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Filer:	Raquel Kravitz
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Re: How To Achieve 65% Renewable Electricity in CA by 2021, at Lowest Cost and Stable Grid**1) Convert and Upgrade the existing "Path 27" Transmission Line from Adelanto CA to Delta UT to 12 GW UHVDC.**

--the existing 488 mile AC "Path 27" Intermountain Power Line runs from Adelanto CA to Delta UT, it goes dark soon anyway. UHVDC "(Ultra High Voltage Direct Current)" conversion is easy: buy two 12 Gigawatt "GW" transformers, one at each end. ABB sells them. Inexpensive for 12 GW capacity. Path 27 AC has 3 cables, UHVDC needs only 2 cables.

2) Extend this Transmission Line from Delta Utah 400 miles East to the Colorado Border near Rawlins WY.

--construct a new extension 400 miles east to the Colorado border just south of Rawlins WY, either of two ways:

--negotiate a deal with Anschutz Corp. to upgrade the pending Transwest Express Line from 3 GW to 12 GW (larger 12 GW DC transformer) and shorten it 330 miles stopping at Delta UT, so it is 400 miles long not 730. Save \$1+ billion. Transwest Express already has a route directly to Delta UT with BLM permits. CA is its customer. Finish 12/21.

--or, file for permits to construct a new line from Delta UT to the CO/WY border near Rawlins. Or, do both.

3) Sign PPAs "Power Purchase Agreements" With Wind Developers for 12 GW Continuous Wind Electricity.

This region has outstanding widespread wind resources. Build local electricity gathering links to wind farms in WY, CO, NE, SD, ND. Diversify geographically widely for a steady electricity flow, and low aggregate fluctuation 24/7. PPA estimated net cost: \$15 per MW in IEC Class 1 wind sites, \$20 per MW in IEC Class 2 sites or 1.5 to 2 cents per kilowatt hour. 12 GW electricity flow=32 GW nameplate turbine capacity at only average 37.5% capacity factor. Not difficult.

4) Qualify for the Production Tax Credit "PTC" by 12/31/17.

"Start Construction" of the wind farms by 12/31/17 to qualify for the PTC. Not difficult per IRS rules, see IRS Notice 2014-46. The developers have 4.5+ years to complete the wind farms by 12/31/21, not difficult.

5) End Result: 12 GWs equal to 35% of CA total demand of reliable, steady 24/7 electricity is delivered to the CAISO Adelanto intertie by December 2021. Electricity cost is between 2 and 3 cents per kilowatt hour delivered to grid (1.5 to 2 cents generation plus 0.5-1 cent transmission). Water saved: 12 GW of thermal power plant use 6+ billion gallons p.a.

Phase 2: Achieve 90% Renewable Electricity in California by 2021 (possibly) at Lowest Cost**6) Convert & Upgrade Existing "Path 46" Transmission Lines from CA to Page AZ or to Palo Verde AZ, to 12 GW UHVDC.**

--LADWP owns an existing Path 46 AC Transmission Line from Adelanto CA to McCullough NV plus a second Line from McCullough to Crystal NV. LADWP owns 21.2% of the Crystal to Page AZ Navajo Transmission Line, this Line goes dark by 2019. Cut a deal with the other Navajo owners: this upgrade by far is the highest and best use of the Navajo line. The owners will not get a better deal. Upgrade all three lines to 12 GW UHVDC (see above). Buy one 12 GW DC transformer.

--Or: Southern California Edison owns an existing 233 mile AC "DPV1" Transmission Line from Devers CA (SW of Palm Springs) to the Palo Verde AZ nuclear plant 40 miles west of Phoenix. Convert this existing DVP1 line to 12 GW UHVDC and add an "on ramp" DC transformer at Palo Verde to carry the Palo Verde nuclear plant electricity into California.

--Or: SoCal Edison already owns a corridor right of way next to the existing "DPV1" Transmission Line. Permit and construct an UHVDC line next to DVP1 using existing corridor rights. UHVDC Line widths are narrow (150-200 feet).

--Or: use Clean Line Energy Partners' proposed 900 mile Centennial West Clean Line from CA to northeast New Mexico.

7) Extend this Transmission Line#2 from Page or Palo Verde AZ, 400+ miles East to the CO/NM Border at Alamosa CO.

--from Page AZ the extension could go through either UT or AZ. Permits are needed. Portions could be buried. The eastern section could go through either CO or NM. Routes exist which bypass national parks, forests, sovereign lands.

--from Palo Verde AZ a "southern corridor" is possible between Phoenix and Tucson which avoids most national parks, national forests, national monuments, sovereign nations, and end at the border near Alamosa CO. Permits needed.

--Or: contract for a portion of the proposed 900 mile Centennial West Clean Line from Page or Palo Verde AZ to NE NM.

--Or: contract for the entire Centennial West Clean Line if it can finish obtaining permits; upgrade it to 12 GW UHVDC.

--Or: locate and buy existing transmission lines built for dying/dead coal fired plants and which run east-west; upgrade.

8) Sign PPAs "Power Purchase Agreements" With Wind Developers for 12 GW Continuous Wind Electricity.

There are superb wind resources south in NM, north in CO, east in OK, northeast in KS. Cost: 1.5 to 2 cents per KwHr net.

9) Qualify for the Production Tax Credit "PTC" by 12/31/17. Not difficult to meet the IRS rules for the wind farms.

10) End Result: 12 GWs of steady 24/7 electricity is delivered to CAISO by 12/21 (if obtain permits). Cost is 2-3 cents per KwHr delivered (excluding permit delay cost). Water saved. Excess generation should not occur; CA will need 5-10 GW more overnight power to charge PHEVs in the next decade. PHEVs are mostly charged overnight. Wind is 24/7.

11) What Happens If Permits Are Delayed? Sell the electricity into local markets while waiting. "2017 PTC" wind farms will be valuable, sell them. Stopping some wind farm construction before 12/21 is worst case scenario, low money spent. (Please contact re questions, additional information: Mr. Jan G. Juran 300 S. Pointe Drive #1506 Miami Beach, FL 33139)

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FOOTNOTES

Section 1: LADWP intends to close the coal Intermountain Power Plant in Delta UT, and convert it to natural gas or solar by 2025. Retire it instead. LADWP and five CA cities (Anaheim, Riverside, Burbank, Pasadena, and Glendale) control the Intermountain Transmission Line. ABB co. offers a 12 GW converter transformer in its catalog, cost \$150MM range, see <http://new.abb.com/products/transformers/power/hvdc-converter> China now is building a 12 GW 1,900 mile Changji-Guquan Line to carry wind power. See <http://www.abb.com/cawp/seitp202/f0f2535bc7672244c1257ff500252646.aspx> UHVDC features low cost, very low transmission losses, less waste heat, high reliability, no frequency synchronization, 2 conductors not 3 used by AC, narrow 150-200 foot wide corridor.

Section 2: Anschutz Corp.'s proposed 730 mile 3GW Transwest Express Line received a Bureau of Land Management permit in December 2016 for 60% of its route including the sections crossing BLM land. Transwest Express goes directly to Delta, Utah. Construction has not begun. Completion is anticipated by 12/21. California entities are its majority electricity customers. A deal to upgrade the capacity 4x to 12 GW makes superb economic sense and high value added. If necessary or prudent, LADWP or a California entity could apply for permits as an alternative.

Section 3: The wind turbine industry easily has capacity to build 32 GW of nameplate capacity wind farms in 4.5 years. Generation Net Cost of 1.5 to 2 cents per kilowatt hour is less than just the fuel cost of any fossil fuel generator. Costs are falling, not rising. An excellent planning model exists: Alexander E. MacDonald and Christopher Clack et.al. built a nationwide 3D wind model with hourly wind measurements 2006-2008 within 13 km grid cells. This National Electricity with Weather Systems model identifies areas with the best IEC (Int'l Electrotechnical Commission) Class 1 (avg. wind speed 10 meters/second) and Class 2 (avg. 8.5 m/s) wind resources. The model calculates both the electricity output and variances. Wide geographic dispersion of turbines and tall towers (140 meters) yield steady, reliable electricity flow. MacDonald and Clack are at: National Oceanic & Atmospheric Administration 325 Broadway Boulder, CO 80305 Email: alexander.e.macdonald@noaa.gov and christopher.clack@noaa.gov See "Future Cost-Competitive Electricity Systems and Their Impact upon US CO2 Emissions" at <http://nature.com/nclimate/journal/v6/n5/extref/nclimate2921-s1.pdf>

Section 4: IRS Notice 2014-43 requires "physical work of a significant nature be performed" by 12/31/17 but "no fixed minimum monetary threshold" exists in order to "start". Constructing dirt roads to a wind farm can qualify. There is either this Physical Work Test or a 5% Safe Harbor Test where 5% or more of the total cost was incurred or paid during 2017. A Continuous Construction Test applies to the Physical Work Test; a Continuous Efforts Test applies to the 5% Safe Harbor option. A project with multiple PPAs and/or multiple contractors counts as one project if it is operated as a single project following completion. Project must be completed by 12/31/21. 2017 PTC is 1.92 cents per kilowatt hour (declines to 1.44 cents in 2018) for 10 years, has inflation adjuster. 2017 PTC covers 50%+ of est. gross generation cost.

Section 5: 12 GW of 2-3 cents per KwHr electricity will enhance CA's competitiveness. Fresh water savings are huge. Wind electricity is steady and reliable if turbines are widely dispersed geographically. California has wind turbines in the Pacific Northwest, Altamont, San Geronio, Tehachapi, plus (here) the north Midwest. The key metric is the average aggregate variance/fluctuation/steadiness of all wind resources. Californians will adopt new plug in hybrid vehicles "PHEVs" during the next 5-10 years, new models have 33+ mile electric range (=average miles driven per day). New PHEVs reduce gasoline use and GWGs by avg. 80%+ vs. vehicle replaced. #1 Transmission Line risk: keep trees trimmed. Back up 12 GW Line#1 with newly redundant natural gas generators, safe reliability should be 99.999%. This Lowest Cost Plan provides power 24/7 cheaper than: today's cost of PV, PV + storage, rooftop PV, community solar, offshore wind.

Section 6: The large coal fired Navajo Generating Station in Page AZ has recorded successive years of declining revenues and increasing losses. Its closure is scheduled in 2019; the owners may close it sooner to avoid more losses. LADWP owns 21.2% of the two Navajo Transmission Lines (including the Page to Crystal Line), but not the coal facility. No known re-purposing proposal will add remotely as much value as an upgrade of this Line to 12 GW UHVDC. A Line Extension from Page AZ to New Mexico could go east, or south then east; UHVDC goes long distance at low losses.

Section 7: Centennial West Clean Line could be a partner re parts of Line Extension#2. Houston's Clean Line Partners has discussed its proposal with California utilities. A good eastern terminus for Transmission Line#2 is the area south of Alamosa NM, at CO/NM border, where best wind resources are. Distance to Page 390 miles; to Palo Verde 650 miles.

Section 8: Wind turbine industry capacity is fully adequate to construct the turbines for Phase 1 and 2 over 4.5 years.

Section 9: The PTC requires the wind farms be completed by 12/21, not Transmission Line#2. The turbines could connect to local grids if needed by 12/21 but PTC is earned per KwHr sold over 10 years. The electricity could be sold overnight at negative price in local grids but still yield a profit; this could financially stress regional coal plants which can't shut overnight. In theory the Trump Administration could help re permits if such local disruption is undesirable.

Section 10: New PHEVs provide 33+ miles electric range, high gas MPG, and a purchase price increment less than 3-4-5 years fuel savings. (Tax credits help even more). Gas use, carbon emitted, pollution are 80%+ lower vs. the replaced car. California could need 5 to 10 GW per hour more electricity overnight to charge PHEVs in the next decade. Wind is 24/7.