

# Near Term Generation

Brad Underwood

Vice President Systems Transformation

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# Purpose

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

## Agenda

- Key Drivers for Generation Needs
- Resource Planning
- Resource Recommendation
- Impacts to Strategic Directives
- Outreach & Feedback
- Next Steps

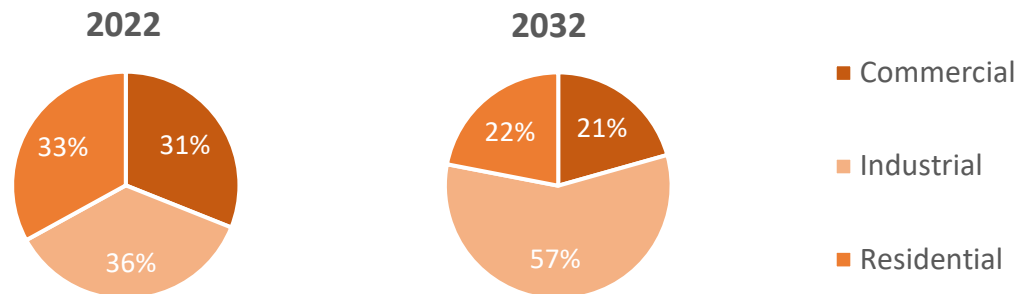
# Key Drivers for Generation Needs



# Key Drivers

## Residential, Commercial, Industrial Growth

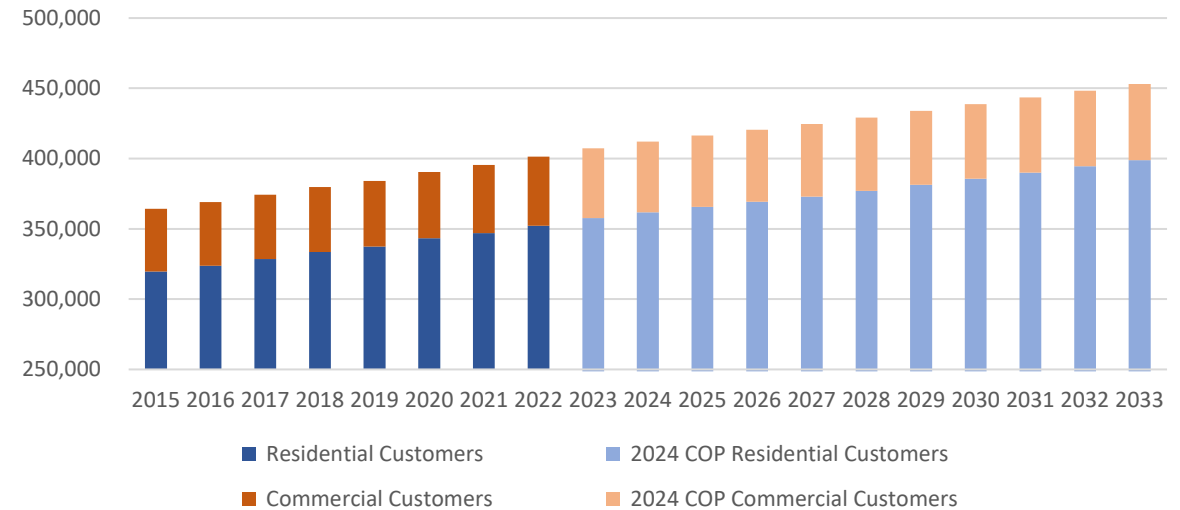
- Residential and commercial growth is on the rise and expected to continue.
- Growth in transportation, education, retail, medical, food, agriculture and more expected over the coming years.
- Energy consumption is expected to grow across all classes but will be primarily driven by the industrial class.
- Data centers make up the largest portion of new growth, roughly two-thirds.



### Industrial Load Growth

- Electrification
- Biotech
- Manufacturing
- Data Centers (Fintech)
- Food Processing
- Agricultural Processing

Average Annual Commercial and Residential Customers  
Historic Actual and 2024 COP Forecast

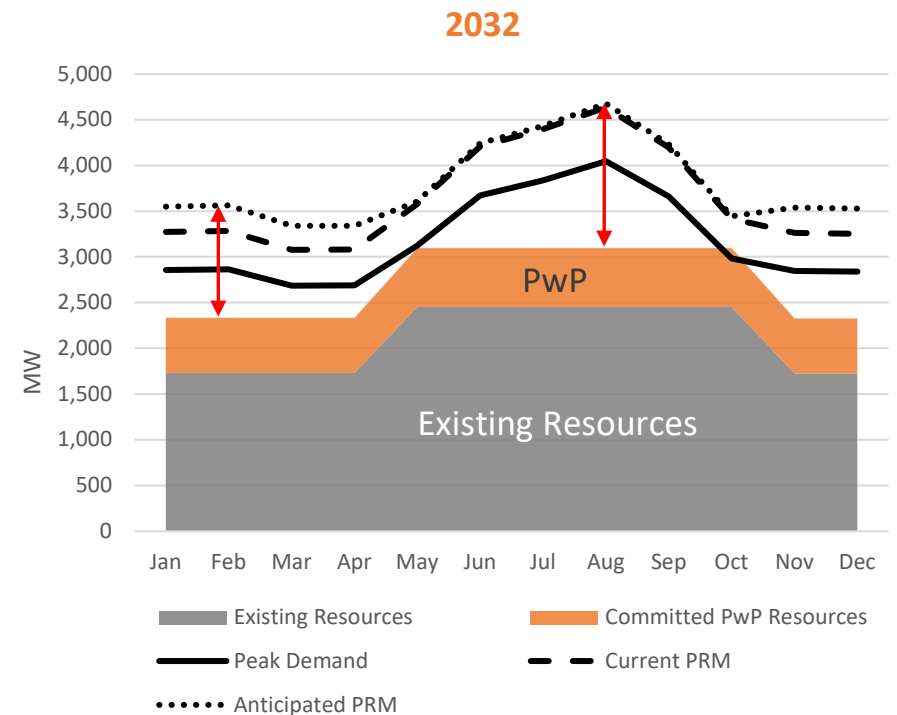


# Key Drivers

## Load, Planning Reserve Margin (PRM), Climate Adaptation

OPPD expects the community to increase their electric system peak demand by approximately 1,050 MW above the base forecast by 2032.

- Service territory is experiencing **historic load growth** – ~100 MW per year – and OPPD has a duty to serve.
- Growth has been spurred by economic development, community growth, and electrification.
- **Increased Planning Reserve Margin** requirements are also expected to increase in order **to ensure sufficient energy supply** capacity.
- Additional generation capacity is needed to **protect customers from outages driven by extreme weather events**.



# Key Drivers

## Customers and Other Agencies/Organizations are Waiting and Taking on Risk

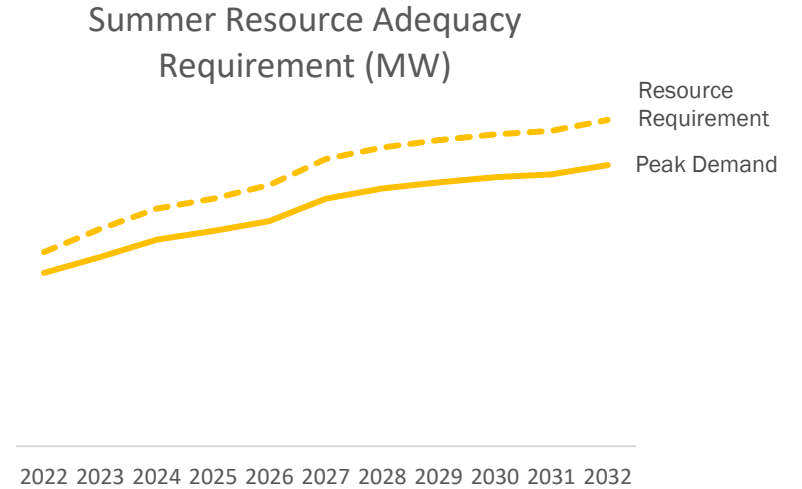
- Currently the **exploding expansion** of commercial and industrial load is occurring at a size and pace that challenges energy infrastructure construction timelines.
- Some customers are taking **financial risk** while OPPD thoughtfully works to plan for and deliver service to their projects.
  - Energy service delays can disrupt land availability, supply chain, permitting and cost plans on customer projects.
- Without **clarity of service timelines** provided by a defined resourcing plan, projects may decide to look **outside of eastern Nebraska**.
- Many of these projects involve state agencies, counties, cities and other infrastructure – **working in parallel** – that are essential to supporting these customer projects and potential OPPD service uncertainty places risks to others.
- Many local and state **programs and incentives** being offered to assist these businesses and service uncertainty places risk on state and local financial economic development packages.

# Key Drivers

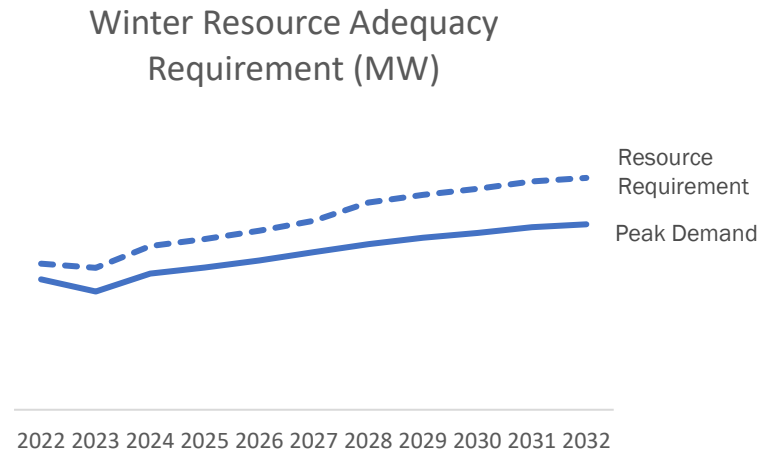
## PRM Requirements

- OPPD is a member of the Southwest Power Pool (SPP), which ensures sufficient resources are available regionally **to reliably serve electric demand**.
- As a member of SPP, **OPPD is required to have generation capacity** to meet its peak demand plus a Planning Reserve Margin (PRM).
- Generation capacity is qualified by testing and is known as Accredited Capacity.
- The PRM is currently set at 15% for both summer and winter, however, **OPPD expects this requirement to increase in coming years**.

- Summer PRM is expected to increase to at least 16%.
  - Requires **664MW** of reserve capacity.
  - Creates a need for 1% higher summer capacity, or **41MW** of additional accredited capacity.



- Winter PRM is expected to increase to approximately 25%.
  - Requires **746MW** of reserve capacity.
  - Creates a need for **298MW** of additional accredited capacity.



# Key Drivers

## Abnormally Long Lead Times

- Manufacturing production slots are being occupied at increasing volumes for **long lead time, major equipment purchases** (i.e. step up transformers).
  - Over the last few quarters, the completion dates continue to extend at a concerning rate.
- In addition to manufacturing production slots, workforce availability for specialty firms offering **Engineer, Procure and Construction services remains challenged.**
- If supply resources are not secured and “deliverable” to OPPD load by 2028, **the District faces a significant forecasted capacity deficit.**



Image credit: Shutterstock/Alexey Krav



# Resource Planning



# Resource Planning

## Guiding Priorities

<b>Affordable</b>	Minimize total costs given our goals and assumptions.
<b>Reliable</b> <i>Local Resource Adequacy (RA)</i>	Create enough accredited capacity to meet regulatory requirements, and predictably serve customers while reducing risk associated with importing energy.
<b>Environmentally Sensitive</b>	Provide realistic pathway to achieving net-zero carbon by 2050.

<b>Resource Options</b> New Generation	<b>Accreditation</b> (% of Nameplate Capacity)	
	Summer	Winter
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%
<b>Existing Generation</b>		
Added dual fuel capability and fuel oil storage at existing generation facilities	95%	95%

\* Subject to SPP Effective Load Carrying Capability policy.

\*\* Winter peaks typically occur outside of daylight hours.

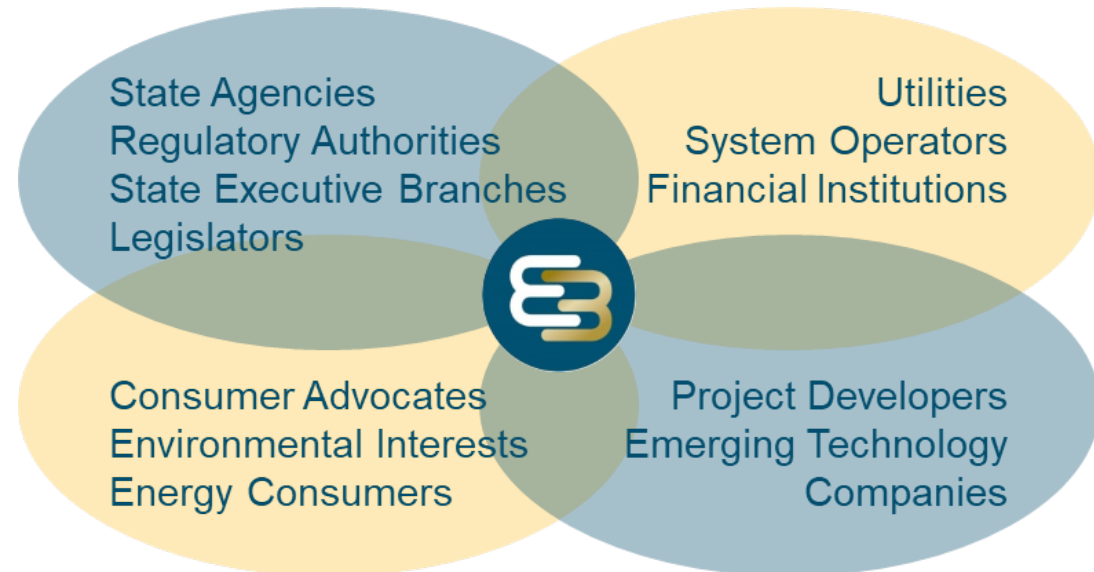
\*\*\*SPP is actively reviewing accreditation values for DR.

# Resource Planning

## About E3

- OPPD partnered with E3, who also helped with the Pathways to Decarbonization modeling, on the near-term generation study.
- E3 is a consulting firm founded in 1989 specializing in electricity economics.
- E3 consults extensively for utilities, developers, government agencies, and environmental groups on clean energy issues.

- **Services for a wide variety of clients made possible through an analytical, unbiased approach.**
- **E3 experts provide critical thought leadership, publishing regularly in peer reviewed journals and leading industry publications.**



**Energy+Environmental Economics**

# Resource Planning

## Model Structure

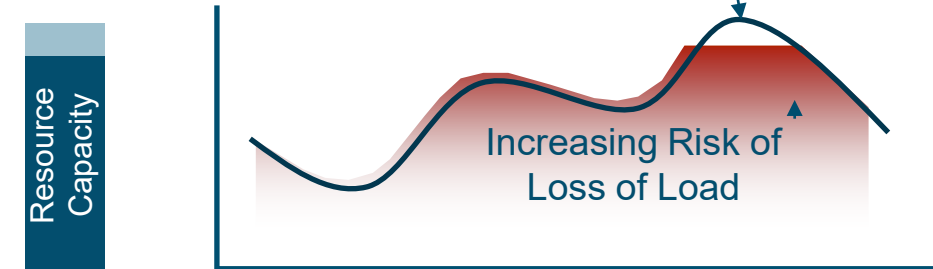
E3's model used the same approach as and built on the Pathways to Decarbonization work. Details can be found on [OPPDCommunityConnect.com](http://OPPDCommunityConnect.com) in the final Pathways report. Inputs included:

- Robust load analysis for expected load growth.
- Utilizing Reliability/Resiliency analysis results from Pathways to Decarbonization.
  - Characterize reliability contribution of both individual and combinations of resources.
  - Meet resource adequacy requirements to ensure sufficient resources to meet demand during a variety of operating conditions.
  - Meet or exceed loss of load expectation which is a measurement of how often there are insufficient resources to serve demand and load must be curtailed.
    - Industry standard is to meet 1-day-in-10-year or 99.972%.
- Portfolio Optimization
  - Identify least-cost plans to meet reliability needs and achieve compliance with regulatory and policy requirements.

### Loss of Load Example

Insufficient resource capacity to serve load

Loss of Load Event



### Loss of Load Probability Table

Identifies the probability of each hour to be deficient

	Hour of the Day																							
	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																								

Illustrative

# Resource Planning

## Model Inputs

- Expected **load growth**.
- Technology **costs and performance**.
  - National Renewable Energy Laboratory Annual Technology baseline.
  - Adjusted for near-term price increases.
- **Fuel price** forecasts.
  - Energy Information Administration Annual Energy Outlook.
- **Transmission grid** considerations.
  - Zonal import capability & grid expansion costs.
  - Essential Reliability Service capabilities.
- Consistency with **Pathways to Decarbonization**.
- Current **market dynamics** and impacts of the Inflation Reduction Act (IRA).
- **Accreditation values**.



# Resource Planning

## Technology Considerations

### Excluded in model:

- **New Coal** – regulatory uncertainty presents a sizable risk, new construction would require CCS to meet regulations further increasing cost and risk and inconsistent with net-zero goals.
- **Traditional Nuclear plant** – regulatory and cost burdens make it not economically viable.

### Included in model:

- **Small Modular Nuclear**– promising beyond 2030 but cost prohibitive and a lack of maturity mean deployment by 2030 is infeasible.
- **Hydrogen** – currently cost prohibitive, there isn't robust regional production or distribution, and it would require extensive collaboration, legislation, resources and time to execute.
- **Distributed energy resources** – while these resources are projected to continue grow in adoption, they have little contribution to winter peak, are not adopted in necessary quantities for timely and feasible contribution to near term needs.
- **Combined cycle combustion turbines** – included in the modeling but simple cycle over combined cycles were chosen in every scenario to provide lower cost for customer owners.

Near-term options also limited by the interconnection process.

- SPP's Generation Interconnection queue includes natural gas, solar, wind and storage hybrid possibilities for 2026 and 2028.
- OPPD will reserve spots for emerging technologies as they become viable.



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# Resource Recommendation



# Resource Recommendation

## Portfolio Recommendation

### Recommendation:

- Guided by OPPD’s mission: affordable, reliable, environmentally sensitive
- SD-2: Keep rates low
- SD-3: Maintain access to credit markets
- SD-4: Ensure reliability
- SD-5: Achieve high customer satisfaction
- SD-7: Net-Zero Carbon by 2050
- SD-9: Integrated System Planning approach
- Builds on previously announced plans:
  - Retirement of units 1-3 and at North Omaha Station and conversion of 4-5 to natural gas.
  - Potential to add storage at North Omaha Station, but no other changes for the site.
  - Construction continues for new generation at Turtle Creek Station (450MW CTs), Standing Bear Lake Station (150MW RICE) and Platteview Solar (81MW).

Resources (Nameplate or Peak Tested Capacity)	Range of Incremental Additions (MW)
Renewable Generation*	1,000 – 1,500 MW
Energy Storage**	Up to 125 MW
Dual Fuel Combustion Turbines***	600 – 950 MW
Demand Response	Minimum of 32 MW
On-site fuel oil storage for year-round accreditation for approximately 320 megawatts (MW) of existing natural gas-fueled generation assets	Approximately 320 MW

\*"Renewable Generation" may include any generation assets that do not use coal, natural gas, fuel oil, or nuclear fuel, but are anticipated to be mainly wind and solar energy assets. The Renewable Generation may be owned by OPPD and/or acquired through purchased power agreements. Renewable generation is stated in terms of net facility ac output.

\*\* "Energy Storage" refers to equipment, such as utility-scale battery equipment, that captures energy produced at one time for use at a later time. Energy storage is stated in terms of 4-hour duration equivalent. The power rating and duration of individual facilities may vary.

\*\*\* Dual Fuel Combustion Turbines are stated in terms of summer max generating capability consistent with testing requirements for accreditation.

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



# Resource Recommendation

## 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 required to inform locations.
  - At the North Omaha location, using 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.

# Impacts to Strategic Directives



# SD-2: Rates

## Expected Rate Impact Results by 2030



- ***Capital Investment totaling \$2.0 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 O&M costs from new load of ~\$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.
- ***Annual revenue increase from new load of ~\$450 million by 2030.***
- ***Estimated rate impact of 2.5%-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.

# SD-2: Rates

## Rate Impact Breakdown



- ***10% - 11% cumulative rate increase by 2030 will need to be recovered.***
  - A Cost of Service Study\* will be performed to determine the fair and reasonable assignment of costs base on the usage of the system of each customer class.
  - Impacts will only be known and authorized by the board every year, potentially starting in 2027.
- ***Drivers leading to increased revenue requirements in the recommendation:***
  - Load growth: from both new customers and electrification (accounts for ~86%).
  - Increased System Resiliency: resource adequacy and planning reserve margin (accounts for ~14%).
- ***Each Customer Class will benefit from the new resources but will likely experience different Rate Impacts based on how they use the electric system.***

\*Nebraska Revised Statute 70-655 requires the Board to establish rates that are fair, reasonable, and non-discriminatory. OPPD adheres to this requirement by establishing rates according to an industry standard cost-of-service study. The cost-of-service study fairly apportions the total costs to each customer class based on the relative proportion of their contribution to those costs.

# 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 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

## Supporting 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 Sensitivity

## Supporting Environmental Sensitivity



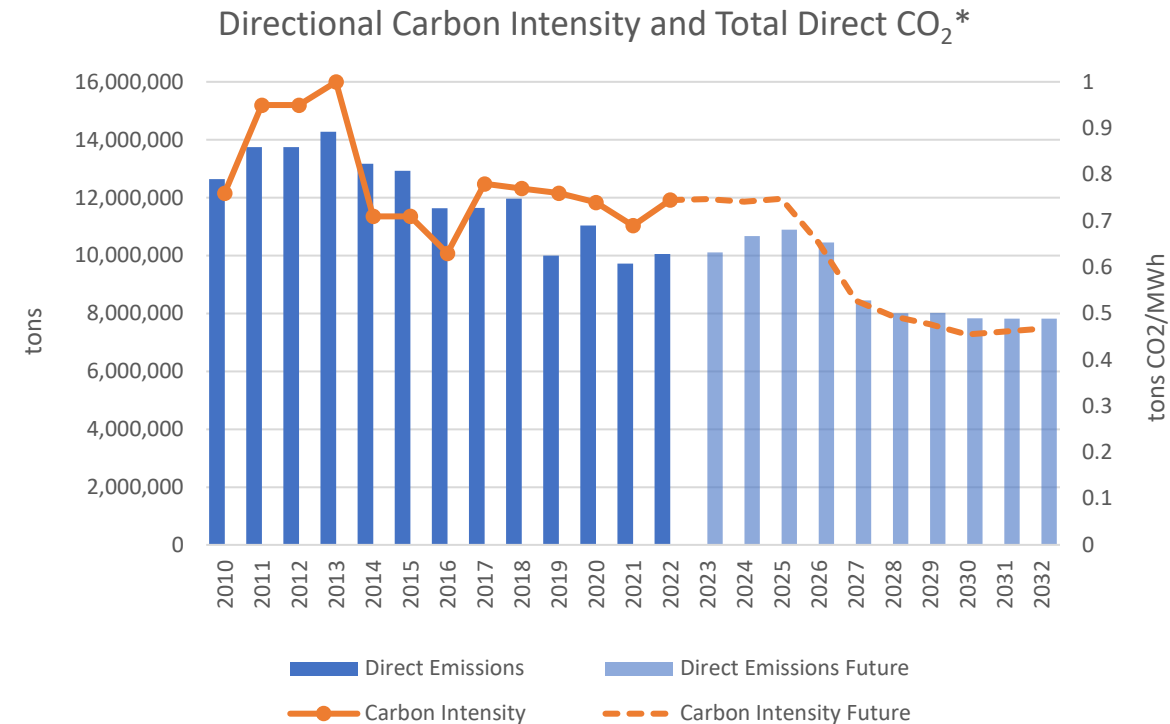
- *Additional load being served substantially by new renewables on an energy basis.*
  - Modeling output indicates that renewables will continue serving an increasing portion of new energy requirements (~90%).
- *Recommendation aligns with Pathways to Decarbonization findings.*
  - Firm generation is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

# SD-7: Environmental Sensitivity

## Directional Emissions and Carbon Intensity



- *Projections are based on dispatch modeling*
- *Projections indicate declining trajectory for both direct emissions and carbon intensity.*
  - Projections are directional and could change.
  - ~6M ton projected reduction in CO<sub>2</sub> from 2013 to 2032.
  - Evolving load profile, execution and interconnection of resources, future SPP resource mix, SPP load growth, and transmission expansion projects all impact final results.



\*Based on latest available dispatch information.



# Outreach & Feedback



# Engagement Journey

## 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.*

## GENERATION OUTREACH TIMELINE



2019

Power with Purpose



2019-2021

Pathways to  
Decarbonization



2022

Integrated Resource  
Plan



2022/2023

North Omaha  
Extension

# SD-13 Guides Our Approach

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 discussions.



### Generation

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

[Read more](#)

## GENERATION COMMUNICATIONS TIMELINE



December 2022  
State of the Utility



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



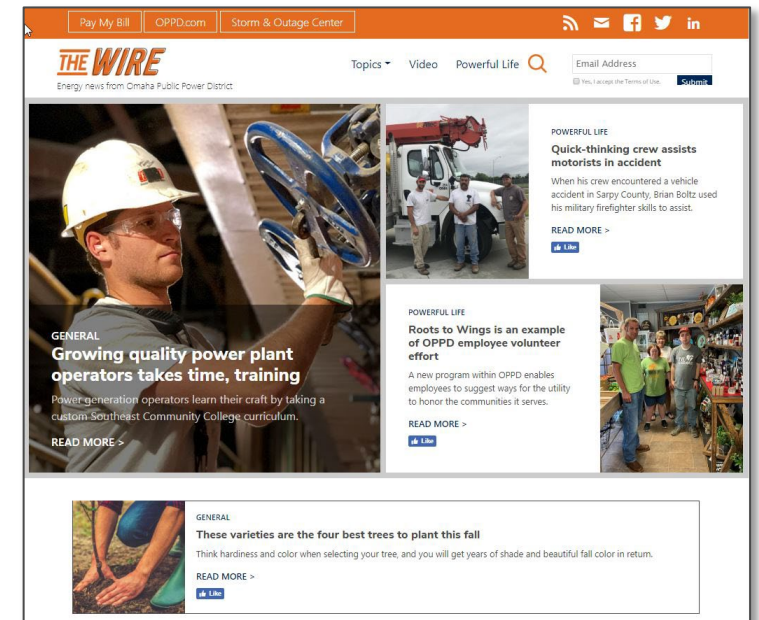
Q2 2023  
Recommendation  
and resolution

# We use channels both broad and narrow to educate and engage customers.

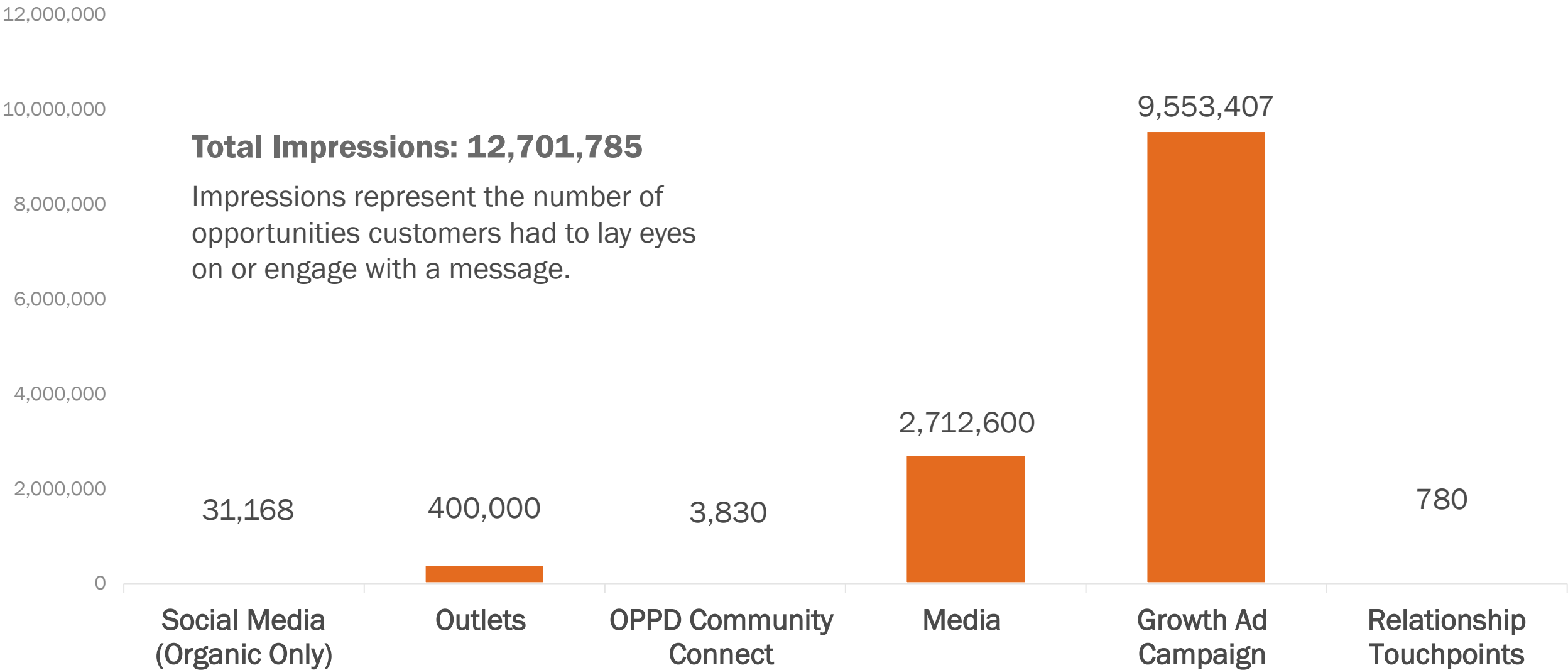
OPPD continues to educate broader audience about our generation journey with focus on new transmission and generation to ensure understanding of situation/recommended solutions.

Use 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



# Using multiple channels, we've spread the word about load growth.



# From our broad channels and outreach, we received **\*410** comments/mentions from those most engaged.

*\*410 comments/mentions compiled through Contact Center, Board and Leadership Contacts, Media, Social Media and OPPDCommunityConnect.com.*

## Sample of topics raised:

- Many comments for AND against a particular form of energy: coal, nuclear, renewable.
- Concerns about meeting the Net Zero 2050 goal.
- Accelerate renewables, reduce dependence on fossil fuels.
- Cost concerns.
  - Relative to rate impact and fixed cost.
  - Price of generation.
- OPPD must consider a diverse generation portfolio.
- More distributed generation and demand-side management.
- Board should vote on large projects going forward.
  - Plan is too vague right now.
- Set specific goals for emissions reductions between now and 2050.
- OPPD should be an environmental leader rather than a conventional utility.
- Impact of Data Centers.

\*~300 unique stakeholders

# **We also reached out to chambers, elected officials, community leaders, other organizations and business customers.**

- Chambers and Economic Development Organizations
- Elected Officials (City, County and State)
- Community Leaders and Organizations
- Commercial & Industrial (C&I) Customers

# Business customers showed most concern for high reliability and reasonable rates.

Feedback compiled through Senior Account Executive/Account Executives, direct contact with 200+ C&I customers (phone, email, presentations) and Annual Customer Meeting (June 1<sup>st</sup>).

## Themes raised:

- *Focus on reliability* –
  - Focus on rates and reliability, reliability #1.
  - Overwhelming call-out for reliability and availability.
  - Wants to ensure someone is advocating for reliability.
  - I have reliable service now that I want to maintain.
  - Rolling blackouts will severely impact my business.
- *Focus on growth and need for load.*
  - Do whatever we can do to support load.
  - Concerned about decision that allows growing my business or keeping business here.
  - Have carbon goals but use good judgement that does not limit the business community's growth.
- *Mixed comments on generation type.*
  - Indifference to portfolio.
  - Supports natural gas units.
  - Understands the position of OPPD but wants more renewable energy to serve their campus in the future.



# Next Steps

