches maximum power at noon. This is not a very good match to the summer time peaking load that occurs in late afternoon or early evening in San Diego. However, it is operating during the day when most of our power is used. Typically, the peaking credit for rooftop PV is from 20 to 60% of its rated capacity. For the urban grid to function you need something else to provide power 24/7 that can also meet late afternoon peaking. The something else would either be fossil powered electricity and/or expensive electricity storage. We are trying to move away from fossil energy and electricity storage is expensive and typically will double the cost of the energy that goes through storage. This is a significant impact – a cost impact.

The other way to balance the grid so that it both reduces fossil dependency and keeps cost reasonable is for a mixture of renewable power sources. This mixture would have some baseload (geothermal, bio-gas, bio-mass or small hydro), intermediate (desert concentrating solar thermal plants with cheap thermal storage), sunrise to sunset solar tracking plants, fixed solar desert plants, less expensive wind with night time and day time capability, and finally, fixed PV. The capacity factor for this mixture goes from about 0.92 for baseload, to about 0.42 for desert solar with cheap storage, to about 0.28 for tracking solar, 0.22 for desert fixed PV, and 0.18 for fixed rooftop PV. Wind is about 0.4 and is available during the night and day depending on the season and daily weather. By mixing these options, you can achieve the capacity factor that is desirable as there is greater and greater use of renewables. As you approach 80% renewables by 2050, you can envision about ¼ baseload, ¼ of the middle capacity factor tracking solar, and ¼ fixed rooftop PV and ¼ wind as a viable mix. Even this mixture could benefit from some storage capability in the 2050 time frame being available to the grid whether it be utility scale battery, hydrogen, on-board batteries in PHEV and EV vehicles, pumped hydro, or movable mass storage. The eventual amount and type of storage would need to be determined by future dynamic grid studies that are not available at this time. If you limit yourself to just fixed rooftop PV at 0.18 capacity factor, it would make the job of a balanced grid extremely difficult and expensive.

Of all the renewable options that are commercially available at this time, PV is the most expensive. Its costs have been dropping since commercial applications started in the 60s and they continue to drop. Over the last decade, the cost learning factor is about 17.5% based on global production. That is, for every doubling of global production, the cost of an installed PV system reduces by 17.5%. This rate had been about 22% in previous decades so the rate of cost reduction is still high but is reducing somewhat. If this rate of cost reduction continues for another decade, the current levelized cost of a residential PV system would go from today's 20 cents/kWh with current federal and state subsidies in San Diego, to 16 cents/kWh without any subsidy in 10 years. Today's cost for residential electricity is about 17.5 cents/kWh in San Diego and has risen historically at close to 5%/yr. Clearly, the unsubsidized cost in 10 years would be attractive if a home owner had the cash to invest or

could negotiate financing. This is a goal that California and federal policy is striving to attain. This would still be the most expensive form of renewable energy in 2020 since the other alternatives would be from 8 to 14 cents/kWh without subsidies. However, the extra cost of residential PV is moderated by a number of considerations such as its contribution to reducing electric distribution cost if the PV is distributed evenly in the grid. There are other more external considerations that favor distributed PV. It will still be an attractive option and stays in the mix.

So what does all this come down to?

Based on balancing the grid and avoiding expensive storage costs, rooftop PV cannot be the sole renewable electricity option and must take its place among the other desirable forms of renewable electricity. Neither can wind be the sole renewable option. But wind is a valuable addition to the renewable energy mix in the San Diego region. It is clean. It is the least expensive renewable energy source. It can be easily integrated into grid operation especially if the grid operators use previous day wind forecasting. Typically, wind farms generate more energy at night and tend not to meet daytime electricity needs and especially not meet summer peaking loads. Fortunately, the Tule wind site has wind characteristics that are favorable even to meeting summer peaking loads and has an average capacity factor of about 0.4. So, it will be able to help meet the new and potentially large night time electric vehicle load as well as the day time summer peaking loads in San Diego. This is an attractive combination of characteristics and may be unique to the Tule site.

When we stand back and look at Tule in light of the bigger picture, we see a clear advantage in going ahead with Tule. The modest local impacts are more than out weighted by the local, regional, state, national and global advantages it contributes to.

We must note that it is unfair to have these local impacts fall on the shoulders of the people who live near the Tule site. Justice demands that a way needs to be found to partially balance these impacts with local benefits.

Respectfully submitted,

Rich Caputo

Board of Directors
San Diego Renewable Energy Society

Board of Directors
American Solar Energy Society

P.O. Box 1660
Julian, CA 92036
760-765-3157
richardcaputo@sbcglobal.net