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Omaha Public Power District

Near Term Generation Update

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April 18, 2023


KEEP GROWING, NEBRASKA.
WE LOVE A CHALLENGE.
OPPD
ILLUMINATE OUR FUTURE

Agenda

- March Recap
- Reliability Considerations
  - Regional Resource Adequacy
  - Grid Reliability & Resiliency
- Resource Planning Study Update
  - Key Concepts
  - Load Growth
  - Technology Availability & Cost Estimates
- Next Steps

What Have We Been Discussing Since February?

March 2023 All Committee Meeting Summary

- In 2022, thanks to stakeholder input, OPPD completed **Pathways to Decarbonization** to identify potential pathways to Net Zero by 2050.

- In the near term, OPPD is experiencing multiple factors, requiring a need to plan to **grow accredited capacity** beyond Power with Purpose. These factors include:
  - Continued rapid near-term load growth
  - More generation supply is required from an increasing Planning Reserve Margin (PRM)
  - Diminishing surplus of regional generation capacity
  - Significant extension of planning & execution time requiring more action, sooner

- OPPD and E3 are **studying near-term resources needs**, guided by OPPD's mission and long-term goals and building on Pathway findings. Our guidepost are:
  - *Affordable*: Economic, least-cost optimization
  - *Reliable:* Maintain OPPD's high historical levels of reliability
  - *Environmentally Sensitive*: 2050 Net Zero carbon target

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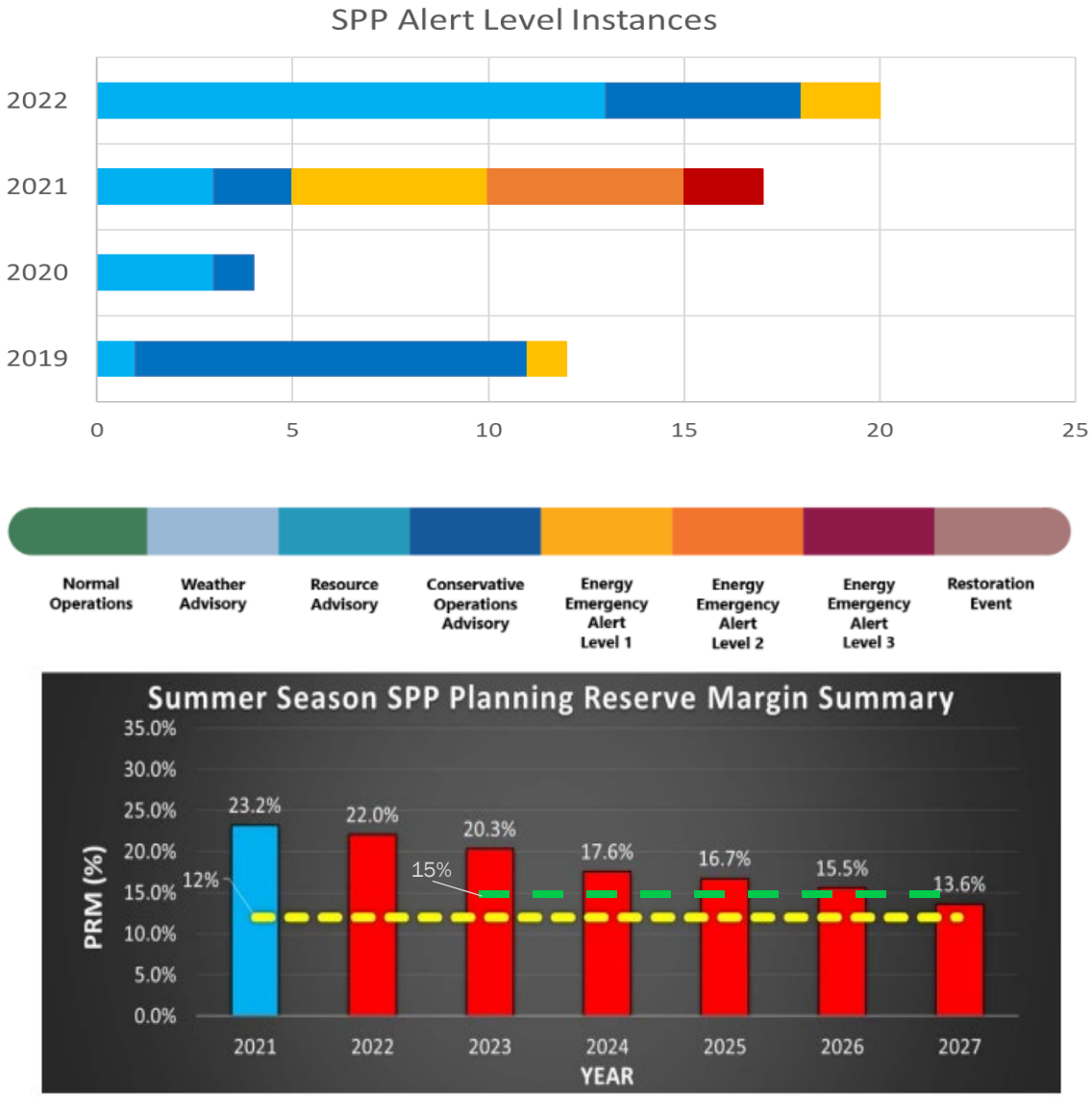
Reliability Considerations

SPP Resource Adequacy

SPP Alerts & Planning Reserve Margin Outlook

- The frequency and severity of regional reliability alerts has increased in recent years, including SPP's first load shedding event during winter storm Uri.
- While SPP increased its Planning Reserve Margin from 12% to 15% in the summer of 2023, SPP's regional resources are forecasted to continue to decline in the coming years, influenced by the following:
  - Retiring existing generation resources
  - Regional growth in peak demand
  - Delays interconnecting new resources

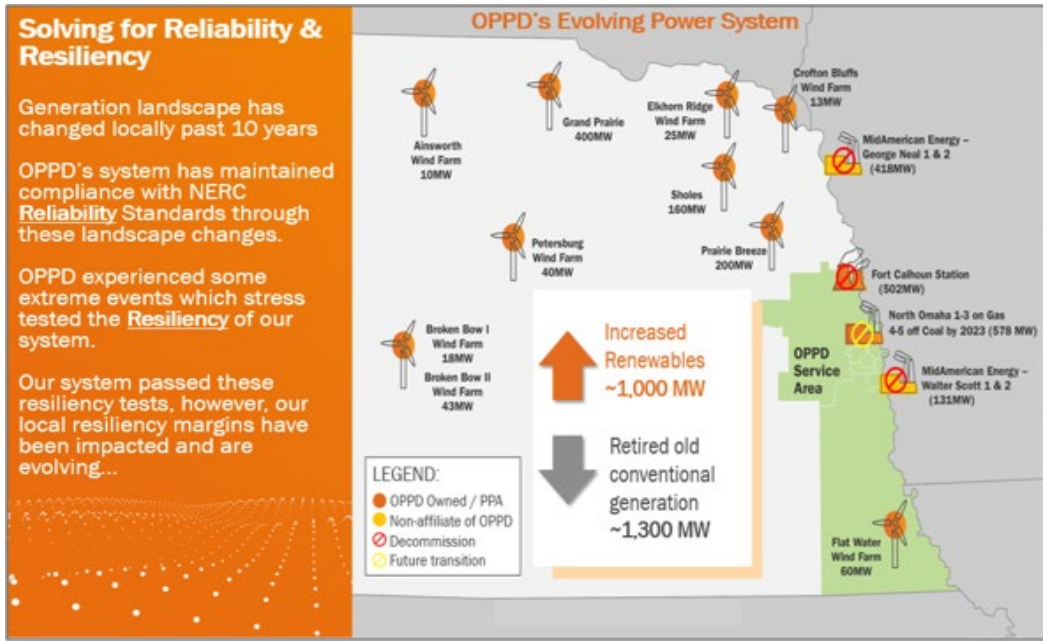


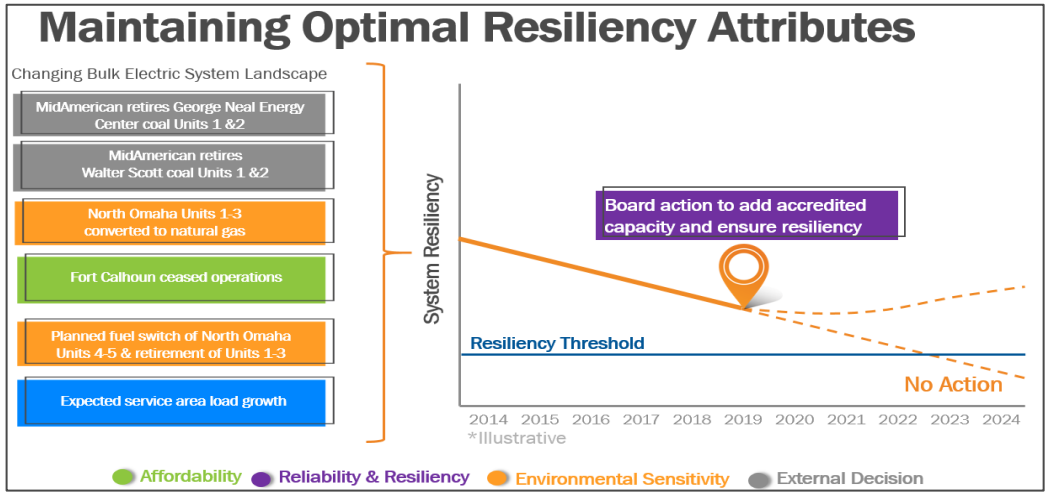
Source: Southwest Power Pool

Grid Reliability & Resiliency

North American Electric Reliability Corporation

- Our federal regulator, North American Electric Reliability Corporation (NERC), mandates requirements for Grid Reliability:
  - Grid reliability 'reserve margins' required on various electrical properties (*Thermal Capacity, Voltage Profile, System Stability & Frequency Response and Load Ramping & Balancing*)
  - Generation is critical to maintaining these grid 'reserve margins,' beyond just providing power, based on both ***grid injection location*** and capability to provide ***Essential Reliability Services***
- NERC identified emerging risks to Grid Reliability:
  - Quickly Changing Generation landscape.
  - Increasing frequency and intensity of Extreme Weather Events.
- Changing generation landscape & projected load growth reduced OPPD's local historic reliability & resiliency margins, and Power with Purpose (PwP) generation expansion plan maintains reliability & resiliency margins.
- Future generation expansion will consider grid reliability & resiliency impacts.





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Resource Planning Study Update

Key Concepts

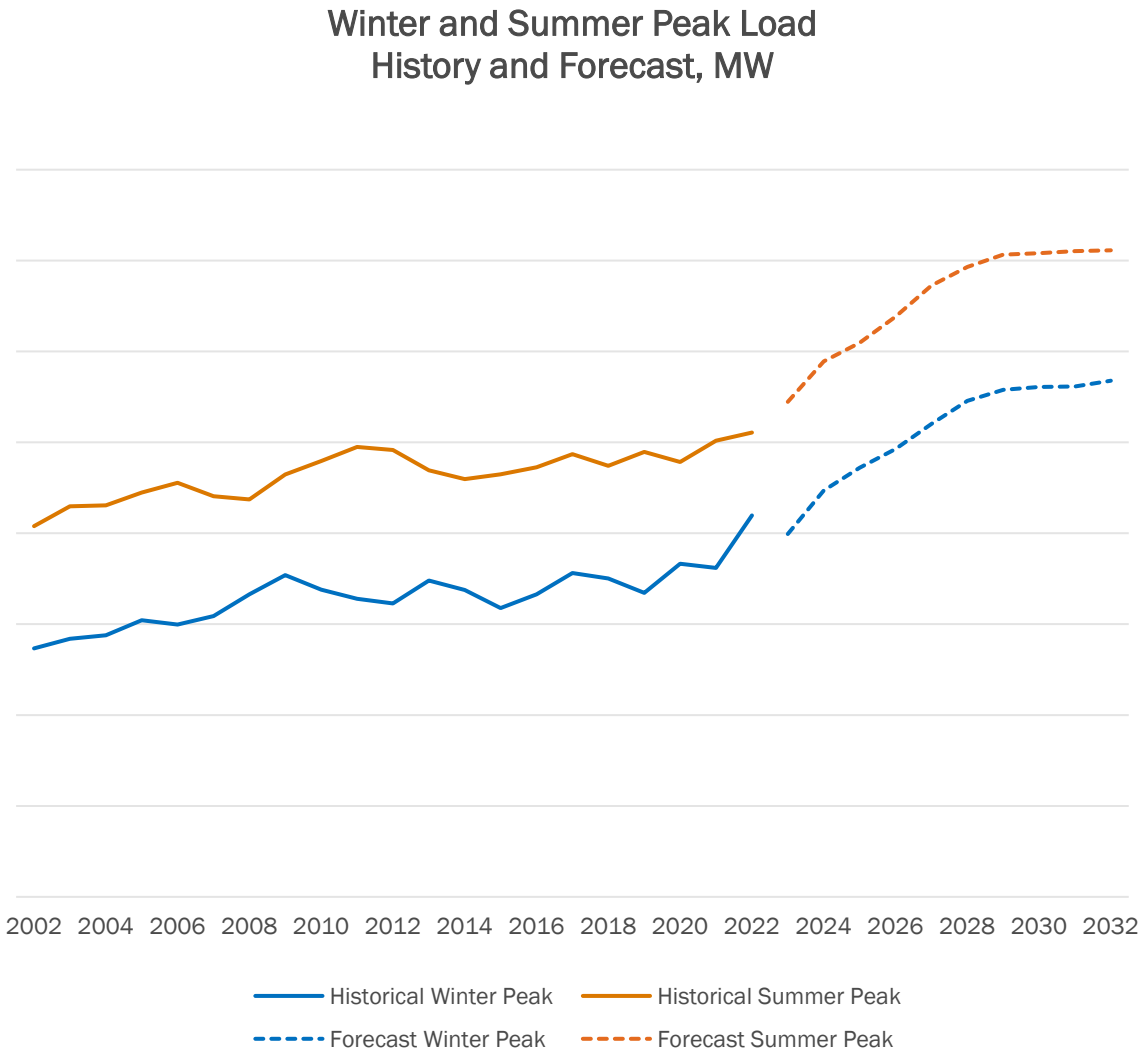
Situational Awareness & Modeling Objectives

- Load growth and changing resource adequacy requirements will drive the magnitude of the resources in the outcome.
- Finite near-term resources are available to meet OPPD's growing needs:
  - Limited quantity of near-term interconnection queue positions are available and the interconnection process continues to see multi-year delays.
  - Critical equipment lead times are extending.
- Modeling scenarios will be developed to evaluate meeting several OPPD objectives, including:
  - *Community Growth:* Provide timely and reliable service during a historic growth period
  - *Affordable:* Keep the system low cost
  - *Reliable*: Meeting regional resource adequacy requirements
  - *Reliable*: Maintaining sufficient local resource adequacy
  - *Environmentally Sensitive:* Reducing carbon emissions to reach Net Zero 2050

Load Growth

Peak Load History and Forecast

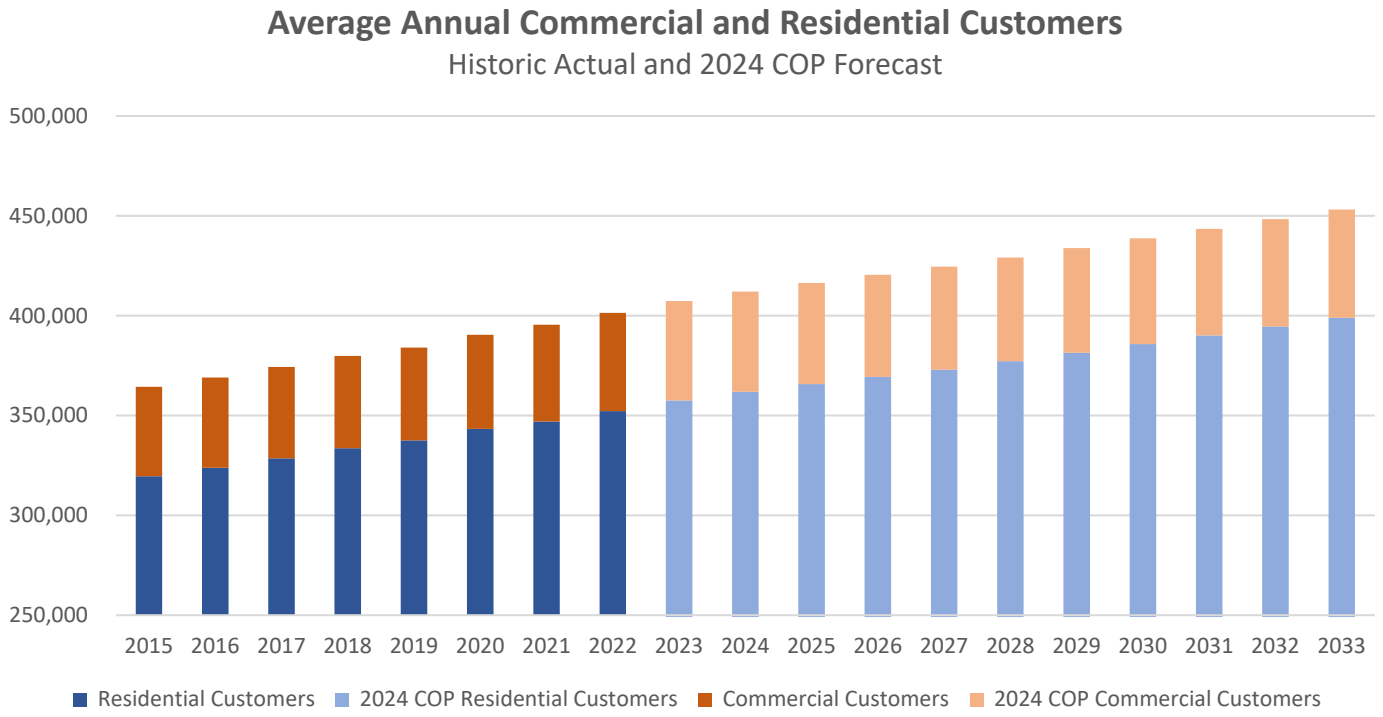
- OPPD has a process to project growth for each customer class based on population data, economic growth data, changing energy consumption, and customer capacity requests.
- Both summer and winter peak loads are expected to see similar growth.
- Current projections exceed all historical growth levels by an extraordinary amount.



New Customer Growth Insight

Residential, Commercial, and Industrial

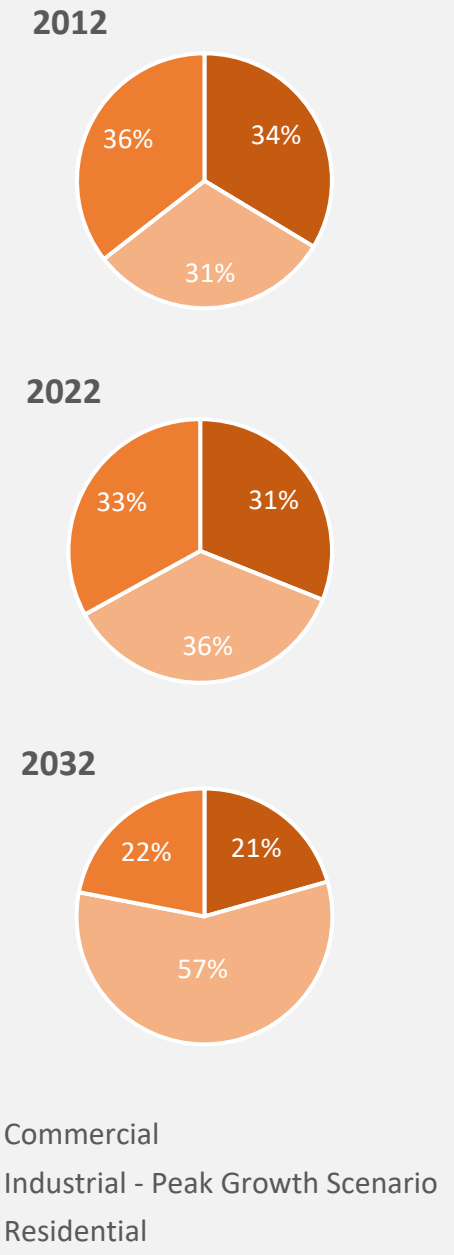
- Residential and Commercial growth is on the rise and expected to continue that trend
- Commercial business is growing to serve our communities
- Growth in transportation, education, retail, medical, food, agriculture and more expected over the coming years



Load Growth

Energy Usage by Class

- Energy consumption is expected to grow across all classes, but will be primarily driven by expected growth in the industrial class.
- In 2022 the industrial class comprised roughly 36% of energy sales, but is expected to comprise roughly 57% of total energy sales by 2032.
- Load growth is coming from economic growth and many customer segments and factors including electrification, manufacturing, biotech, data centers, and food and agricultural processing.
- Data Centers make up the largest portion, roughly two-thirds, of the new growth.



Like OPPD, Data Centers are essential for powering our daily lives.

Data centers provide mission critical support and keep essential services operating:

- Transportation
- Healthcare
- Military/Defense
- Banking & Finance
- Utilities
- Agriculture
- Rural Community Growth

Demand for data increased substantially during the pandemic as workforces and schools became remote and social network use skyrocketed.

Demand for data and cloud storage continues to increase in support of new technology, artificial intelligence, and augmented and virtual reality.

Like OPPD, data centers in our service area expanding to serve increasing customer demands and provide capacity.

Data Centers Help Build Community

Digital Equity:

"The condition in which all individuals and communities have the information capacity needed for full participation in our society, democracy and economy."

The National Digital Inclusion Alliance

Address critical service territory needs by putting the power of technology to use for community benefit

Enabling commerce throughout Southeastern Nebraska and connecting people to bring the world closer

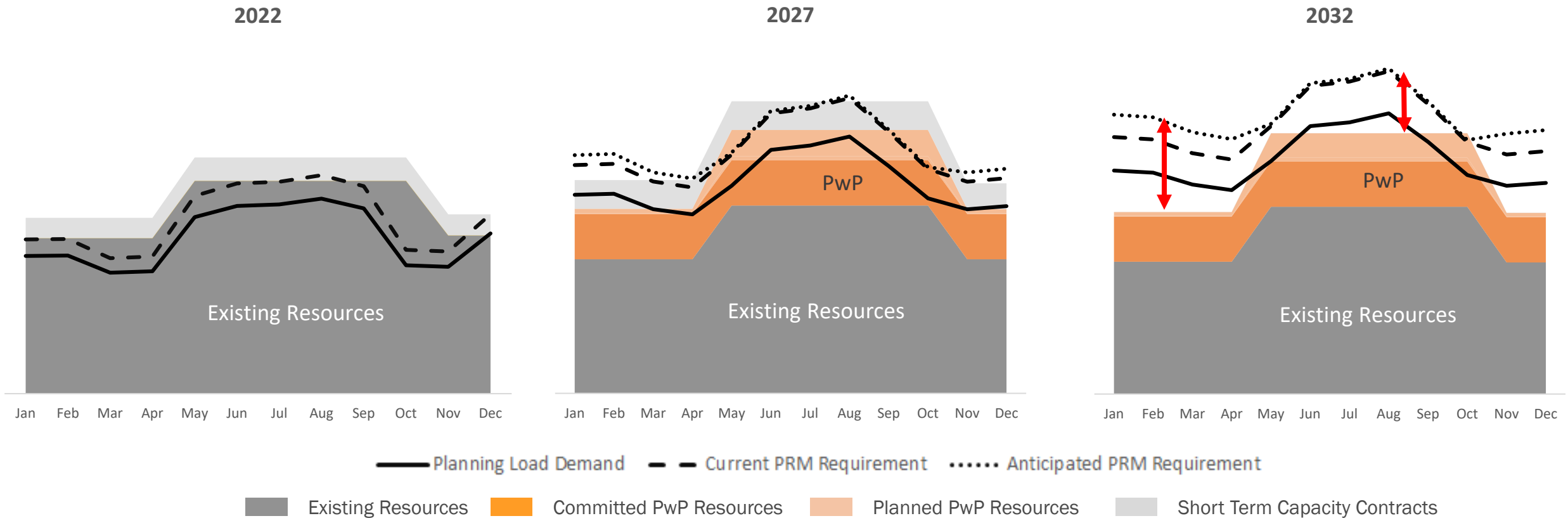
Improving local STEM (science technology, engineering, mathematics) education

Investments in technology are investments in economic and community growth and equity

Peak Demand vs. Resources

Monthly Peak Demand vs. Accredited Capacity

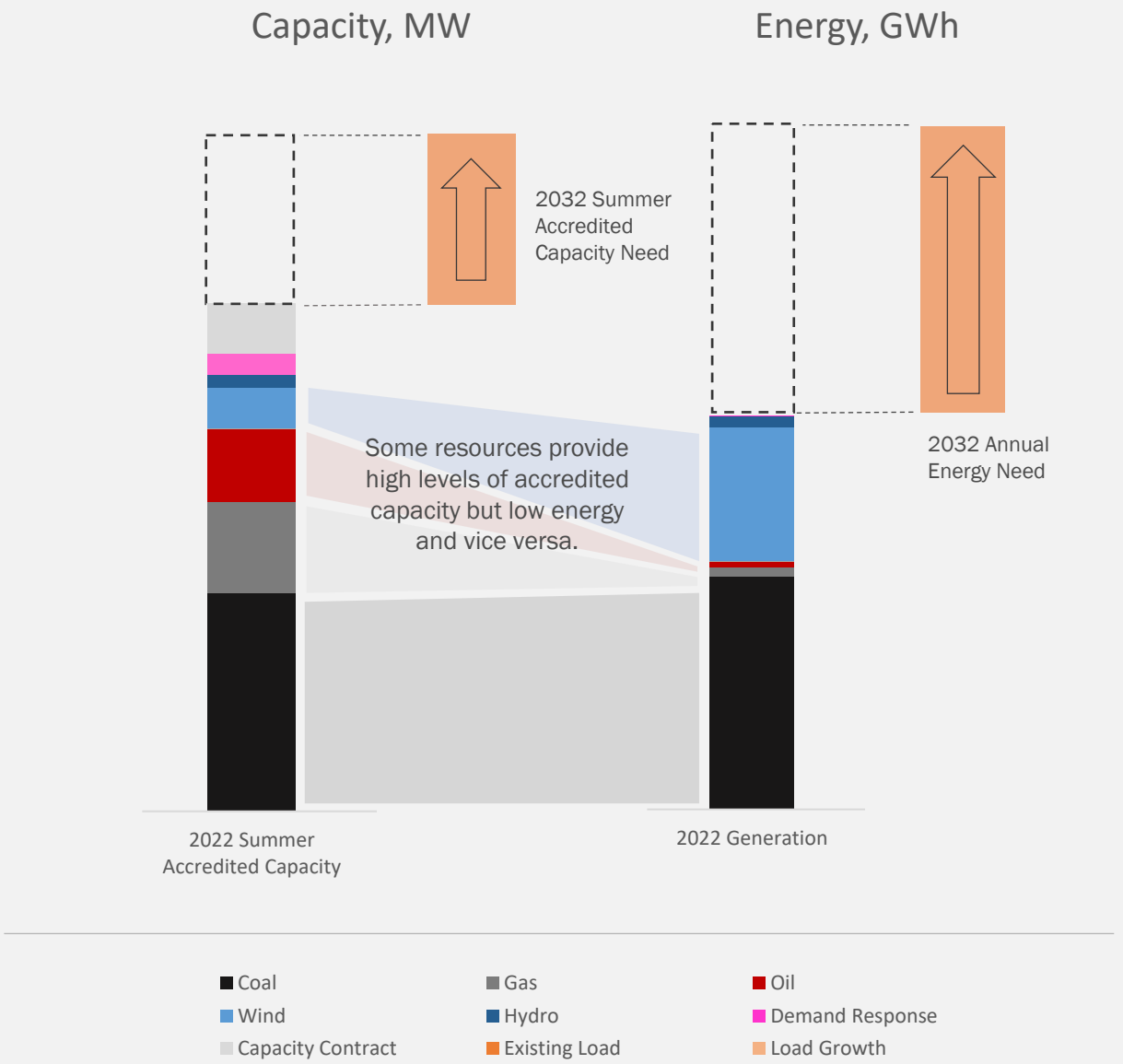
OPPD will need additional summer and winter capacity to meet growing seasonal peak demand.



Resource Mix

Accredited Capacity and Energy Needs

- Different generation technologies provide varying levels of summer and winter accredited capacity and contribute differently to OPPD's energy production.
- Capacity is the maximum amount of electricity that a generator can produce at a given time.
  - OPPD needs to maintain enough capacity to meet the demands during peak periods
- Energy is the amount of electricity that is produced over a period of time
  - When demand is less than peak, lowest cost resources are used first to provide energy resources to customers
  - High cost resources, such as fuel oil or peaking stations, are used to meet peak demand but only for short periods of time
  - Renewable resources can provide significant levels of energy but have lower accredited capacity
- New capacity *and* energy sources will be needed to satisfy growing load



Technology Availability and Cost Basis

Including In-Service Dates

- Resource options are consistent with the options identified in OPPD's Pathways to Decarbonization with the following modifications:
  - New generation for 2026 and 2028 is limited as a percentage of resources currently in queue for SPP's Generation Interconnection process in the state of Nebraska.
- New resource cost data based on National Renewable Energy Laboratory (NREL) estimates updated by OPPD modeling partner, E3, to reflect current market dynamics and impacts of the Inflation Reduction Act (IRA).
  - Consistent with the high inflation sourcing environment of today, all technologies have seen significant cost increases and availability challenges as a result of recent supply chain impacts and demand.

Resource Type	Available Nameplate Capacity, MW	
	2026 - 2028	2030+
Solar	Limited	Unlimited
Wind	Limited	Unlimited
Storage	Limited	Unlimited
Combustion Turbine	Limited	Unlimited
Combined Cycle	0	Unlimited
Nuclear Small Modular Reactor	0	Unlimited
Demand Response	Limited	Limited

Demand Side Management

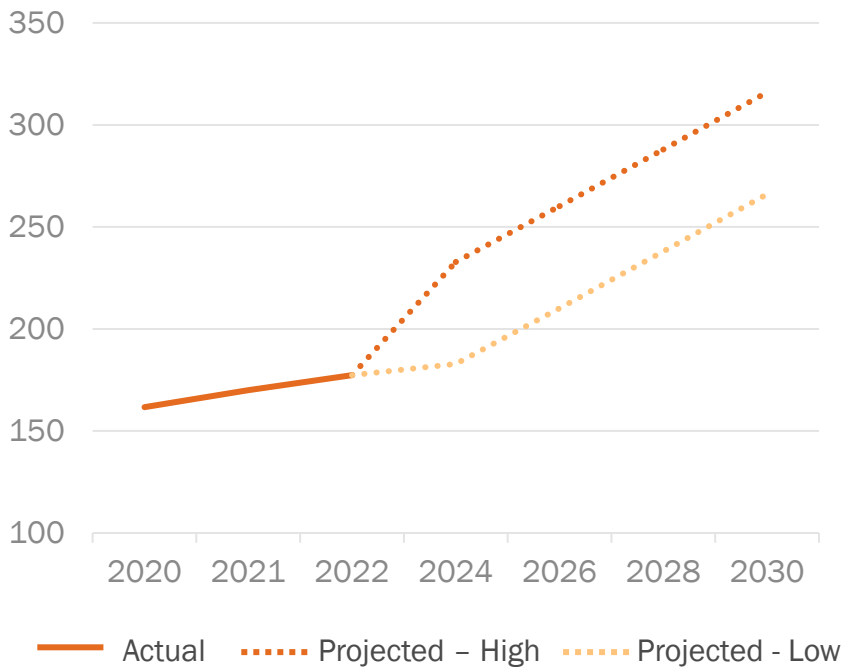
- Our future will continue to focus on and evolve products and services supporting demand response and energy efficiency in support of both enterprise and customer goals

2023

- Energy Education (high school)
- Energy Efficiency Assistance Expansion (single family home renters)
- Energy Star Appliance
- HVAC Tune-up
- Residential Lighting
- Weatherization

2024 and beyond

- Additional Business Prescriptive Measures
- AMI Product Strategy, Plan and Execution
- Business Interruptible
- CI New Construction
- CI Strategic Energy Management
- Commercial Food Service Rebates
- Energy Education (after-school programs)
- Multi-Family, Renter and Landlord Solutions
- Small Business Direct Install
- SMB Building Mgmt. System
- Thermostat Program Expansion
- TOU Rates & Other Value-Added Rate/Rate Strategies
- Winter Peak Strategy & Plan



1. Total DSM includes Demand Response and Energy Efficiency
2. Does not include voluntary business interruptible
3. Projections may change based on accreditation policy
4. Projections are revised annually

Informing our Direction

Customer, employee and public feedback through workshops, surveys, etc.

Transition to broad communications

2019
Power with Purpose (PwP)

OPPD launches plans to add solar power and national gas to meet load growth through 2026.

2019-2021
Pathways to Decarbonization

- 6 workshops
- 400 attendees
- 700+ recording views
- 83.7% satisfaction

Study determines it is possible to reliably operate with a mix of renewable, storage, and low-carbon firm resources to achieve net-zero.

January 2022
Integrated Resource Plan

OPPDCommunityConnect Decarbonization Pages
- 10,500 visits
- 80 comments & questions

Regulatory plan finds that OPPD's forecasted load is fully supported through 2026 with new solar and natural gas resources (PwP).

June 2022
North Omaha Extension

PwP delays require OPPD to temporarily extend the capability for coal operations at NOS.

2023
Near-term planning

As part of on-going planning, OPPD studies how to meet growing energy needs.

GENERATION OUTREACH TIMELINE

2019
Power with Purpose

2019-2021
Pathways to Decarbonization

2022
Integrated Resource Plan

2022/2023
North Omaha Extension

Outreach and Engagement to Date

OPPD is committed to engaging customers, the community and other stakeholders around key decisions and providing meaningful ways for them to participate and provide feedback.

- OPPD Community Connect
  - OPPD's stakeholder engagement platform – follow along the generation journey
  - Opportunity to ask questions, take surveys provide feedback
- Listening Sessions
- Master-class deep dive workshops
- 1:1 customer discussions

GENERATION COMMUNICATIONS TIMELINE

December 2022
State of the Utility

Q1 2023
Power with Purpose
North Omaha Station
Solar updates
New resources

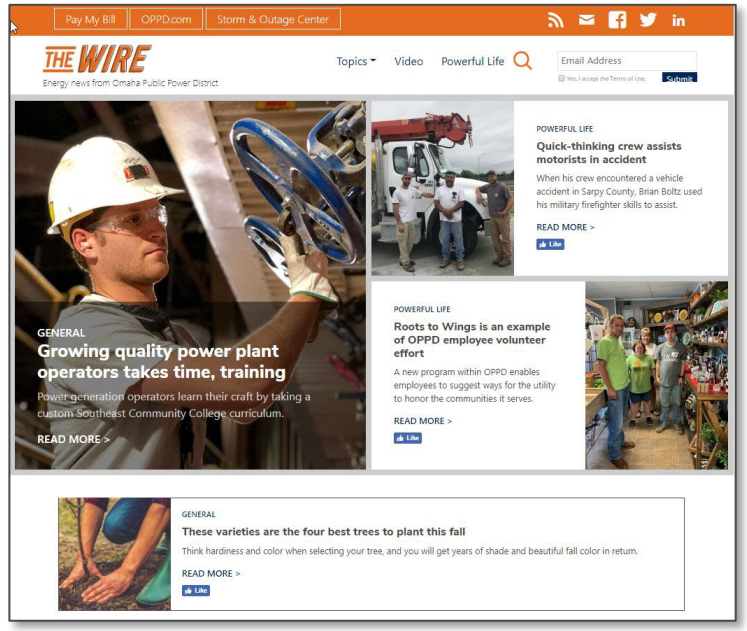
Q2 2023
Recommendation and resolution

Education Going Forward

OPPD continues to educate broader audience about our generation journey with focus on new transmission and generation to ensure understanding of situation / recommended solutions.

Use OPPD's broad communication channels to build understanding about load growth, as well as trust in our near- and long-term generation strategies as they evolve and continue. Examples:

- OPPDtheWire content
- Social media
- News releases
- Outlets bill insert newsletter
- OPPDCommunityConnect.com
- Community events, i.e. Earth Day
- Community relationships
- Customer conversations



Likely Outcomes & Next Steps

- Generation resource recommendations are expected to be a combination of renewables and continued expansion of dispatchable natural gas.
- Supporting infrastructure for those resources is expected to be required.
- These solutions are consistent with our 2050 goals.
- More detailed information in May and the coming months.
- Continue the ongoing conversation on load growth in the community.
- Due to system needs, extensive education and outreach as well as 4-5 years of community conversations, the District will use IAP2 (Inform) framework for the decision.

Photo credit: Andrey Metelev on Unsplash