ROCHESTER
PUBLIC UTILITIES
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5.B. Power Supply Resource Plan Update

Renewable Energy Portfolio Options

RPU Board: July 22, 2025

Bill Bullock

Rochester Public Utilities Board Meeting
July 22, 2025

Power Supply Resource Plan | Reliable Capacity. Renewable Energy.

Reliable Capacity

Firm Dispatchable Generation

Battery Storage

Demand Response

Renewable Energy

Wind

Solar

Hydro

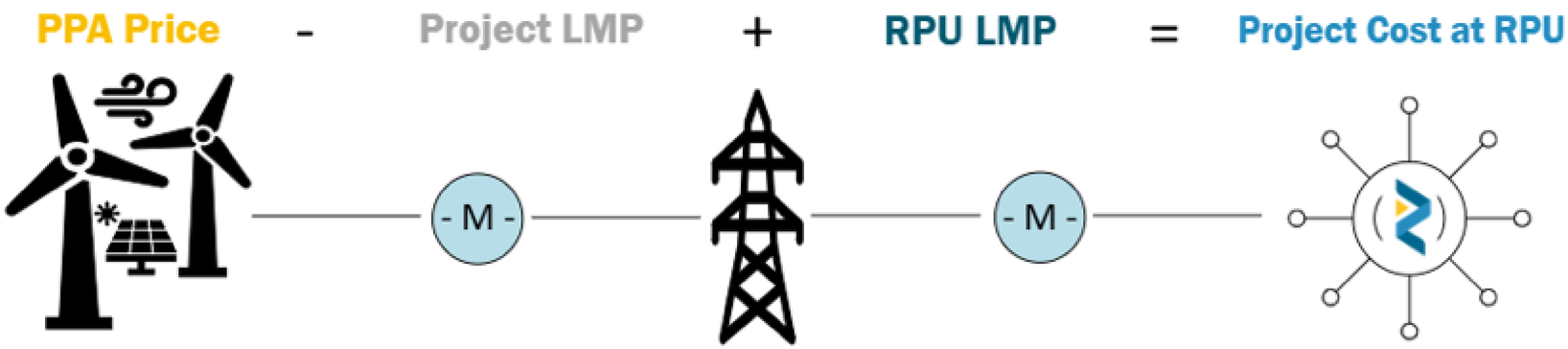
Continued Conservation

Power Supply Resource Plan | The One Big Beautiful Bill Act (OBBBA)

- **Short-Term Status Quo**
  - Most renewables still eligible for tax credits through ~2027, with urgency for utility-owned land projects
- **Tax Credit Phaseout**
  - Wind/Solar: Must begin construction by July 4, 2026; energized by Dec 31, 2027
  - Batteries: Grandfather by starting construction before Jan 1, 2026
- **Foreign Materials Restrictions**
  - Post-2026 projects face thresholds on materials from “Prohibited Foreign Entities” (China, Russia, Iran, N. Korea)
  - Complex rules and unknowns pending Treasury guidance by Dec 2026
- **Executive Order (July 7, 2025)**
  - Directs Treasury to tighten guidance on Safe Harbor Provisions of construction eligibility and foreign supply restrictions

Power Supply Resource Plan | Recommended Adjustments

- **Focus on projects most likely to qualify for tax credits**
  - Projects in advanced stage of development
    - Interconnection agreement with known interconnection costs
    - All or most permits in hand
    - Likely to be safe harbored
- **Purchase output of projects before 2030, as early as 2026**
  - Will expose RPU to some market price risk
  - Ensure projects are built and available for 2030 compliance
  - Bank renewable energy credits (RECs)
- **Phase in 100% Net Renewable Energy by 2030 goal**
  - Focus on elimination of largest components of emissions
  - Provides time for policy to settle and lessen economic impact
  - Lead by Example vs. Cautionary Tale



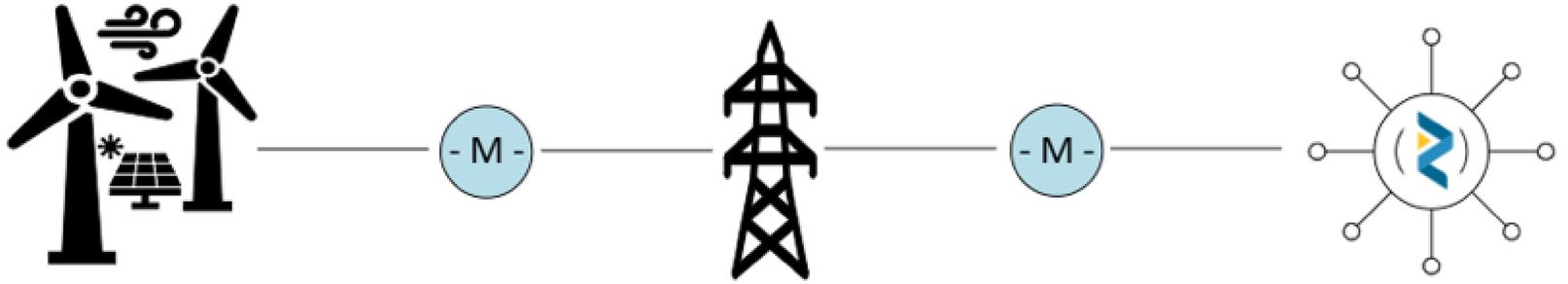
LMP variation impacts RPU costs

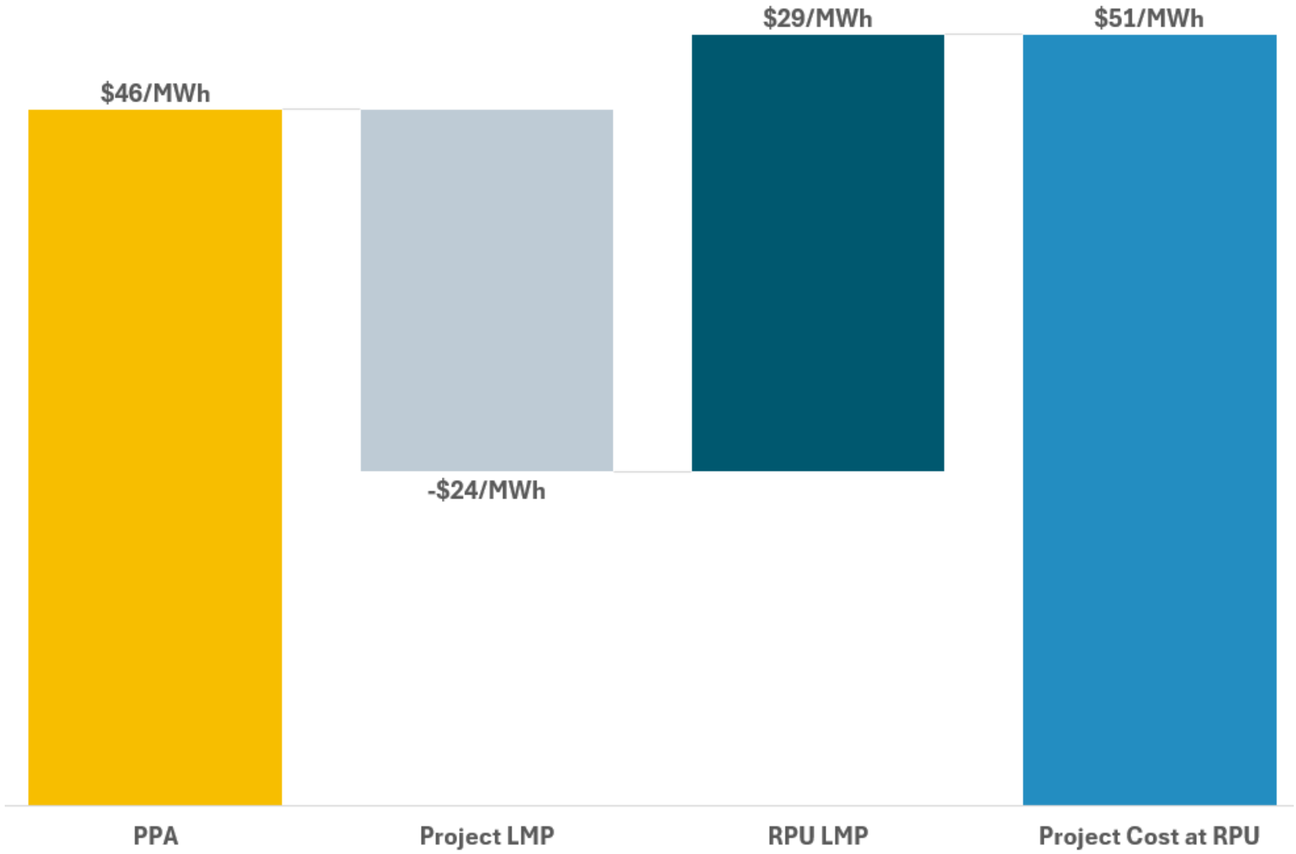
- Energy is purchased at the project at the **PPA Price**
- Energy is sold into the MISO Market at the **Project Node LMP**
- The difference between the PPA Price and LMP is what we call the **Net Price at Project Node**

Because we have an obligation to buy our first 216 MW from SMMPA pre-2030, any renewable project that comes online early must be operated as a merchant plant and stand on its own economics.

Pre-2030 the primary cost driver for renewables is the **Net Price at Project Node**

PPA Price - Project LMP + RPU LMP = Project Cost at RPU

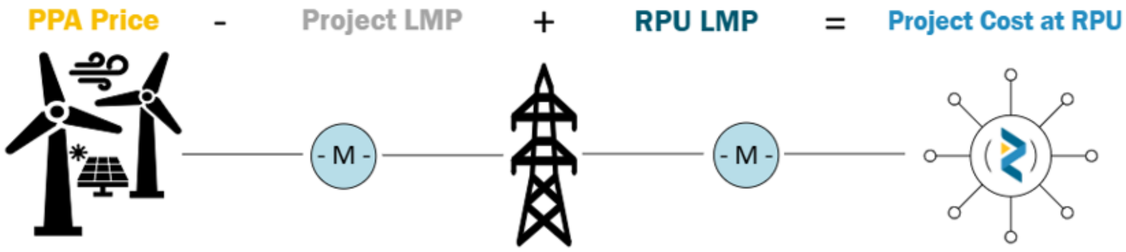


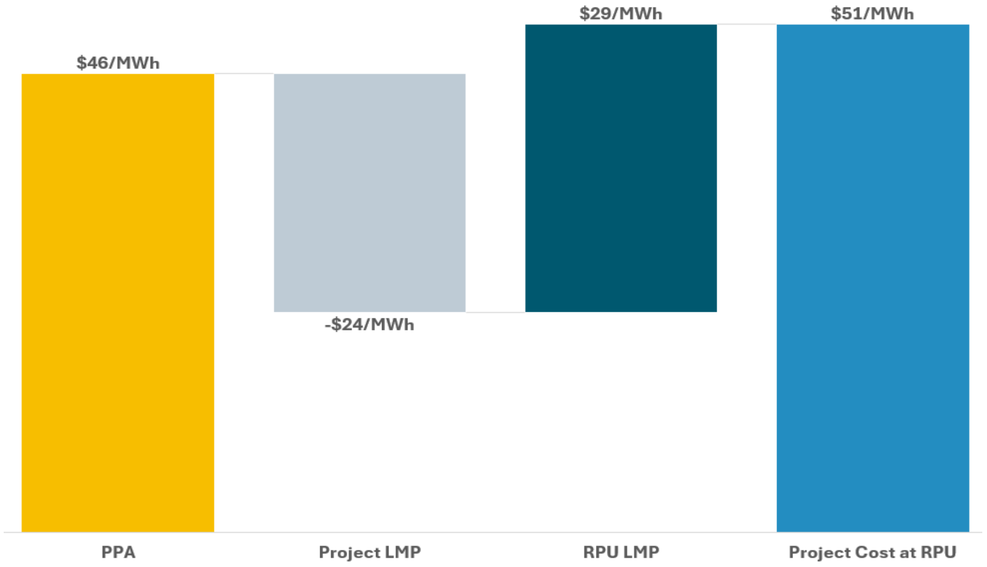


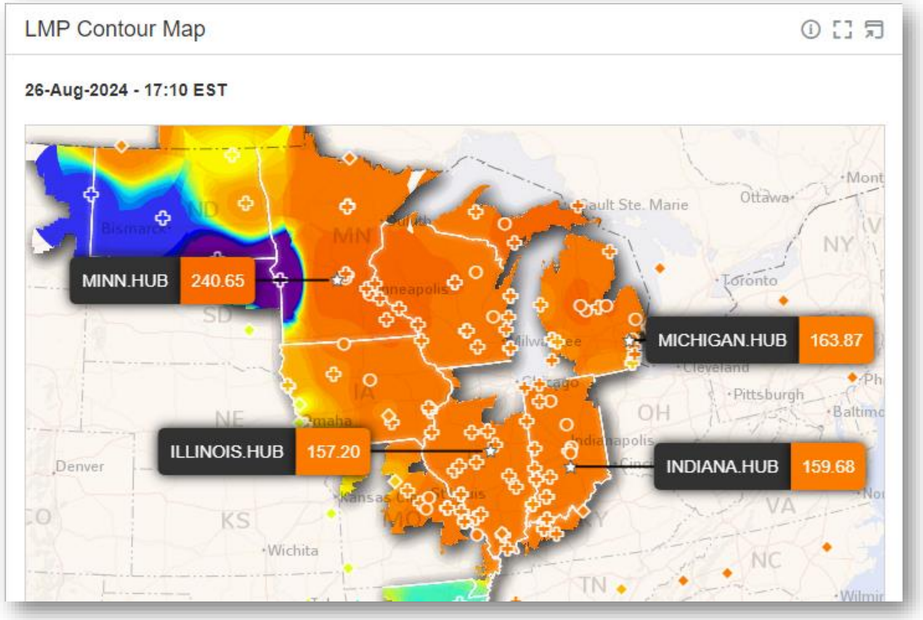
LMP variation impacts RPU costs

- Energy is purchased at the project at the **PPA Price**
- Energy is sold into the MISO Market at the **Project Node LMP**
- The difference between the PPA Price and LMP is what we call the **Net Price at Project Node**
- Energy for RPU's load is purchased at the **RPU LMP**
- The cost of energy for load is **Project Cost at RPU** = **PPA Price** – **Project Node LMP** + **RPU LMP**

In 2030 and beyond, the primary cost driver for renewables is the **Project Cost at RPU**







Project Node LMP	High	High	Low	Low
RPU Node LMP	High	Low	High	Low
Resulting RPU Energy Cost	PPA Cost	Less than PPA	Greater than PPA	PPA Cost

Keeping projects close regionally helps mitigate transmission congestion risk

Minnesota Statute 216B.1691

"Subd. 2f. Solar energy standard.

…

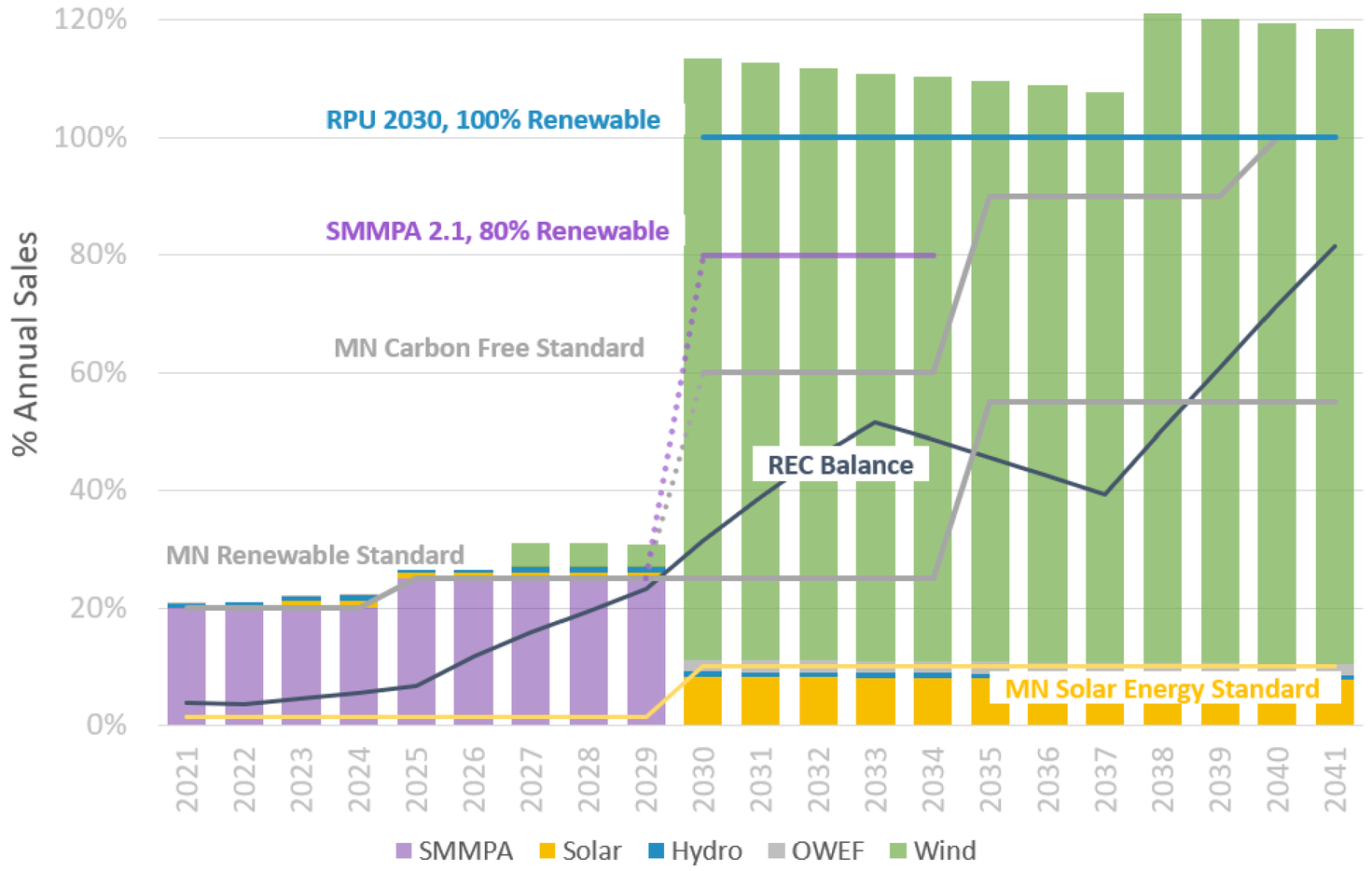
…

(e) It is an energy goal of the state of Minnesota that, by 2030, ten percent of the retail electric sales in Minnesota be generated by solar energy."

	Sales to Ultimate Customers		Required Solar (low)	Required Solar (high)
2021	1,141,414 MWh		57 MW	63 MW
2022	1,126,860 MWh		56 MW	63 MW
2023	1,147,711 MWh		57 MW	64 MW
2024	1,133,267 MWh		57 MW	63 MW
Average	1,137,313 MWh		57 MW	63 MW
2030 Forecast	1,184,815 MWh		59 MW	66 MW

Currently, the MN solar energy standard is not enforceable for municipal utilities. It applies to public utilities like Xcel. We have historically aligned our portfolio with voluntary compliance.

2024 Renewable Energy Portfolio Goals



2024 Renewable Portfolio

Existing Resources
- Lake Zumbro Hydro
- Valley High Solar
- Olmsted Waste to Energy
- Distributed Energy Resources (DERs)

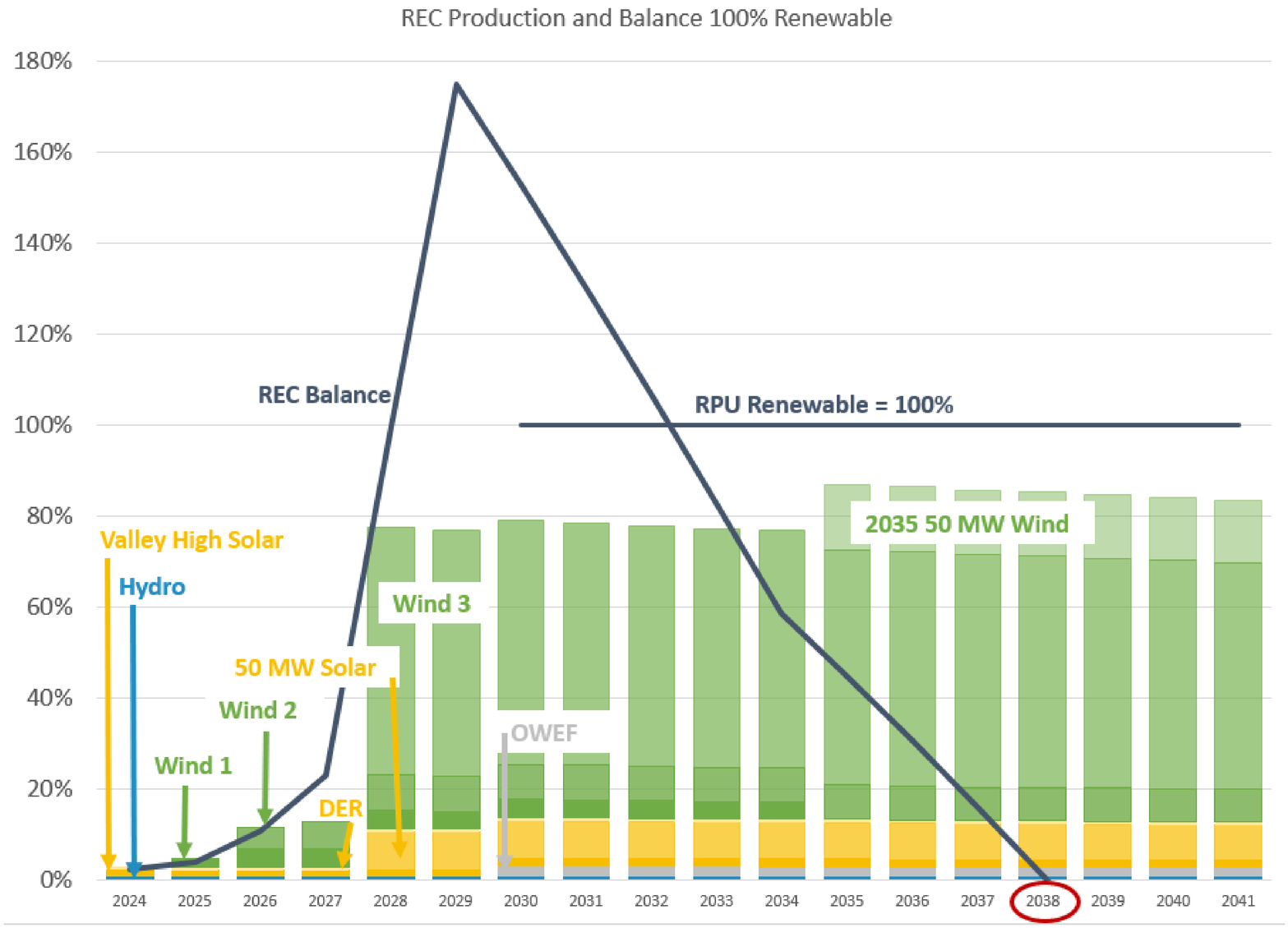
2030 Projects
- Wind 350 MW
- Solar 50 MW
- Distributed Energy Resources (DERs)

2035 Projects
- Wind 100 MW

The REC Balance line represents the ‘savings account’ for renewable energy credits (RECs). As long as the line stays above zero, you are meeting your goal.

2025 Resource Plan Update
Renewable Energy Portfolio Options

All Wind & Solar | 100% Net Renewable Energy by 2030 (thru 2038)



Current Goal Portfolio Options

Existing Resources
- Lake Zumbro Hydro
- Valley High Solar
- Olmsted Waste to Energy
- Distributed Energy Resources

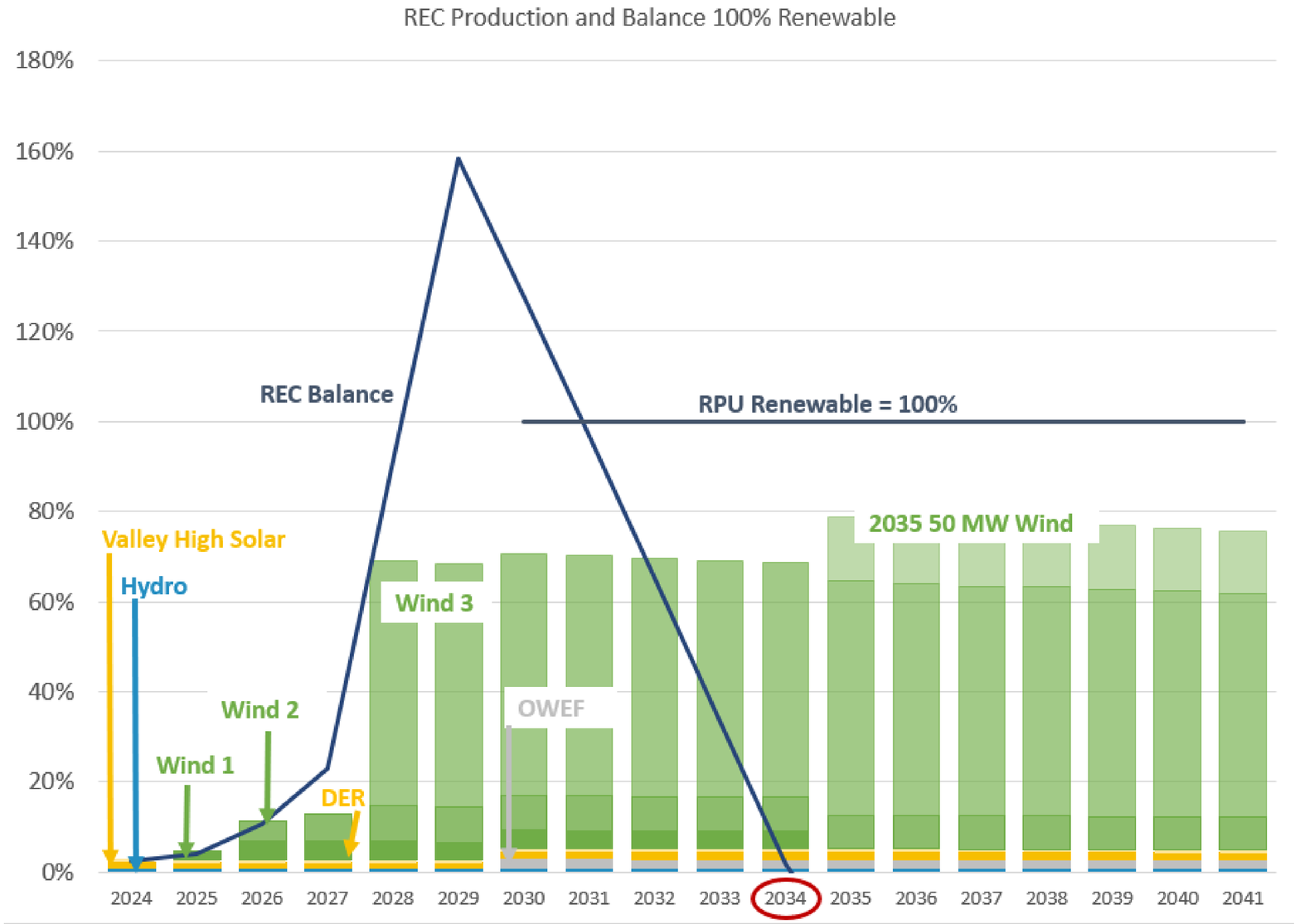
Projects/PPA Under Consideration
- Wind 1 (smaller scale)
- Wind 2 (smaller scale)
- Wind 3
- Solar 50 MW
- Future Distributed Energy Resources

Future Project
- Wind 50 MW

2030 Average Net Cost at Project Node
- Min / Ave / Max = -$5 / $16 / $24 million per year

2030 Total Net Cost at Project Node
- Min / Ave / Max = -$5 / $16 / $24 per MWh

Wind Only | 100% Net Renewable Energy by 2030 (thru 2034)



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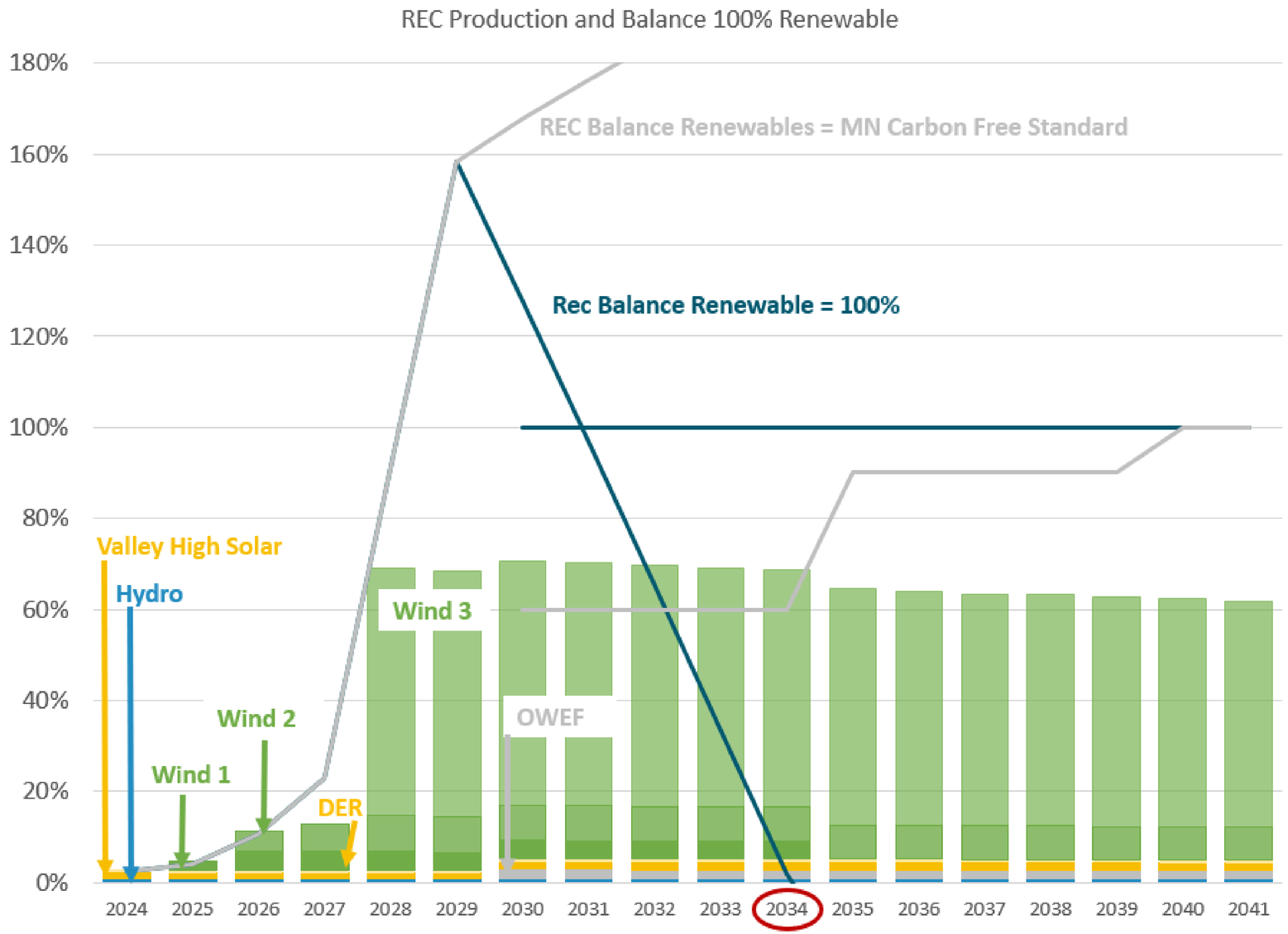
2030 Average Net Cost at Project Node
- Min / Ave / Max = -$7 / $10 / $18 million per year

2030 Total Net Cost at Project Node
- Min / Ave / Max = -$8 / $12 / $20 per MWh

Early Wind | 100% Net Renewable Energy by 2030 (thru 2034)



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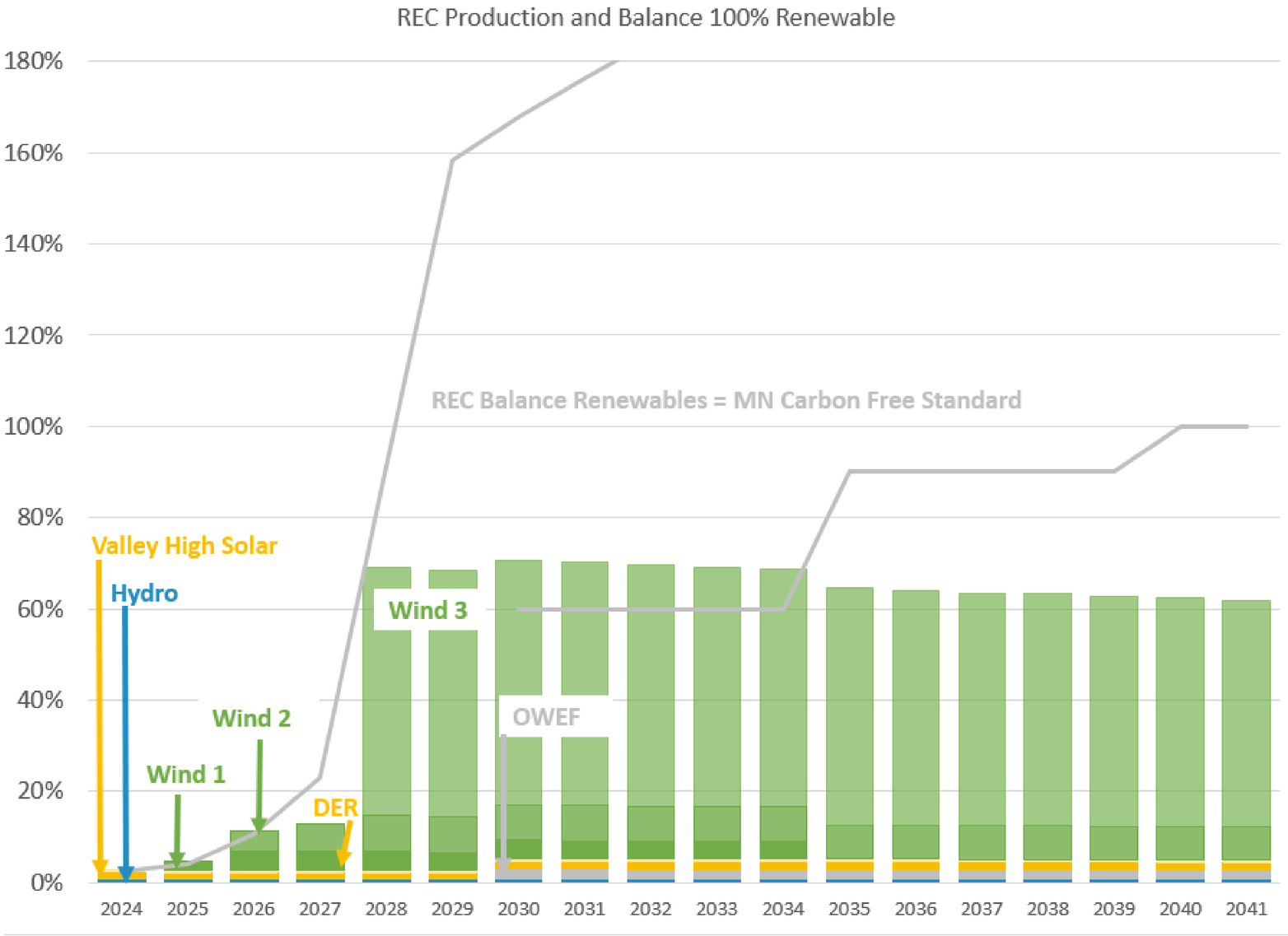
Early Wind | Meets MN Carbon Free Standard (beyond 2040)



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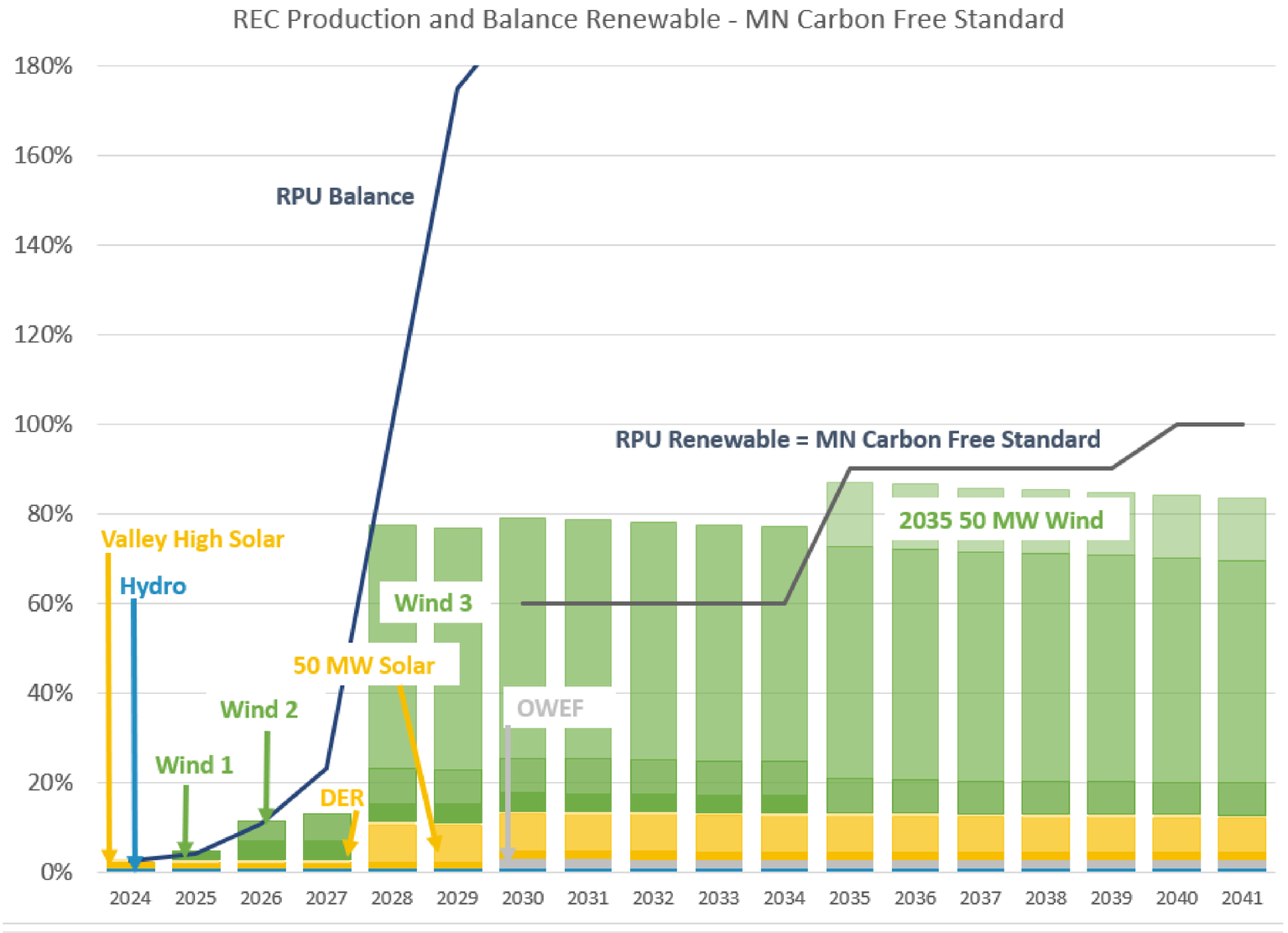
2023 Minnesota Carbon Free Standard

60% 2030
90% 2035
100% 2040

All Wind & Solar | MN Carbon Free Standard (well beyond 2040)



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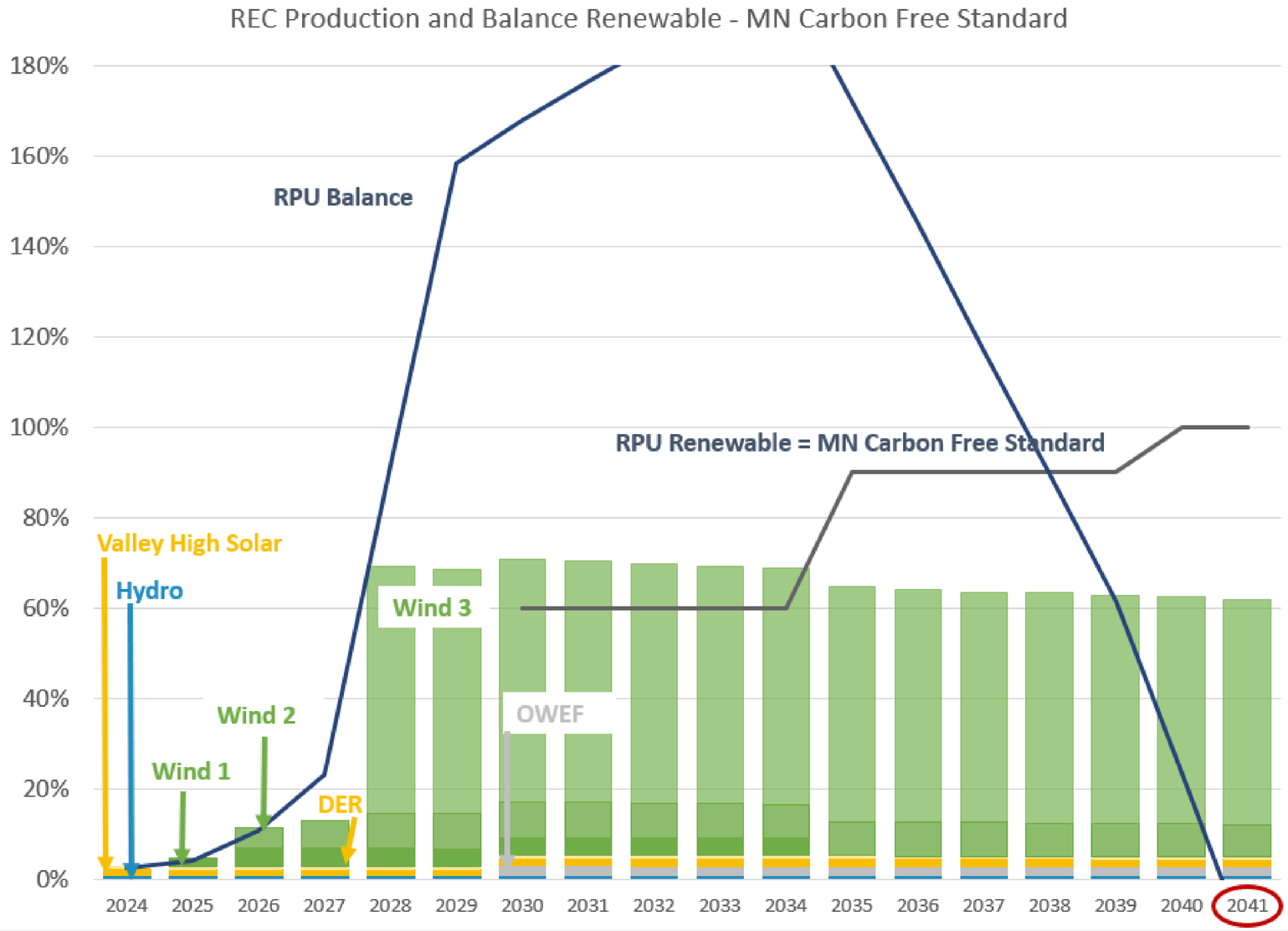
Early Wind | MN Carbon Free Standard (until 2041)



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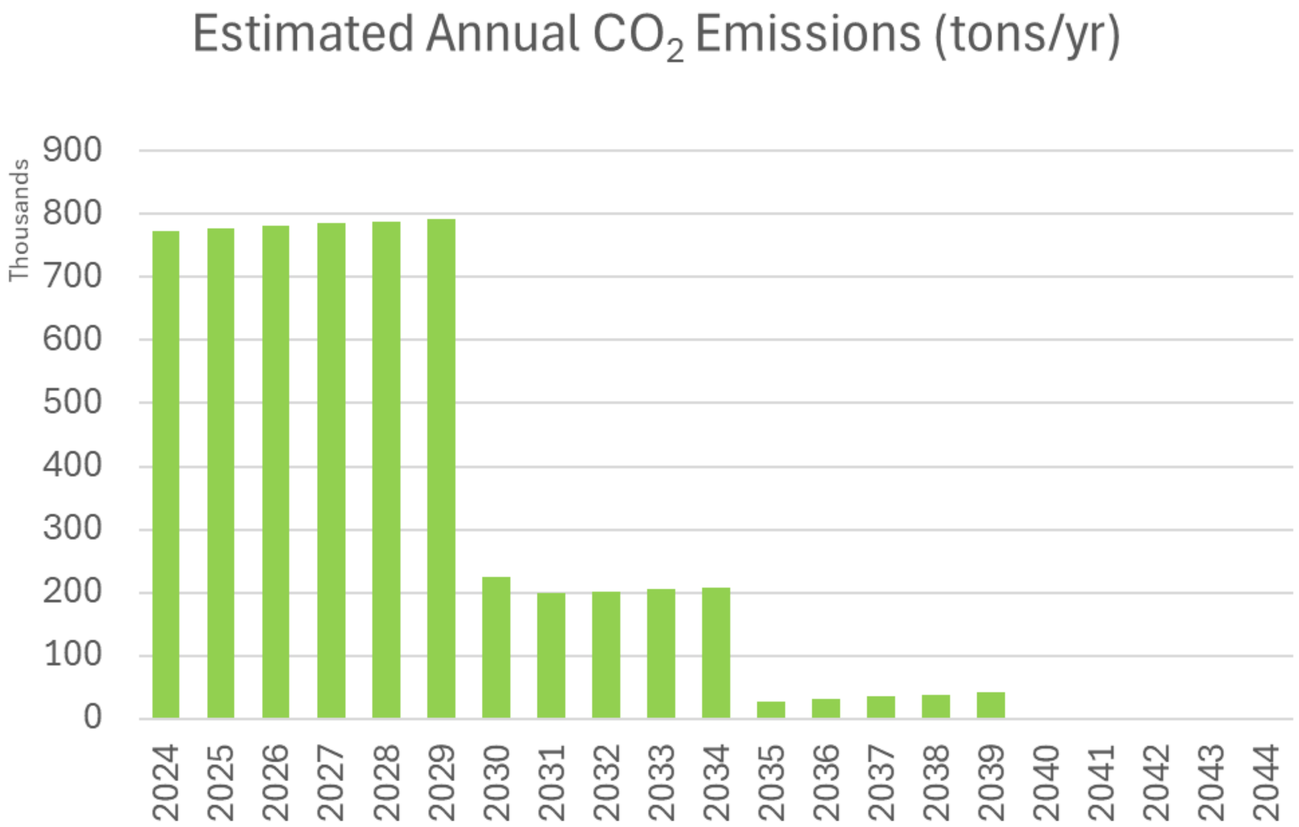
Renewable Portfolio Summary | Project Options, Costs, & Risks

	Project Net Price ($/MWh)	Annual REC Volume %	Compliance? 100% by 2030	Compliance? MN Carbon Free	Annual Market Risk Exposure in 2028-2030 Low Risk	Med Risk	High Risk
Wind 1	$37	4%			$0.08	$1.32	$2.12
Wind 2	$43	8%	Compliance Through 2038	Compliance Through 2041	-$1.28	$0.07	$1.11
Wind 3	$41	54%			-$6.89	$4.75	$12.40
Solar	$80	8%			$2.36	$5.02	$6.17

($millions)

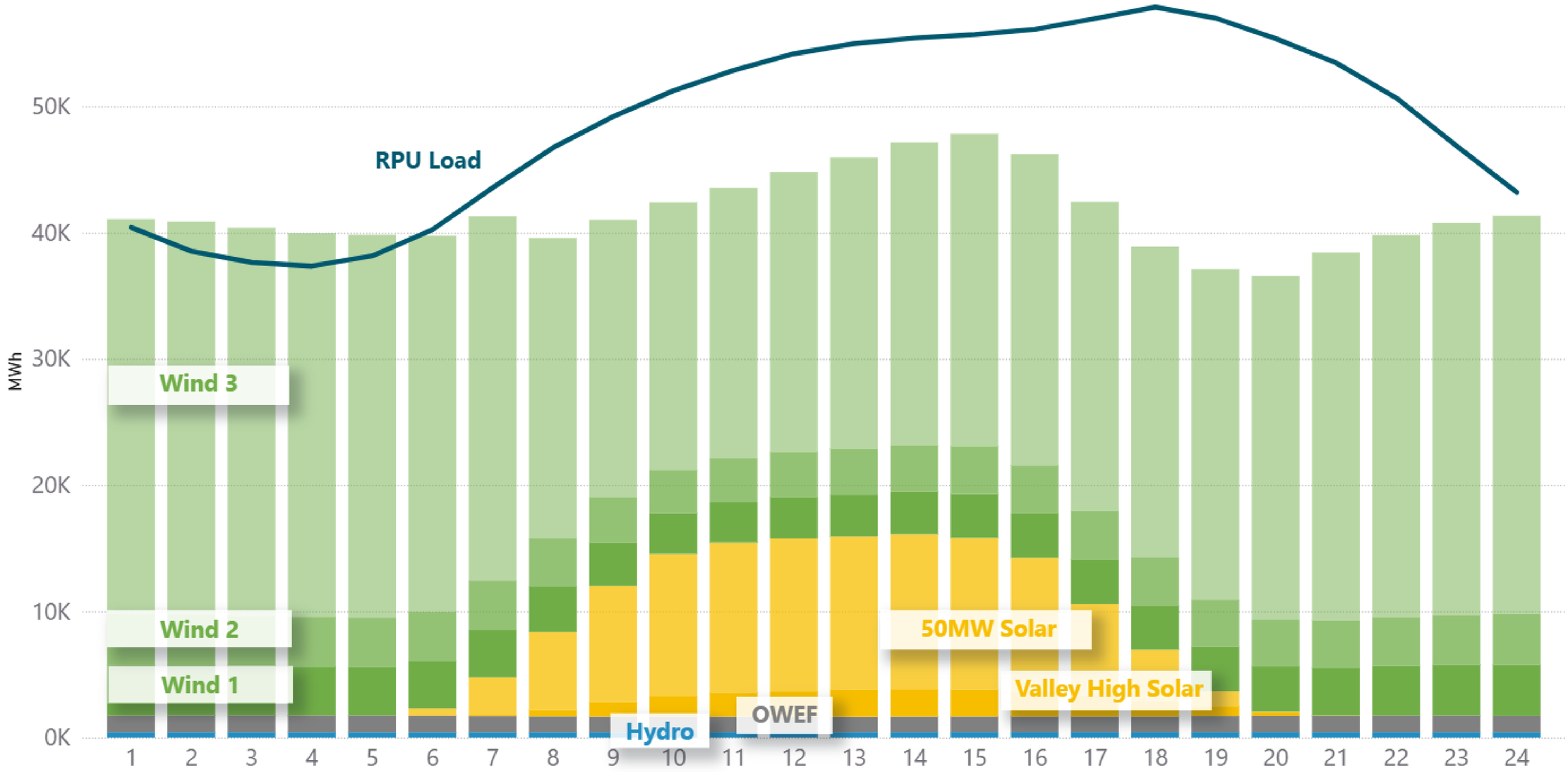
Power Supply Resource Plan | Effective GHG Emissions



- **2030**
  - SMMPA Exit & Sherco 3 Retirement
  - 2-3 Years of Banked RECs
  - Market Purchases ~ 28%
  - >70% Reduction of GHG Emissions
  - Plan for 2035
- **2035**
  - Additional Renewable Contracts
  - More Settled Policy Environment
  - Meet 90%
- **2040**
  - Achieve net zero

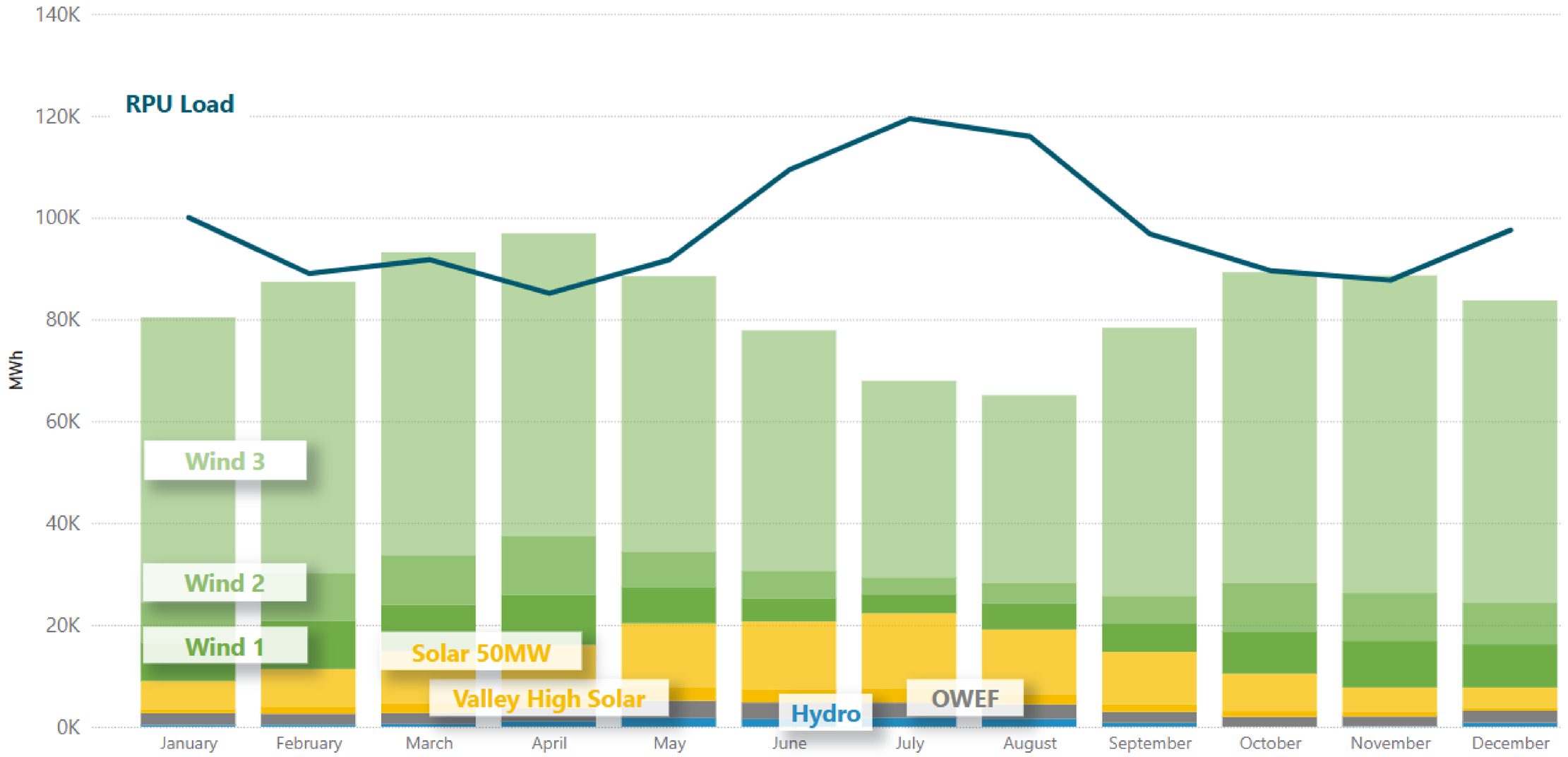
Renewable Energy Timing & Locational Pricing

Annual Sum of Renewable Generation and Load by Hour of the Day



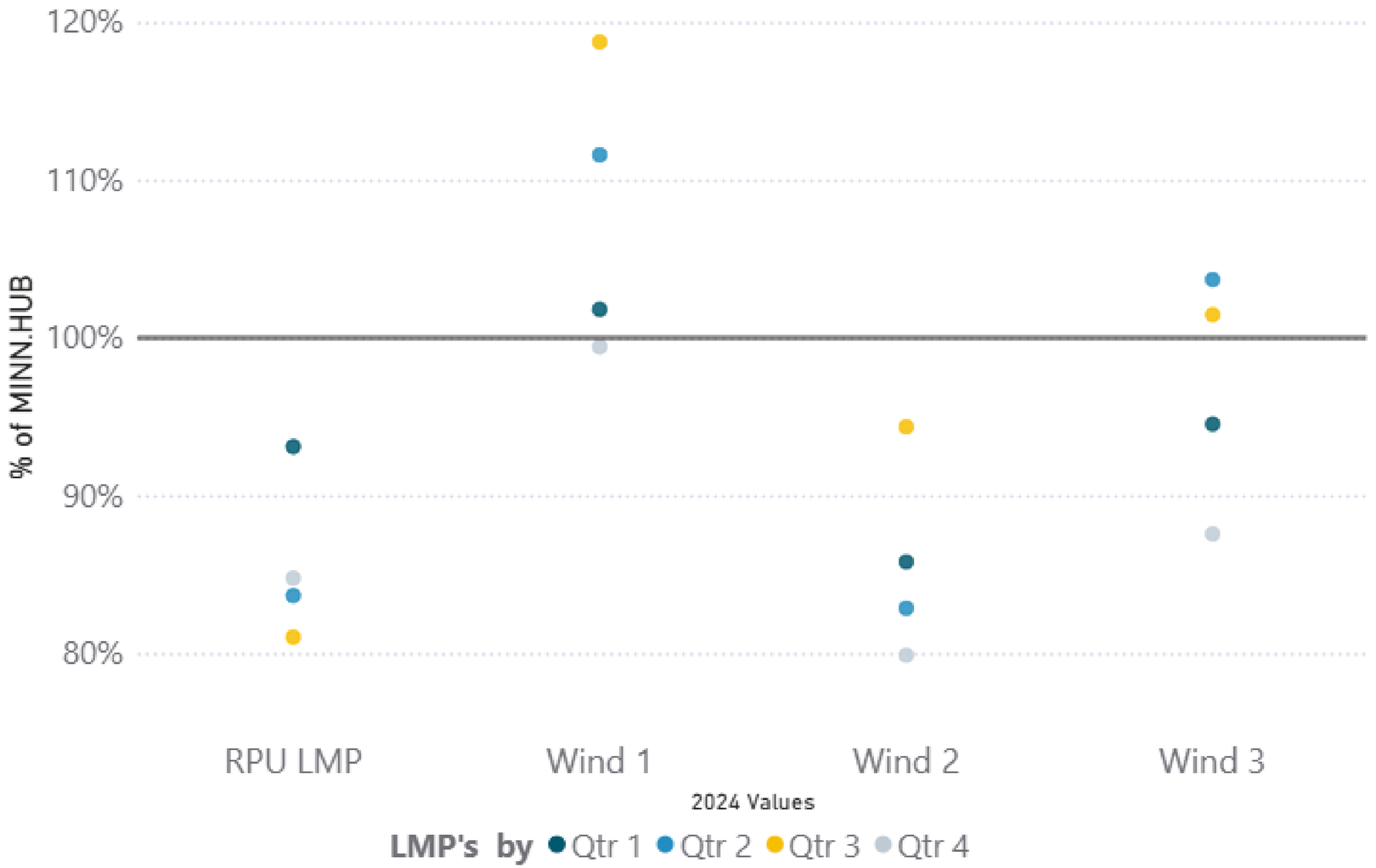
Wind and solar provide a good hourly generation balance on average.

Monthly Sum of Renewable Generation and Load



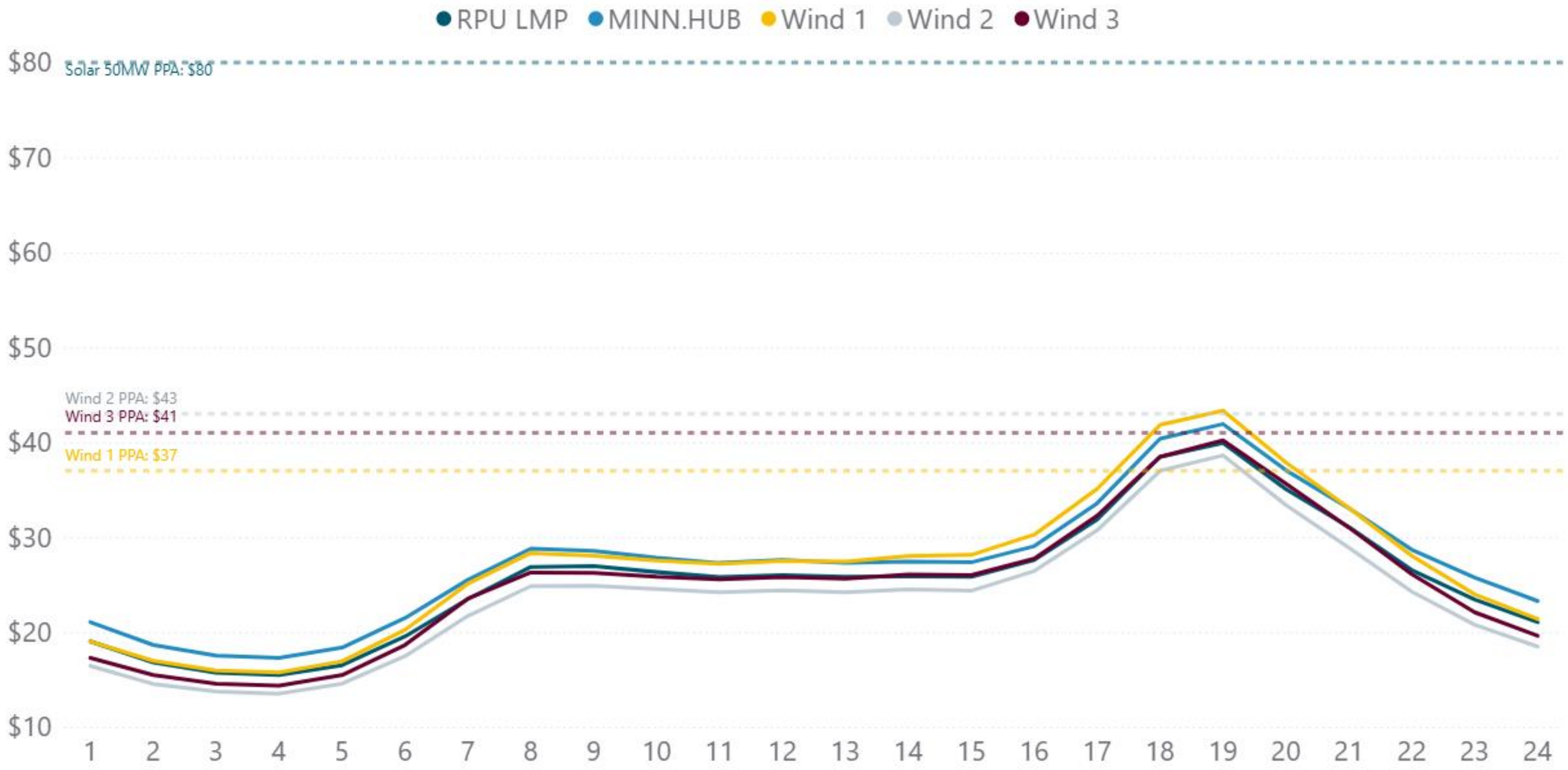
Wind and solar also provide a good seasonal balance by month on average.

Nodal Price Alignment of Renewable Projects



Locational Marginal Price (LMP) differences are a congestion price signal.

Average 2024 LMP by Hour



If energy market prices resemble 2024, the potential project portfolio will have a net cost of up to $24M of additional annual power supply cost per year through 2030

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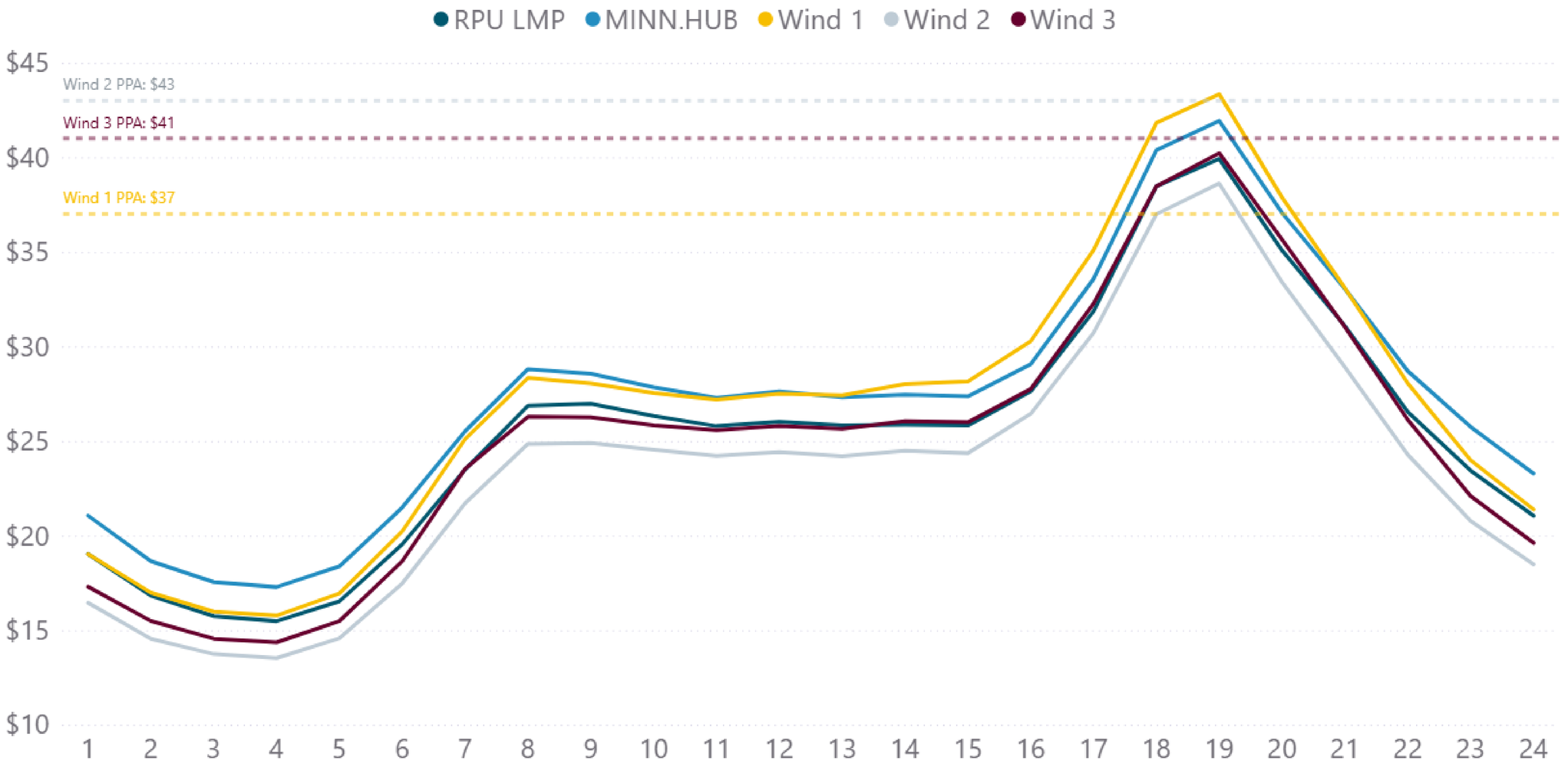
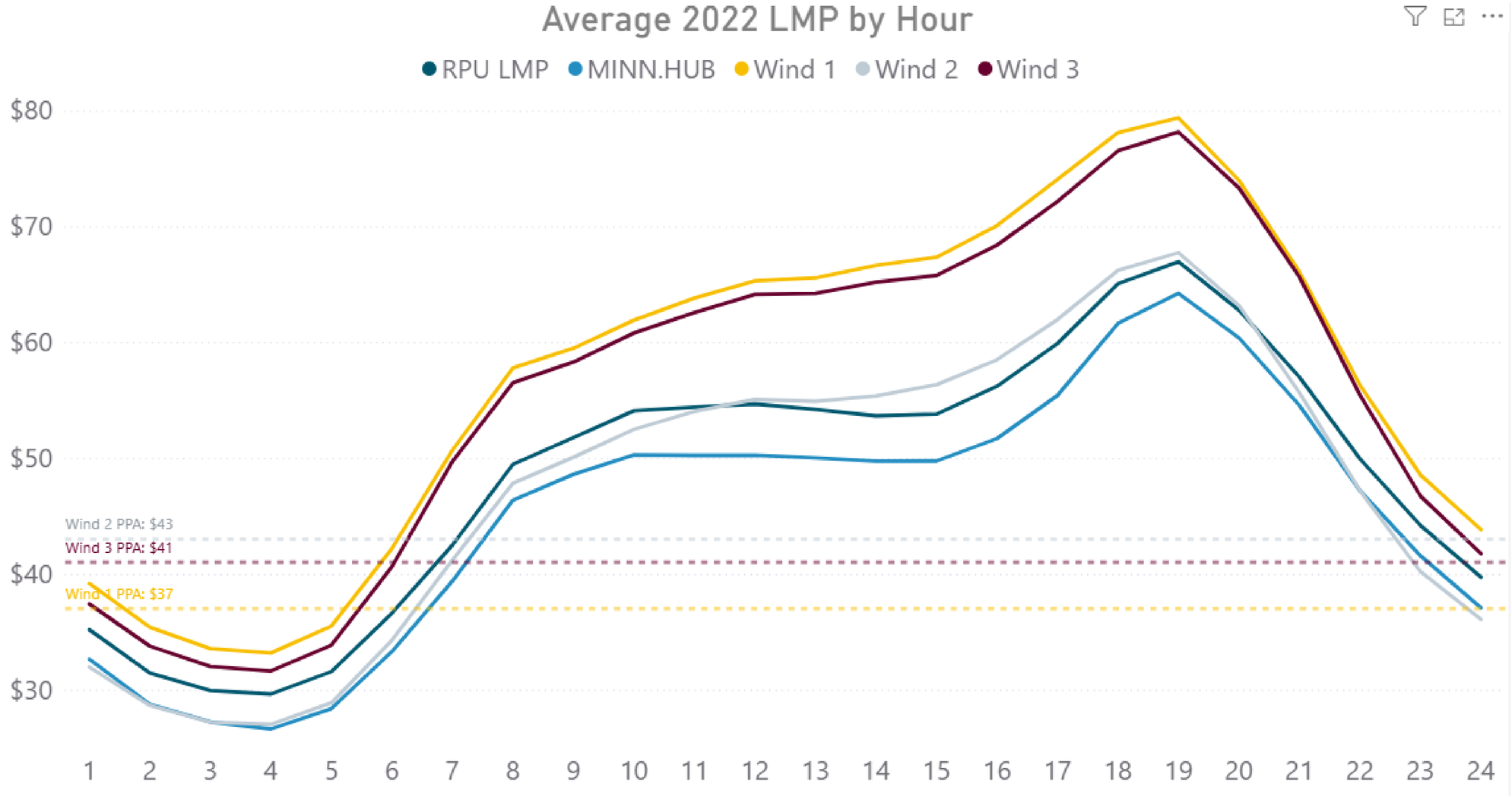


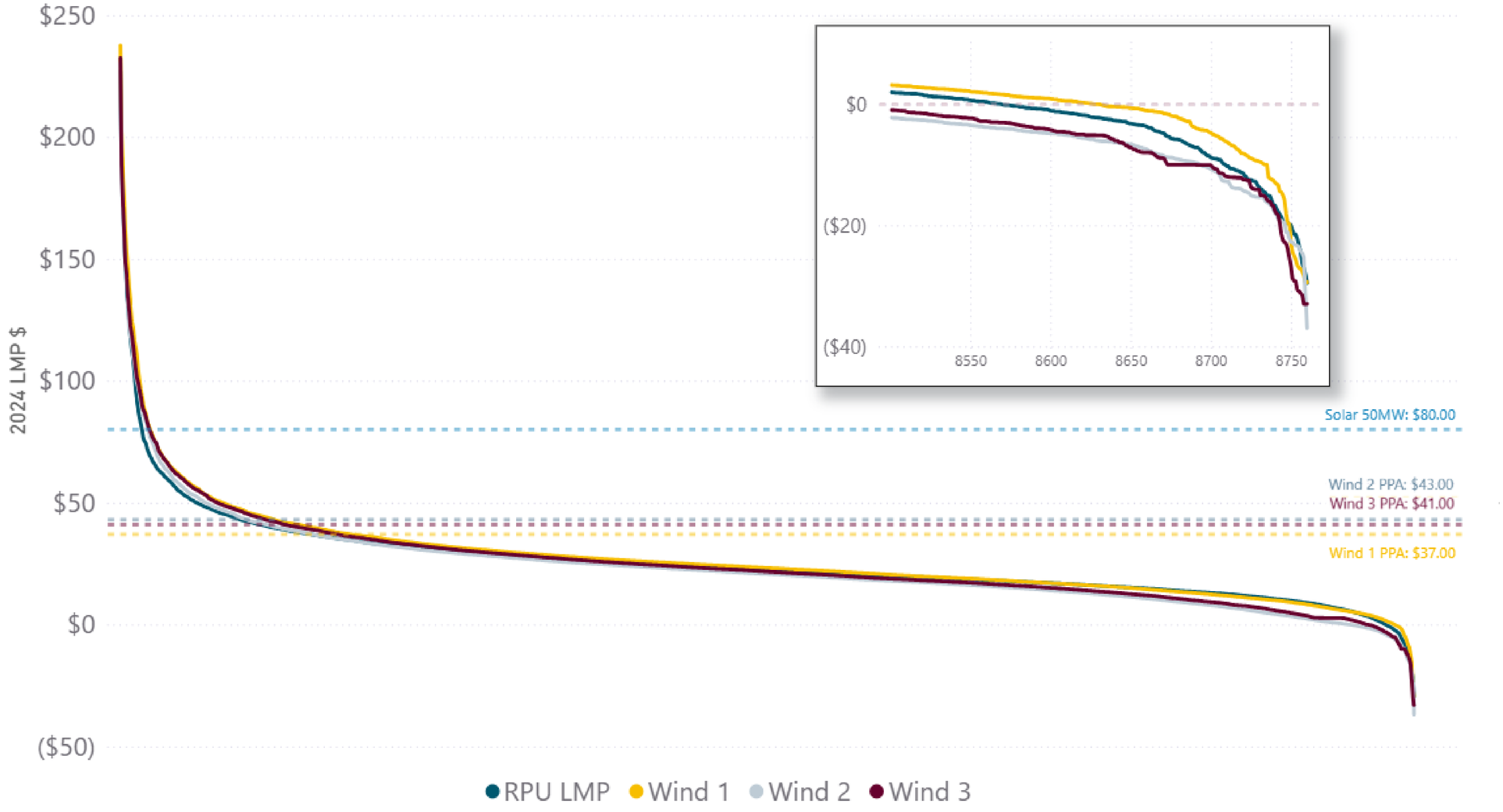
If energy market prices resemble 2024, the potential project portfolio will have a net cost of up to $24M of additional annual power supply cost per year through 2030

Average 2022 LMP by Hour



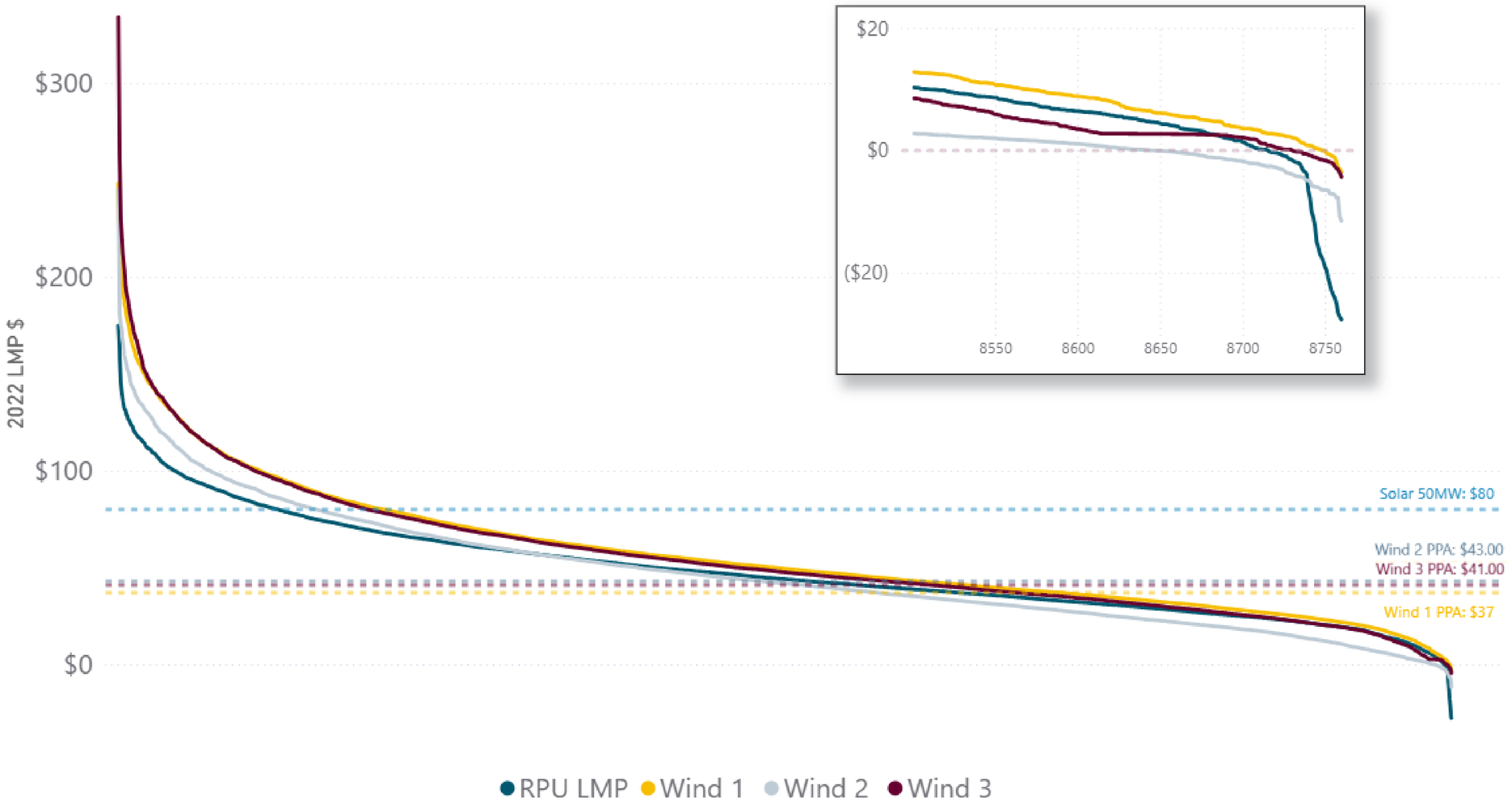
If energy market prices resemble 2022, the potential project portfolio will have a net cost of up to $5M of additional annual power supply cost per year through 2030

A Price Duration Curve of 2024 Annual LMP Prices



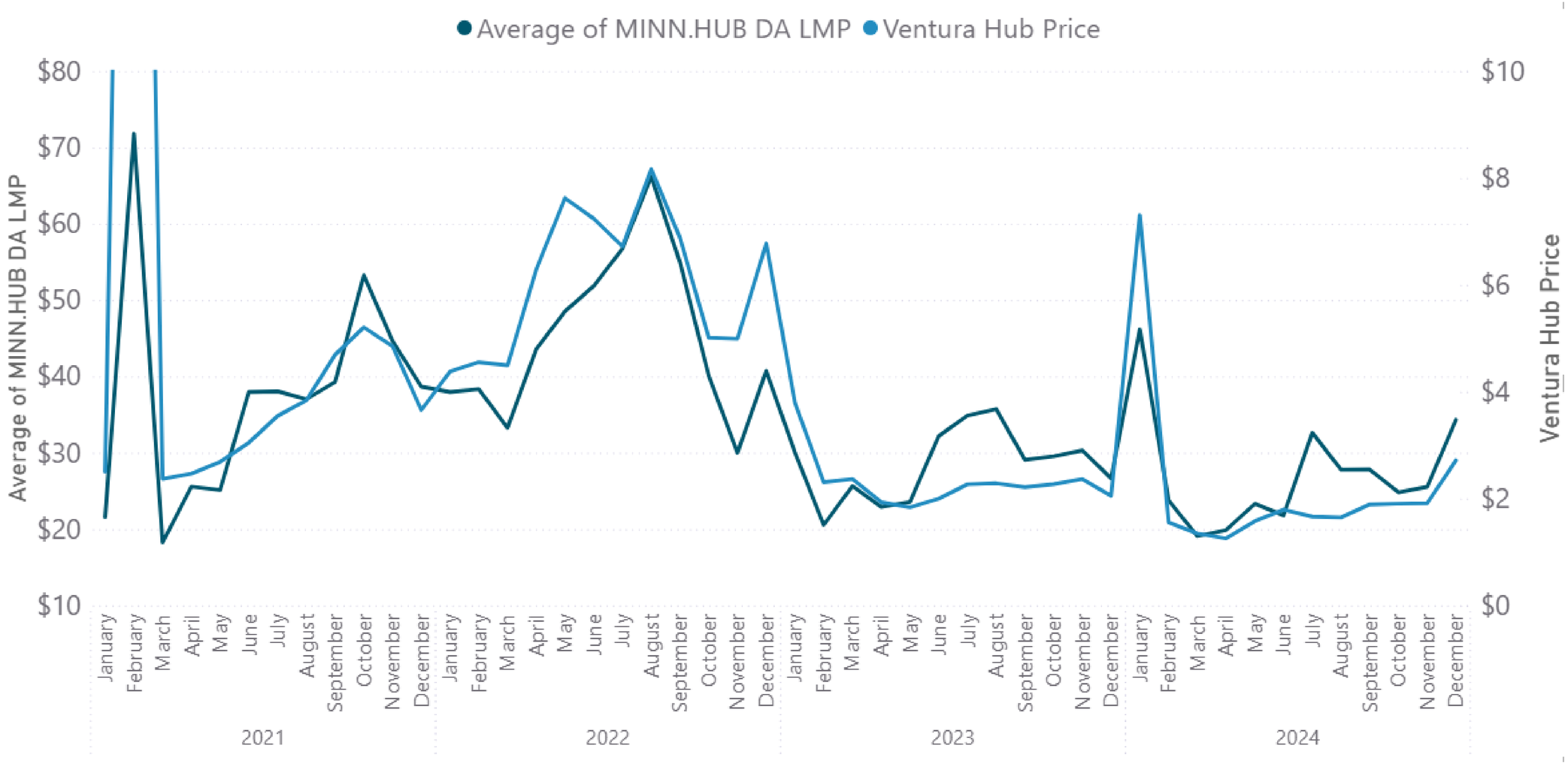
A price duration curve is all annual hourly node prices sorted in descending order.

A Price Duration Curve of 2022 Annual LMP Prices



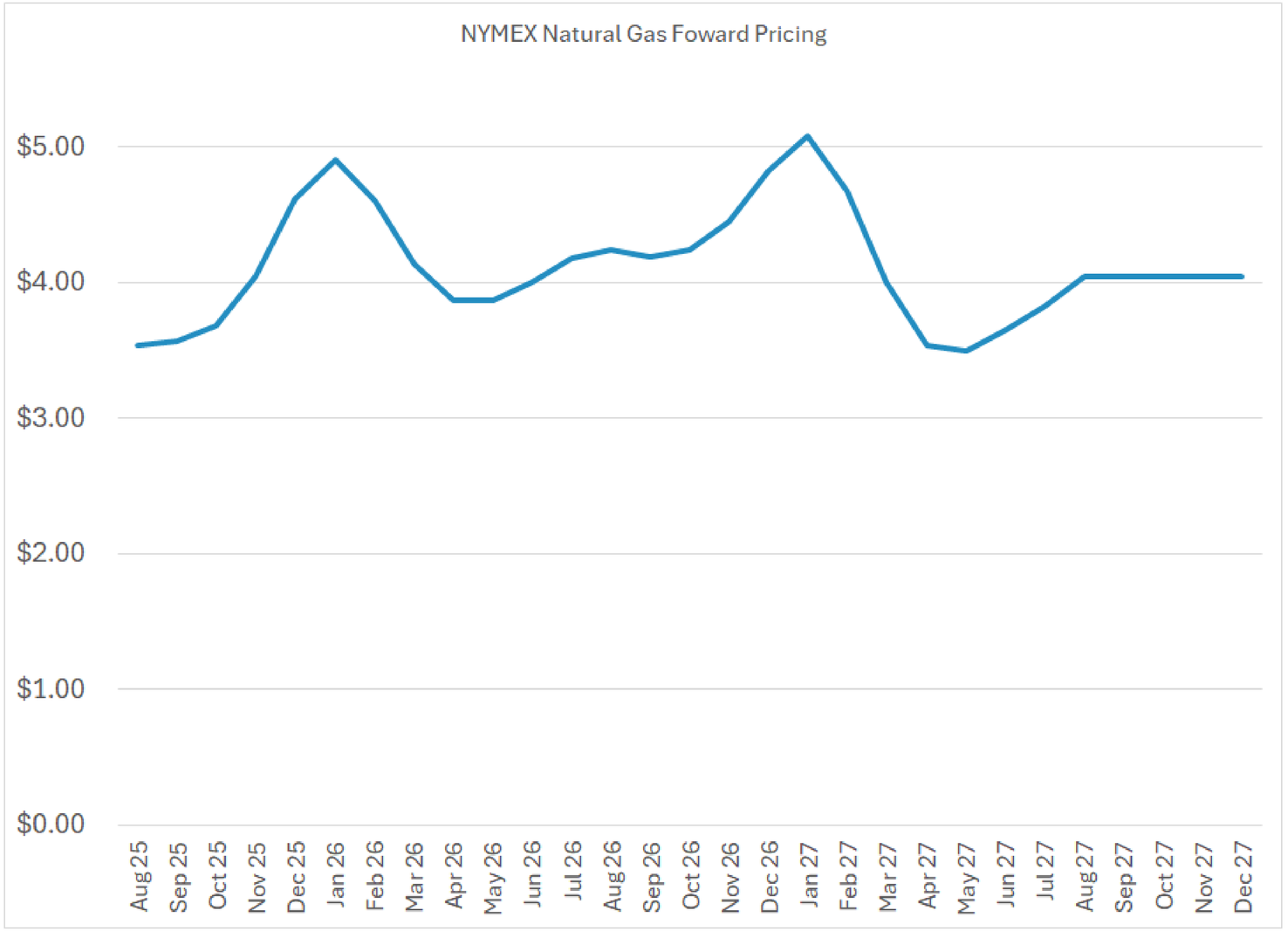
A price duration curve is all annual hourly node prices sorted in descending order.

Average Monthly Day Ahead Electricity Price versus Gas Price



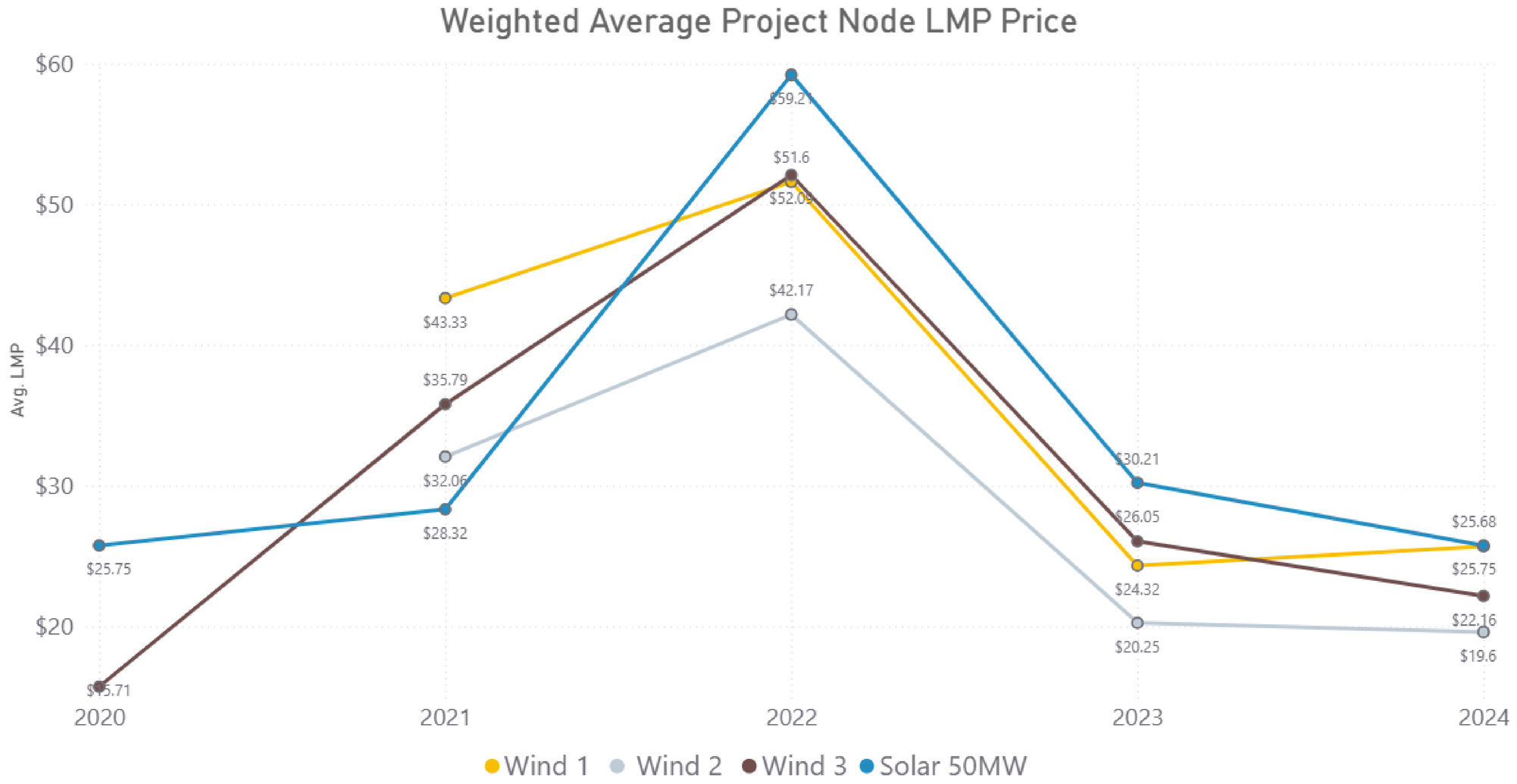
The cost of natural gas is strongly correlated to the average monthly energy market price. Higher LMPs in 2022 correlated to an above $4 gas price.

Gas Futures are an (Often Misleading) Indicator of Energy Prices



There are indications we are facing a higher Natural Gas price future.

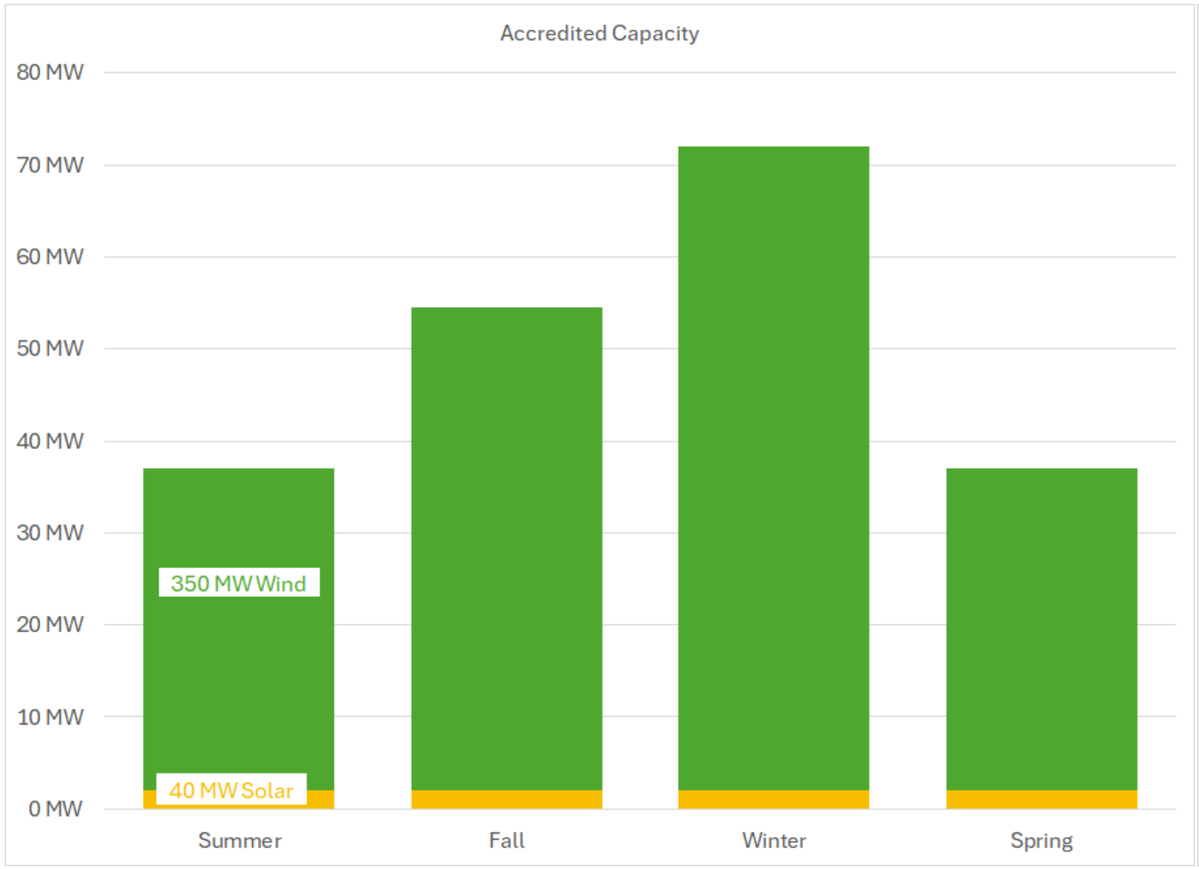
Historic Look Back at Renewable Project Node Price

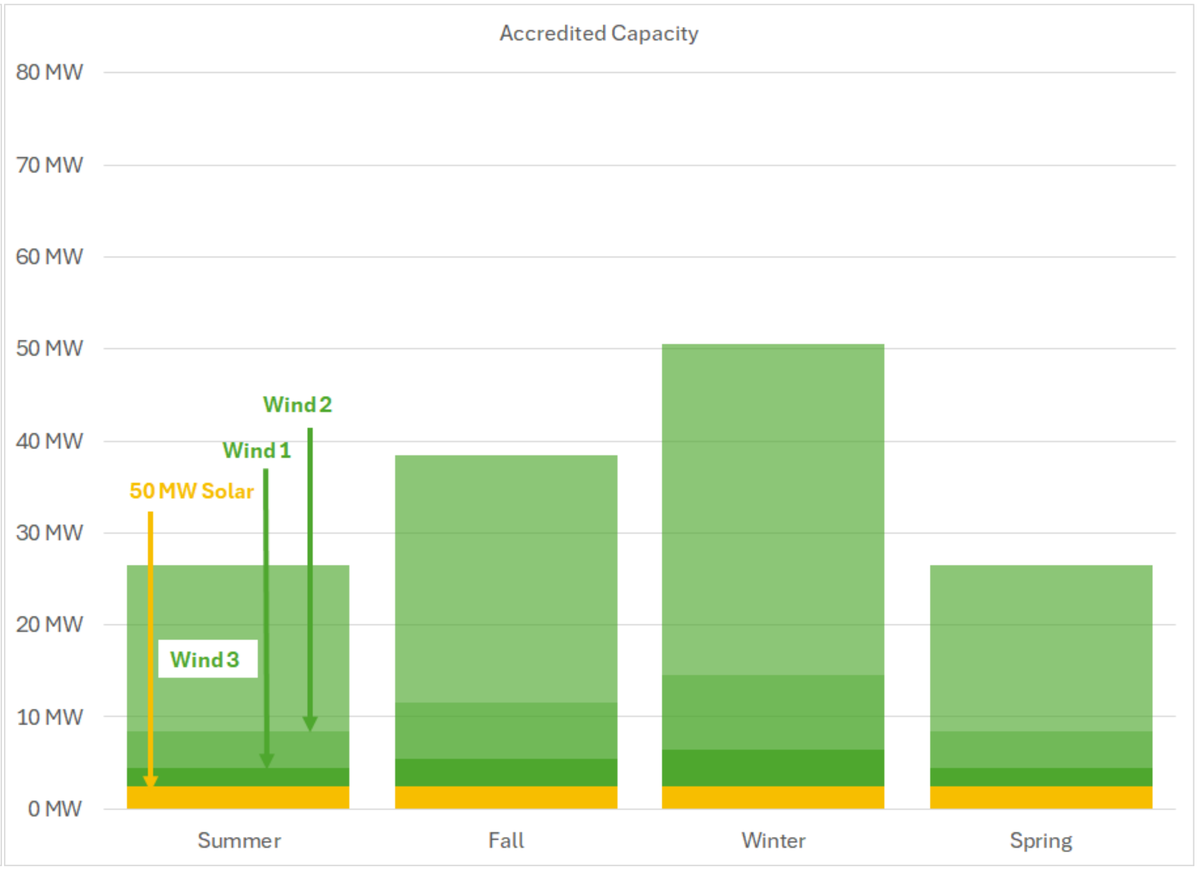


If future energy market prices resemble 2022, the possible projects portfolio would be nearly cost neutral pre-2030 and provide a good long term energy cost hedge.

Reliable Capacity Considerations

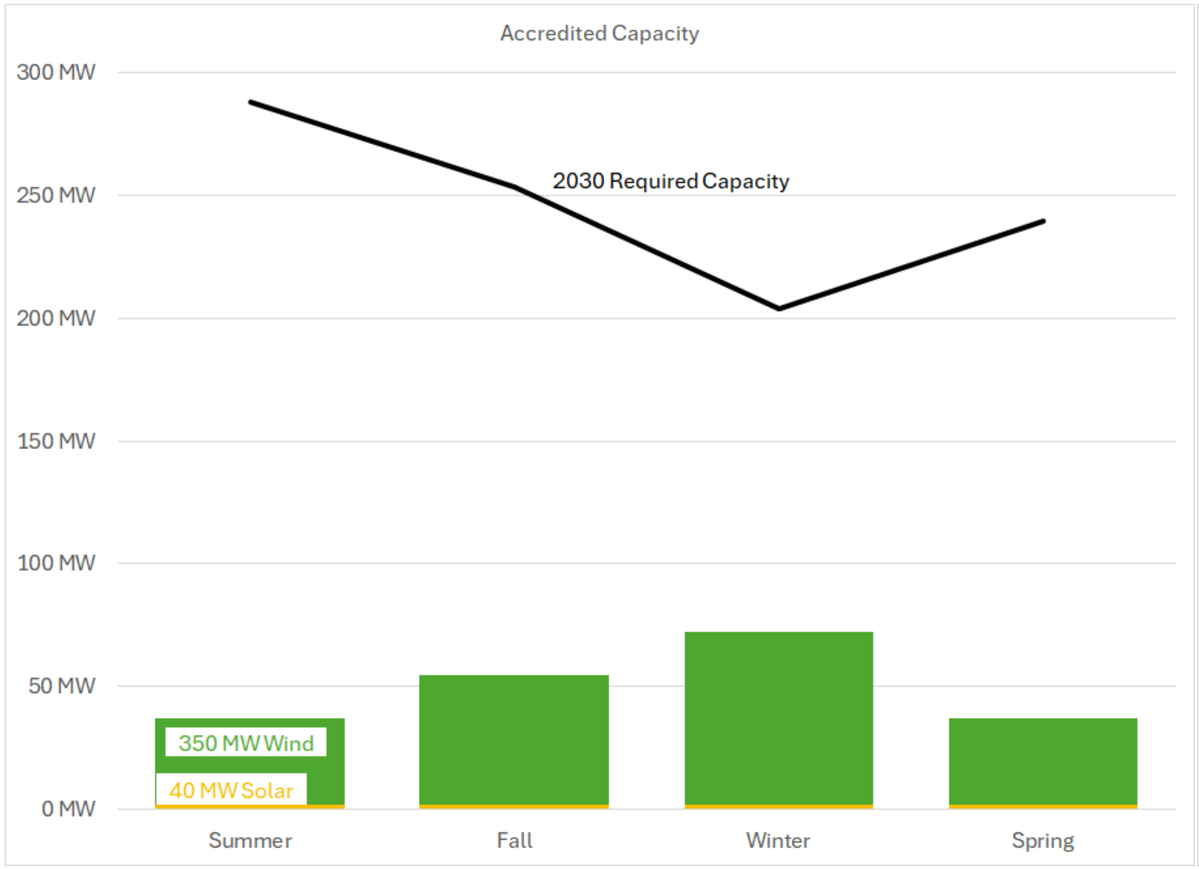
Impact to Reliable Capacity between plan and possible projects.

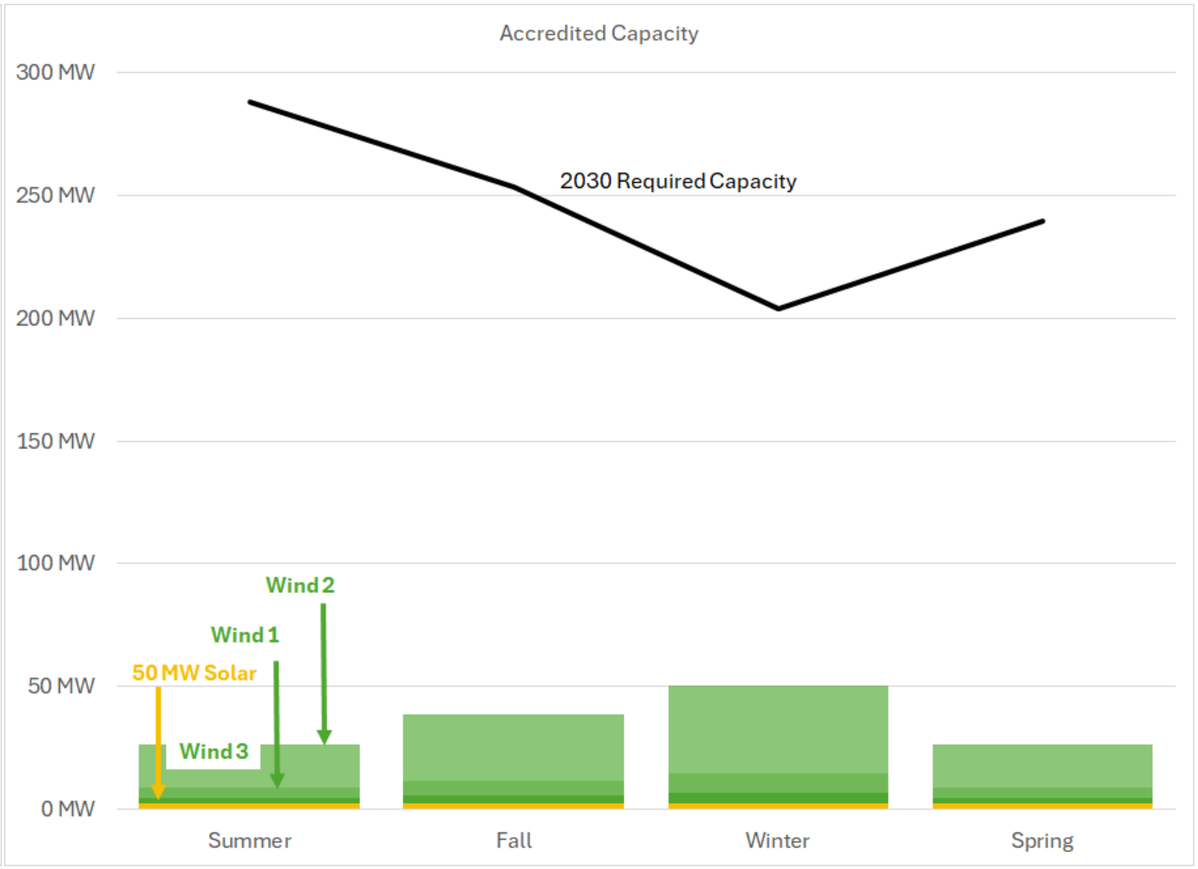




There is less capacity available in the possible projects compared to the plan due to the project's sizes and transmission interconnection types.

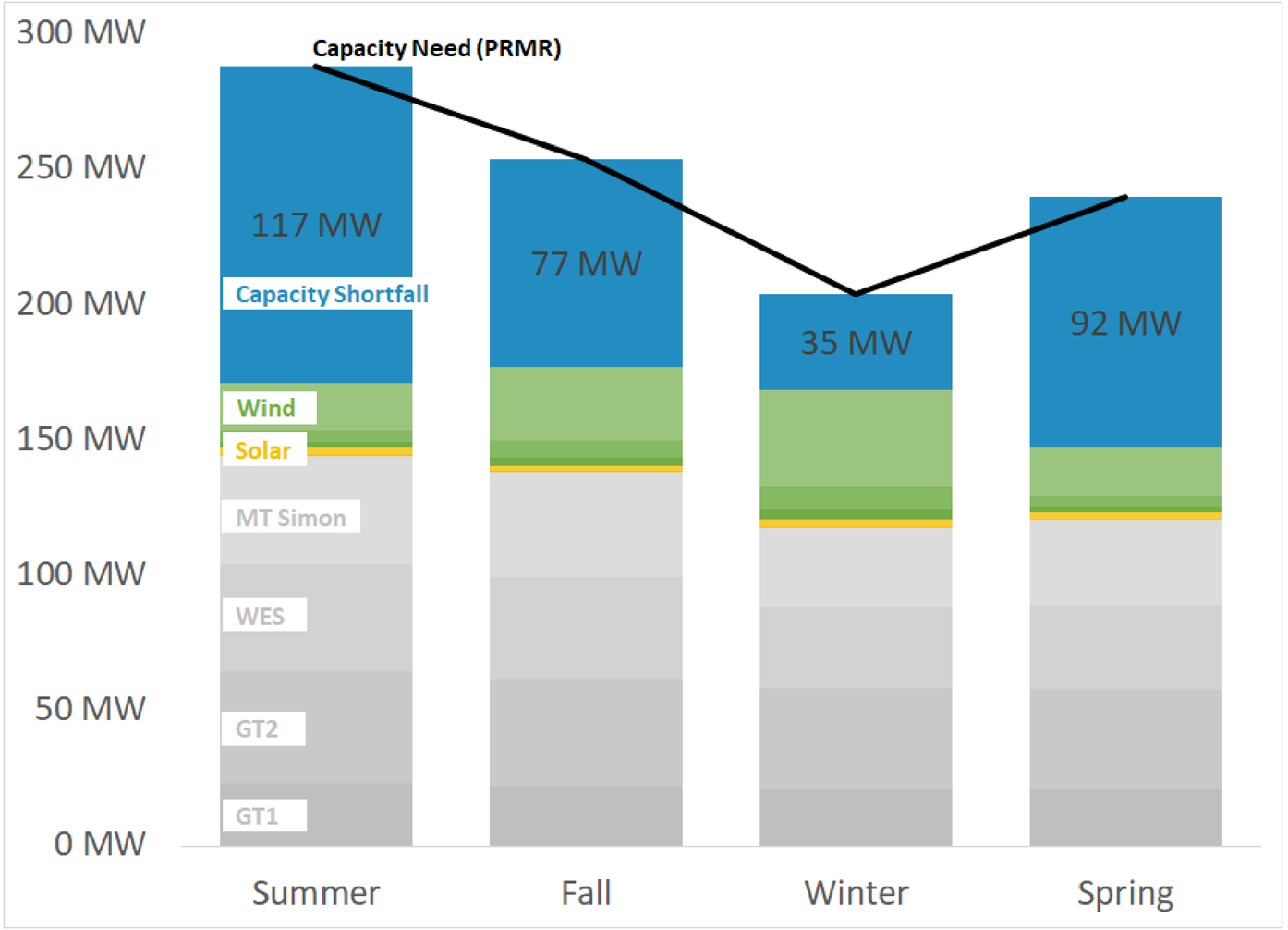
Impact to Reliable Capacity between plan and possible projects.





Renewables alone cannot fulfill our MISO capacity obligation.

2030 Reliable Capacity position with possible projects



Additional projects or contracts are needed to address the **Reliable Capacity** shortfall after current potential projects. Notice GT1 and Mt Simon are included.

Questions

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General Manager Recommendation on Information Items

5.A: 20-Year Financial Forecast – Electric Utility

5.B: Power Supply Resource Plan Update

Rochester Public Utilities Board Meeting
July 22, 2025

Power Supply Resource Plan | General Manager Recommendations

1. Consideration and Adoption of the 2026/27 Budget:

- Baseline budget assumes:
  - Achieving our **100% net renewable by 2030** portfolio goal.
  - Scenario 4 from the 20-year financial forecast. In summary, scenario 4 is to build local **Reliable Capacity** and procure additional **Reliable Capacity** and **Renewable Energy** through contracts and agreements.
  - Sensitivities of (1) additional tariff impacts, (2) potential battery accreditation loss, and (3) further ITC/PTC losses **are not included**

2. Authorize Renewable Energy Power Purchase Agreements (PPAs):

- Secure shovel-ready renewable energy projects that may still qualify for current tax credits and are positioned for construction within 12 months or completion by end of 2027.
  - These earlier **Renewable Energy** project start dates **have a short-term financial risk to be discussed**.

3. Consider Alternate Renewable Energy Goal and the Associated Rate & Risk Scenarios:

- Update our customer research completed in 2019 to understand current customer sentiment toward: Sustainable **Rates**, **Reliability** of Service and Environmental Stewardship **Responsibility.** ***Ad Hoc group to review draft survey on Jul 31***
- Consider alternate rate trajectories, timing of future decisions, tradeoffs, and associated risks to inform future decisions.

RPU Board & City Council | Timeline for Upcoming Decisions

	July	August	September	October	November	December
RPU Board & Other Board & Commission Meetings	**10 | RPU Ad Hoc |** Reviewed Renewable PPAs **21 | RPU Ad Hoc |** Policy 30 Reviewed **22 | RPU |** 20-Year Financial Forecast **|** Reviewed Renewable PPAs **23 | RPU Ad Hoc |** Standby Charge	**5 | RPU Special Budget |** 2026-2027 RPU Proposed Budget **26 | RPU |** Authorize Renewable PPAs **|** Alternate RE Goal & Rate Scenarios	**10 | Sustainability & Resiliency Commission |** Resource Plan **|** Alternate RE Goal & Rate Scenarios **30 | RPU |** Decide on Alternate RE Goal & Rate Scenarios **|** Approve 2026-2027 Rate Change Notifications **|** Legislative Priorities	**28 | RPU |** Approve & Recommend to Council 2026-2027 Budget, Rates & Tariffs	**25 | RPU |**	**16 | RPU |**
City Council Meetings **(SS = Study Session)**	**28 | SS |** Silver Lake Dredging & Dam Modification Project Update	**4 |** **18 | SS |** **18 |** **25 | SS |** 26/27 Budget (RPU)	**3 | SS |** 26/27 Budget **8 |** Authorize Renewable PPAs **15 | SS |** 26/27 Budget **22 |** Adopt Prelim Budget & CIP **29 | SS |** Resource Plan **|** Alternate RE Goal & Rate Scenarios	**6 |** **13 | SS |** **20 |** **27 | SS |** Legislative Priorities	**3 |** **10 | SS |** Final Budget Review (if needed) **17 |** **24 | SS |**	**1 |** Adoption of Budget **|** Confirmation of Mayoral RPU Board Appointment **8 |** **15 | No Meeting** **22 | No Meeting** **29 | No Meeting**

Consideration & Adoption of the 2026/27 Budget | Authorize Renewable Energy PPAs | Consider Alternate Renewable Energy Goal with Rate & Risk Scenarios