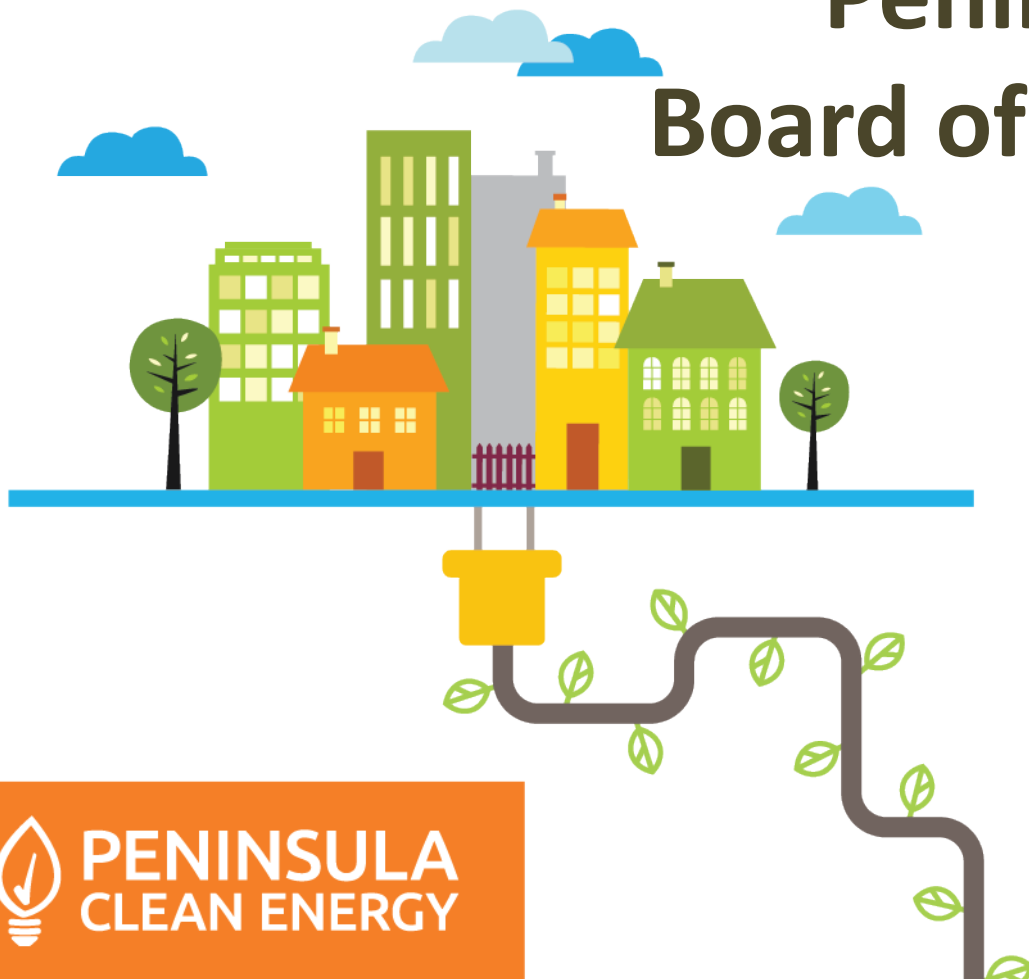


Peninsula Clean Energy Board of Directors Meeting

October 26, 2017



Agenda

Call to order / Roll call

Public Comment

Action to set the agenda and approve consent items

Regular Agenda

1. Chair Report (Discussion)

Regular Agenda

2. CEO Report (Discussion)

New Staff

- Welcome to our new Outreach Fellows!
 - Alejandra Posada
 - Charlsie Chang

Recruiting Update

- Regulatory Analyst
 - Offer made
- New Job Postings (to be posted by next week)
 - Key Accounts Executive
 - Power Resources Manager
 - Energy Programs Director
 - Creative Content Designer (part-time)

PCE Board Retreat - Debrief

- Ongoing efforts based on input from retreat:
 - Market research on brand awareness and why customers opt out
 - Stress test our pro forma financial projections based on changes in customer base, power costs, PCIA, rates, ITC and PTC expiration
 - Power supply options to meet load with time-coincident 100% renewables
 - Move forward on pilot/small-scale local program(s)

CalCCA Update

- Beth Vaughn promoted to Executive Director
- 13 CCAs on board + 10 more CCAs on deck
- Successful summit in Riverside – Oct 2-4
- CPUC's California Customer Choice Project – informal workshop in Sacramento on Oct 31 – PCE (Jan) representing CCAs in “shark tank” panel

Regular Agenda

3. Citizens Advisory Committee Report (Discussion)

Regular Agenda

4. Audit and Finance Committee Report (Discussion)

Regular Agenda

5. Marketing and Outreach Report (Discussion)

6. Regulatory and Legislative Report

October 26, 2017

Joseph Wiedman
Senior Regulatory/Legislative Analyst



September/October Regulatory Activities

– “October” Filings

- Sonoma Clean Power, MCE Clean Energy and PCE filed **Opening and Reply Briefs** on October 2nd and 16th, respectively in PG&E’s 2018 ERRRA docket (A.17-06-005).
- PCE as part of the Smart Charging Coalition filed comments on October 6th at the Air Resources Board concerning reforming the allocation of low carbon fuel credits (no docket number).

– Other Regulatory Activities

- Sept. 22nd – Jan Pepper and Joe Wiedman met with Matt Freedman from The Utility Reform Network to discuss areas of mutual interest.
- Sept. 26th – Joe Wiedman met with Steve Chadima and other representatives from Advanced Energy Economy to discuss areas of mutual interest.

September/October Legislative Activities

- AB 726/813 – Would have authorized procurement of additional renewable energy resources by California's three largest investor-owned utilities (IOUs) with other load-serving entities, including CCAs, paying a non-bypassable charge for the cost of the procurement. Did not pass.
- SB 100 - Amended to prohibit non-IOU entities from owning distributed energy resources which decrease the need for investment in transmission and distribution. Did not pass.

Regular Agenda

7. Proposed 2018 Rate Adjustment Process (Discussion)

Rate Adjustment Process

- PG&E implements an annual rate adjustment on Jan 1
- Generation and PCIA are both affected
- In 2017 PG&E concurrently implemented increases in the PCIA and decreases in their generation rate such that PCE was no longer delivering a 5% discount to customers taking service in our ECOPlus program
- PCE implemented changes to our rates to restore the 5% discount, however due to a variety of factors rate adjustments did not go live until March 15, 2017.
- To avoid a similar scenario in 2018 PCE Staff is proposing to bring a slate of rate adjustments to the PCE Board at the November Board meeting

Rate Adjustment Process

- Preliminary information coming out of the ERRA (Energy Resource Recovery Account) Proceedings indicates that PG&E will again be increasing the PCIA while concurrently lowering their Generation rate.
- Final filings will be available from the CPUC on November 2nd at which time PCE will confer with our consultants on a proposed slate of rates for the November Board meeting
- Actual rates from PG&E will not be known until they are live on January 1, 2018.
- Depending on the discrepancies from our projections and actual rates, PCE may return to the Board in January for another small rate adjustment.

Regular Agenda

8. Role of Out of State Wind in PCE Portfolio (Discussion)

Out of State Wind in PCE's Portfolio

October 24, 2017



California Wind Potential

- 5,662 MW of capacity operating in CA today¹
- Most located in 4 areas²:
 - Tehachapi Pass (Kern County)
 - Solano County
 - San Geronio Pass (Riverside County)
 - Altamont Pass (Alameda, Contra Costa, and San Joaquin Counties)
- In 2016, CA-based wind generated 13,500 GWh of electricity accounting for 6.81% of in-state generation. CA imported an additional 13,000 GWh, in total wind accounted for 9.06% of CA's power mix³

1. <http://www.calwea.org/fast-facts>

2. <http://www.calwea.org/fast-facts>

3. http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

California Wind Potential

Capacity Factor by Location & Quarter

Quarter	San Gorgonio	Tehachapi	Altamont	Solano
Jan-Mar	19%	22%	7%	14%
Apr-Jun	41%	41%	32%	39%
Jul-Sep	30%	22%	32%	48%
Oct-Dec	15%	18%	6%	12%
Annual Avg	26%	26%	19%	12%

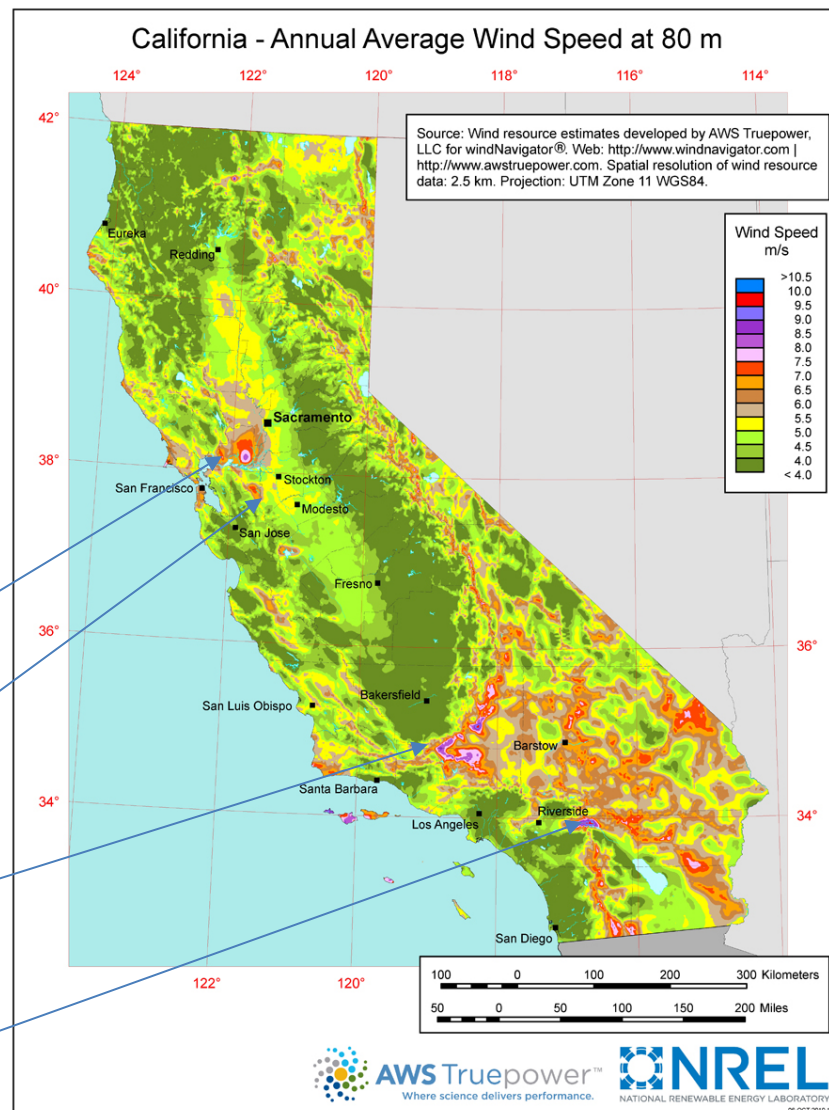
Capacity Factor: Capacity factor is the ratio of the actual energy produced by a turbine in a period of time, to the nameplate capacity of the turbine. (Nameplate capacity is the hypothetical maximum possible when running full time).

Solano

Altamont

Tehachapi

San Gorgonio



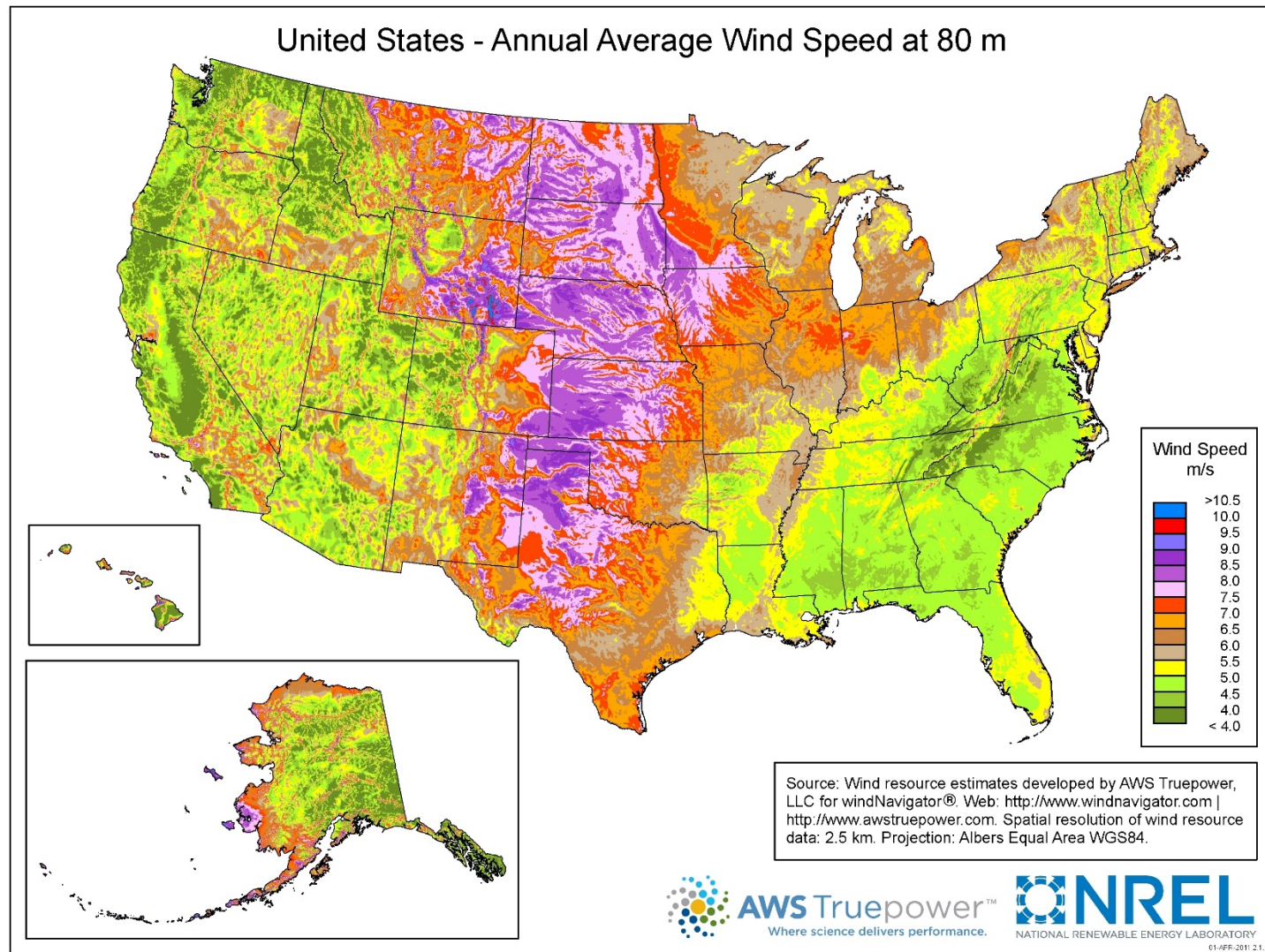
California Wind Potential

- Limited new wind sites in CA
 - Good sites already developed
 - Land-use restrictions limit greenfield development
 - In 2013, San Diego County in adopted rule changes for wind projects, including a noise restriction
 - Los Angeles County recently passed a renewable energy ordinance that bans large-scale wind turbines in unincorporated areas
 - Inyo and Solano counties have also put in place restrictions for wind projects
- California Wind Energy Association estimates overall growth in the state to top out at 2,000 additional megawatts in the near-term
- Opportunities to repower existing wind farms
 - Replace older turbines with new, more efficient turbines
 - Less land required
 - Higher output
 - May require additional permitting and interconnection upgrades

CA Wind Installations by Date

Install Date	1980's	1990's	2000's	2010's
MW	1,986	285	809	2,919

National Wind Resources

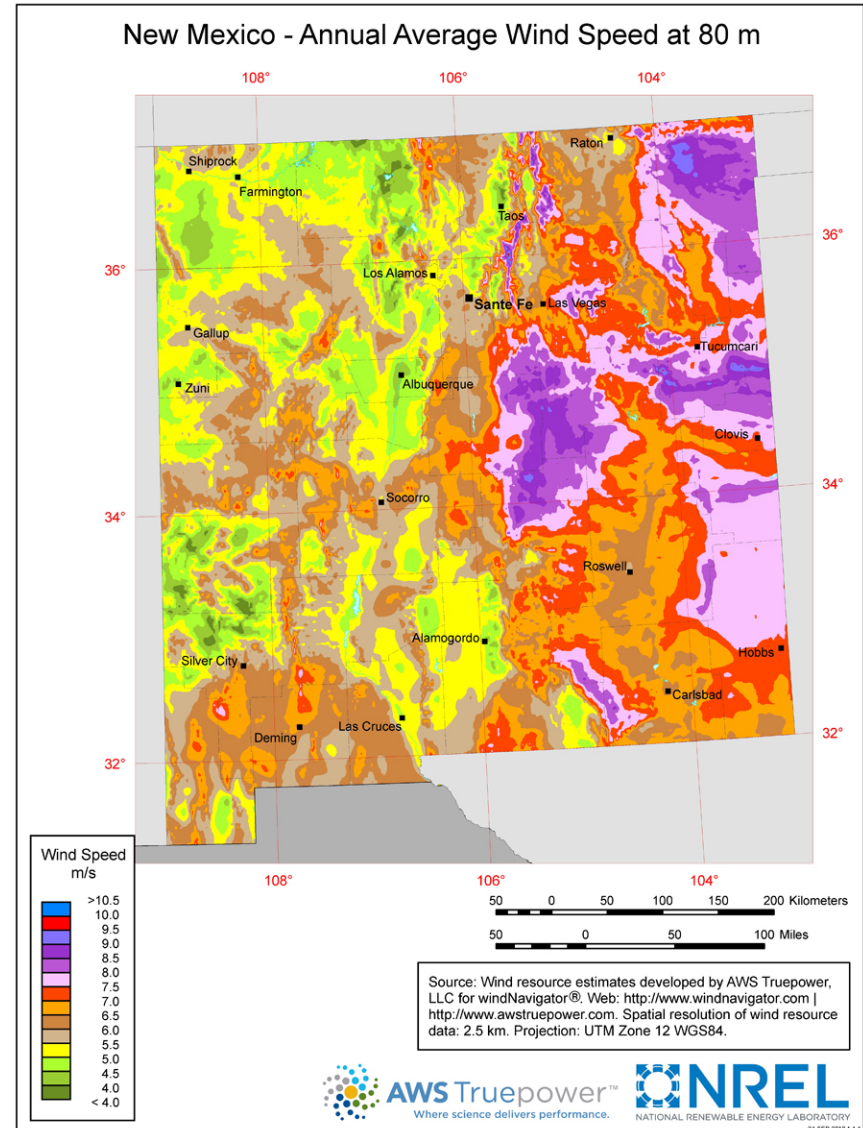


New Mexico Wind Resource

- Economic benefits
 - Including 4475 MW of regional wind to the 2030 RPS portfolio (roughly 5% of total generation) will save California customers between \$750 Million and \$1 Billion per year by 2030¹
- Better wind resource
 - Due to higher average wind speeds, wind projects in these locations produce more energy for the same nameplate capacity as new California wind projects, and almost four times more energy than legacy first generation CA projects
- Generation profile complements in-state solar and wind

Quarter	Average Capacity Factor
Jan-Mar	66%
Apr-Jun	46%
Jul-Sep	31%
Oct-Dec	54%
Annual Average	49%

1. "The Value of Regional Wind in CA's Carbon Constrained Future"; CEERT, May 2016



3rd Party Studies - Benefits of OOS Wind

Low Carbon Grid Study

Premise

- ❑ National Renewable Energy Laboratory (NREL) California study & WECC modeling platform
- ❑ Used for long-range, west-wide emissions projections

Findings on NM Wind

- California can **save ~\$1 Billion per year** when renewable portfolio includes ~5% regional wind.
- Regional wind increases the value of CA solar, and enables higher solar penetration.
- “Wind + solar” is more cost effective than “solar + storage”.

E3 PATHWAYS Study

Premise

- ❑ California state-sponsored study on GHG reduction feasibility, methods and costs.

Findings on NM Wind

- 50% reduction in electricity GHG is required by 2030 to meet CA goals; over 70% reduction required by 2050.
- **Diverse portfolio is essential** by geography and technology, including significant additions of low-cost regional wind.

RETI 2.0

Premise

- ❑ California state-sponsored survey of resource potential, costs and benefits of renewables, and also new and existing transmission solutions to access renewables

Findings on NM Wind

- Access to **regional wind can reduce ratepayer costs**, when generation compliments solar.
- Without integration solutions, continued growth in only solar PV will lead to increased costs.
- Most in-state California wind has already been developed.
- SunZia is one of five identified “advanced” projects, able to deliver regional wind by 2020.

IRP Reference System Plan

Premise

- ❑ CPUC model of options, costs and benefits of electric sector decarbonization scenarios

Findings on NM Wind

- **~1,100 MW of PTC wind is cost effective** across almost all sensitivities on the preferred 42 MMT scenario
- Regional wind additions **save ~\$100 Million per year** when procured while the federal PTC is available at 100% value.

Interconnection / Congestion

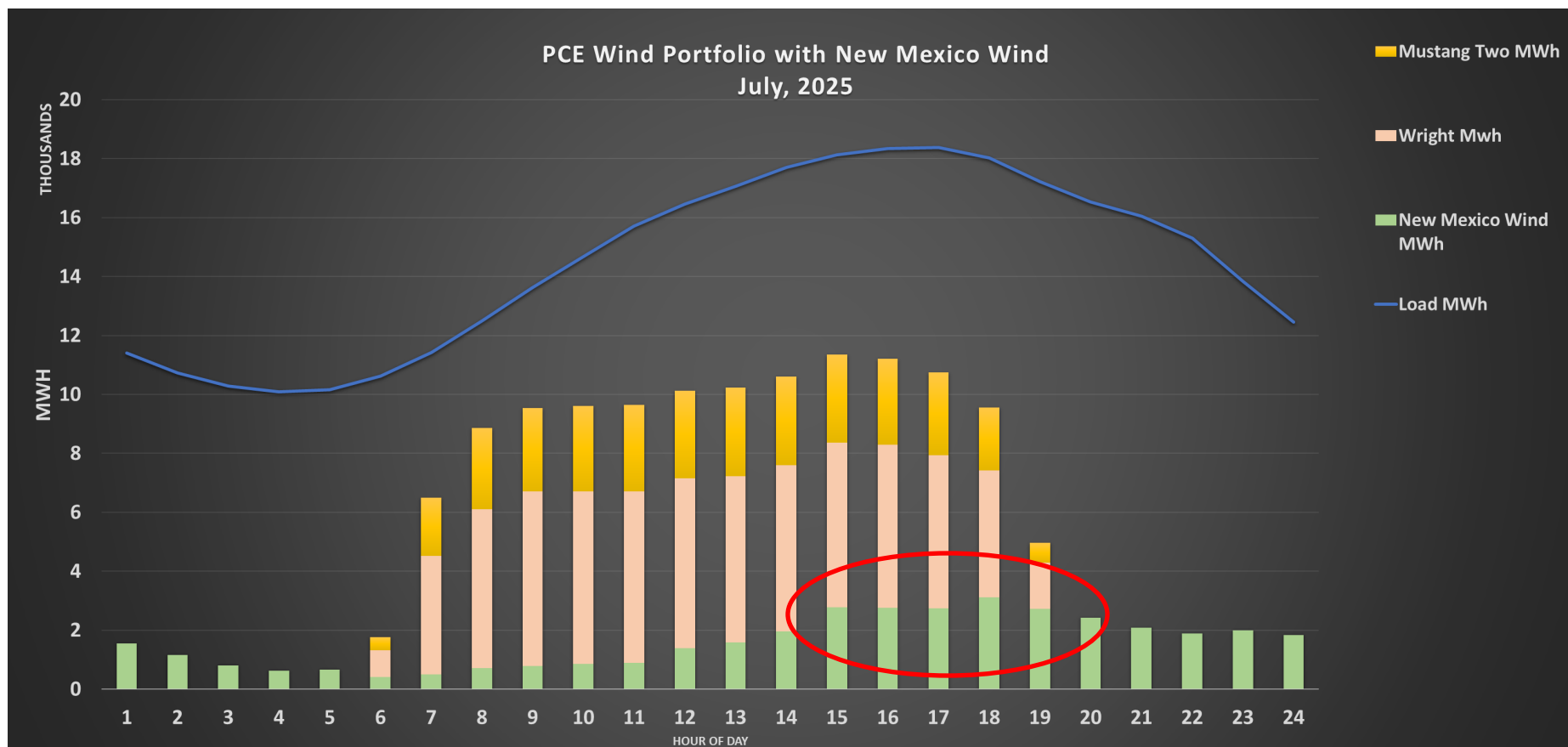
- Dynamically scheduled at CAISO intertie point
- Dynamic scheduling puts resources under CAISO control as if they were physically located within CAISO's balancing area
 - Qualify for PCC1 for RPS requirement.
- > 700 MW of NM wind energy projects using dynamic scheduling and firm transmission service on existing lines have already signed PPAs with two California utilities.
- CAISO 2016-2017 Transmission Plan
 - Portfolio including OOS wind least severe in terms of reliability issues on CA transmission system
 - Sufficient import capacity exists to deliver OOS resources from a scheduling point within CAISO BA to CAISO loads
 - Deliverability of OOS resources up to CAISO scheduling point was not tested

Transmission Projects to Bring OOS Wind to CA

- Requires construction of new transmission lines between wind facility and Palo Verde / Willow Beach
 - Risk that transmission lines delayed

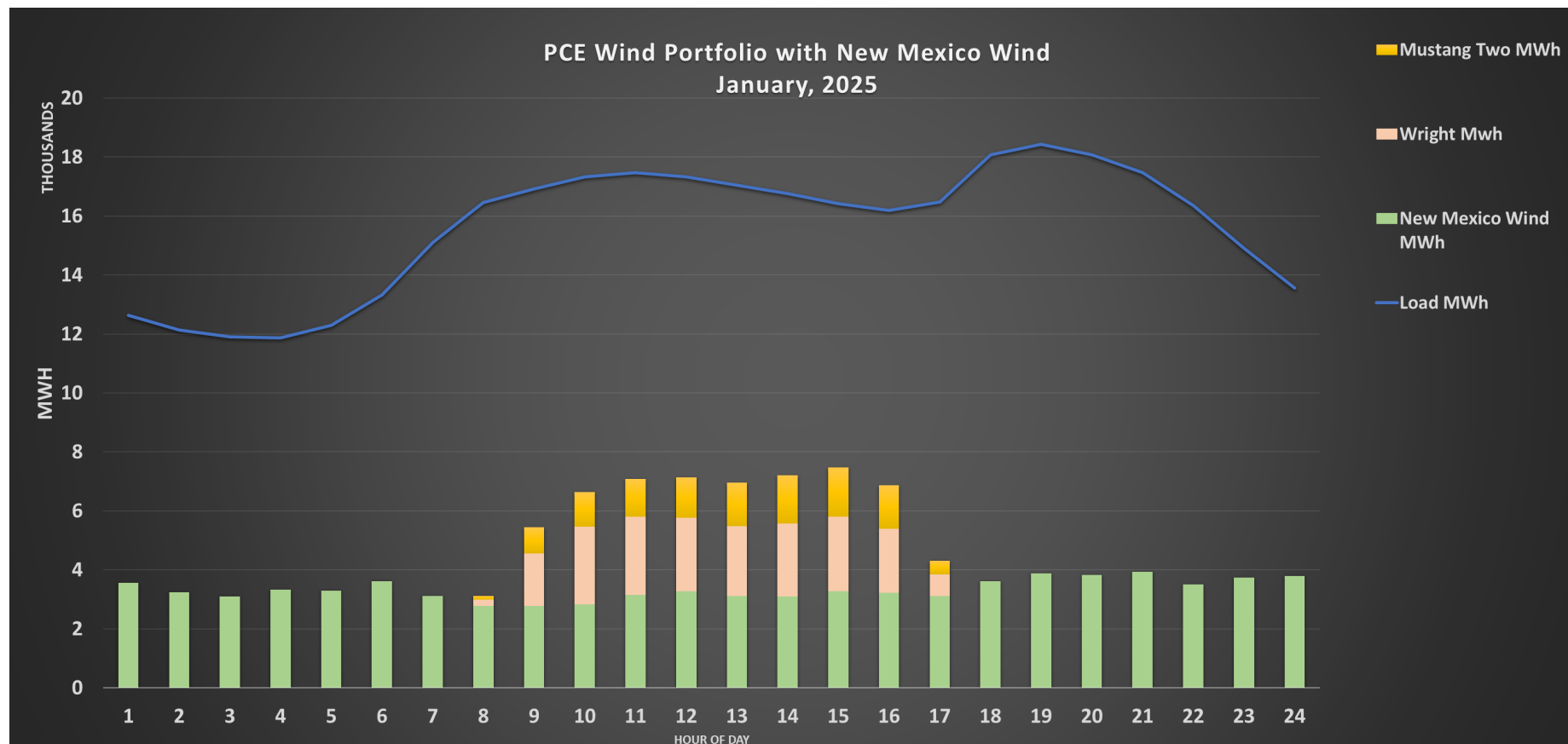
Project Name	Length	Capacity	Location
TransWest Express	730 miles	3,000 MW	WY wind to load centers in CA, NV & AZ
Cleanline Western Spirit	140 miles	1,000 MW	central NM to northwestern NM
Centennial West HVDC	900 miles	3,500 MW	
SunZia Southwest Transmission Project	515 miles	3,000 MW	Arizona and New Mexico to population centers in the Desert Southwest
Southline Transmission Project	240 miles of new + 120 miles of upgrading existing lines	1,000 MW	southern NM to AZ

Current PCE Portfolio with NM Wind, July 2025



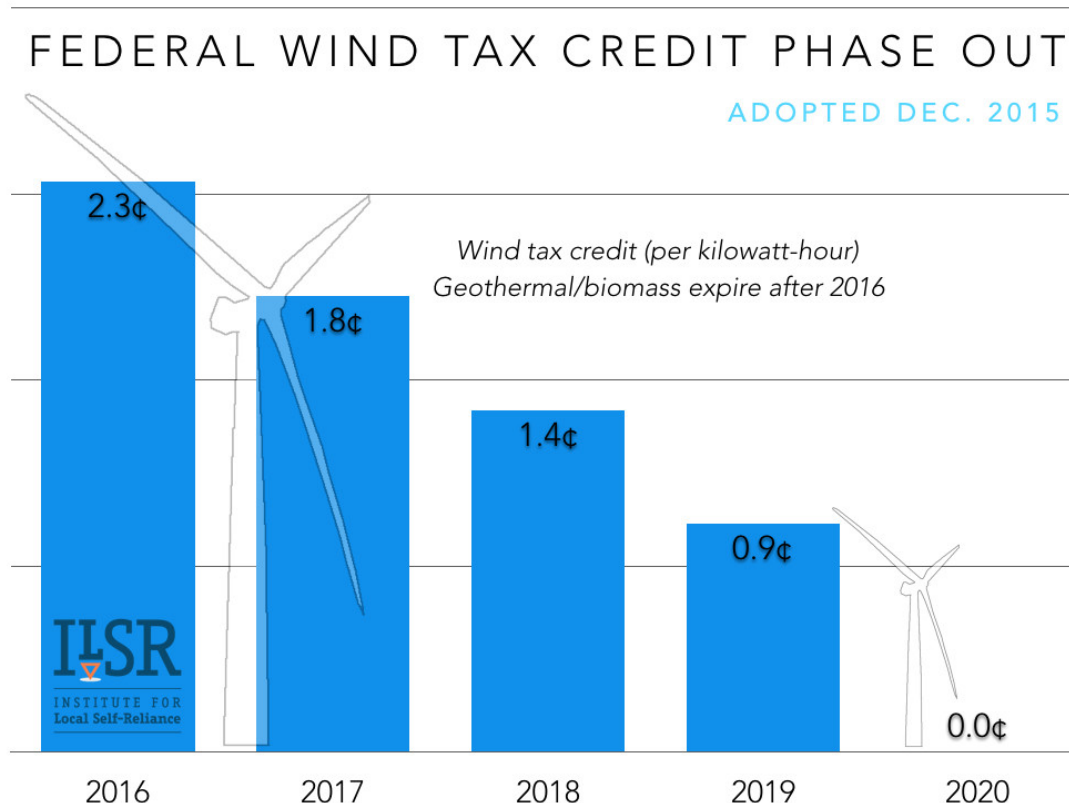
- NM Wind peak more closely aligns with load peak

Current PCE Portfolio with NM Wind, January 2025



PTC Phase Out

- Applies to first 10 years of operation
- Must commence construction in year indicated
 - beginning "physical work of a significant nature" (i.e. the beginning of the excavation for the foundation, the setting of anchor bolts into the ground, or the pouring of the concrete pads of the foundation)
 - 5% or more of the total cost of the facility was paid or incurred.



Discussion and Next Steps

- Wind will play an important role in PCE's portfolio
- Resources from NM and other non-CA states can play an important role in relieving some of the effects of the duck curve and provide a cost-efficient option for meeting PCE's renewable energy goals
- Next steps:
 - Conduct RFO targeting renewable resources to fill gaps identified in IRP process including both in-state and out-of-state wind
 - Continue to research and explore environmental and labor considerations

Regular Agenda

9. Integrated Resource Plan (IRP) Update (Discussion)

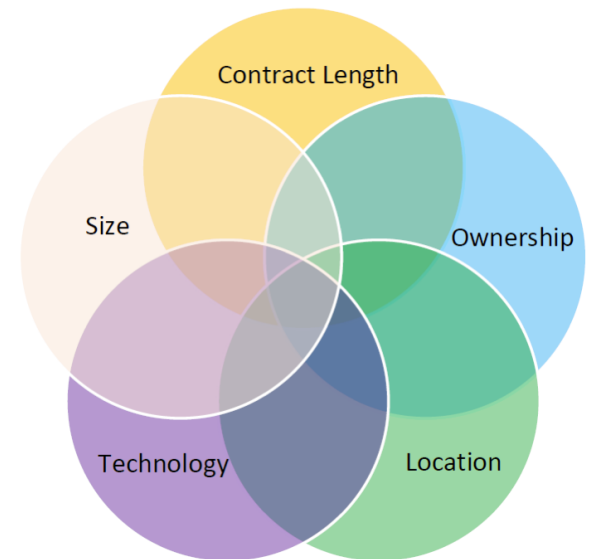
Integrated Resources Plan Update

October 26, 2017



IRP Vision

- Develop guiding procurement principles to create a diverse portfolio composition:
 - Contract Term Length
 - Project Ownership
 - Project Location
 - Resource / Technology Mix
 - Project Size
- Guideline on market exposure
 - How should we manage our open position
 - How early should we procure to close open position



IRP Model

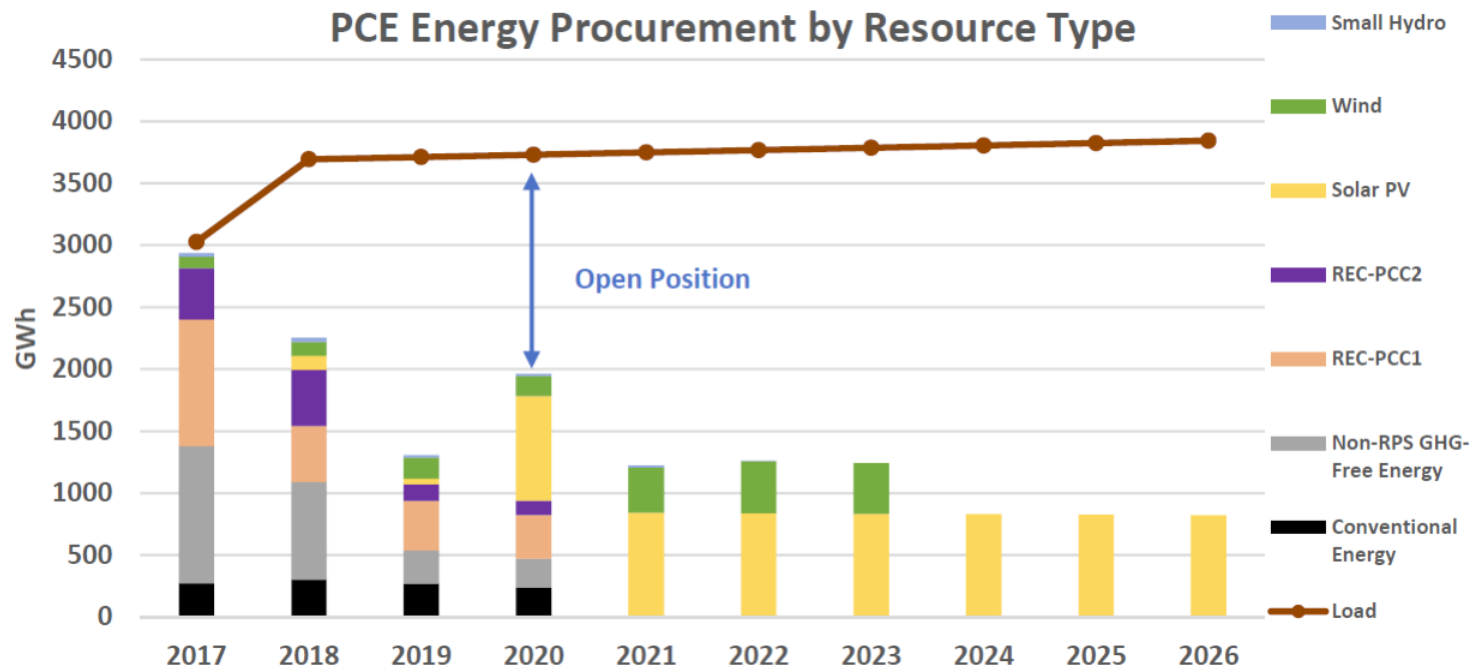
- PCE commissioned 3rd-party expert consultant to design cost model
- Sophisticated Excel model that quantitatively analyzes potential energy portfolios
- Considers CA regulations, RPS, energy prices, technology, and future project development in the area
- Inputs include: PPA prices and locations, penetration of EVs and DER, RPS targets, Carbon and REC costs
- Specifically tailored to PCE's goals



Energy+Environmental Economics

Current Contracted Portfolio

- PCE's current portfolio includes a mix of non-resource specific contracts, small hydro, solar and wind
- We are mostly procured for 2017 with increasingly open positions in later years

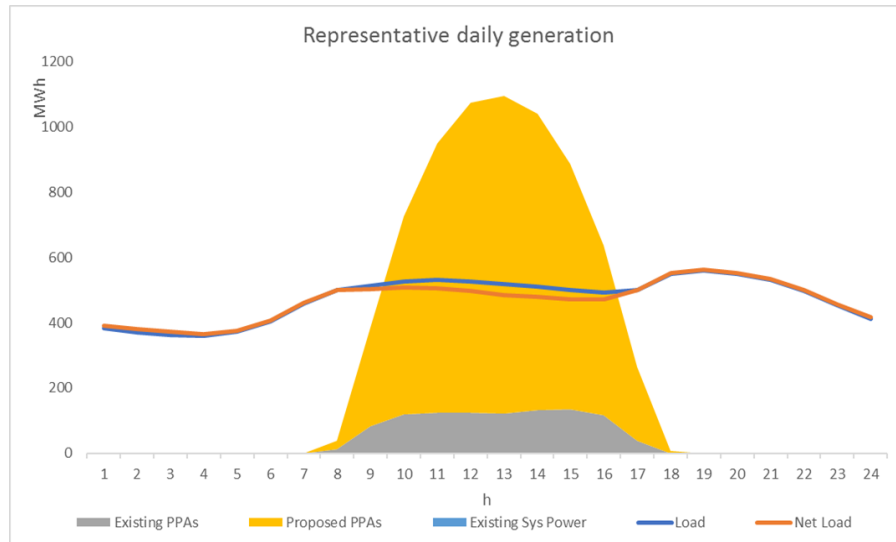


Overview and Approach

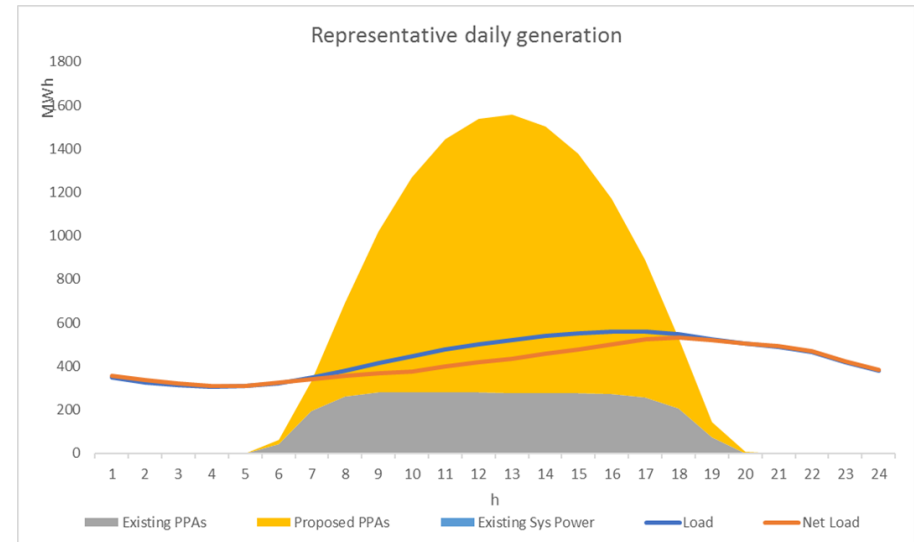
- Throughout October, focused on learning modeling tool and running scenarios related to resource diversity
- Evaluate scenarios with various resource combinations to meet goal of 100% renewable in 2025
 - First, evaluated matching annual generation MWh to annual load MWh with a single resource such as solar, wind, etc.
 - Load is approximately 3850 GWh annually
 - Supply is approximately 3850 GWh annually – PCE injects 3850 GWh of renewables into the grid to meet our load, but it is not time-coincident with our load
 - Then, looked to combine resources to get closer hourly matching of generation and load

100% Solar

- Contains 1750 MW of solar to produce ~3850 GWh from NP-15 region
 - 300 MW from contracted solar (produces 824 GWh annually)
 - 1450 MW of new solar (produces 3024 GWh annually)
- Peaks in the middle of the day
- Used as baseline scenario to compare cost of other portfolios



January, 2025

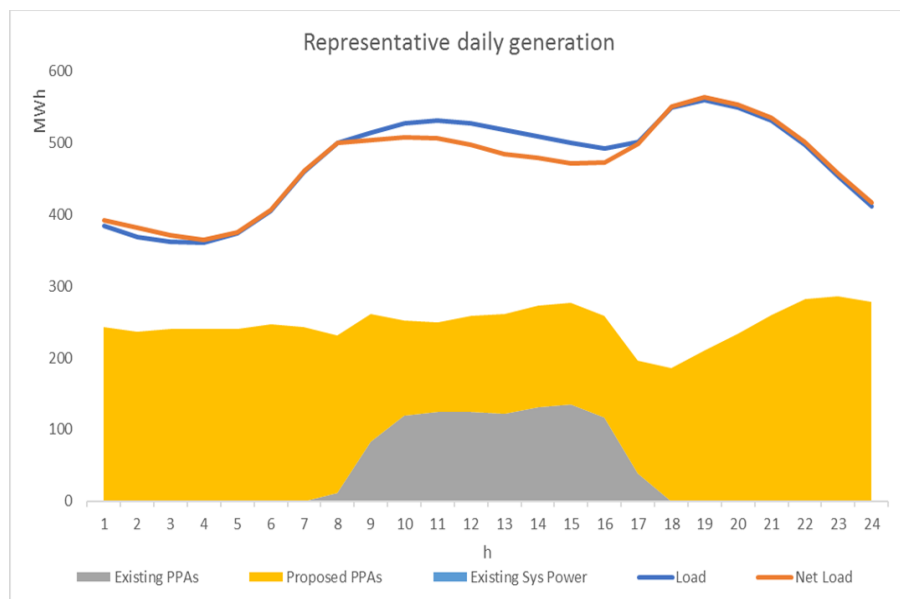


July, 2025

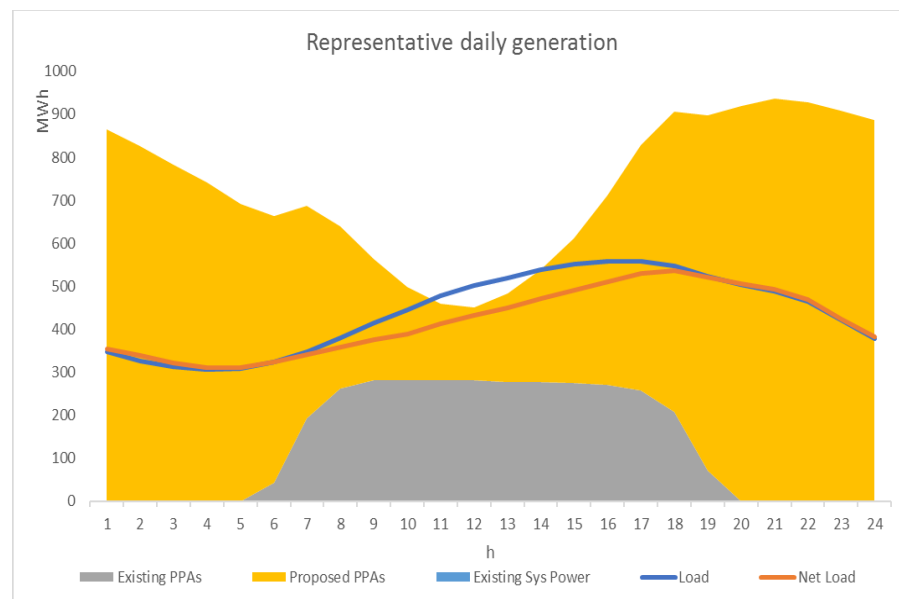
Note: Net Load includes effects of Energy Efficiency, DER, and EVs

Current Solar PPAs + Northern CA Wind

- Contains
 - 1,125 MW of Wind from NP-15 Region (3,065 GWh)
 - 300 MW of contracted solar (824 GWh)
- Weak Winter resource
- Abundant resource in the Summer but does not match load shape
- 11.1% cheaper than all-solar base case scenario



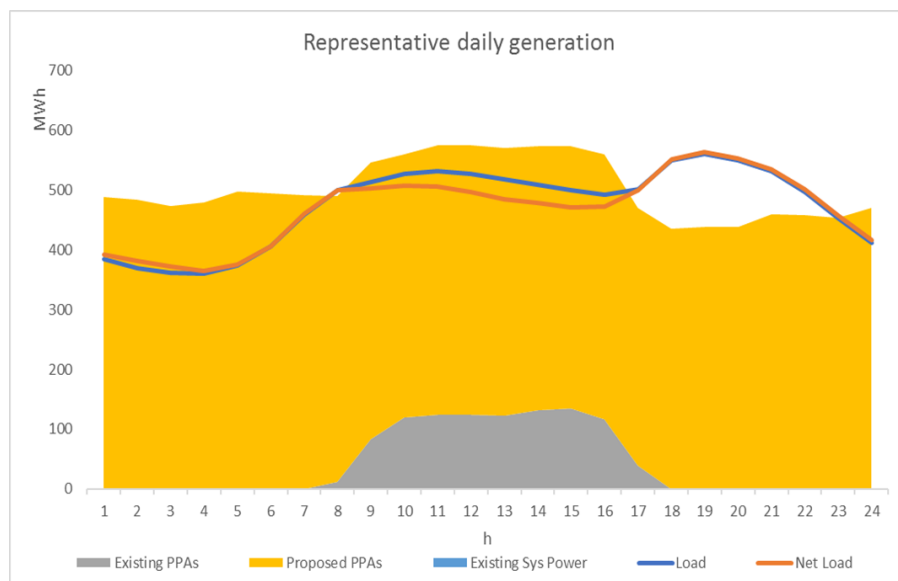
January, 2025



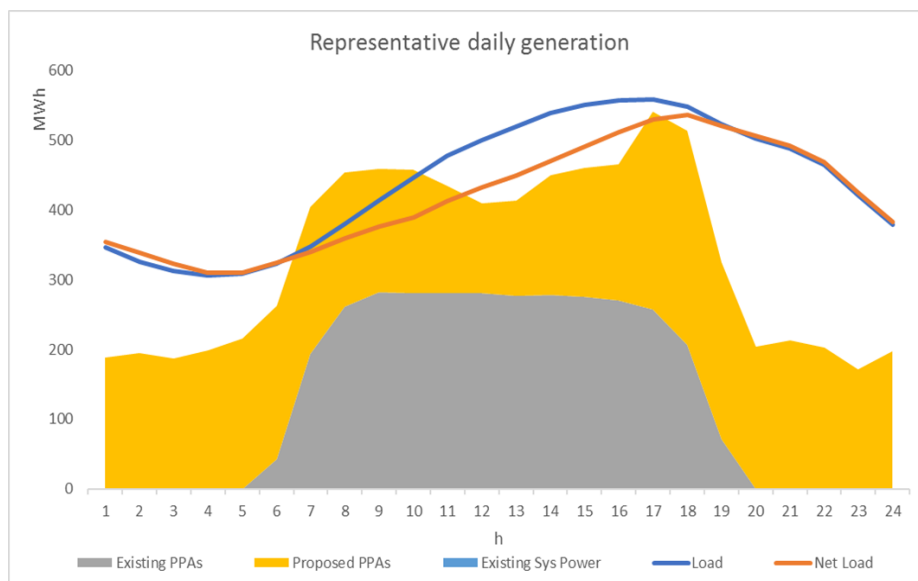
July, 2025

Current Solar PPAs + NM Wind

- Contains
 - 705 MW of New Mexico Wind (3,036 GWh)
 - 300 MW of contracted solar (824 GWh)
- Great Winter resource
- Weaker Summer resource
- 11.6% cheaper than all-solar base case scenario



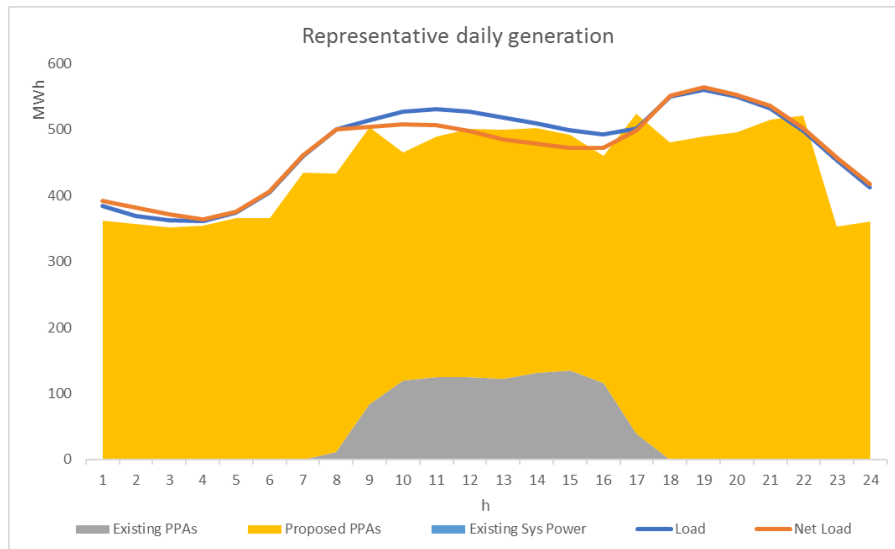
January, 2025



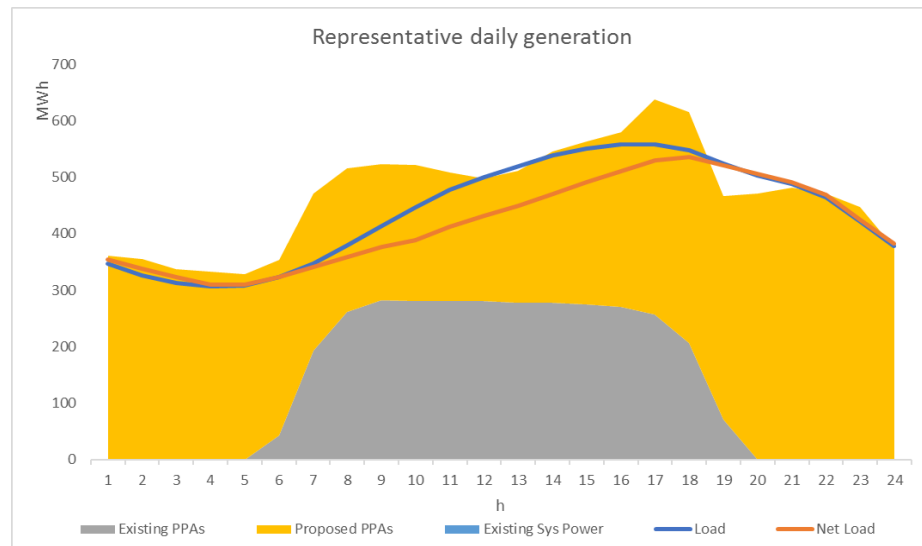
July, 2025

Possible Load-Matching Renewable Mix

- Contains
 - 405 MW of NP-15 Solar (including already signed solar PPAs totaling 1043 GWh annually)
 - 325 of NP-15 Wind (885 GWh annually)
 - 420 MW of New Mexico Wind (1,808 GWh annually)
 - 250 MW of Geothermal (180 GWh annually)
- Closely aligns hourly load to generation throughout the year
- 9.8% cheaper from all-solar base case scenario



January, 2025



July, 2025

Summary and Next Steps

Scenario	100% Solar	Solar + NorCal Wind	Solar + NM Wind	Combo to Match Load
Cost	100	88.9	88.4	90.2

- Assume 100% solar as baseline then look at how cost of resource combinations compare
- Despite low PPA prices, 100% solar looks to be most expensive scenario due to effects of duck curve and over-generation
- Next steps:
 - For resource diversity, evaluate role of DERs and storage and other demand-side options
 - Design and run scenarios to test other diversity components: term, size, location, ownership, % PCC1 vs PCC2

Regular Agenda

10. Board Members' Reports (Discussion)

Regular Agenda

Adjourn