DOCKETED

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Comment Received From: Gene Nelson, Ph.D.
Submitted On: 8/5/2017
Docket Number: 17-MISC-01

The Trident Winds Project as Proposed is Harmful, Risky, Impractical, and Not Cost-Effective

Please see the attached document titled, "DCPP is superior to all of California's Wind Generation." The arguments are relevant to the controversial proposal to place the Trident Winds project above the Offshore Continental Shelf (OCS), since large scale wind patterns, including the pressure gradients that power wind turbines are determined by weather systems whose size is typically measured in hundreds of miles.

This is the text of a recently-transmitted email to a CEC staffer regarding this Docket

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05 August 2017
RE: Docket No. BOEMâ€“2016â€“0051; MMAA10400

Hello, Jean:

Attached find a pair of documents that summarize Californians for Green Nuclear Power's (CGNP's) objections to the Trident Winds Project. I request that they become part of the record as public comments in opposition to this proposal, which CGNP characterizes as harmful, risky, impractical, and not cost-effective.

CGNP requests the opportunity to become an active stakeholder in this proposal. Our group's bona fides are summarized in the signature block below. However, the website's means to sign up did not appear to function when I last attempted, so I am contacting you directly. Furthermore, I do not have assurance that any of our electronic submissions sent via will actually become part of the record.

I request confirmation that CGNP's comments have been placed into the record and confirmation that CGNP is now an active participant.

Special note to Scott Flint of the CEC: CGNP also notes that the means to sign up to be alerted to upcoming Trident Winds meetings appear to be nonfunctional. Therefore, CGNP is contacting you directly to sign up. We also request confirmation that you have received these documents and that they have become a part of the record in this docket.

Sincerely,

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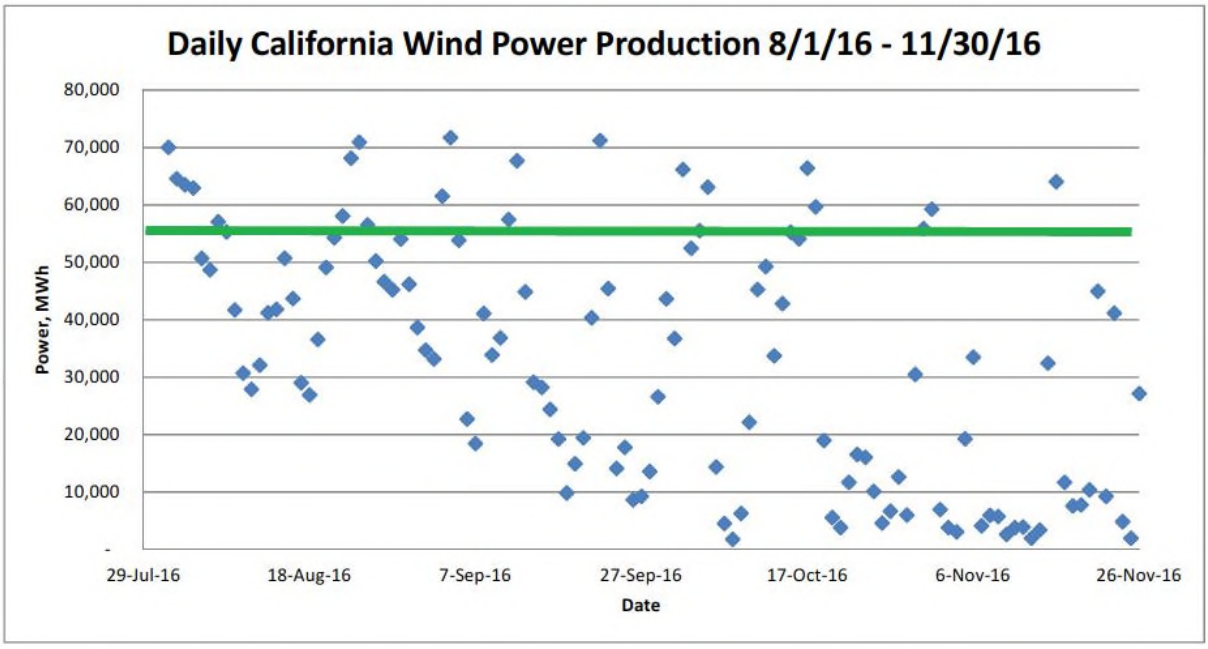
CGNP is an independent pro-environment non-profit educational organization advocating for the continued safe operation of Pacific Gas & Electric's Diablo Canyon Power Plant since 2013. We have been recognized by the IRS as a 501(c)(3) . We are also a CPUC Intervenor supporting nuclear power in California in CPUC Proceedings including A.16-08-006, among others. CGNP has obtained eligibility to claim intervenor compensation in Proceeding A.16-08-006. CGNP is also a Party to FERC Docket AD17-11-000 regarding preventing the potential harm of state policies regarding nuclear power..

Additional submitted attachment is included below.

DCPP is superior to <u>all</u> of California's Wind Generation 05 Aug 2017 Gene Nelson, Ph.D.

In order to prove the above contention, I utilized the excellent California Independent System Operator (CAL-ISO's) "Daily Renewables Watch" for each day to "cut and paste" the daily wind production for each day from 1 Aug 2016 through 30 Nov 2016 into a spreadsheet. The URL for the page is shown in the graph's legend. I prepared a "scatter plot" showing the stochastic (random) nature of California wind production during that period. However, note that in November, 2016, there are many days with very small amounts of wind power generated.



The green horizontal line shows DCPP's typical daily production of 54,360 MWh/day during this period.
Minimum production was 1,946 MWh on 25 Nov 2016 and maximum production was 71,750 MWh on 4 Sep 2016.
Source: CAL-ISO Daily Renewables Watch Report for each day at
http://www.caiso.com/market/Pages/ReportsBulletins/DailyRenewablesWatch.aspx
Author: Gene A. Nelson, Ph.D. Prepared 04 August 2017

Per PG&E, Diablo Canyon Power Plant's (DCPP's) "nameplate capacity" is 2,240 MW. Per the CAL-ISO "Power Mix by Fuel Type" website chart, California wind "nameplate capacity" is calculated at 6,255 MW, almost three times the DCPP nameplate capacity. If all of California's wind capacity were operating at 100% of its output, the result would be 6,255 MW * 24 hrs = 150,120 MWh, about twice the maximum value shown on the above chart. This chart shows that the percentage of time that wind is generating power, also known as "**capacity factor" is much smaller than 100%.** The actual wind CF is **21.73%,** in comparison with **DCPP's CF of 100%.** In fact**, DCPP produced 1.65 times all of California's installed wind capacity during this period**. (DCPP produced 6,558,720 MWh and wind produced 3,979,122 MWh.) Please note that a similar analysis for California's **solar** power would yield a similar conclusion, since essentially all solar power is generated within plus or minus 2.5 hours of solar noon. DCPP's written testimony also established that almost <u>none</u> of California's abundant solar power in stored at Helms Pumped Storage or at Castaic Pumped Storage. (See the accompanying file for additional details regarding the insignificant amount of California battery-based electricity storage.)

In California, where the dominant energy source for electricity generation is euphemistically labeled as "**Thermal**," aka burning natural gas or coal to generate power, this stochastic nature of wind, (which further varies from minute-to-minute throughout the approximately 700-mile-long length of California) means that considerable "Thermal" generation capacity is required to be operated in "**back down**" mode so that a generator is preheated and idling and ready to supply power in response to random diminutions to wind power. The "backed down" fossil-fuel power plant is consuming fossil fuel - and emitting carbon - at almost the same rate as it would be producing full power. Some thermal plants require 24 hours of preheating to be ready to produce power. Providers of natural gas (and coal for the substantial amount of out-of-state imported electrical power) are very pleased with this situation. **The public perception is that wind power cuts emissions when in actual fact, very little emissions are avoided.**

The green, horizontal line shows the level associated with the daily output of Diablo Canyon Power Plant (DCPP) during this period. Note that the level is **above** that associated with wind power on that day for a super majority of the 122 days during the period. Since the large California economy needs reliable power at the proper voltage and frequency, DCPP provides important voltage and frequency stability within the large "reliability area" near DCPP on California's central coast. DCPP makes lots of power. Over a year, it produces the equivalent of five (5) Hoover Dams or fourteen (14) Topaz Solar Plants. Hoover Dam, Topaz Solar, and DCPP make "zero carbon" power. DCPP's power is cost-effective. A 2016 study showed that DCPP generated the huge amounts of power it makes at a cost of about 2.71 cents/kwh. This low cost dilutes the ratepayer cost of so-called "renewables" such as the trouble-plagued Ivanpah Solar Plant, which has a long-term supply contract with PG&E at 20 cents/kwh. **These ratepayer and environmental benefits** are some of the reasons why Californians for Green Nuclear Power (CGNP) is advocating for continued operation of DCPP past 2025 in the CPUC Application A.16-08-006, now being decided by the CPUC.

I note the reporting in the attached ***Tri-City Herald*** article, "Richland nuclear plant under 'no touch' order during heat wave" 02 August 2017 By Annette Cary

http://www.tri-cityherald.com/news/local/hanford/article165116382.html documents the benefits of nuclear power for northwest Washington state - and contrasts it with wind, which can be abundant at times in Washington state.

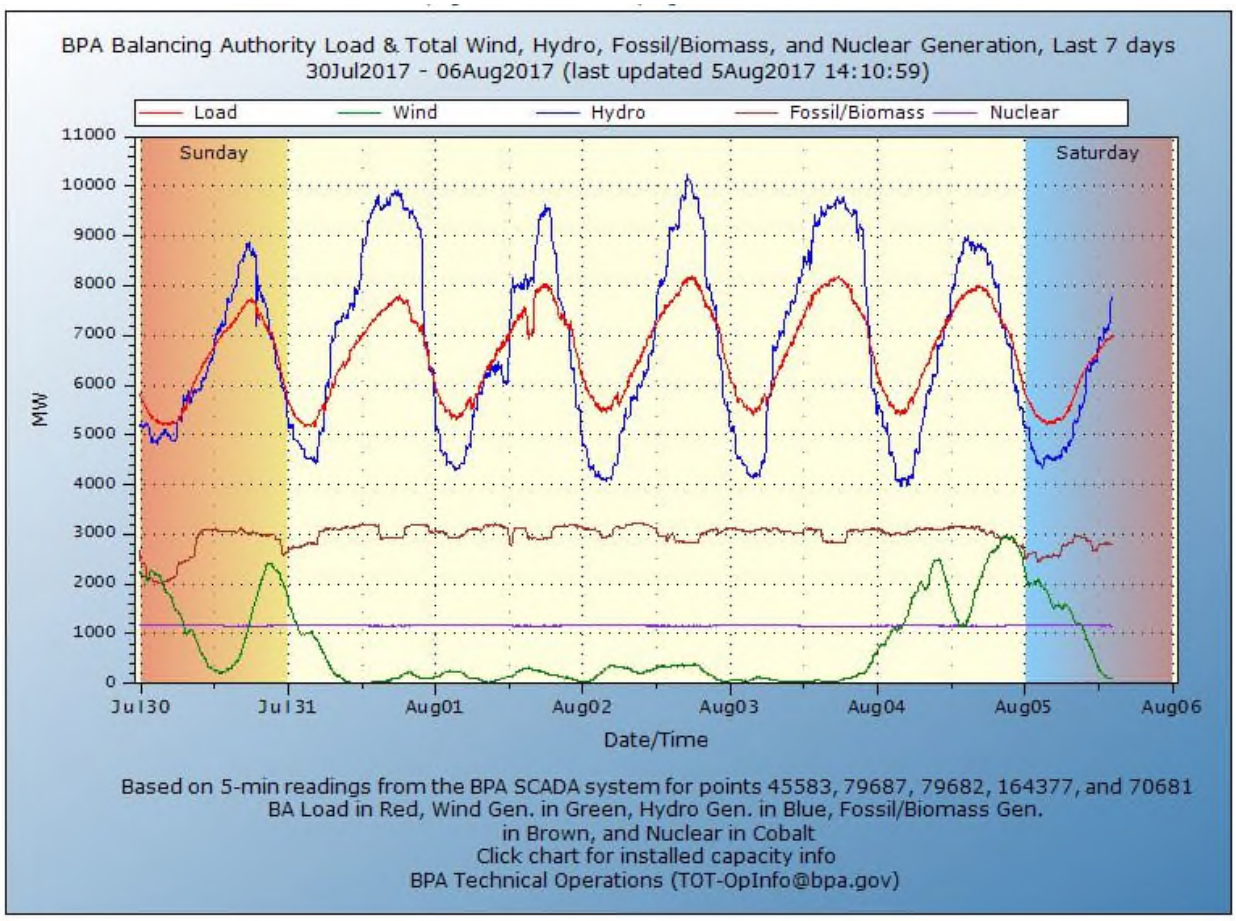
Annette Cary, the author of the ***Tri-City Herald*** article contacted me and provided me an informative link regarding a near-real-time chart showing power generation by source and total load for the Bonneville Power Administration (BPA)

https://transmission.bpa.gov/business/operations/wind/baltwg.aspx

This was my response to Annette:

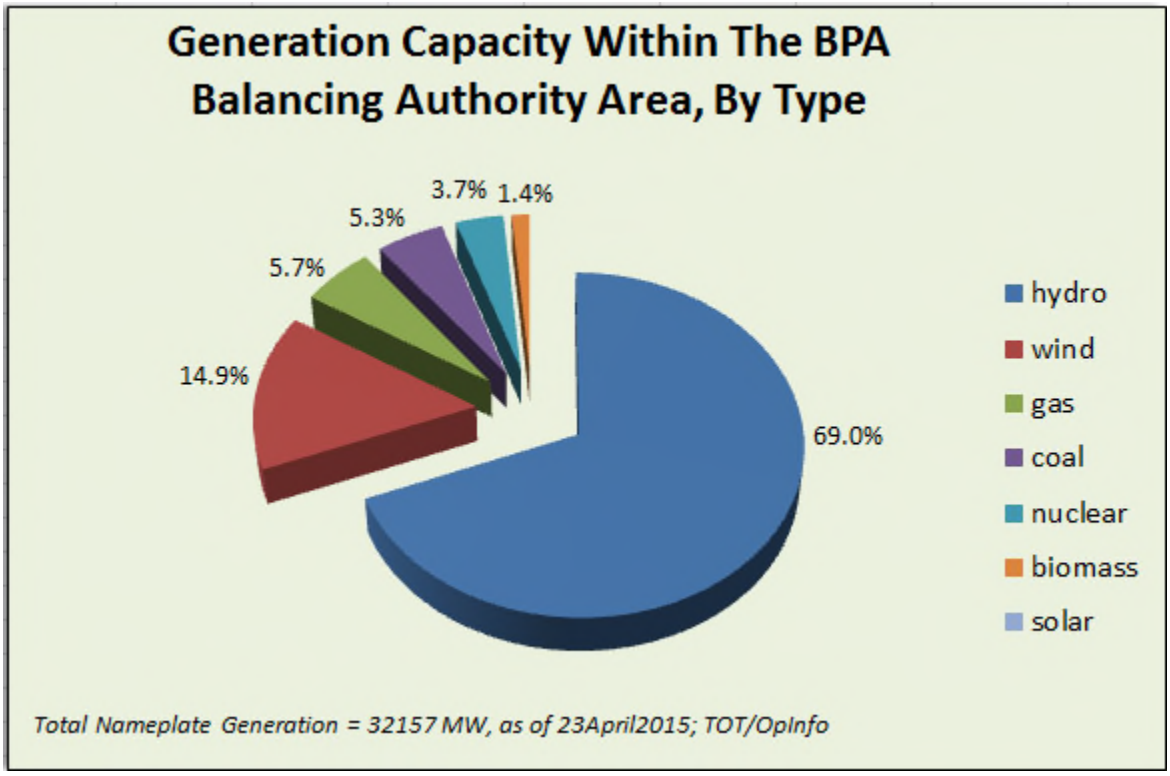
The BPA is to be commended for providing a relevant and concise presentation of the relevant operational parameters. I'm particularly pleased to note that nuclear power is included.

The BPA sources and load graphs for the past 6 days show that nuclear "pulled its share of the load" very well!



Nuclear is the almost horizontal blue line on the BPA Generation plot at about 1,200 MW. Note that the total generation is in excess of "BA load" as the BPA exports surplus power to locations such as southern California via the Pacific Intertie.

The "nameplate capacity" graph shows that on a nameplate capacity basis, nuclear is 3.7% of the total BPA generating capacity of 32,157 MW. (The product is 1,190 MW, the rated capacity of Columbia Generating Station [CGS] per the Nuclear Regulatory Commission [NRC.])



On the other hand, wind's "nameplate capacity" is 14.9% of the 32,157 MW, or 4,791 MW . **The BPA wind nameplate capacity is slightly more than four times the nameplate capacity of CGS.**

Yet, during the recent heat wave, the blue horizontal line for CGS generation was many multiples of the wind generation!

This observation shows the importance of "Capacity Factor" (CF) or the percentage of time that a generator is producing useful power. During the past week, CGS was operating at a CF of 100%. In comparison, the CF of wind, shown by the green line in the above BPA power production graph (that gets close to zero at times) was less than 1% at times this last week.

On a "return on investment" basis, nuclear generation is also superior, since the capital cost of CGS is likely less than the installation cost of the 4,791 MW of BPA wind capacity. Conservatively-designed CGS has a design lifetime of about a century. Please also note that wind turbines experience significant "wear and tear" from the occasionally abundant winds in parts of Washington state (think the Tacoma Narrows Bridge.) The typical expected lifetime for a wind turbine is about 20 years. Here's a 2 minute 45 second YouTube video link that shows some of the problems with wind turbines: **https://www.youtube.com/watch?v=MVHzfUWul2Y** The text that accompanies the video follows.

> **Windmill Failures** Published on Nov 17, 2016
>
> Nearly 120 wind turbines catch fire each year, according to a research - ten times the number reported by the industry. The researchers claim that out of 200,000 turbines around the world, 117 fires take place annually - far more than what is reported by wind farm companies.

Fire has a huge financial impact on the industry; Each wind turbine costs more than £2 million and generates an estimated income of more than £500,000 per year. Any loss or downtime of these valuable assets makes the industry less viable and productive.

Fires are a problem for the industry, impacting on energy production, economic output and emitting toxic fumes, this could cast a shadow over the industry's green credentials. Wind turbines catch fire because highly flammable materials such as hydraulic oil and plastics are in close proximity to machinery and electrical wires. These can ignite a fire if they overheat or are faulty. Lots of oxygen, in the form of high winds, can quickly fan a fire inside a turbine.

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