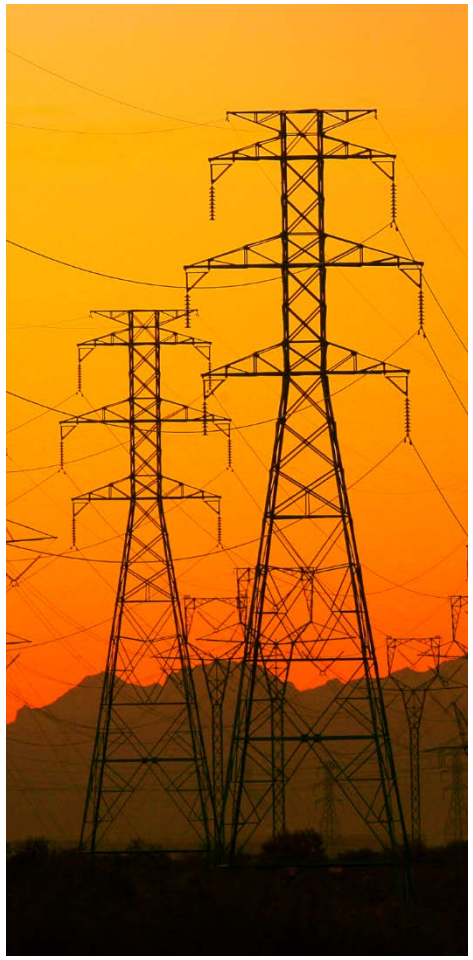
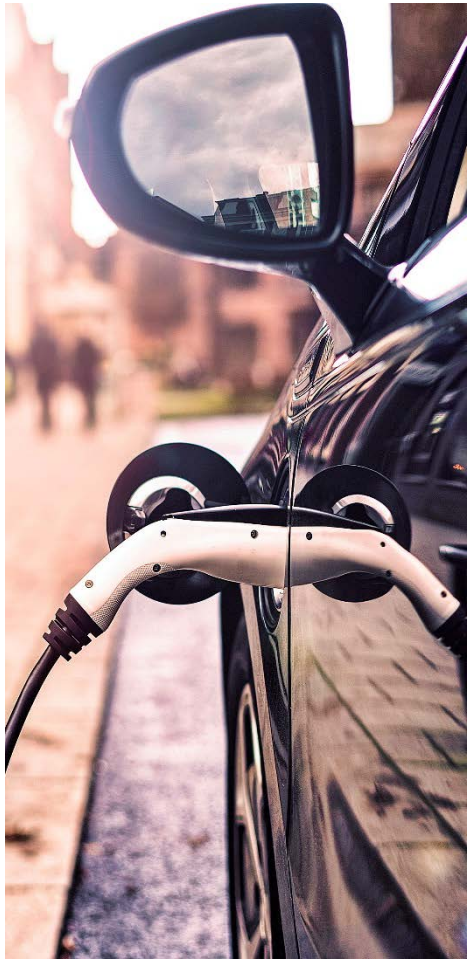


Tucson Electric Power

UniSource Energy SERVICES

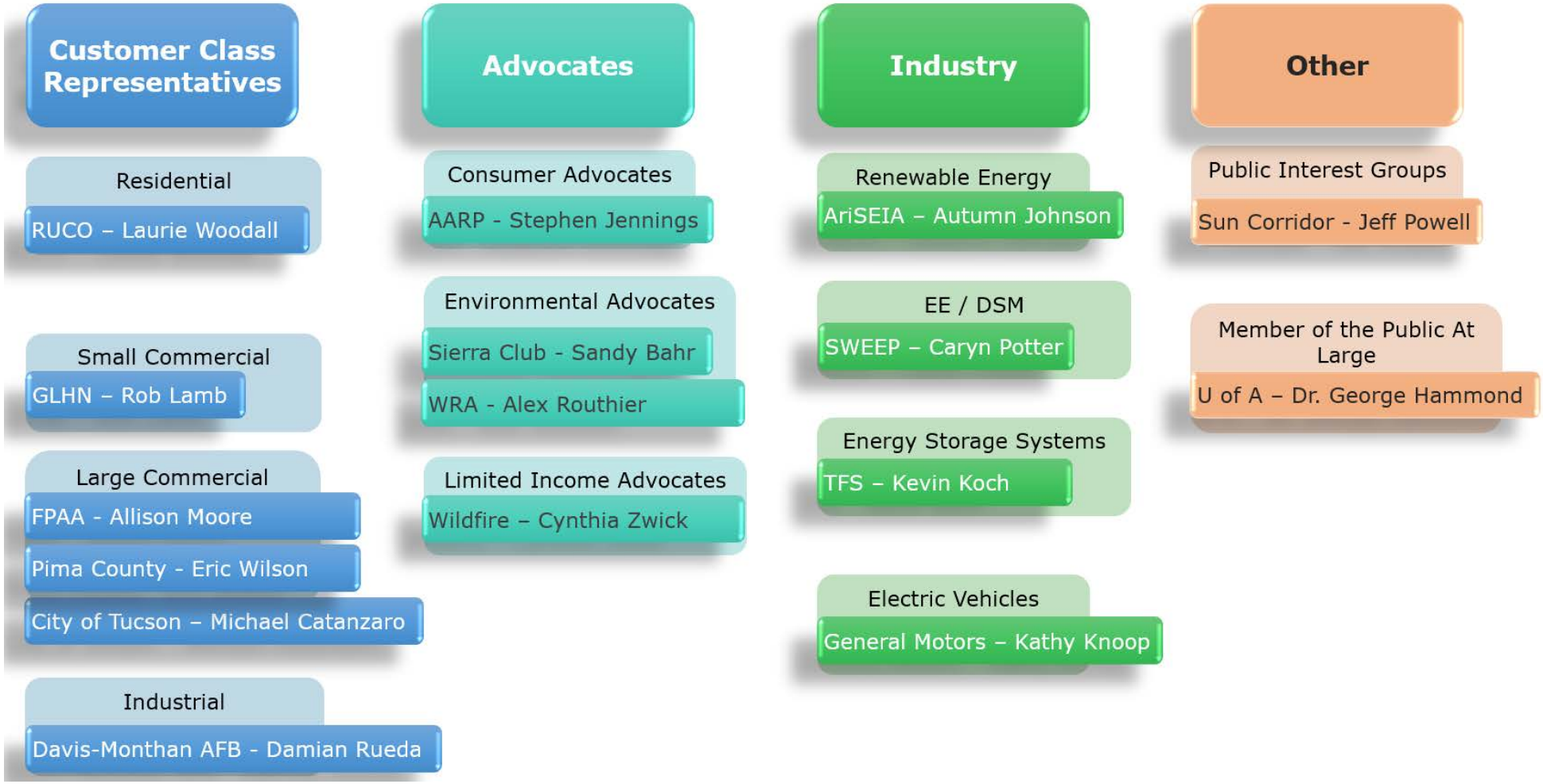
Resource Planning Advisory Council Meeting

October 27, 2022

Welcome and Introductions

- TEP Resource Planning & Procurement Team
  - Lee Alter, Lead Analyst & IRP Program Manager
  - Nonso Emordi, Lead Analyst & IRP Coordinator
  - Victor Aguirre, Lead Analyst
  - Ilse Morales, Supply Side Planner II
  - Brianna Robles, Supply Side Planner
  - Energy and Environmental Economics (E3)

RPAC Members

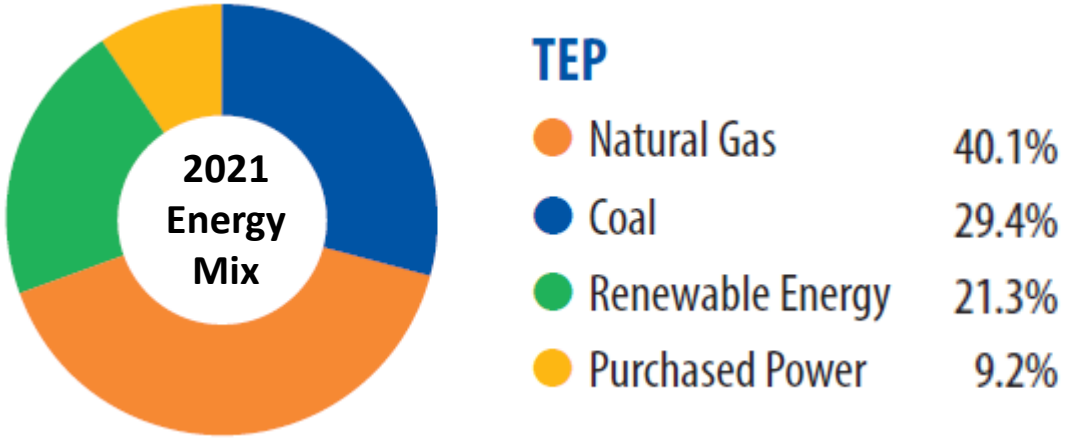


Today's Agenda

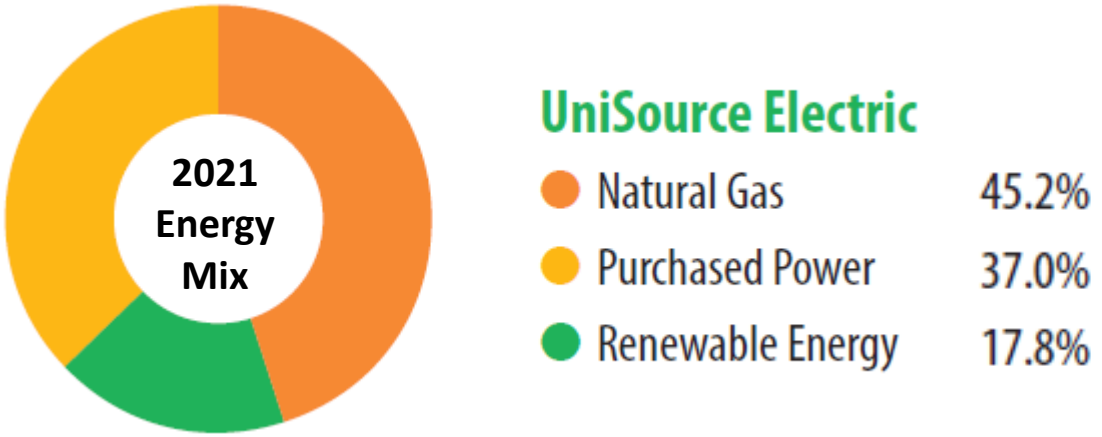
- Where We've Been
  - Summary of 2020 resource plans
- Where We Are (Changes Since 2020)
  - IRP Action Plan updates
  - Market updates
  - Other recent developments
- Where We're Going
  - 2023 IRP
  - Procurement (All-Source Requests for Proposals)
  - Clean energy tax incentives
- Next Steps

Quick Facts

- 440,000 customers
- 1,100 MW average demand
- 2,400 MW peak demand
- 2,720 MW of dispatchable supply



- 100,000 customers
- 225 MW average demand
- 520 MW peak demand
- 290 MW of dispatchable supply



Where We've Been

LEE ALTER

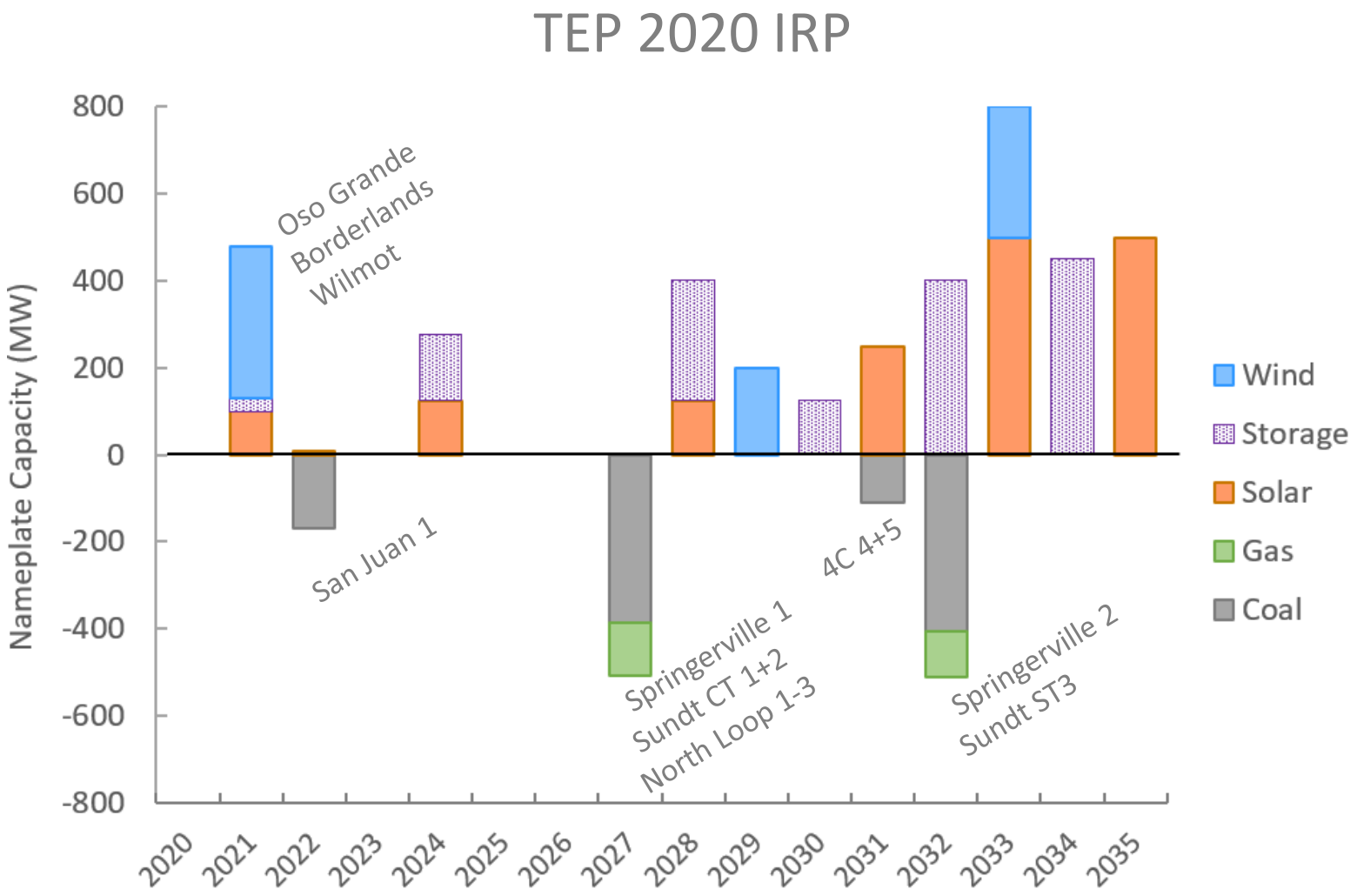
LEAD RESOURCE PLANNER

OCTOBER 27, 2022

TEP 2020 Resource Plan

		Currently In Service
Retirements		
Gas	225 MW	*1,820 MW*
Coal	1,073 MW	*1,073 MW*
Additions		
Wind	850 MW	*430 MW*
Solar	1,610 MW	*480 MW*
Storage	1,430 MW	*30 MW*

Continuation of trends in distributed solar and energy efficiency

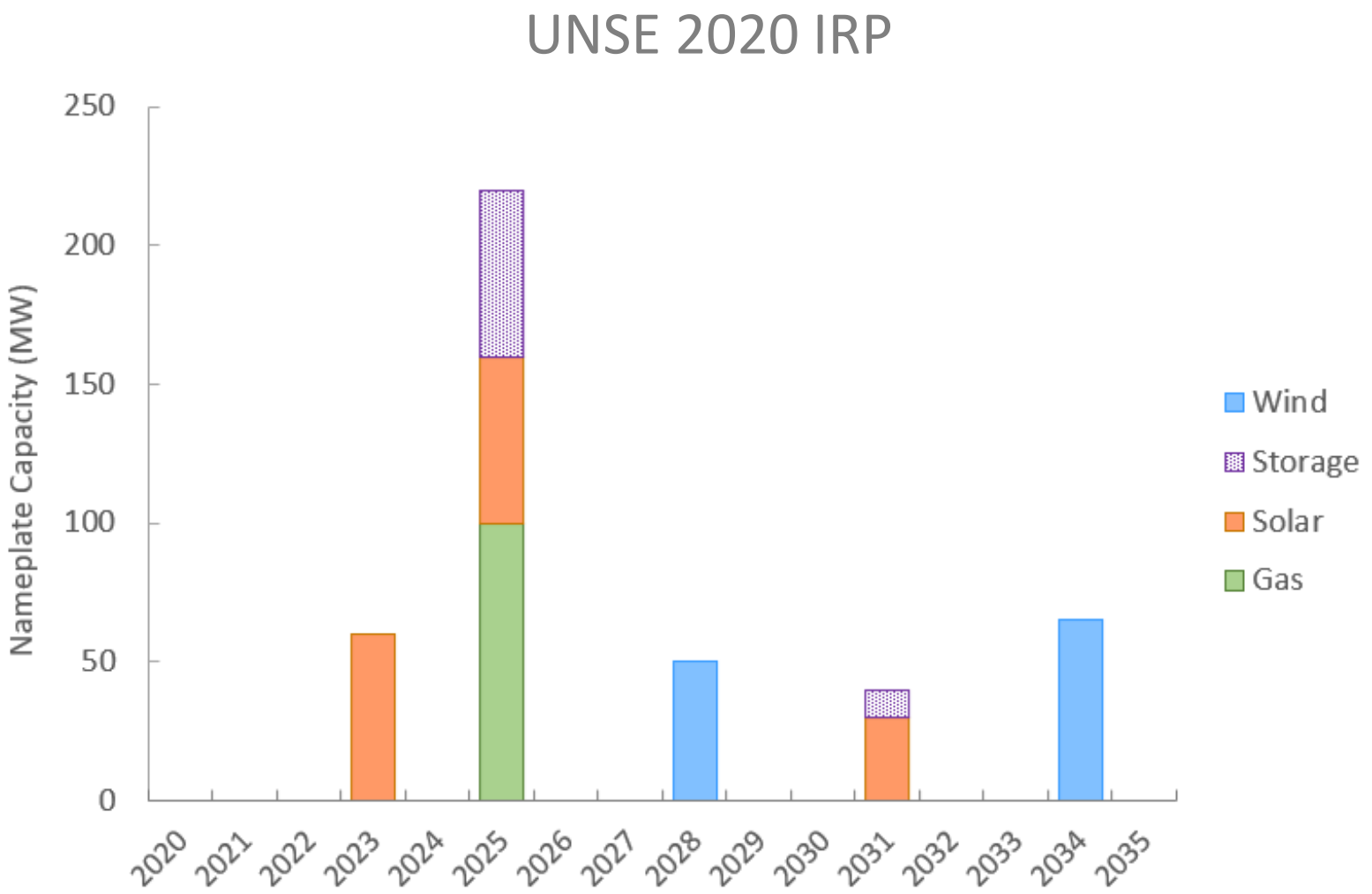


UNSE 2020 Resource Plan

Retirements		*Currently In Service*
None		

Additions		
Gas	100 MW	*280 MW*
Wind	115 MW	*10 MW*
Solar	150 MW	*95 MW*
Storage	70 MW	*0 MW*

Continuation of trends in distributed solar and energy efficiency



Where We Are: Changes Since 2020

NONSO EMORDI, PH.D.

LEAD RESOURCE PLANNER

TEP Action Plan Update

Phase I of Coal Plant Retirements

41%
Coal capacity retired since 2015

SJGS Closed **June 30, 2022**

Mitigate Community Impacts of SGS 1 & 2 Retirements - 2027, 2032

Workforce transition, increased training, and education for TEP employees.

Partner with Apache County, St. Johns, Eager, and Springerville communities.

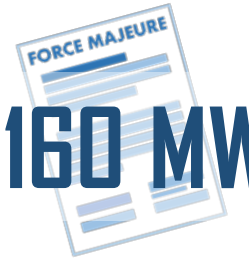
Continue EE programs 1.5 % year/year Incremental Energy Savings through 2024

2 New Initiatives
Beneficial Electrification
Innovative Customer Solutions Framework

DSM Implementation Plan submitted June 1, 2021 to Docket E-01933A-21-0182.

22
New measures

Complete RE Projects Under Contract/Construction



160 MW

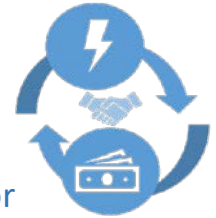
Oso Grande Wind **250 MW**
Borderlands Wind **99 MW – PPA**

Raptor Ridge Solar **15 MW**
Wilmot Energy Center **100 MW Solar + 30 MW Storage – PPA**

Join CAISO EIM by April 2022

Joined CAISO **May 3, 2022.**

$13M
Approximate Annual Energy Cost Savings for customers.



Commit to ASRFPs for Future Resource Needs

300 MW
Capacity Resources in service by May 1, 2024, Latest May 1, 2025

Independent Monitor

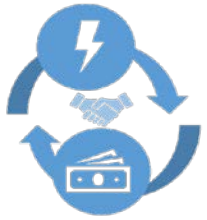
Issued April 19, 2022

250 MW
Supply-side + Demand-side Clean Energy Resources

UNSE Action Plan Update

Participate in CAISO EIM by April 2022 under TEP BA Arrangements

TEP Joined CAISO **May 3, 2022.**



Lowest-cost energy to EIM members through market-based coordination and optimized unit dispatch and transmission scheduling .

Tangible economic and environmental benefits expected through regional coordination of power plant dispatch across market.

Continue EE programs 1.5 % year/year Incremental Energy Savings through 2024

2 New Initiatives

Beneficial Electrification
Innovative Customer Solutions Framework

2022 DSM Implementation Plan submitted to Docket E-04204A-21-0181.

42 New measures

Commit to ASRFPs for Future Resource Needs

Issued April 19, 2022

150 MW Capacity Resources in service by May 1, 2024, Latest May 1, 2025

170 MW Supply-side + Demand-side Clean Energy Resources

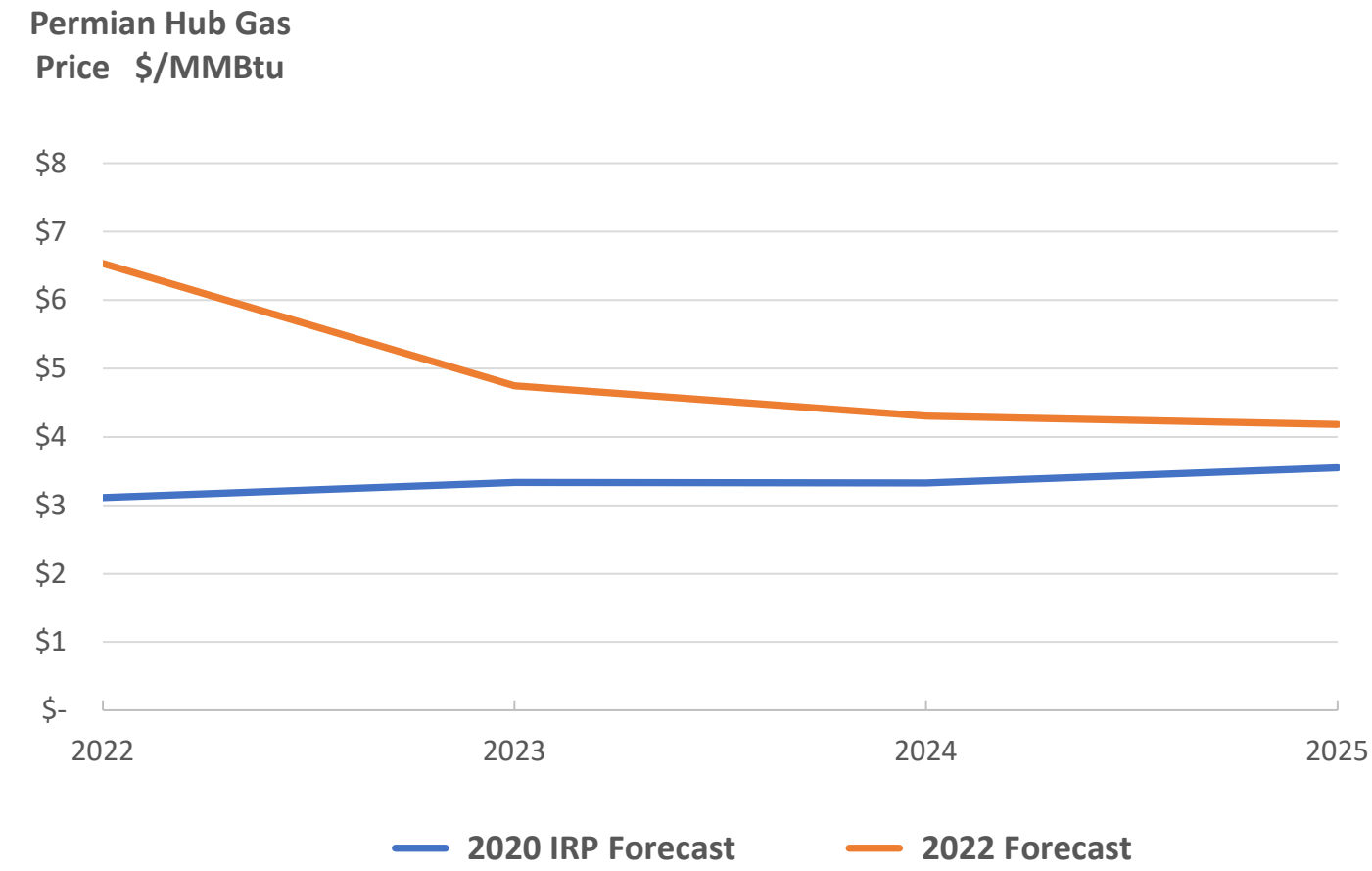
Independent Monitor

Natural Gas Prices

Base forward prices in the short-term (2022-2025) significantly higher than last IRP ($3 vs. $6.50 in 2022)

- Monthly storage inventories remain below 5-year average.
- Uncertainty regarding LNG due to tight global supply conditions – Ukraine war

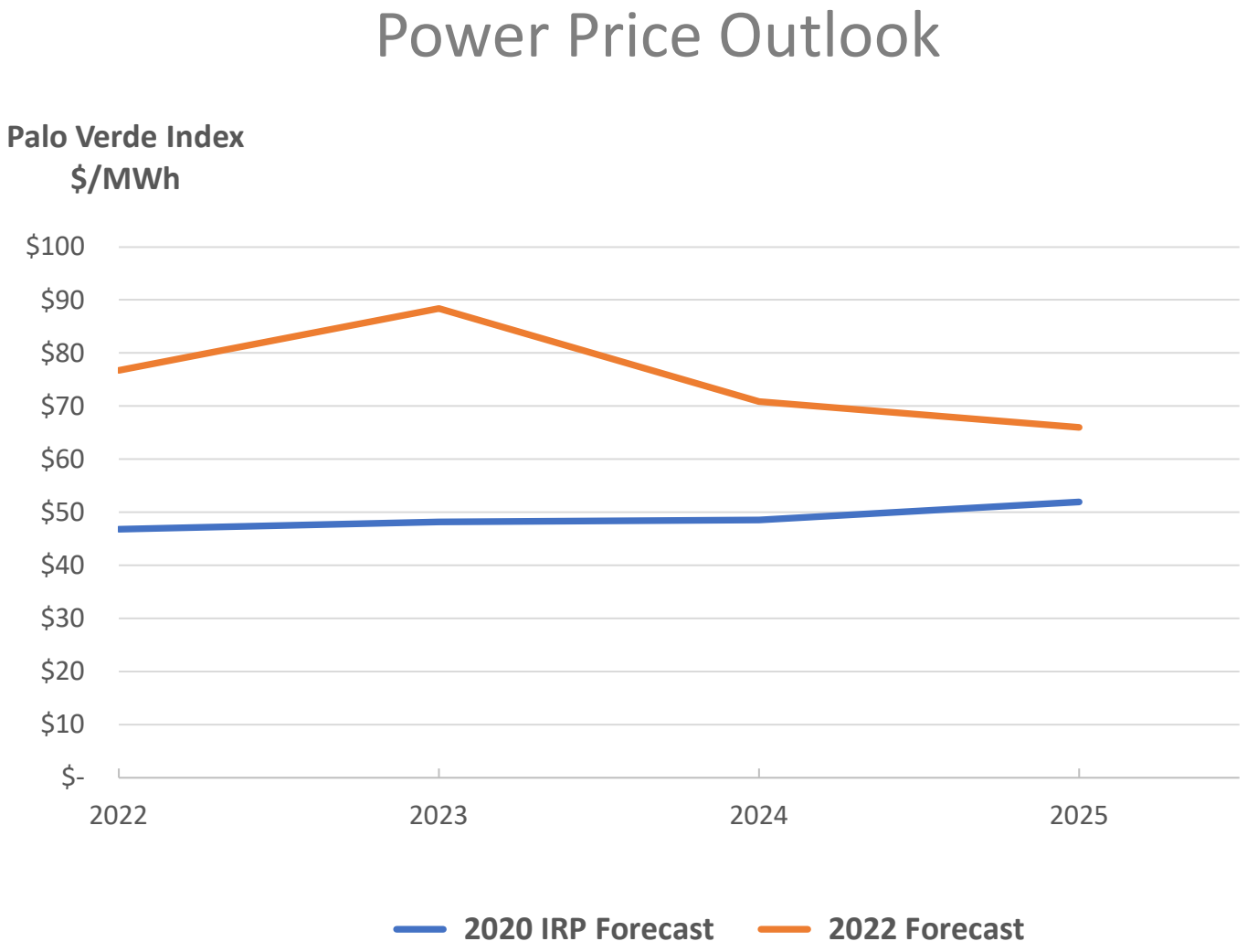
Natural Gas Outlook



Wholesale Power Prices

Near-term electricity prices 20% - 60% higher

- Plant retirements
- Increased demand for electricity, particularly from renewables
- Supply chain for renewables, storage, and other equipment
- Department of Commerce solar panel anti-dumping investigation
- Reduced natural gas inventories for power generation



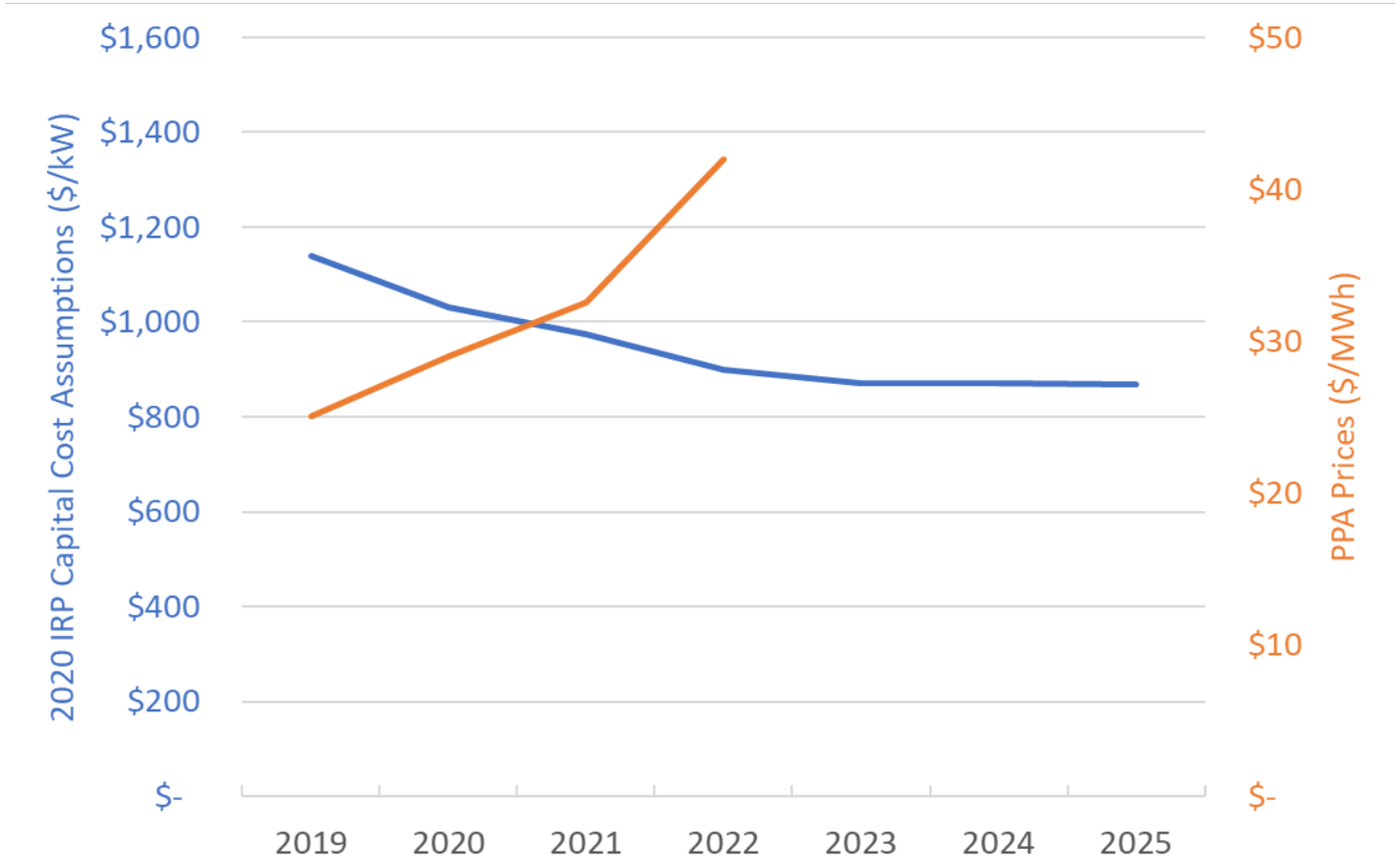
Capital Costs

In the past year, contract prices for renewable energy have increased 34%.

Since 2020, the renewable industry has faced a series of compounding economic, regulatory and permitting challenges that have created an imbalance between PPA supply and demand, and led to an increase in development costs.

“The supply-demand imbalance is unrelenting. We are having so much demand and so little available supply.”

LevelTen Energy

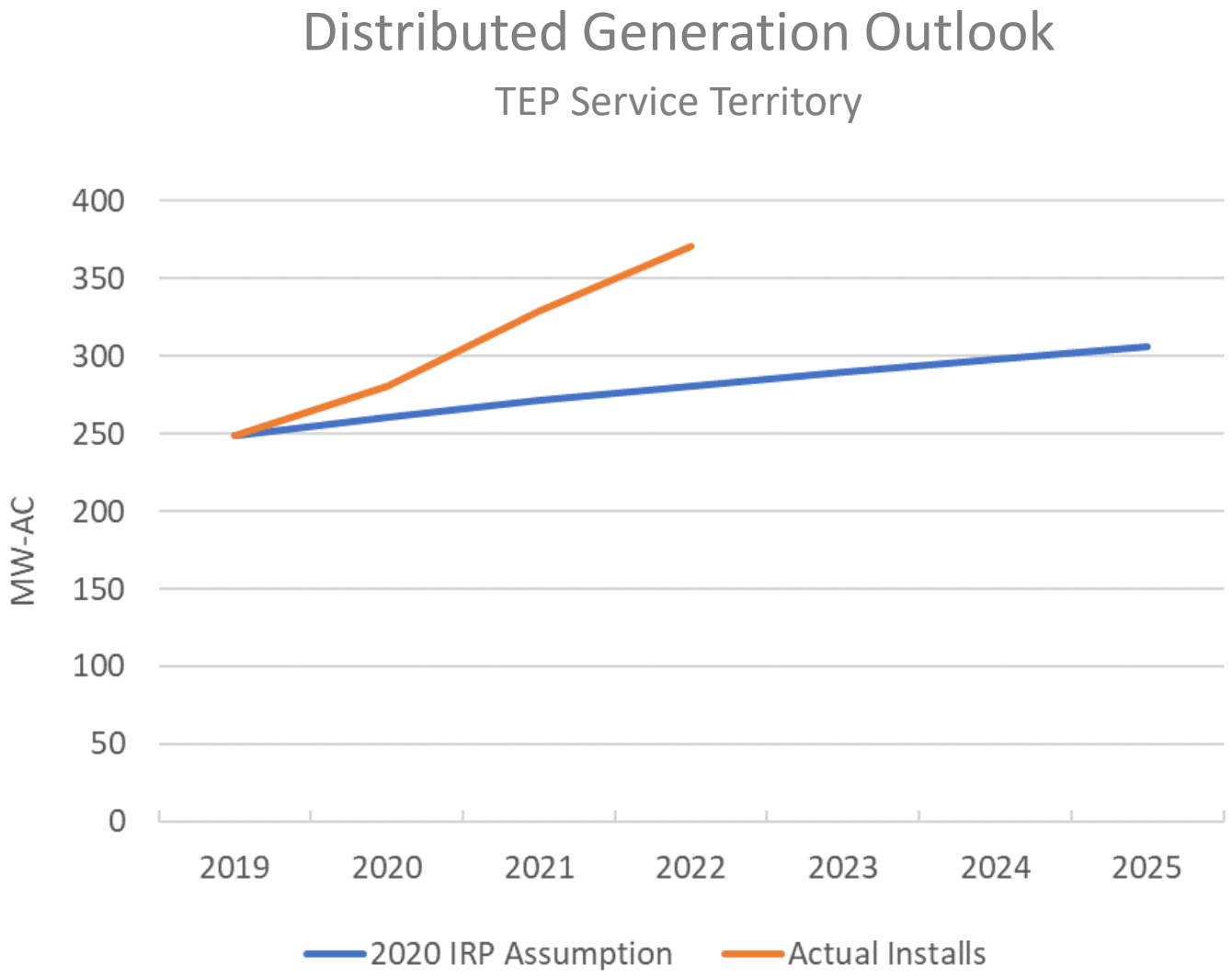


Load Forecast

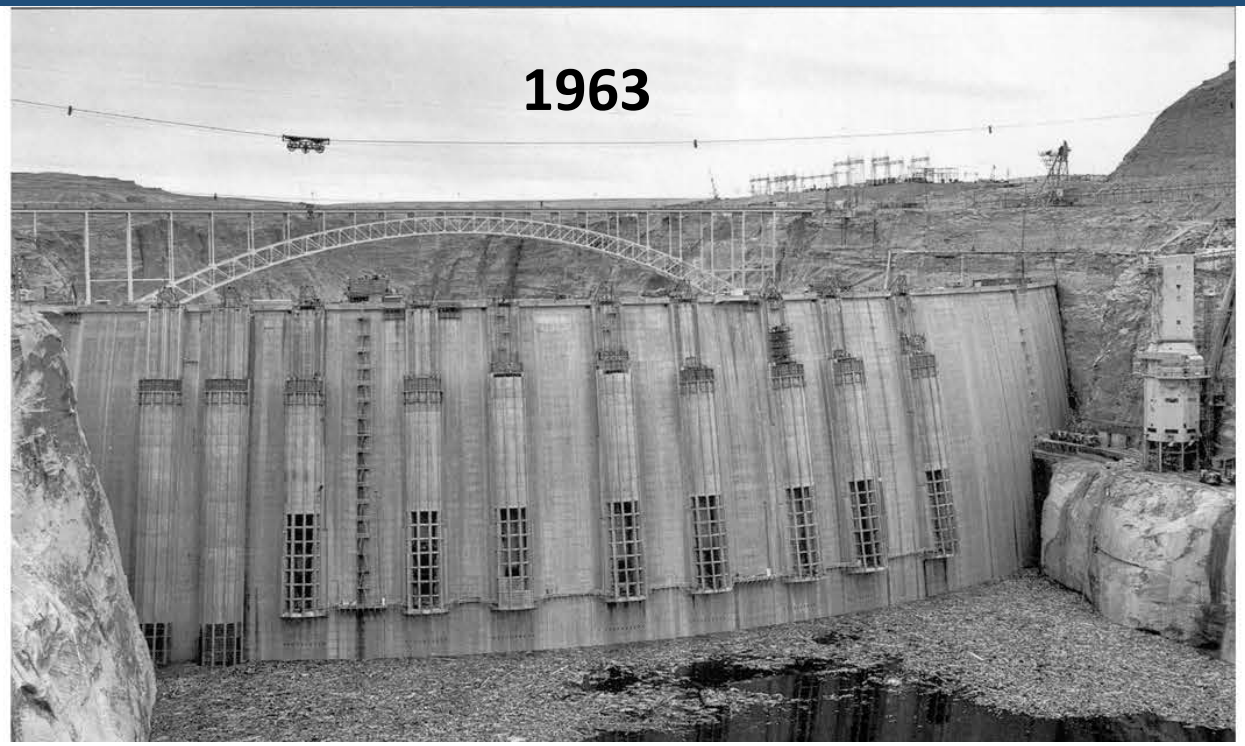
The amount of residential and commercial solar installations has outpaced assumptions.

This is an example of one variable affecting the load forecast.

Others include commercial customer growth, population growth, adoption of energy efficiency measures, climate change, electric vehicles, and other electrification trends.

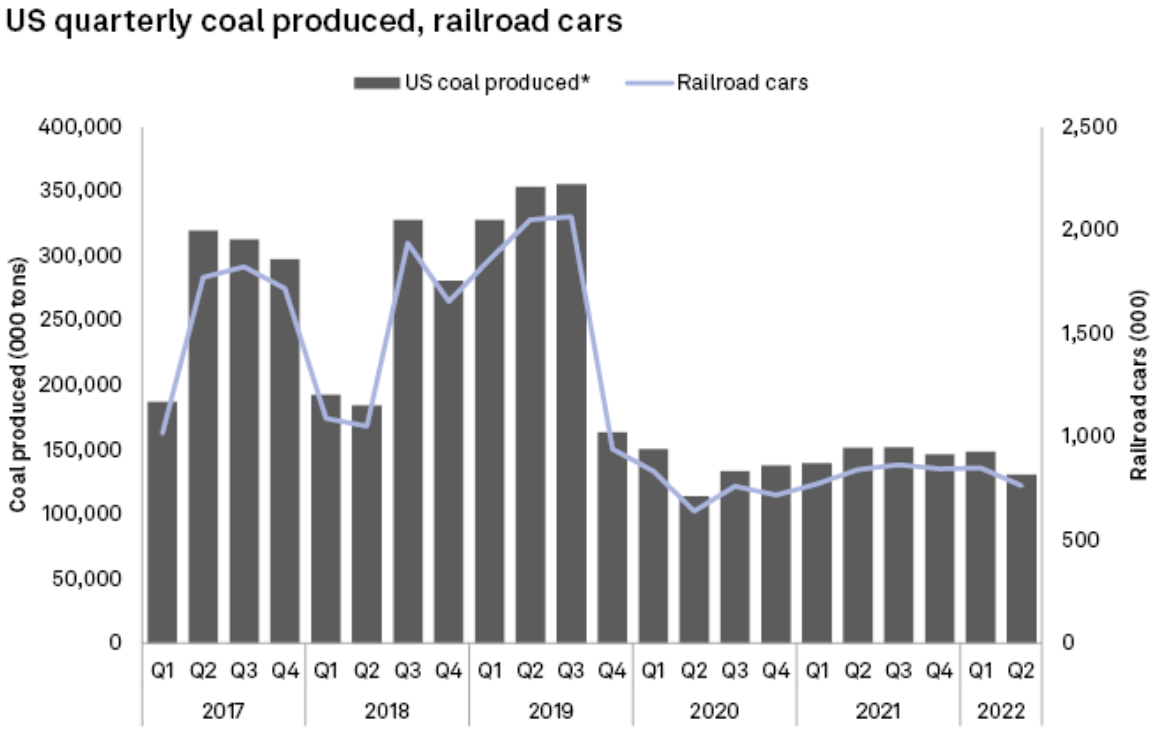


Hydropower Issues



In March, water levels at Glen Canyon Dam dropped to within 33 feet of minimum power pool levels, the lowest level since the reservoir was filled in the 1960s. Notice the intake grates becoming exposed.

Coal Supply Issues



Increased demand for rail service and shortages in the rail workforce have reduced coal deliveries by half, forcing TEP to shift some generation to its gas-fired power plants.

Summary of Recent Issues Affecting Electric Utility Resource Planning

Operational

- Component shortages
- Global shipping congestion
- Coal supply
- Longer project timelines

Macroeconomic

- Inflation / freight charges
- Increased demand for natural gas
- DOC anti-dumping Investigation
- Uncertain costs and tax incentives for clean energy

Technology

- Semiconductor & chip shortages – impact on cybersecurity
- Large-scale deployment of new technologies

Geographic

- Thin capacity margins in the Western U.S.
- Ukraine
- Commodity price fluctuations and global materials sourcing

Environmental / Regulatory

- Drought – hydropower
- Extreme events - fire, wind, heat
- ACC proposed Energy Rules
- EPA regional haze rules

Where We're Going

LEE ALTER

LEAD RESOURCE PLANNER

What Is an IRP?

- A long-term plan for meeting forecasted annual peak and energy demand, with an adequate reserve margin, through a combination of supply-side and demand-side resources
- IRPs address multiple objectives such as affordability, reliability, regulatory compliance, and environmental sustainability
- IRPs for TEP and UNSE due to the Arizona Corporation Commission (ACC) by August 1, 2023

Major Requirements of Next IRP

- At least 10 resource portfolios, including those that are least cost, achieve corporate emission reduction goals, reduce energy use 40% (cumulatively) by 2030, and include demand-side resources equal to at least 35% of peak demand
- Analyses of power system resiliency, regional power markets, early coal plant retirements, optimal mix of distribution- vs transmission-connected energy storage and renewables, etc.
- Conduct capacity expansion modeling
- Provide modeling software licenses and support to interested RPAC members

Oso Grande Wind Farm

250 MW from 62 Turbines on 24,000 Acres

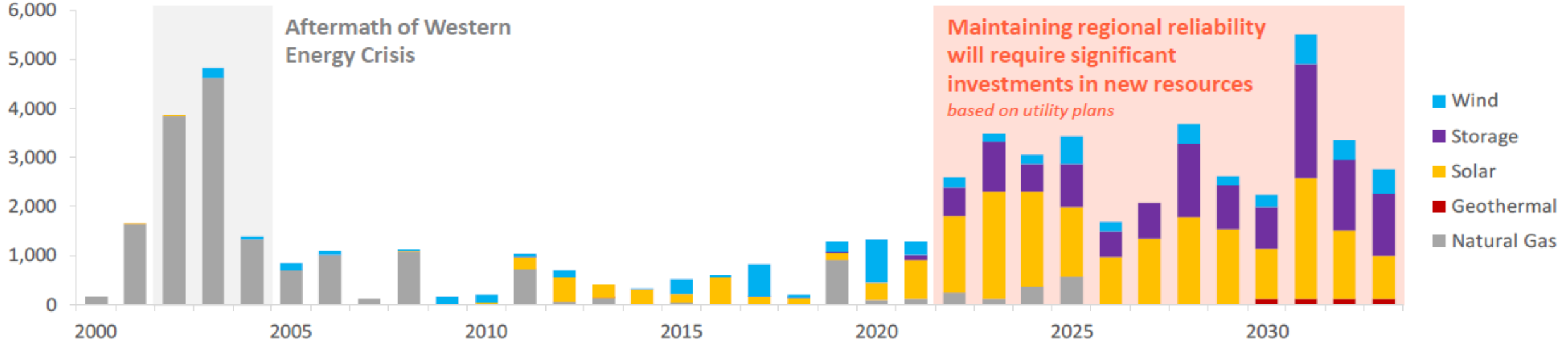
2020 IRP envisions two of these built over the next 10 years

TEP's Wilmot Energy Center
100 MW of Solar + 30 MW / 2-Hr Battery
2020 IRP envisions one of these built each year for next 10 years on average

Maintaining reliability will require immediate and sustained action over the next decade

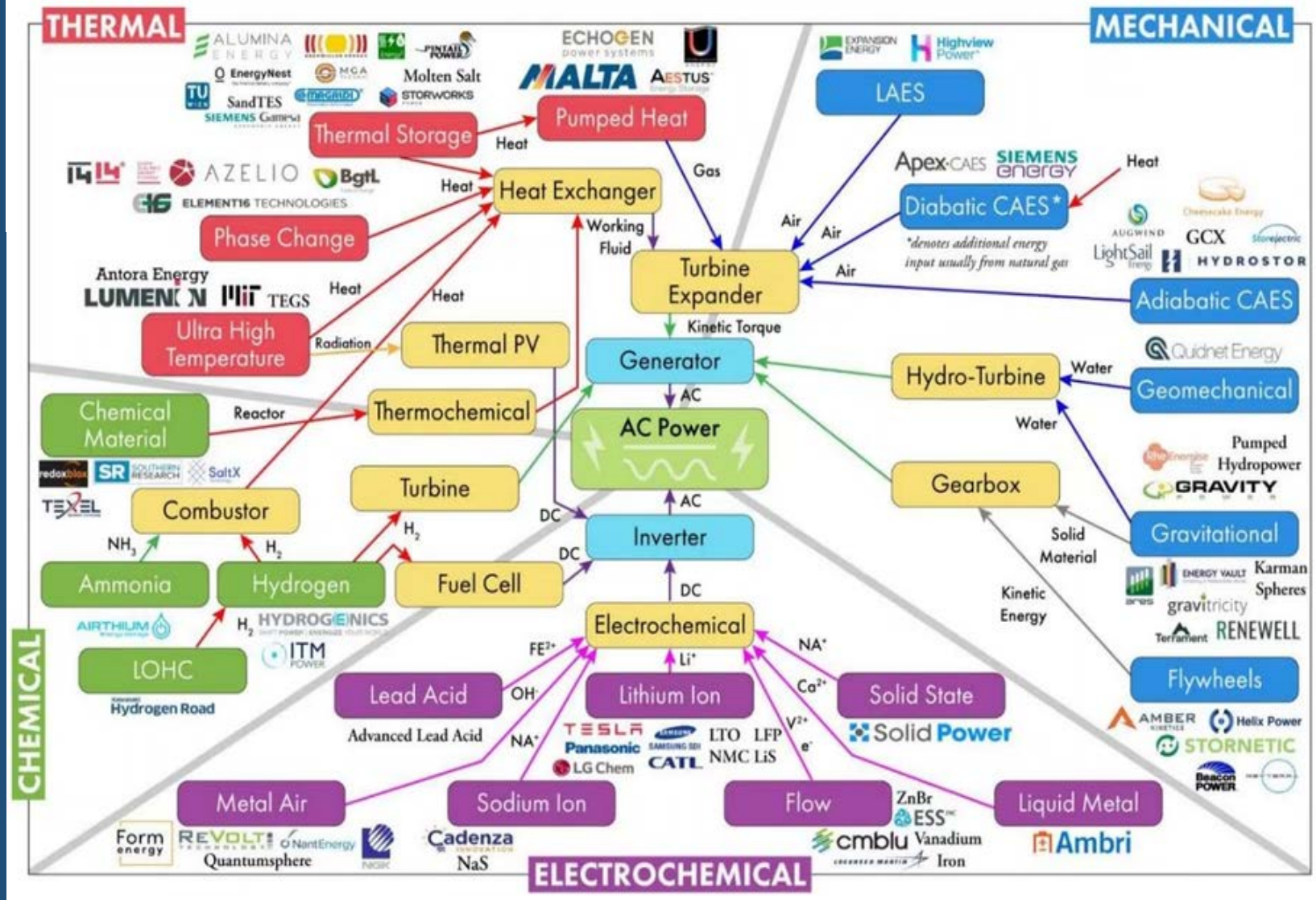
+ **The rate of new resource additions required in the next ten years is nearly unprecedented in the history of the Southwest**
+ **With project development timelines measured in years and near-term supply chain risks looming, advance planning and prompt action by utilities are needed to avoid falling behind in the transition**
+ **Utilities, regulators, developers and stakeholders will share responsibility for working cooperatively to ensure new resources are in place as needed**
  - Plans for new resource additions should account for reasonable risks of project delays and cancellations
  - Failure to develop new resources in a timely manner will either result in (1) a degradation of reliability or (2) the need to retain existing plants with scheduled retirements

New Installed Capacity Additions by Year (Southwest Region)
(Nameplate MW)



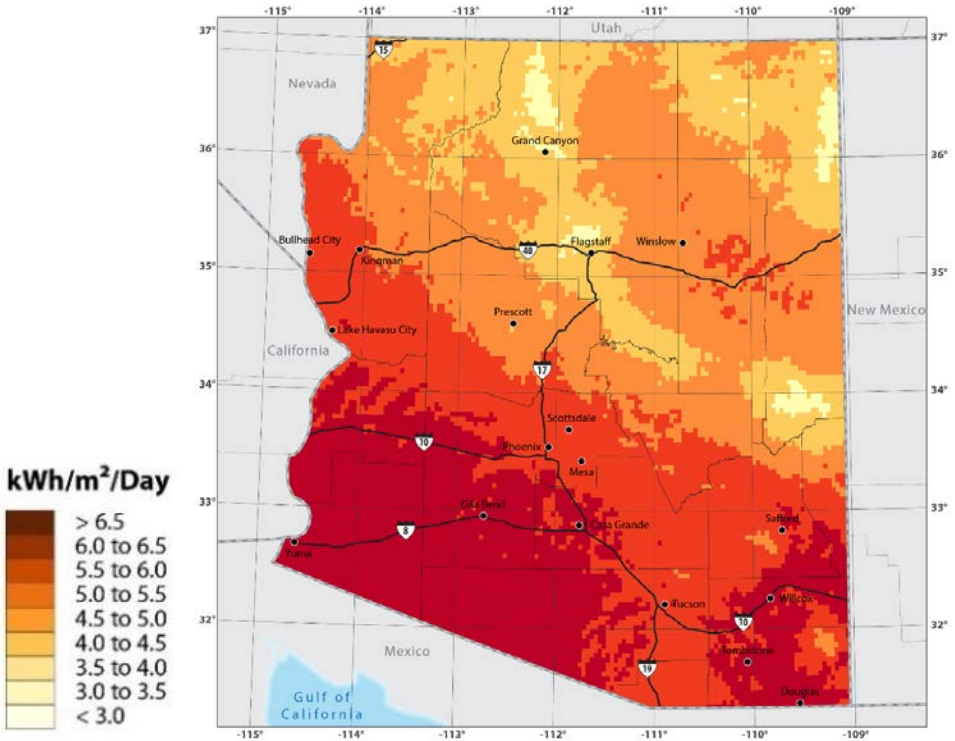
Electric Power Research Institute

Tracking 90+ storage technologies

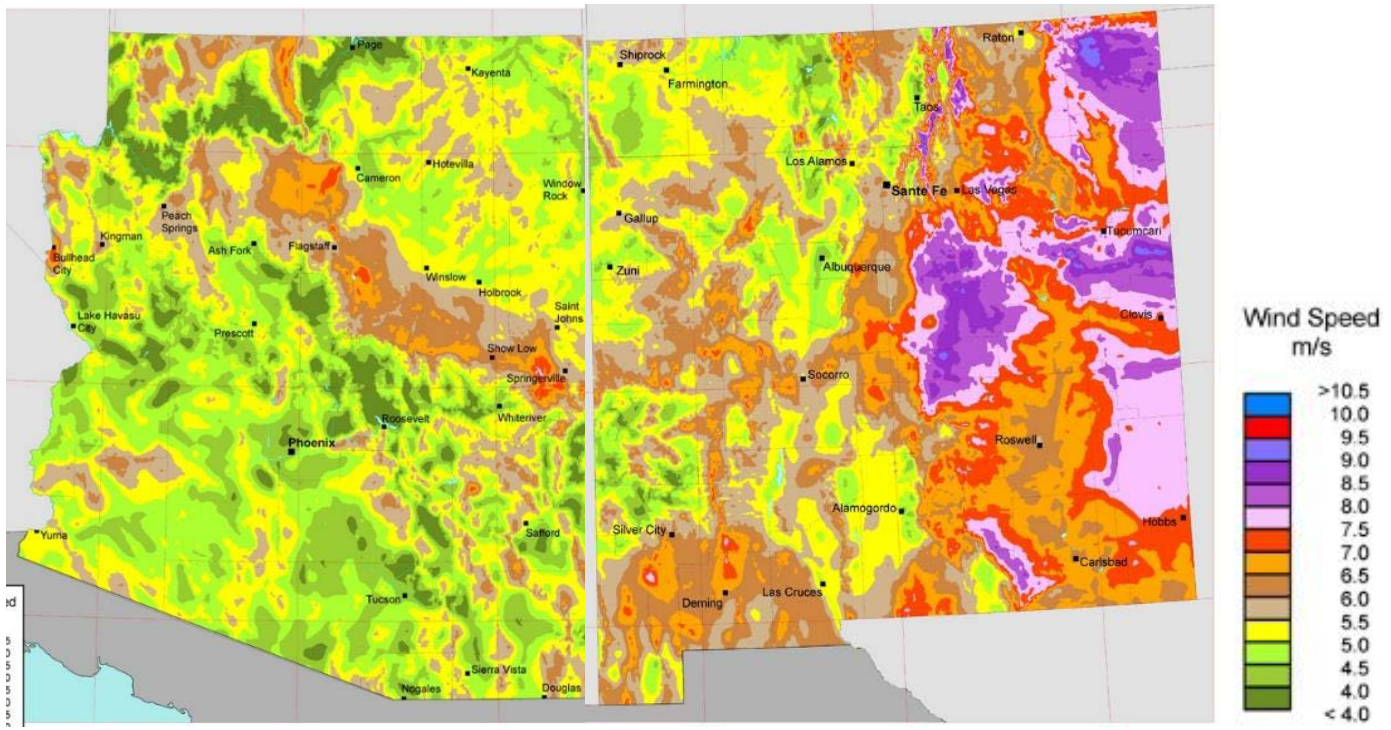


TEP/UNSE Future Fuel Supply

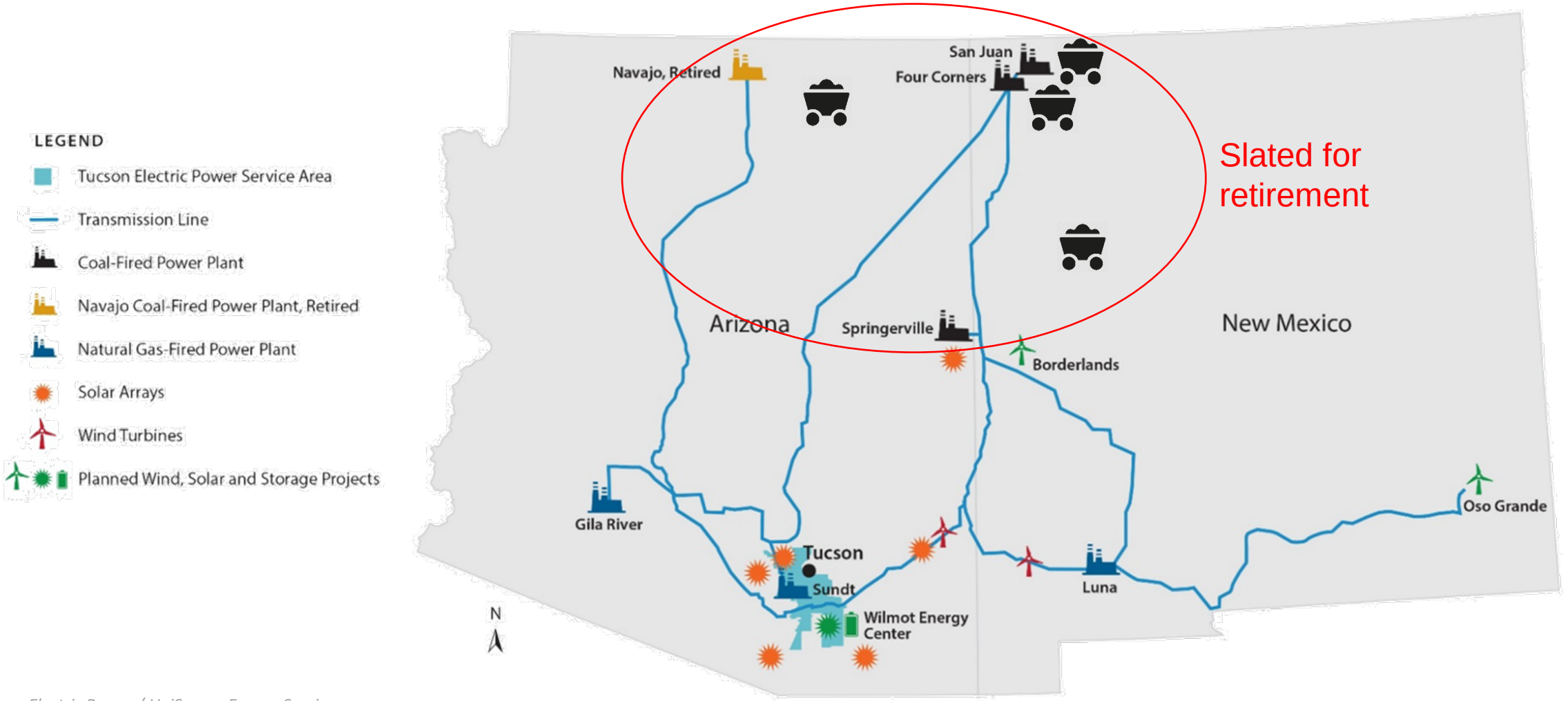
Solar



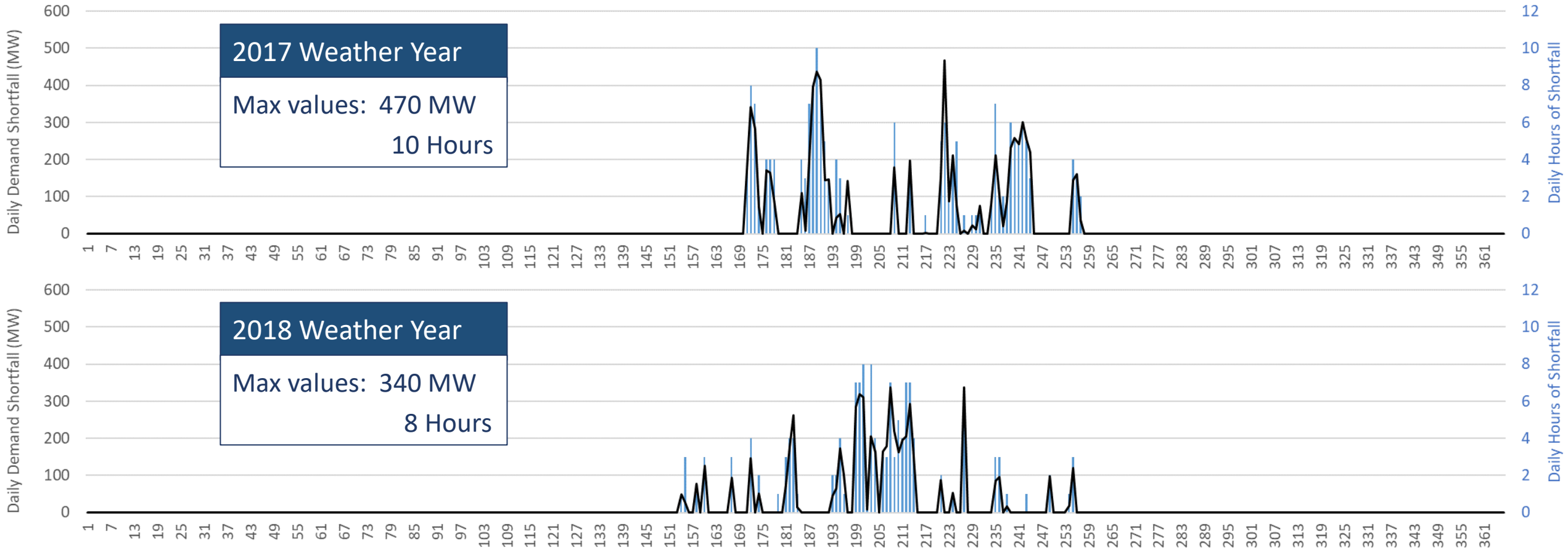
Wind



TEP's Current Generation & Transmission Assets



TEP
Daily Supply Shortfalls After SGS 1 Retirement
(2028 Preliminary Results, No New Resources)



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Daily Supply Shortfalls After SGS 1 Retirement
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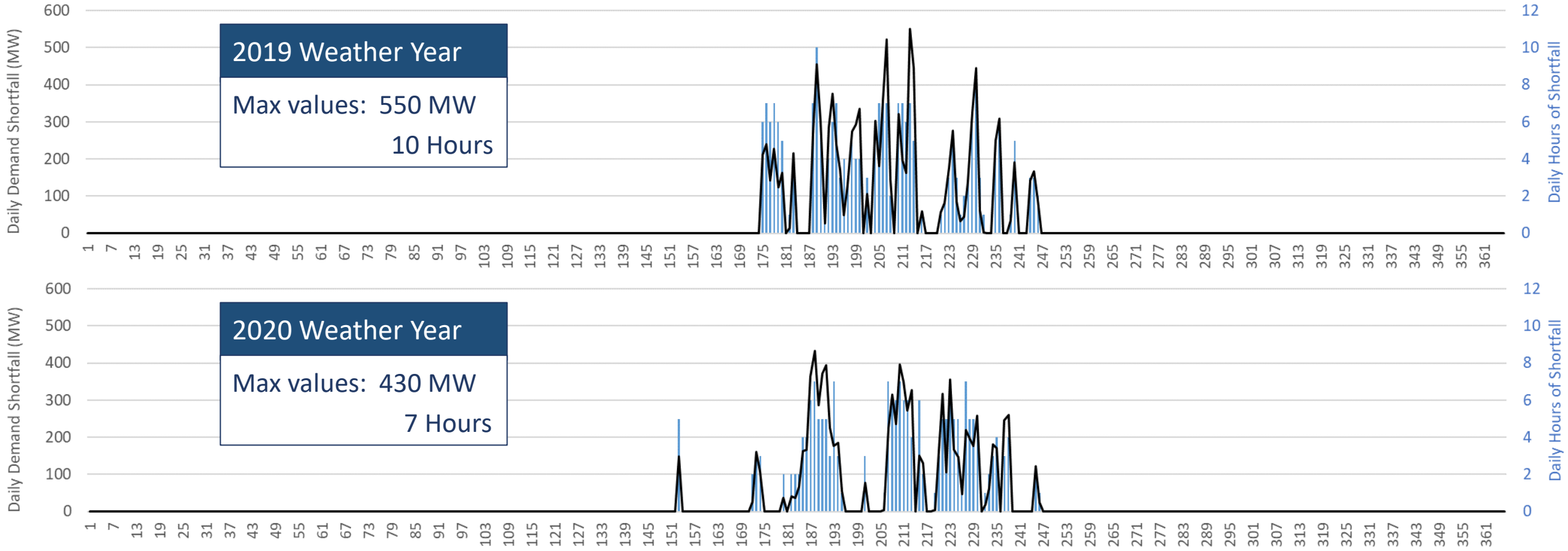
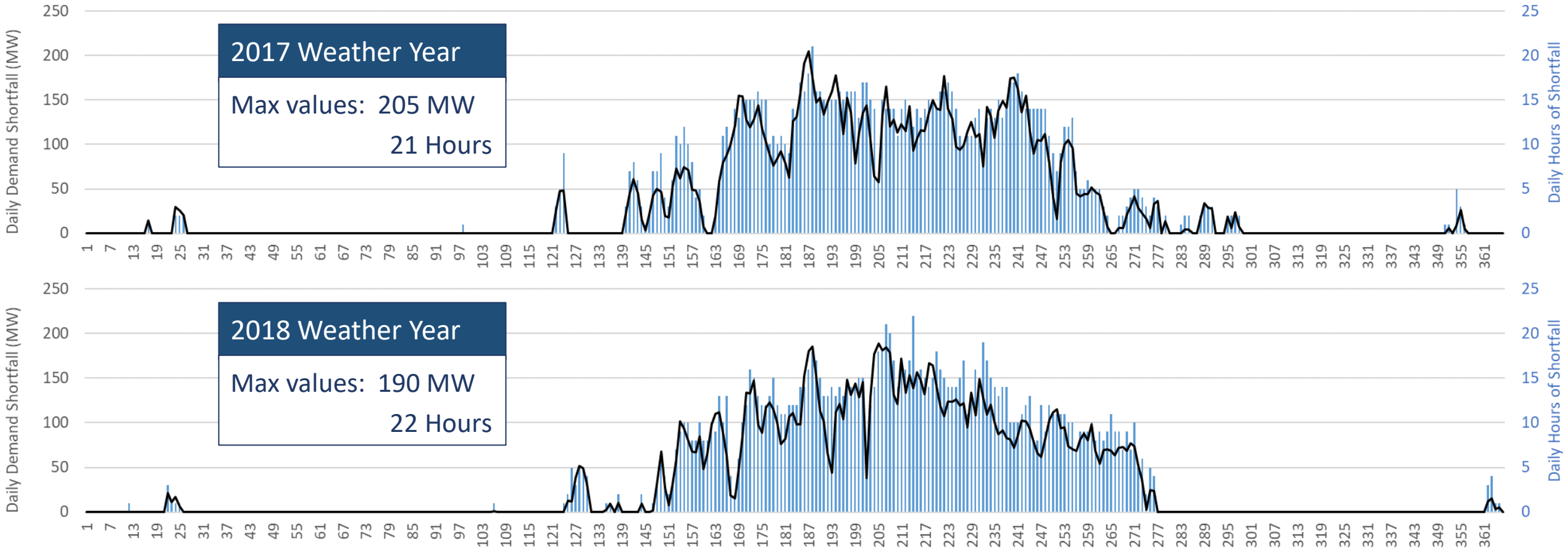
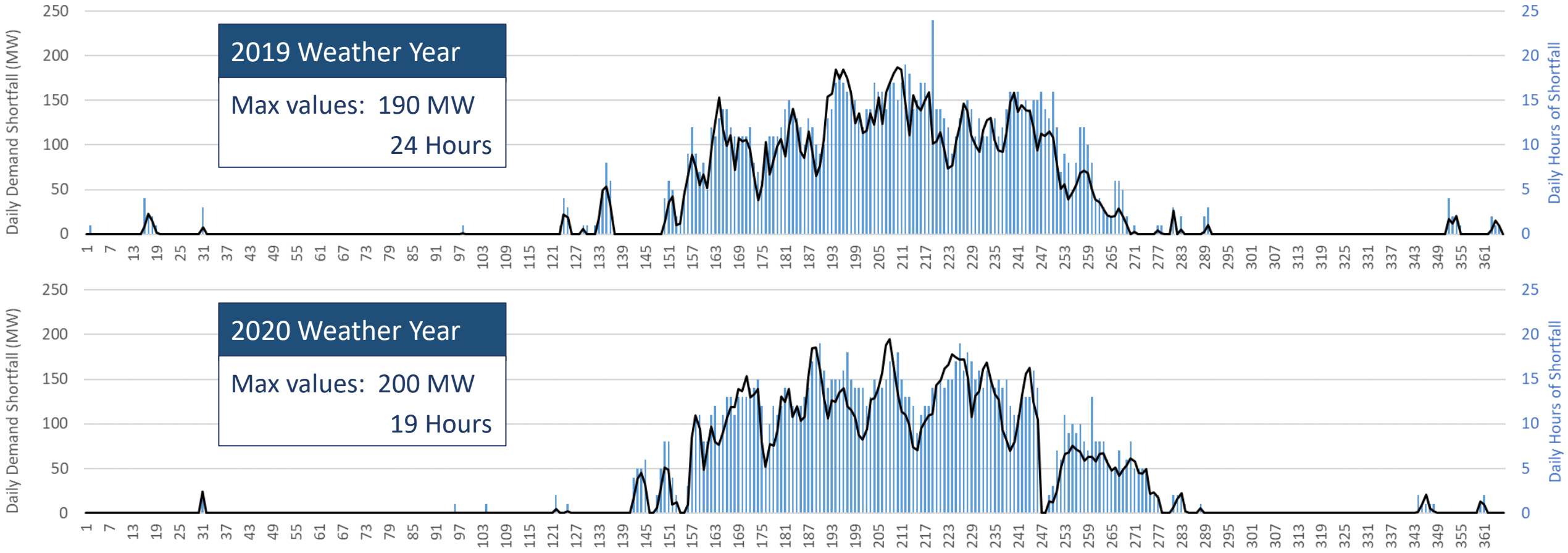


UNSE
Daily Supply Shortfalls
(2024 Preliminary Results, No New Resources)



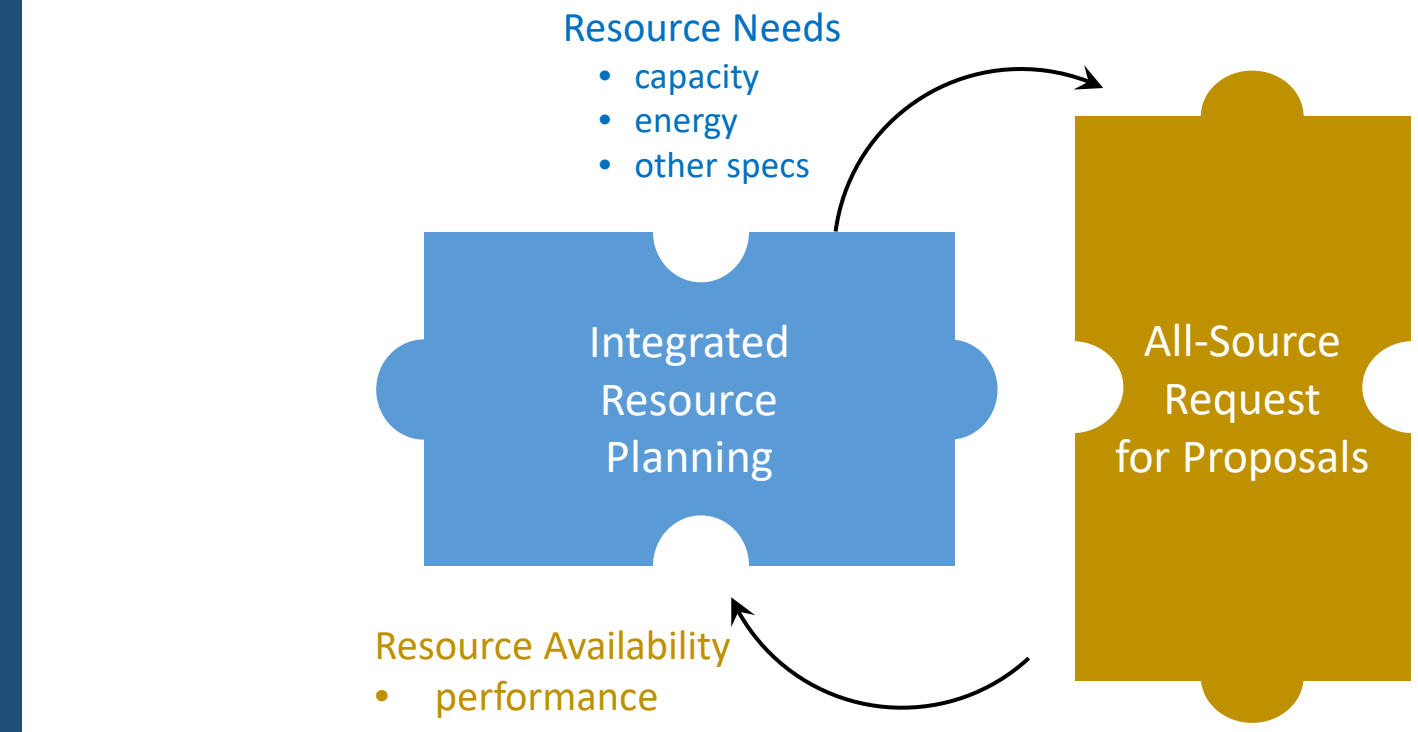
UNSE
Daily Supply Shortfalls
(2024 Preliminary Results, No New Resources)

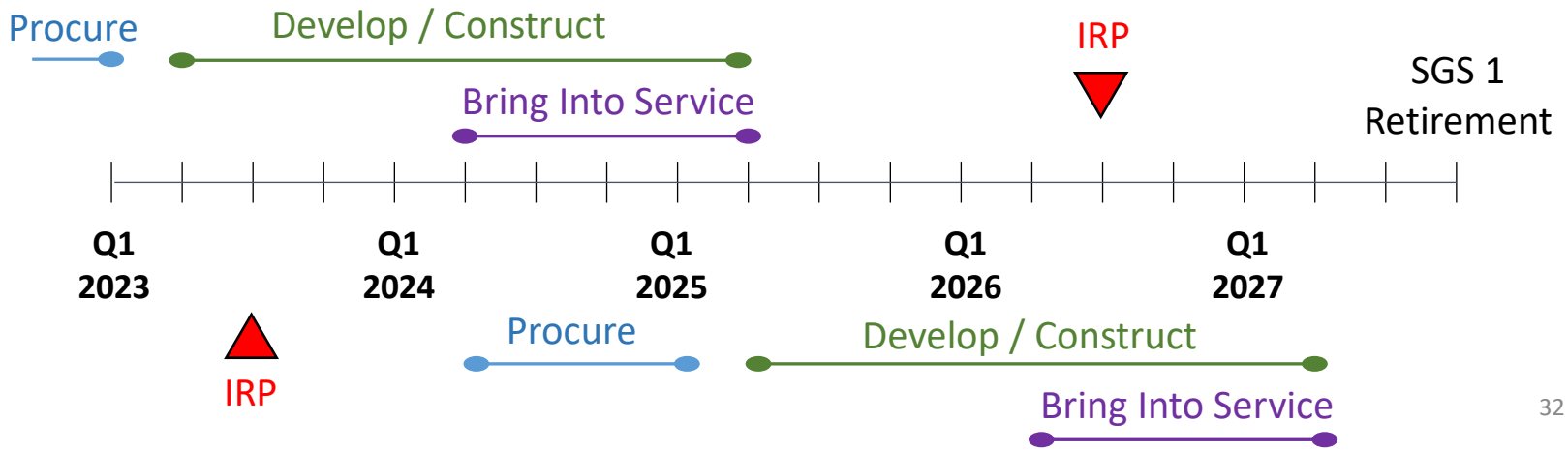


Integrated Resource Planning and Procurement

Going forward:

- Planning and procurement will be more tightly integrated
- Procurement will be more informed by long-term needs
- Long-term planning will be more informed by firm proposals
- Actual resource selection and implementation will depend more on market conditions at time of procurement





All-Source Request for Proposals (ASRFP)

VICTOR AGUIRRE

LEAD RESOURCE PLANNER

ASRFP Overview

- Resource Needs
- Products Requested
- Evaluation Teams
- Schedule
- Proposals Received
- Proposal Pricing
- Evaluation Factors
- Next Steps

TEP Resource Needs

TEP 2024

HE:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
JAN																								
FEB																								
MAR																								
APR																								
MAY																								
JUN																								
JUL																								
AUG																								
SEP																								
OCT																								
NOV																								
DEC																								

TEP 2028

HE:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
JAN																								
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UNSE Resource Needs

UNSE 2024

HE:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
JAN																								
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UNSE 2028

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TEP / UNSE All-Source Request for Proposals

	TEP	UNSE
Renewable Energy (MW)	250	170
Firm Capacity (MW)	300	150
Energy Efficiency & Demand Response Programs	Based on Customer Participation	
Estimated In-Service Dates	2024 - 2025	

Products Requested

Technologies:

- Wind
- Solar
- Storage
- Thermal
- Other supply-side options, if approved
- Demand Response
- Load Management
- Energy Efficiency

Transaction Structures:

- Build-Ready Site (storage and TEP only)
- Build-Own Transfer Agreement
- Asset Purchase Agreement (existing resources)
- Power Purchase Agreement
- Load Management Agreement

ASRFP Evaluation Teams

ASRFP Consultants

- **RFP Evaluation Consultant** -1898 (Burns & McDonnell)
- **Independent Monitor** -Sargent & Lundy

Project Evaluation Teams

- Resource Planning
- Energy Resources & Development
- Transmission Planning & Engineering
- Legal & Procurement
- Environmental & Land Management

Battery Storage Due Diligence Team

- Focused on proven technologies with flexible O&M agreements
- Performed safety due diligence on battery storage technologies

ASRFP Schedule

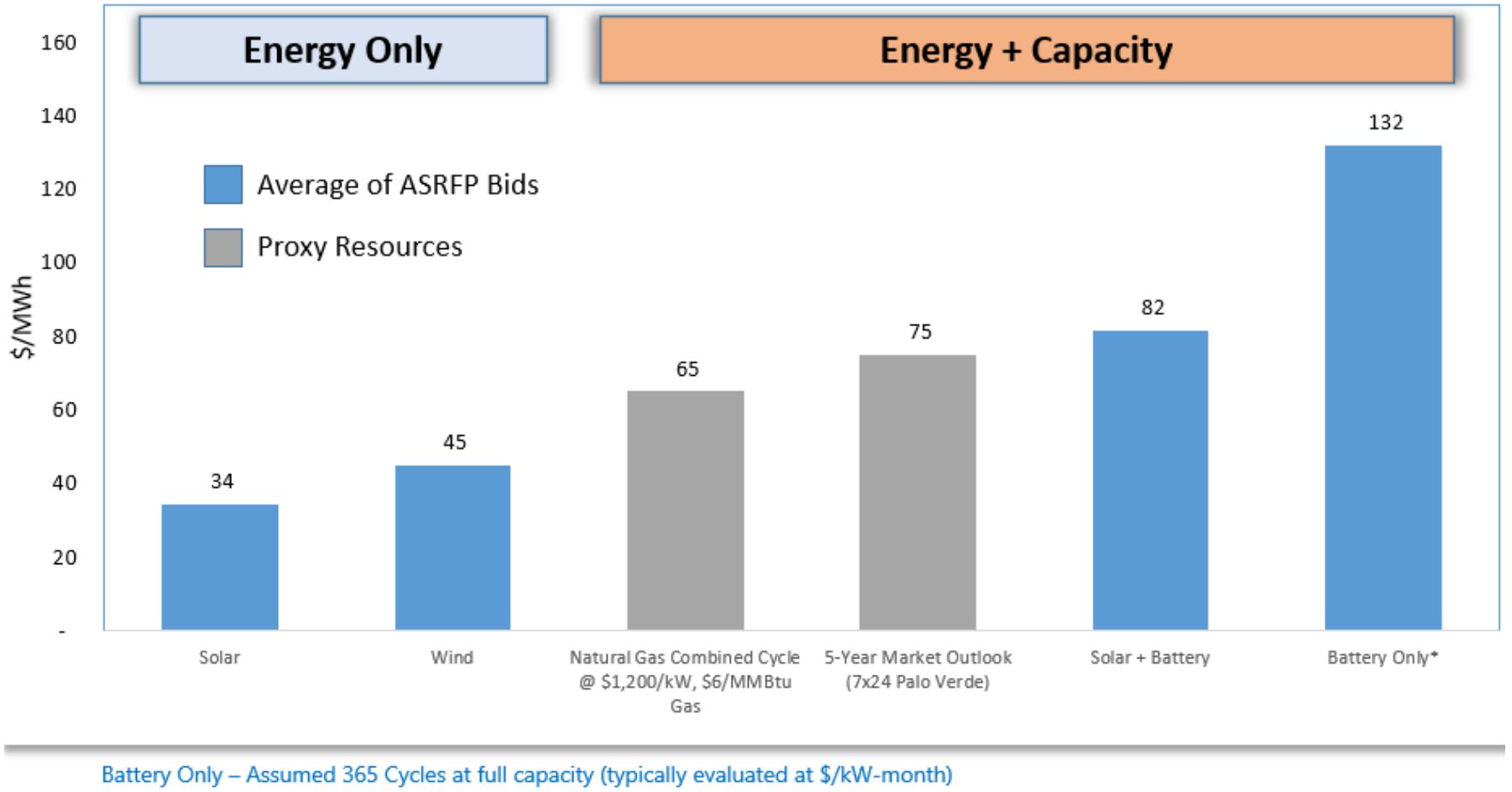
Milestone	
Issue ASRFP	April 19, 2022
Proposals Due	July 1, 2022
Short-List Determination	September – October 2022
Negotiations	November 2022 – December 2022
Notice of Awards	December 2022 – February 2022

Proposals Received

Product	TEP	UNSE
Demand Response	2	0
Solar + Battery (2024 and prior)	15	16
Solar + Battery (2025 and prior)	68	20
Solar	10	9
Battery Only	4	2
Thermal	8	0
Wind	8	4
Total	**115**	**51**

Proposal Pricing

Range of Resource Costs bid into the 2022 All Source Request for Proposal



Battery Only – Assumed 365 Cycles at full capacity (typically evaluated at $/kW-month)

Key Project Evaluation Factors

Evaluation Criteria

- Interconnection status
- Lowest cost
- Ability to complete projects on time
- Project size and location diversification
- Internal workforce requirements
- Supply-chain risks

Energy Storage Requirements

- Complete safety review on all energy storage designs
- Long-term need to manage BESS O&M contracts (OEM warranties and service)
- Ability to manage BESS dispatch options in light of evolving energy markets

ASRFP Next Steps

October 2022 – Short List Notification and Bid Refresh

- On-going work to analyze Inflation Reduction Act implications
- Conduct bid refresh meetings with key developers

November 2022 – Project Selection and Contract Negotiations

- Confirm and update contract terms and conditions
- Finalize project short-list and start contract negotiations
- Complete RFP evaluations and independent monitor report

December 2022 –February 2023 - Contract Execution

- Purchase Power Agreements
- Build-Own Transfer Agreements
- Engineering Procurement and Construction Agreements

Clean Energy Tax Incentives

Inflation Reduction Act of 2022

STEVE ALLAMANO

DIRECTOR, PLANT ACCOUNTING & TAX SERVICES

Overview

- Credit Rates / Effective Dates
- Key Eligibility Changes
- New Requirements to Achieve Bonus Rates
- Credit Utilization - Monetization Changes
- Additional Credit Incentives (“Adders”)

Credit Rates / Effective Dates

Credit Type	Effective Date	Base Rate	Bonus Rate	Comments
ITC	01.01.2022	6%	30%	Battery Storage
Wind PTC	01.01.2022	$0.003 per kWh	$0.015 per kWh	Inflation Adjustment

- Clarifying information on Wind PTCs
  - *Inflation-adjusted 2022 credit rate for facilities placed in service prior to 2022 is $0.026*
  - *Credit rate for facilities placed in service during 2022 is $0.0275*
- Facilities placed in service prior to calendar year 2022
  - *Fall under pre-Inflation Reduction Act rules; new legislation has no impact*
  - *Phase-down percentages dictated by when beginning of construction occurred*
- Both credits replaced by "Technology Neutral" versions effective 01.01.2025
  - *Phase-out determined based on later of: 1) 2032, or 2) achievement of certain annual GHG emissions reductions*
  - *Net carbon emissions must be at or below zero to qualify*
- Overlap between current rules and Technology Neutral rules
  - *If beginning of construction occurs prior to 2025, the current rules will apply re: credit applicability*

Key Eligibility Changes

- Battery Storage changes
  - *Stand-alone battery storage projects are now ITC-eligible*
    - *Prior rules required storage to be part of an otherwise-qualifying project*
  - *Energy source for battery storage no longer matters post-2022*
    - *Prior rules required specified energy percentage (75% or more) to come from renewables*
  - *Normalization opt-out provision for regulated utilities*
    - *Relieves restriction re: speed at which tax credit benefit can be passed back to ratepayers*
- Solar projects now eligible for either ITC or PTC
  - *Can claim one or the other – not both!*
  - *Under prior law, Solar projects were only ITC-eligible*

Bonus Rate Requirements

- Transitional Rule
  - *Projects beginning construction within 59 days of published clarifying guidance will be presumed to have met the bonus eligibility requirements*
- Apprenticeship Hours
  - *Percentage of total labor hours for construction, alteration, or repair work must be performed by qualified apprentices*
  - *Takes into consideration taxpayer, contractors, and subcontractors*
  - *Phase-in percentages: 10% in 2022, 12.5% in 2023, and 15% after 2023*
- Prevailing Wages
  - *Applies to laborers and mechanics employed by taxpayer, contractors, or subcontractors*
  - *Involved in construction/alteration/repairs during the applicable credit period*
  - *Must be paid not less than Prevailing Wages for jurisdiction (DOL determined)*
- Need for Clarifying Guidance – Timing Unknown

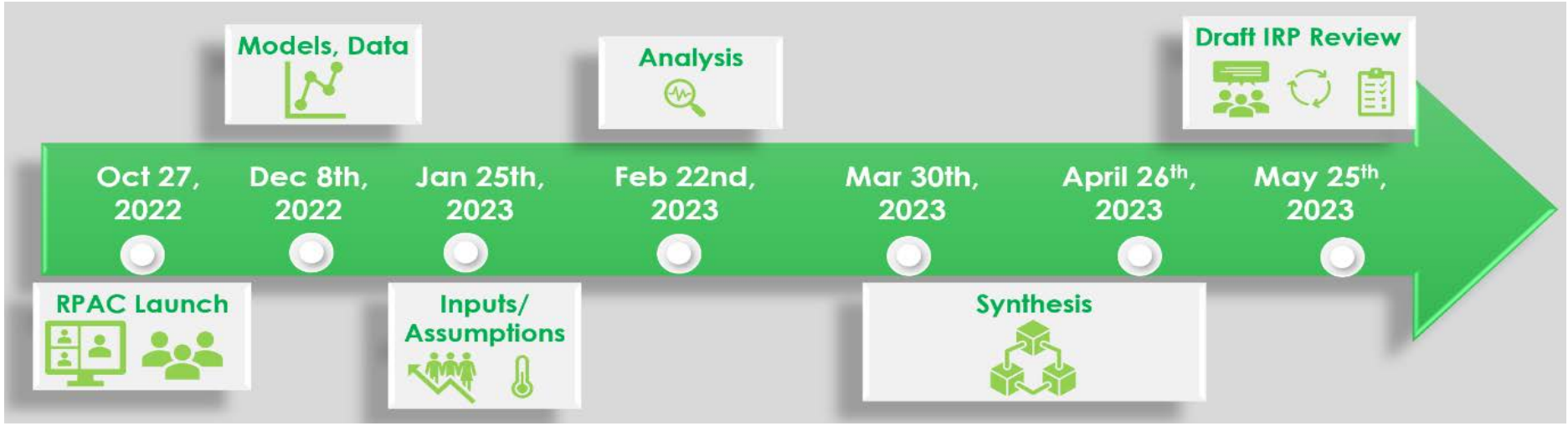
Credit Utilization – Monetization Options

- True “direct pay” limited in scope
  - *Applies to certain tax-exempt, governmental, and tribal entities*
  - *UNS and its subsidiaries are not eligible*
- Transferability option
  - *Can elect to transfer all or a specified portion of generated credits*
  - *Election must be made not later than the due date (including extensions) of tax return for tax year in which credit is generated*
  - *Consideration must be paid in cash*
  - *Non-taxable event for both transferor and transferee*
  - *One-time only; recipient cannot subsequently transfer same credit*

Additional Credit Incentives - Adders

- General Comments
  - *Apply to projects placed in service after 2022*
  - *Additive concept – could theoretically achieve a 70% ITC if all apply*
- Domestic Content – 10%
  - *Steel, iron, or manufactured products which are components of applicable facilities must be produced in the United States*
- Energy Communities – 10%
  - *Brownfield sites*
  - *Employment/tax revenue metrics associated with coal, oil, or natural gas*
  - *Coal mine closure (post-1999) or coal-fired electric generating unit retired (post-2009)*
- Low-Income Communities – 10-to-20%
  - *10% if located in low-income community as defined in New Markets Tax Credit Code Section*
  - *20% if project is a "qualifying low-income residential building project" or a "low-income economic benefit project"*
- More Guidance Needed

Next Steps


Models, Data
Analysis
Draft IRP Review
Oct 27, 2022
Dec 8th, 2022
Jan 25th, 2023
Feb 22nd, 2023
Mar 30th, 2023
April 26th, 2023
May 25th, 2023
RPAC Launch
Inputs/ Assumptions
Synthesis