

Near Term Generation Update

May, 2023



Purpose

Review OPPD's near-term generation needs and key planning assumptions

Agenda

- Nebraska Continues to Thrive
- What Have We Been Discussing
- Resource Planning Study Results
- Strategic Directives Impact
- Next Steps

KEEP GROWING, NEBRASKA.
WE LOVE A CHALLENGE.

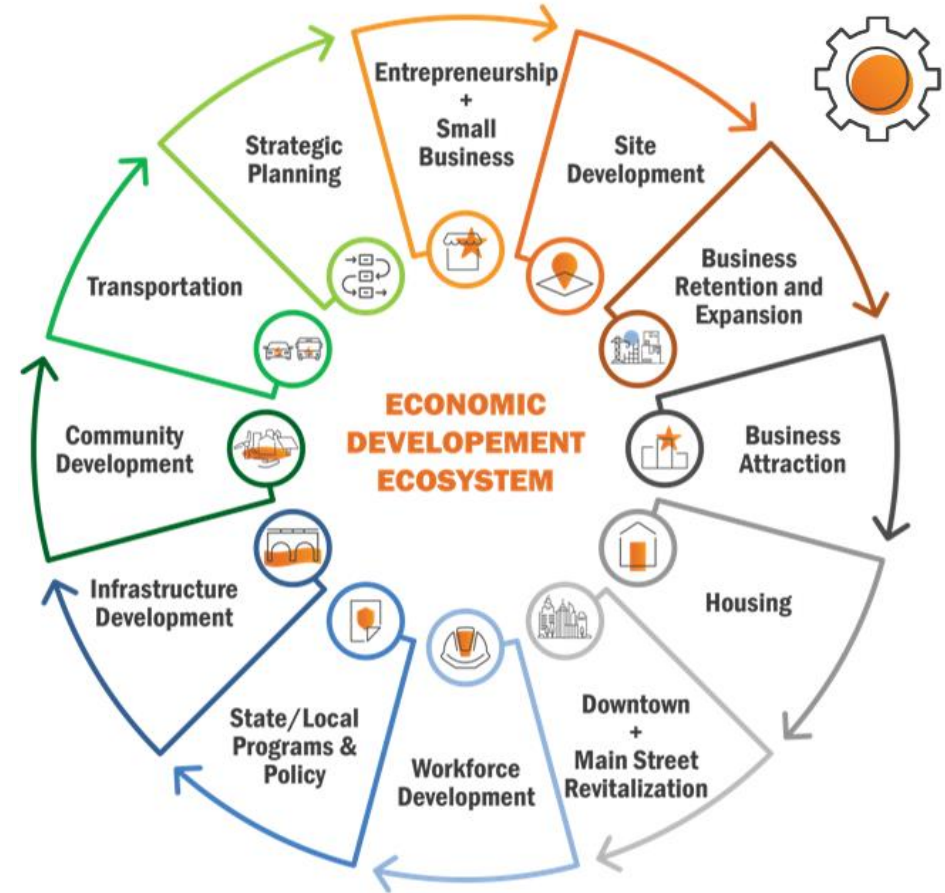


ILLUMINATE OUR FUTURE

Keep Growing, Nebraska

Opportunity to Serve

- Electric service is the **backbone of modern life**, empowering all aspects of the region's life, wellbeing and prosperity.
- OPPD partners closely with the state, counties, cities and many others to understand where businesses, schools and other **power users are planning to grow**.
- These partnerships have sent strong growth signals the last few years and continue to send very strong growth signals. **OPPD must be prepared**.
- It is OPPD's **responsibility and obligation** to serve its customers.

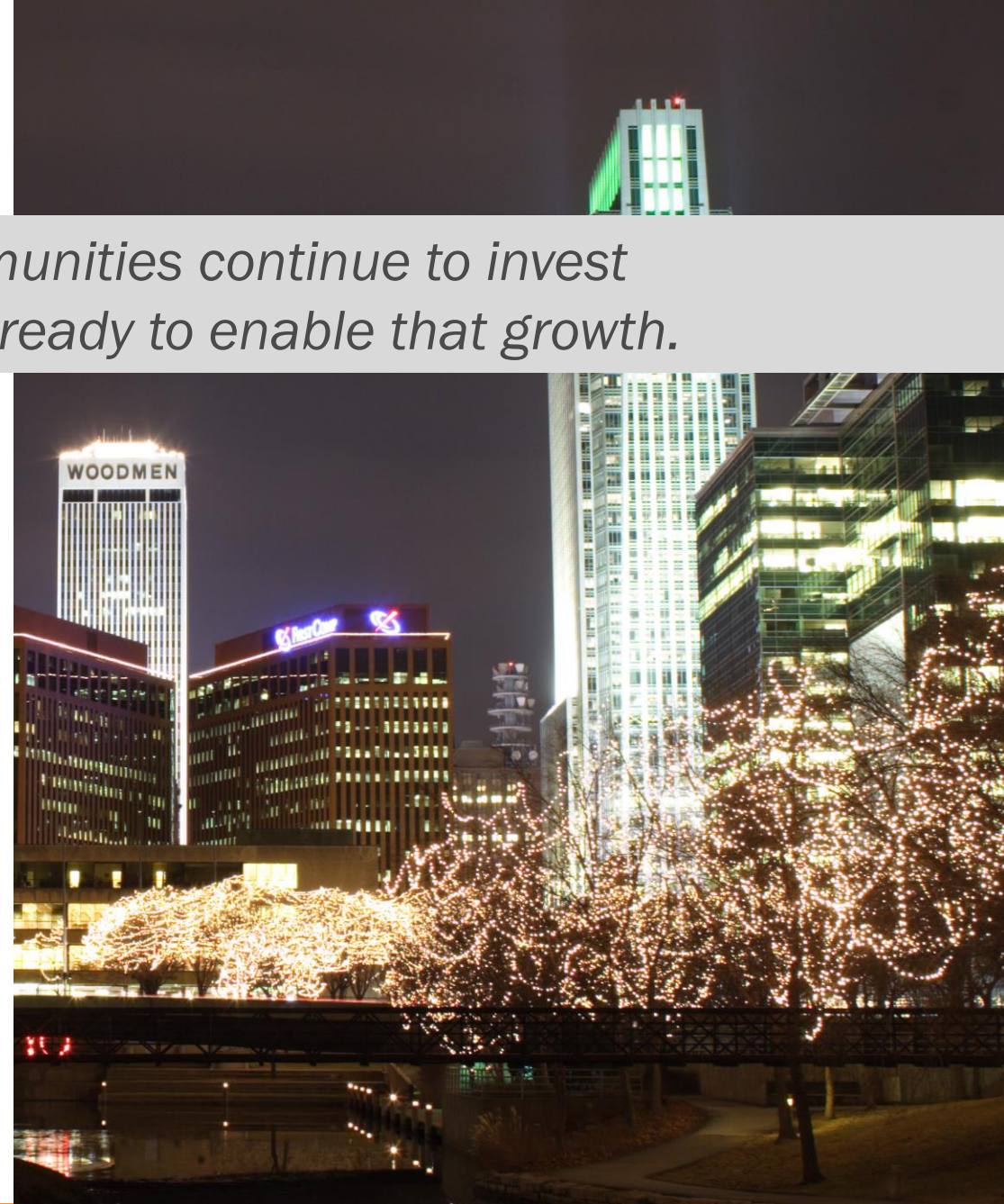


Keep Growing, Nebraska

State Has Prioritized Growth

The State of Nebraska and local communities continue to invest in economic growth, and OPPD must be ready to enable that growth.

- State has dedicated **\$110M** to site development in last two legislative sessions, up from \$2M annually.
- **\$430M+** is proposed this legislative session.
- The greater Omaha area had **61** new projects last year, totaling \$2.1 billion capital investment.
- Nebraska Department of Economic Development has clear **economic development goals**:
 - **Recruit** high-wage, high-tech job creators.
 - Encourage **expansion** of existing firms.
 - Develop first-rate sites to **attract** projects.
 - Promote startups and small business.



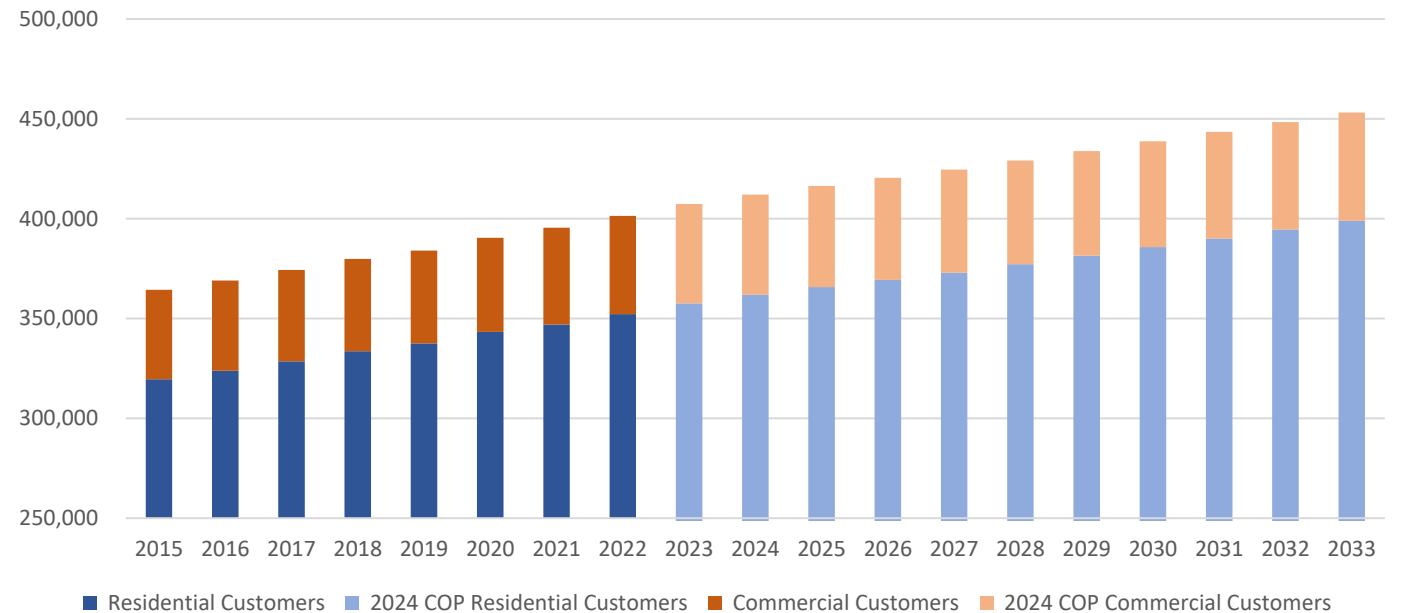
Keep Growing, Nebraska

Residential & Commercial Class Outlook

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

Average Annual Commercial and Residential Customers

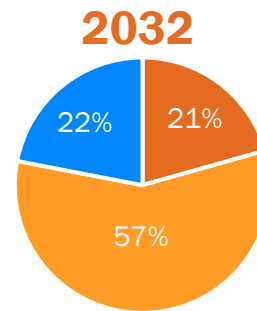
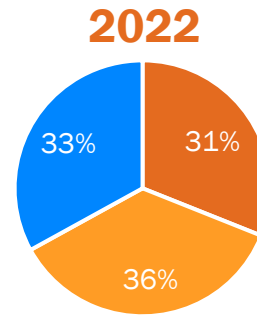
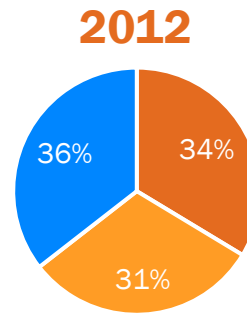
Historic Actual and 2024 COP Forecast



Keep Growing, Nebraska

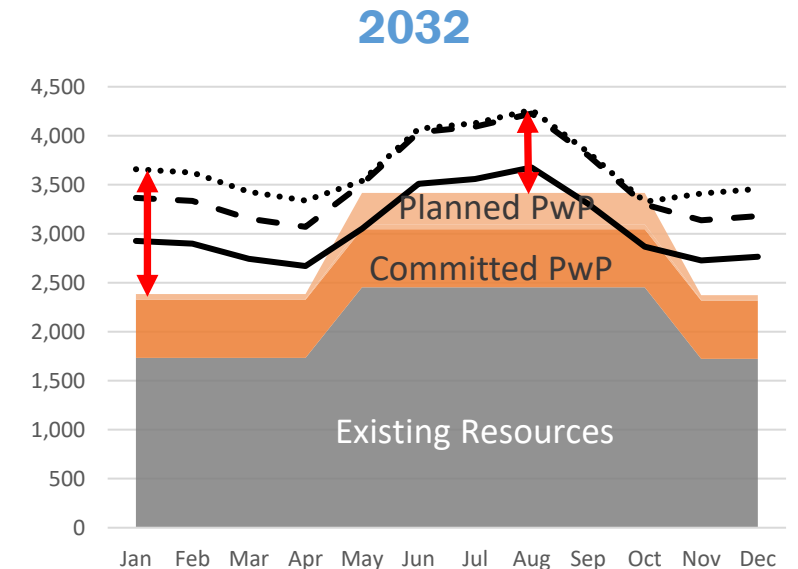
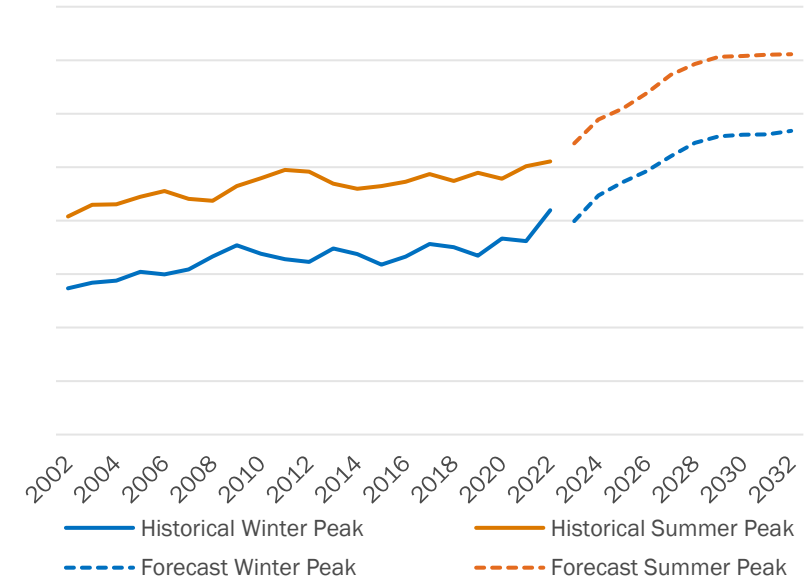
Current & Future Load Levels

- We are experiencing **historic load growth, upwards of 100 MW per year** with an **expected** increase of ~1,050MW of peak demand growth by 2032.
- Expected **demand and regulatory requirements will drive size of resource growth.**
- Energy **consumption is expected to grow across all classes**, but primarily driven by industrial class, especially data centers.
- OPPD will **need additional summer and winter capacity** to meet peak demand.
- New capacity and energy sources will be needed.



- Commercial
- Industrial - Peak Growth Scenario
- Residential

Winter and Summer Peak Load History and Forecast, MW



What Have We Been Discussing?



Review

Longer Lead Time for Electricity Generation Solutions

- Growth over the next 10 years will be **significant, demanding and at levels never seen before by OPPD.**
- Bringing on new generation is now taking **6 to 10+ years.**
- OPPD must make **resourcing decisions now** to get ready.

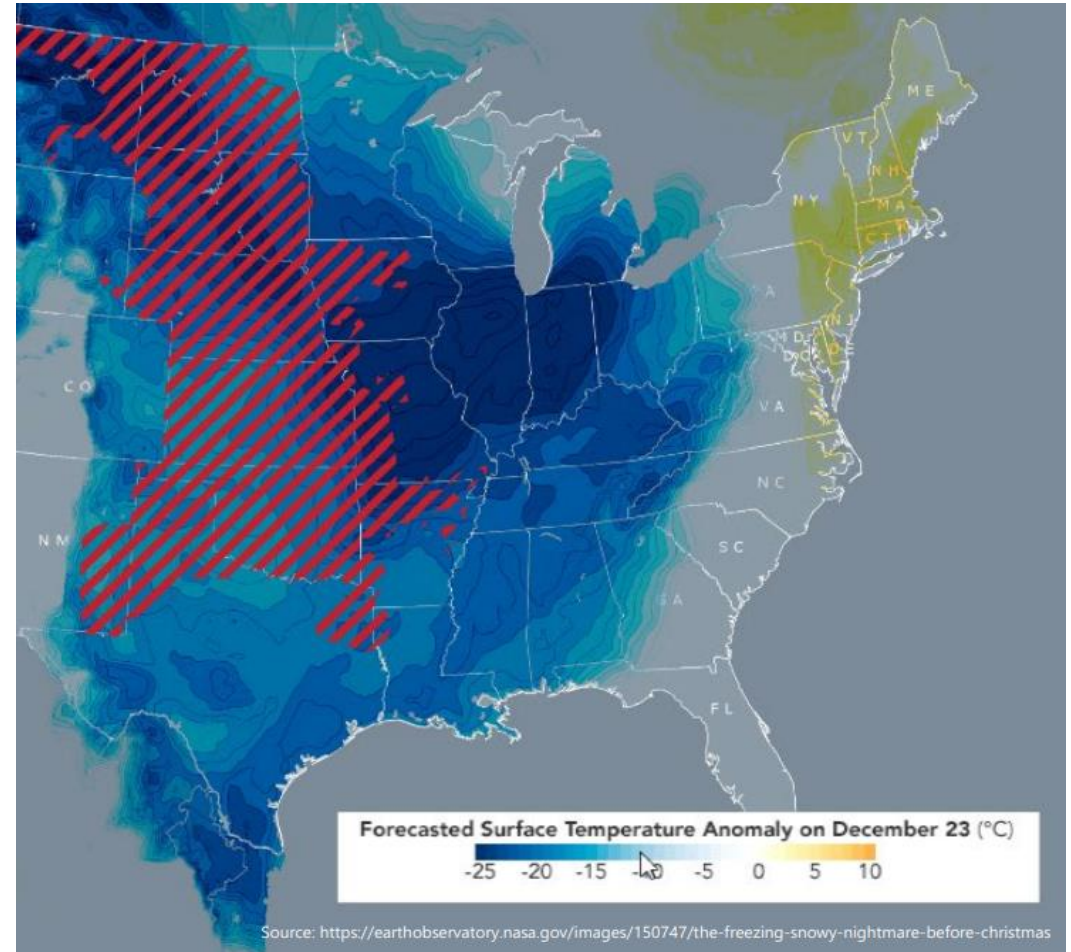
Factors driving LONGER LEAD TIMES

- Regulated grid interconnection study backlogs.
- Solar zoning & Federal regulatory challenges.
- Supply and workforce challenges.
- Building at multiple sites is a significant incremental challenge to execution teams.

Review

Extreme Winter Events

- **Resource and operational challenges** can contribute to the **stress** of extreme events, such as winter storms Uri and Elliott.
- During these extreme events, **margin for disturbances is low** with typically all available resources in service.
- **Resource diversity** remains critically important.
- Winter storm Uri was more impactful to OPPD requiring load shedding throughout SPP, and Elliott required load shedding in the Southeast U.S.



Winter Storm Elliott – Dec. 23, 2022

Review

Advisory, Alert and Resource Adequacy

- The frequency and severity of regional reliability alerts has increased in recent years.
- While the Southwest Power Pool (SPP) increased its Planning Reserve Margin (PRM) from 12% to 15% in the summer of 2023, SPP's regional resources are expected to continue to decline in the coming years.
 - Retiring existing capacity resources.
 - Regional growth in peak demand.
 - Challenges interconnecting new resources.
- OPPD anticipates SPP Summer and Winter PRM to grow. Current MISO requirement is 24.7%.
- Increasing PRM requires more capacity on top of our growing load to produce the reliability margins the grid requires.

SUMMER PRM

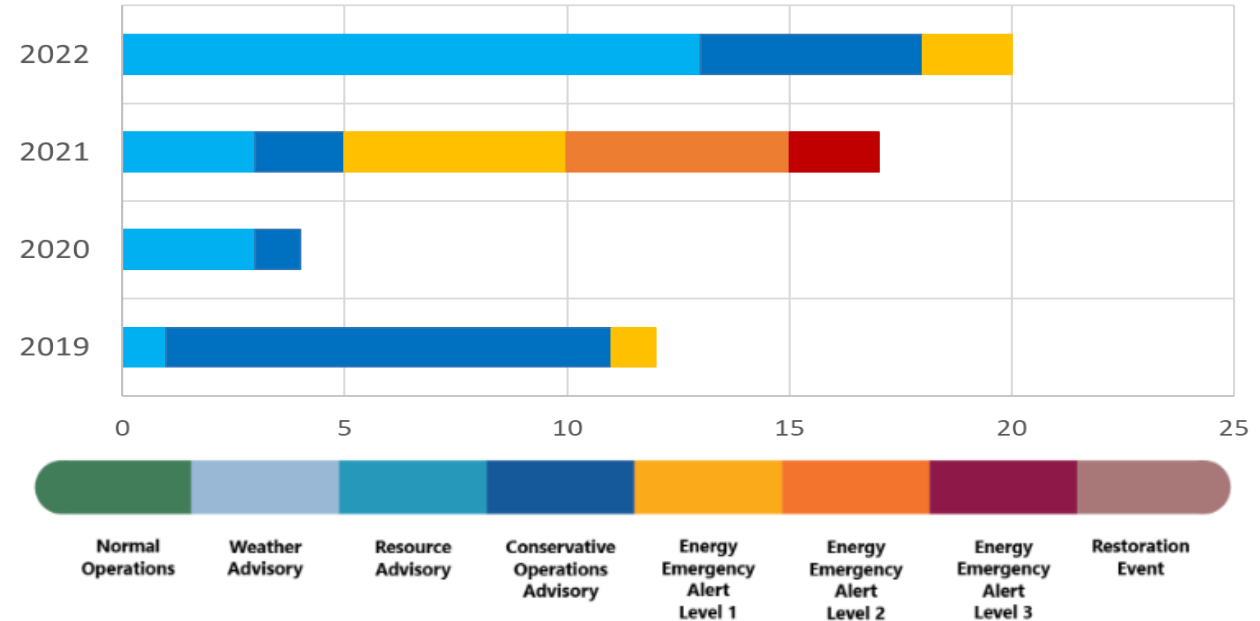
2022: 12%
 Now: 15%
 2025: 16%*

WINTER PRM

2022: 12%
 Now: 15%
 2026: 20%*
 2028: 25%*

*expected

SPP Alert Level Instances



Source: Southwest Power Pool

Resource Planning Study



Resource Planning Study

5 Step Study

- 1 Gather prior findings on regulatory direction, strategic alignment, and customer feedback
- 2 Define near-term needs, objectives, and requirements
- 3 Develop modeling assumptions
- 4 Develop and interpret modeling results
- 5 Communicate outcomes and recommendation

Resource Plan – Step 1

Gather Regulatory, Strategy and Customer Feedback Inputs

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

Transition to broad communications

2019
Power with
Purpose (PwP)

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

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

2019-2021
Pathways to
Decarbonization

- ◆ OPPD Community Connect
- ◆ Decarbonization Pages
- ◆ 10,500 visits
- ◆ 80 comments & questions

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

- ◆ Since January 2022:
- ◆ Significant load projection growth
- ◆ Increasing PRM requirements

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.

Resource Plan – Step 2

Define Output Objectives, and Requirements

Affordable

*Portfolio Cost
Minimization*

All resource portfolios are developed to minimize total costs given the goals, objectives, and assumptions made.

Reliable

*Regional Resource
Adequacy (RA)*

OPPD must have sufficient accredited capacity above its peak system load to meet regional PRM requirements.

*Local Resource
Adequacy (RA)*

Local RA ensures that OPPD maintains the right mix of local resources to predictably serve its local load. This mitigates overdependence on regional transmission imports and potential import congestion issues that could arise. This not only maintains diversity of generation, it also ensures sufficient generation capacity during periods of low renewable production.

Environmentally Sensitive

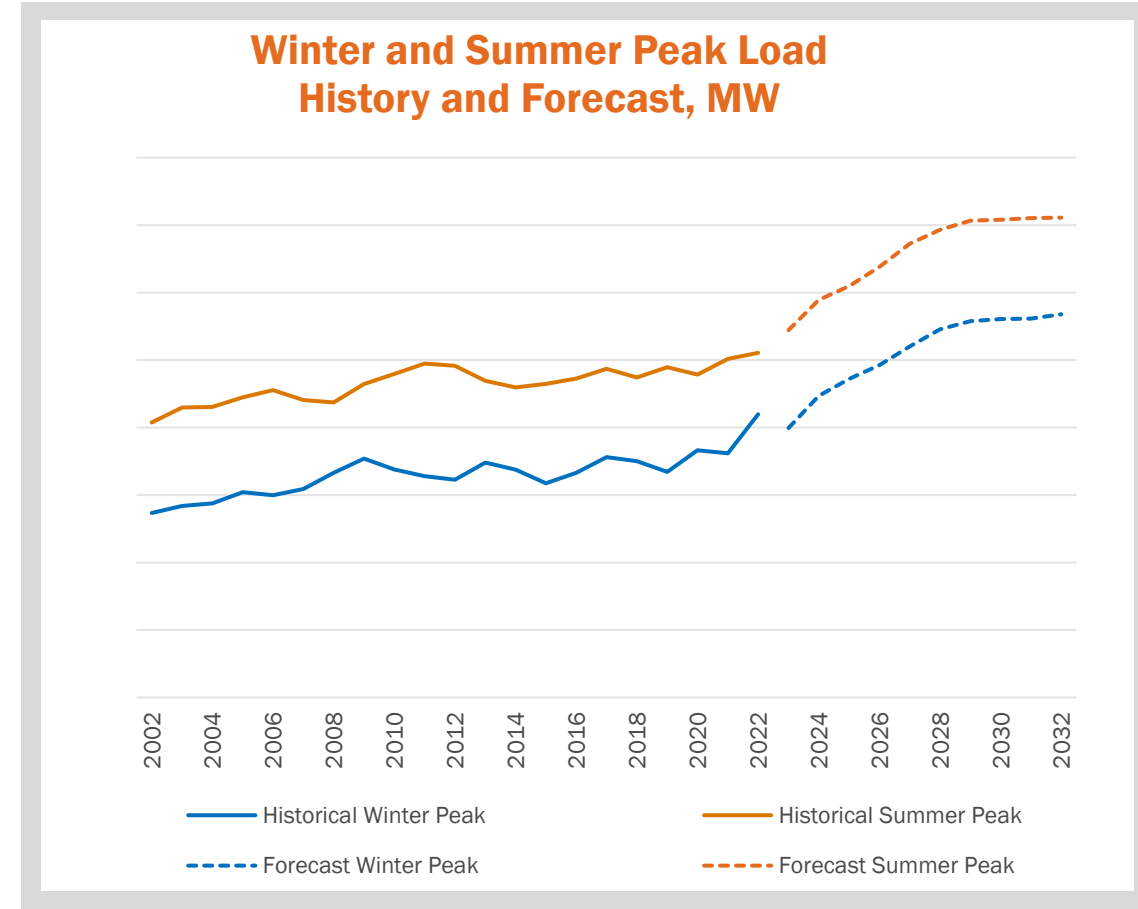
*Consistent with net
zero 2050 goal.*

Any resource portfolio proposed must be consistent with the Pathways to Decarbonization analysis and provide a realistic pathway to achieving net zero carbon production by 2050.

Resource Plan – Step 3

Evaluate Load Growth to Determine Generation Needs

- OPPD projects growth for each customer class.
 - Projection based on population and economic growth, changing energy consumption, and customer capacity requests.
 - Cross-functional process evaluates requested and forecasted demand.
 - Process projects annual energy consumption and hourly load profiles.
- Similar growth expected in both summer and winter peak loads.
- Projections exceed all historical growth levels.
 - Unprecedented load growth: **upwards of 100 MW per year.**
 - **Expected** need: Resources to serve an additional ~1,050 MW of peak load by 2032.



Resource Plan – Step 3

Demand and Supply Resources

- Resource options are consistent with the options identified in OPPD’s Pathways to Decarbonization, with some limitations:
 - Strategy must account for the near-term feasibility of designing, constructing, and interconnecting new resources.
- Technology costs and performance parameters were developed from the National Renewable Energy Laboratory Annual Technology Baseline and adjusted for near-term price increases.
- Fuel price forecasts were developed from the Energy Information Administration Annual Energy Outlook
- Costs reflect current market dynamics and impacts of the Inflation Reduction Act (IRA).
 - Inflation, demand and supply chain issues have resulted in significant cost increases in all technologies.

Resource Options	Accreditation (% of Nameplate Capacity)	
	Summer	Winter
New Generation		
Solar*	75%	0%
Wind*	14%	27%
Storage*	88%	85%
Combustion Turbine	95%	95%
Combined Cycle	95%	95%
Nuclear Small Modular Reactor	100%	100%
Demand Response**	100%	100%
Existing Generation		
Added dual fuel capability and fuel oil storage at existing generation facilities	95%	95%

* Subject to SPP Effective Load Carrying Capability policy.

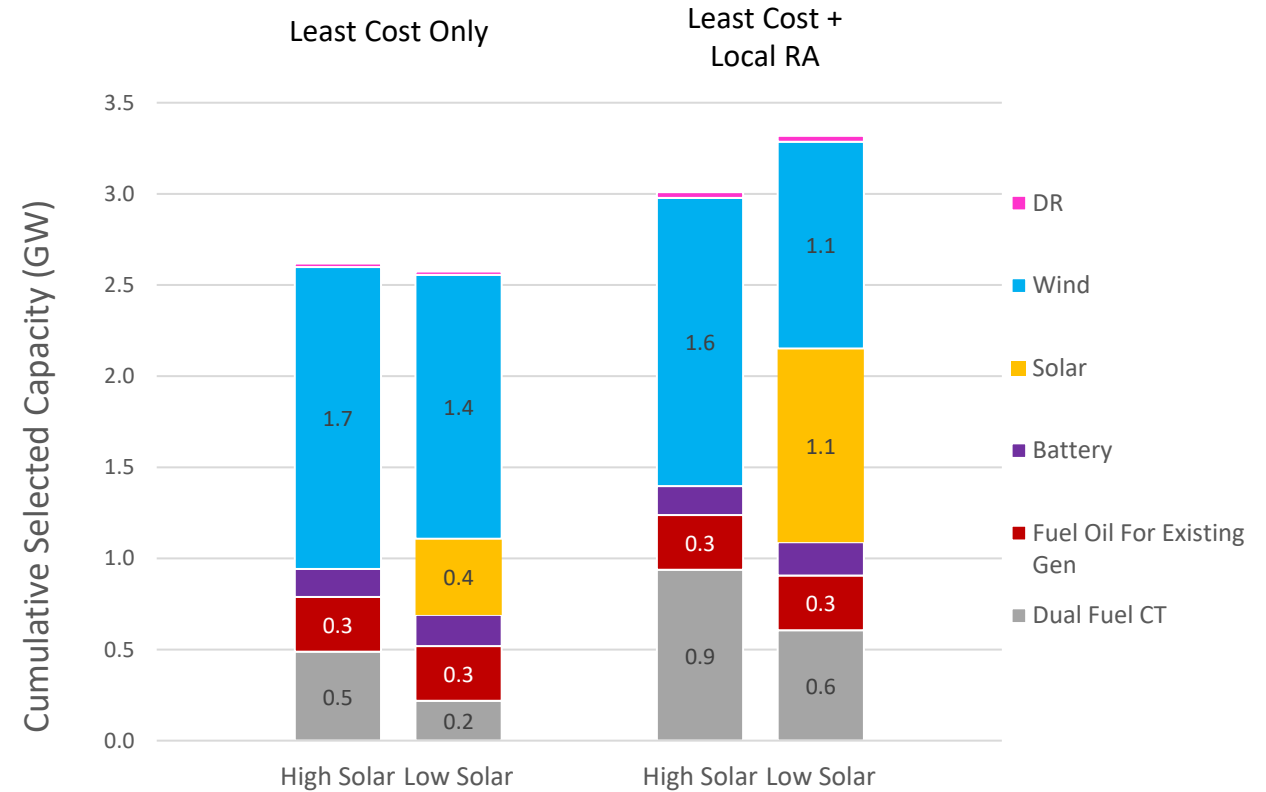
**SPP has yet to complete a study to conclusively determine accreditation value for DR.

Resource Plan – Step 4

Develop and Interpret Results

- Two layers of additive constraints were studied, including:
 - Least cost only
 - Least cost + local RA
- Two price points for utility scale solar generation were studied, including:
 - Low solar prices reflective of the costs just prior to the study initiating
 - High solar prices reflective of the current solar market

Near Term Selected Capacity



All values are above currently announced projects, including Platteview, Turtle Creek Station, and Standing Bear Lake

Resource Plan – Step 4

Develop and Interpret Results

- ***New renewable generation*** is required to supply system energy needs while maintaining low system costs.
 - Large additions of both wind and solar generation are required and are sensitive to pricing.
- ***Increased capacity of dispatchable thermal generation*** is required and critical to meet local system resource adequacy requirements under a variety of operating conditions.
 - Added dual fuel capability and multi-day fuel oil storage to existing resources to provide critical winter and resilient capacity.
 - Addition of new flexible ramping generation.
- ***Energy storage is selected in specific situations*** to minimize system costs through balancing real-time energy needs.
 - More feasibility and conceptual analysis is required on energy storage and locations required to inform execution path.
 - At the North Omaha location, utilizing existing interconnection capacity and providing fast reacting power injection and voltage support to a load pocket in a critical area of the system.
 - As part of a hybrid resource installation paired with renewables to secure SPP Generation Interconnection capacity or queue positions.
- The modeling was a valuable tool to inform our approach to future generation in a ***reliable, affordable, environmentally sensitive, flexible, and feasible*** manner.
 - Scenarios and qualitative analysis provide optimal resource mix and volume ranges.

Resource Plan – Step 5

Communicate Outcomes and Recommendation

- Resource recommendations are in ranges for key reasons:
 - Pricing volatility of resources.
 - Uncertainty around project feasibility and known construction speed challenges.
 - Uncertainty around queue positions and/or queue speeds.
 - Uncertainty around load ramp and the need to mitigate undue financial risk to the District.
- OPPD remains committed to Power with Purpose generation expansion projects at Turtle Creek Station (450MW CTs), Standing Bear Lake Station (150MW RICE) and Platteview Solar (81MW).
- OPPD remains committed to previously announced generation plans at North Omaha.
 - At North Omaha Station to retire units 1-3 and convert units 4-5 from coal to natural gas.
 - OPPD’s intention is the only change at the North Omaha Station is the potential to add battery storage.
- The approximately 2.5 GW of additional generation along with Power with Purpose nearly double OPPD’s generation capability over the next decade.

Resources Selected (Nameplate or Peak Tested Capacity)	Recommended Range of Incremental Additions (MW)
Renewables (Either Solar and/or Wind)	1,000 – 1,500
Storage (4-hour equivalent)	Up to 125
Dual Fuel Combustion Turbine	600 – 950
Demand Response	32+ <i>Future DR to be pursued as available.</i>
Added fuel oil capability and storage at existing facilities	Approximately 320MW

All values are above currently announced projects, including Platteview, Turtle Creek Station, and Standing Bear Lake

Resource Plan – Step 5

Communicate Outcomes and Recommendation

- Execution of our recommended portfolio will require an unprecedented level of execution and rigor.
- Execution of North Omaha Station is on track for the N04 and N05 fuel conversion to gas and the N01, N02, N03 retirement.
 - Timing of transition remains important because of site size and asset location but adds to overall employee workload.
- Other challenges will remain and likely emerge as we execute over the next decade, including:
 - Regulated grid interconnection study backlogs.
 - Solar zoning and federal regulatory challenges.
 - Supply chain disruptions.
 - Workforce readiness, including hiring key skill sets.
 - Construction challenges. Building at multiple sites compounds issues, such as interconnection backlogs, supply chain and workforce challenges.



Impact to Strategic Directives

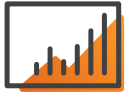


Strategic Impact

Strategic Directives



SD-2: Rates



SD-3: Access to Credit Markets



SD-4: Reliability



SD-5: Customer Satisfaction



SD-7: Environmental Stewardship



SD-9: Integrated Systems Planning



SD-11: Economic Development



SD-13: Stakeholder Outreach and Engagement

SD-2: Rates



Expected Rate Impact Results by 2030

- ***Capital Investment totaling from \$2.0 billion to \$2.2 billion by 2030.***
 - Capital totals may vary depending on future project structures (i.e. ownership or purchased power agreements) and selected generation asset portfolio.
- ***Annual Operating & Maintenance Costs approximately \$310 million by 2030.***
 - Reflects net power costs, fixed and variable costs to support the new assets, as well as assumed overhead growth for a growing organization.
- ***Estimated annual retail revenue increase from new load of \$450 million by 2030.***
- ***Estimated rate impact from 2.5% to 3.0% per year from 2027 to 2030.***
 - Rate impact is incremental to any potential rate impacts from business as usual and/or other OPPD priorities.
- ***Timing of events (e.g. load ramp, project construction) will be key to manage rate impacts and will be closely monitored.***

SD-3: Access to Credit Markets



- *Additional capital and operating costs will put pressure on OPPD's key financial metrics.*
 - Transparency and expectation setting will be a focus with rating agencies as the recommendation is executed.
 - Credit Positive:
 - Transition to low or non-carbon emission generation.
 - Serving a thriving and diverse economic environment.
- *The District plans to maintain 2.0 times Total Debt Service Coverage and OPPD's AA rating.*
 - Consistent with current practice financial metrics will be closely monitored and managed.

SD-4: Reliability

Impacts to System Reliability



- ***“Assure all customer energy requirements are met through the use of its generation resources and purchase power portfolio...”***
 - Diverse assets with fast ramping and voltage characteristics provide tools for system operators to manage increasingly challenging and complex grid dynamics to minimize risk of blackouts.
- ***Analysis considered important transmission system attributes.***
 - Feedback loop between Operations and System Planning informs modeling efforts.
- ***Recommendations encourage resource hardening and asset availability.***
 - Deployment of local fuel oil storage supports fuel redundancy needed during extreme events.

SD-5: Customer Satisfaction



- ***Enable critical service to a growing and thriving community.***
 - Solution allows us to pursue JD Power Top Quartile in the categories of affordability, reliability and sustainability.
 - Allows foundational fulfillment of our mission: providing energy services to our customers.
- ***Incorporated customer feedback from the past five years.***
 - Solution builds on the five-year conversation we have had on the growing community, rate implications, system reliability and directional sustainability goals.
- ***Illuminates the process.***
 - Study unpacks the process for how these system needs are solved, why the solution was selected and why it's consistent with customer interactions and strategic goals.

SD-7: Environmental Stewardship



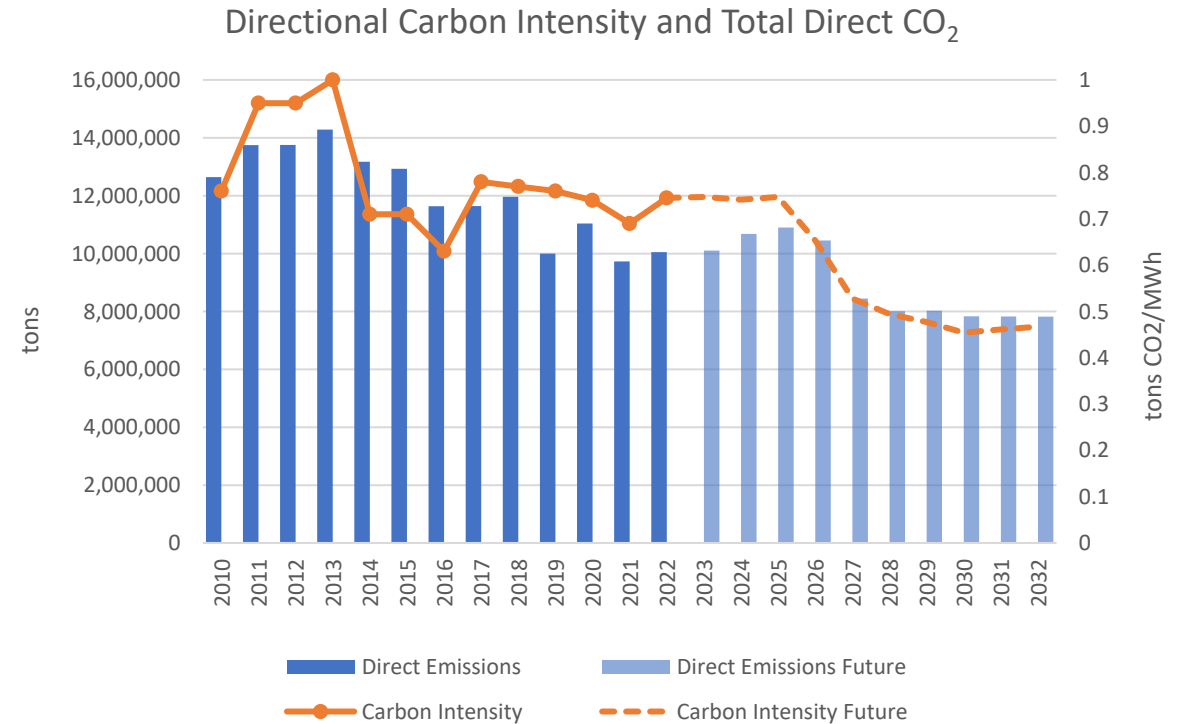
- ***Approach includes strategies for both climate mitigation and adaptation.***
 - Recommendation continues transition away from fossil fuels, while providing necessary resiliency for our communities.
- ***Recommendation aligns with Pathways to Decarbonization findings.***
 - Specifically, two key findings: firm generation is needed to maintain resource adequacy; and a mix of new low-carbon resources including renewable energy, energy storage, and community-wide energy efficiency will be required.
- ***Additional load being served substantially by new renewables on an energy basis.***
 - Modeling output indicates that renewables will continue serving an increasing portion of new energy requirements (>90%).

SD-7: Environmental Impact

Directional Emissions and Carbon Intensity



- Projections are:**
 - Based on dispatch modeling utilizing projected hourly load and dispatch profiles, 2021 SPP ITP Study resource forecast, and SPP's FERC-714 load forecast.
 - Directional in nature and subject to change based on an evolving load profile, execution and interconnection of resources, future SPP resource mix, SPP load growth, and transmission expansion projects.
- Projections indicate declining trajectory for both direct emissions and carbon intensity.**



SD-9: Integrated System Planning

Impacts to the Integrated System



- ***Comprehensive view of the system and its needs.***
 - Study considered supply and demand side resources, transmission constraints and expectations for Customer Owned Generation as well as the speed of electrification and its impacts on the distribution system to ensure year-round resource adequacy levels and loss of load hour requirements.
- ***Ensures planning accounts for system risk and contingency events.***
 - Modeling simulates loss of electrical infrastructure contingencies (from a variety of events like storms, floods, and other equipment failure) to simulate grid performance during disruptions.
- ***Analysis assumed and solved for important transmission system attributes.***
 - Import limits and transmission system improvements were assumed.

SD-11: Economic Development



- ***Supports ability to attract, retain, and expand businesses.***
 - All customer classes are growing, with a large portion coming through expansion of current businesses. Additional generation resources support this growth.
 - Supports state incentive and economic development programs.
- ***Creates the opportunity to support cultivating and thriving communities.***
 - Growing workforce and capital investment opportunities through thriving businesses and communities.
- ***Brings economic impact benefits to the region with investment in generation.***

SD-13: Stakeholder Outreach and Engagement



“OPPD is committed to engaging its customers, the community and other stakeholders.”

- Robust, five-year stakeholder outreach and engagement process used during Power with Purpose and Pathways to Decarbonization informed Near-Term Generation study.
- Education and engagement will continue going forward.

Informing our Direction



Next Steps



GENERATION COMMUNICATIONS TIMELINE



December 2022
State of the Utility



Q1-2 2023
Power with Purpose
North Omaha Station
New resources and
growth

Broad
communication
campaign around
load growth
(April-May)

Education Going Forward

OPPD continues to educate broader audiences 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:

- External communication campaign (billboards, radio, print, etc.)
- OPPDtheWire content
- Social media
- News releases
- Outlets newsletter
- OPPDCommunityConnect.com
- Community relationships
- Customer conversations



GENERATION COMMUNICATIONS TIMELINE



Q2 2023
Recommendation
and resolution



Q3 2023 and
Beyond
Continued
communications and
engagement

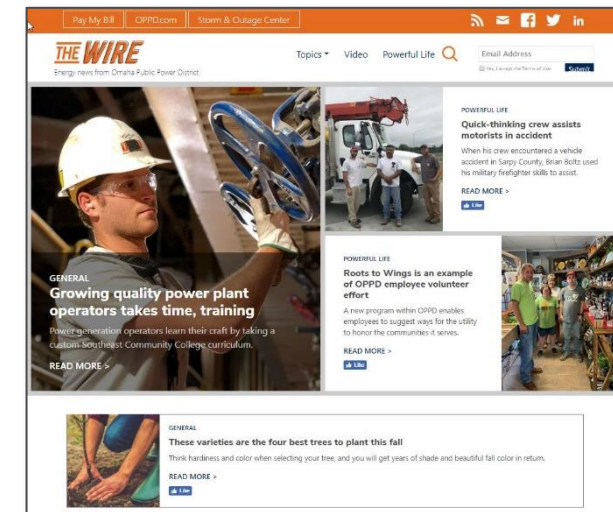
Project specific
outreach

Engagement Going Forward

Accepting comments May 16 – June 11 via
OPPDCommunityConnect.com/generation

Additional and new
information will be
shared through:

- OPPDtheWire content
- OPPDCommunityConnect
- Social media
- Community relationships
- Customer conversations



Generation

Our communities are
growing, and we're
actively planning for
their bright futures.

[Read more](#)

Next Steps

Now

- Introduce recommendation in May Board Committee Meeting.
- Start open comment period May 16. Comments can be taken via **OPPDCommunityConnect.com/generation.**

June

- Public comment period closes June 11.
- Board vote to approve resolution on June 15.
- On-going communication and engagement of key stakeholders.

July+

- On-going communication and engagement of key stakeholders as design and planning progresses.
- Project specific engagement and outreach as projects are identified.
- Higher resolution transmission system impact analysis as project siting matures.
- Present generation recommendation to Nebraska Power Review Board for approval.