SRP Integrated System Plan Advisory Group Meeting #11

ISP Analysis Key Findings

April 21st, 2023

Welcome

Bobby Olsen
Senior Director, Corporate Planning, Environmental Services & Innovation (SRP)

Safety & Sustainability Minute

Safety & Sustainability Minute

SRP Updates

Meeting Objectives:

Advisory Group Meeting #11: ISP Analysis Key Findings

- Share and discuss key findings from ISP analysis for Forecasting, Customer Programs, Distribution Planning, Transmission Planning, and ISP long-term capacity expansion
- Share and discuss initial strategy themes

Advisory Modeling Subgroup Meeting: ISP Analysis Results Part 1- Technical Q&A Session

- Discuss technical Q&A for the key findings from ISP analysis for Forecasting, Customer Programs, Distribution Planning, Transmission Planning, and ISP long-term capacity expansion

Agenda:

Advisory Group Meeting #11: ISP Analysis Key Findings

Time		Topics	Discussion Lead
8:30-9:00	**30 min**	Breakfast & Networking	
9:00-9:20	**20 min**	Welcome, SRP Updates and Meeting Orientation	Bobby Olsen (SRP) Joan Isaacson (K&W)
9:20-9:30	**10 min**	Recap of Mar. 10th ISP Advisory Group Meeting & ISP Roadmap	Maria Naff (SRP) Angie Bond-Simpson (SRP)
9:30-10:55	**85 min**	**ISP Analysis Key Findings w/ Q&A**	
	5 min	Forecasting	Jed Cohen (SRP)
	25 min	ISP Long-Term Capacity Expansion - All Cases	Nathan Lee (E3)
	15 min	Transmission Planning	Justin Lee (SRP)
	15 min	Coffee Break	
	15 min	Distribution Planning	Melissa Martinez (SRP)
	10 min	Customer Programs	Nathan Morey (SRP)
10:55-11:10	**15 min**	Key Findings: Turn and Talk & Roundtable Discussion	Facilitated by Joan Isaacson (K&W)
11:10-12:00	**50 min**	Initial System Strategy Themes: Small Group and Roundtable Discussion	Angie Bond-Simpson (SRP)
12:00-12:30	**30 min**	Working Lunch: Technical Working Session: *Regional Market Developments Debrief, Roundtable Discussion and Takeaways for Planning/Wrap Up	Arne Olson (E3) Angie Bond-Simpson (SRP)

*Regional Market Developments Debrief, Roundtable Discussion and Takeaways for Planning agenda item not covered due to time constraints

Agenda:

Advisory Modeling Subgroup Meeting: ISP Analysis Results
Part 1 - Technical Q&A Session

Time		Topics	Discussion Lead
12:30-12:45	**15 min**	Coffee Break	
12:45-2:30	**135 min**	Forecasting & Customer Programs- Technical Q&A	Jed Cohen (SRP) Nathan Morey (SRP)
		Distribution Planning- Technical Q&A	Melissa Martinez (SRP)
		Transmission Planning – Technical Q&A	Justin Lee (SRP)
		ISP Long-Term Capacity Expansion Results — All Cases	Nate Lee (E3)

Guides for Productive Meetings

- Actively participate
- Stand up name tent to indicate wanting to provide input, ask a question, etc.
- Encourage and seek multiple perspectives, including use of multiple engagement methods
- When introducing technical subjects, begin with straightforward definitions and avoid acronyms; create comfortable environment for questions and understanding
- Stay concise so that everyone has time to participate
- Maintain one representative per Advisory Group member organization in meeting discussions
- Enjoy the meeting!

Recap of Mar. 10th ISP Advisory Group Meeting: ISP Preliminary Results

Maria Naff
Manager, Integrated Planning (SRP)

Mar. 10th Discussion Themes

- Debrief the Technical Working Session: Inverter-Based Resource Integration
- Share and discuss preliminary ISP long-term capacity expansion results


KEARNS WEST

Salt River Project (SRP)
Integrated System Plan
Advisory Group
Meeting #10- Summary

Prepared by Kearns & West

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SRP INTEGRATED SYSTEM PLAN STUDY PLAN APPENDIX – ASSUMPTIONS USED IN SCENARIOS, SENSITIVITIES AND STRATEGIC APPROACHES

This appendix details the assumptions underlying the key drivers outlined in the Integrated System Plan (ISP) Summary Study Plan document for the scenarios, sensitivities and strategic approaches that SRP will analyze. These assumptions were developed in collaboration with the ISP Advisory Group during the *Prepare* Phase of the ISP (November 2021–April 2022). SRP subsequently updated the assumptions in February 2023 to incorporate impacts from the Inflation Reduction Act of 2022. Additional details on these assumptions are included in the meeting materials from the *Advisory Modeling Subgroup Meeting 2: Inputs for the ISP Study Plan*, *Advisory Modeling Subgroup Meeting 3: Inputs for the ISP Study Plan – Part 2* and *Advisory Group Meeting 9: Continuing Forward.*[1]

Scenarios

Current Trends

Key Drivers	Assumptions
Economic Growth	Economic load grows 1,645 MW by 2035 and residential and commercial load grows by 1,776 MW by 2035, driven by an average population growth of 1.5% per year. The resulting total load growth is 2.9% per year.
Temperature Rise	"RCP[2] 4.5" climate scenario from the Intergovernmental Panel on Climate Change (IPCC)
Carbon Reduction Policy	No federal or state policy beyond SRP's 2035 Sustainability Goals (reduce the emissions intensity [CO2 per MWh] by 65% from 2005 levels by 2035)
Electrification	500,000 electric vehicles by 2035; 83% residential electric heating adoption by 2035
Distributed Generation	1,300 MW distributed solar by 2035
Energy Efficiency	3,800 GWh total energy efficiency by 2035
Renewable and Battery Storage Costs	Midpoint between low cost (Strong Climate Policy Scenario) and high costs (Desert Contraction Scenario) (see below)
Gas Resource Costs	Energy Information Administration 2022 Annual Energy Outlook (AEO)
Emerging Technology Availability	Carbon capture and sequestration (CCS) available in 2035. 100% hydrogen and nuclear (small modular reactors) are not available by 2035.
Emerging Technology Cost	Gas with CCS costs are midpoint between low costs (Strong Climate Policy Scenario) and high costs (Desert Contraction Scenario) (see below). 100% hydrogen and nuclear are not available by 2035.
Hydrogen Prices	Green hydrogen forecast developed by E3 using electricity production from solar (blend between Arizona and Utah using Renewable and

[1] https://www.srpnet.com/grid-water-management/grid-management/integrated-system-plan
[2] Representative Concentration Pathway- RPC

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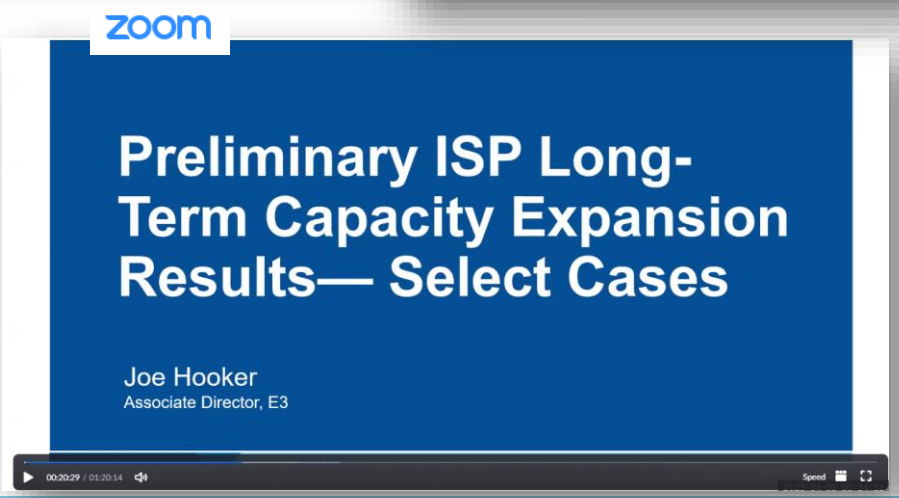
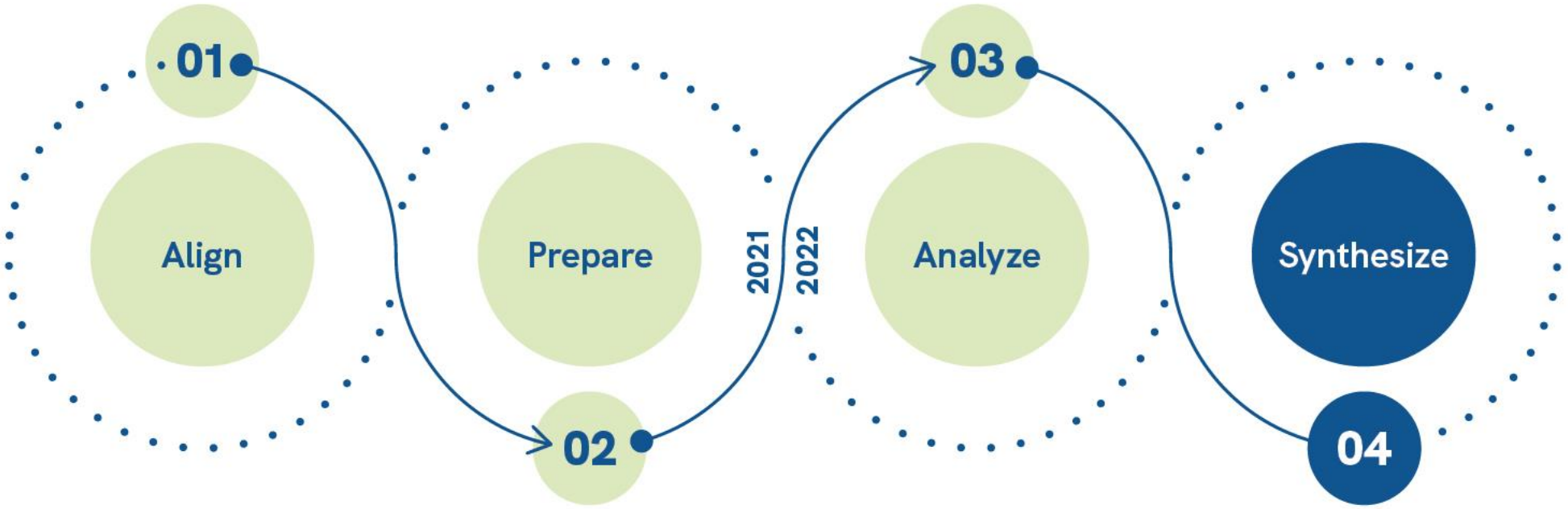


ISP Roadmap

Angie Bond-Simpson
Director, Integrated System Planning & Support (SRP)



SRP ISP ROADMAP

Stakeholder Engagement and Public Outreach

Align on Objectives of the first ISP

Collaboratively develop Study Plan:
Scenarios & Sensitivities
Strategic Approaches
Metrics

Gather input data

Perform system analysis

Validate and share results

Recommend new SRP system strategies

Recommend near term actions

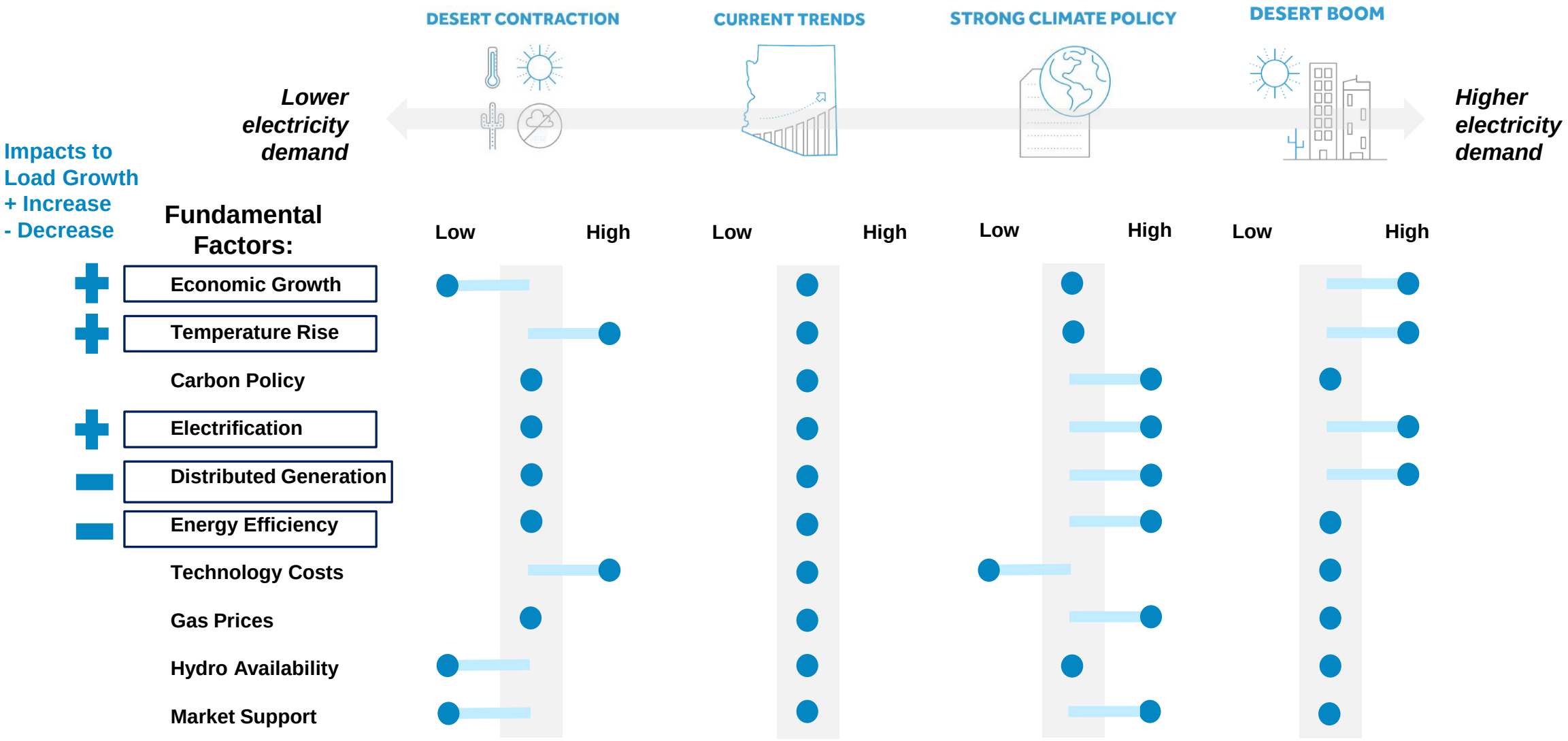
ISP Analysis Key Findings

w/ Q&A

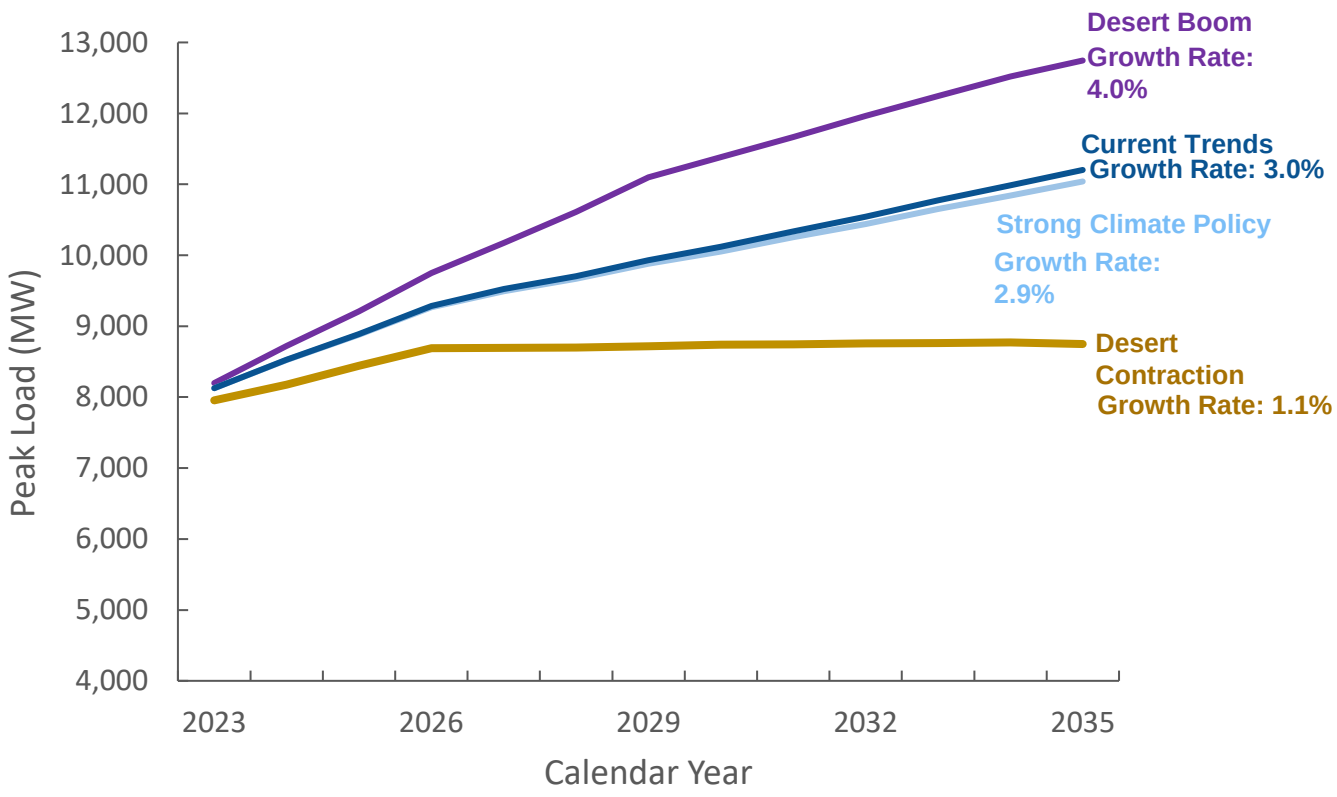
Load Forecasting:
Scenario Forecasts

Jed Cohen
Manager, Forecasting (SRP)

The Scenarios in the Integrated System Plan



ISP Scenarios Peak Load Forecasts



Growth rates calculated as compound annual growth rates

- **Desert Boom**: Strong growth in economic loads as Arizona grows to be a regional energy, technology and manufacturing hub
- **Current Trends & Strong Climate Policy**: Sustained economic growth in the greater Phoenix area, continued migration and expansion in commercial and industrial business activity
- **Desert Contraction**: Limited new migration and reversal of commercial growth trends due to scarcity of water and increasing summer-time temperatures

ISP Long-Term Capacity Expansion Results

Arne Olson
Senior Partner (E3)

Nathan Lee
Managing Consultant (E3)

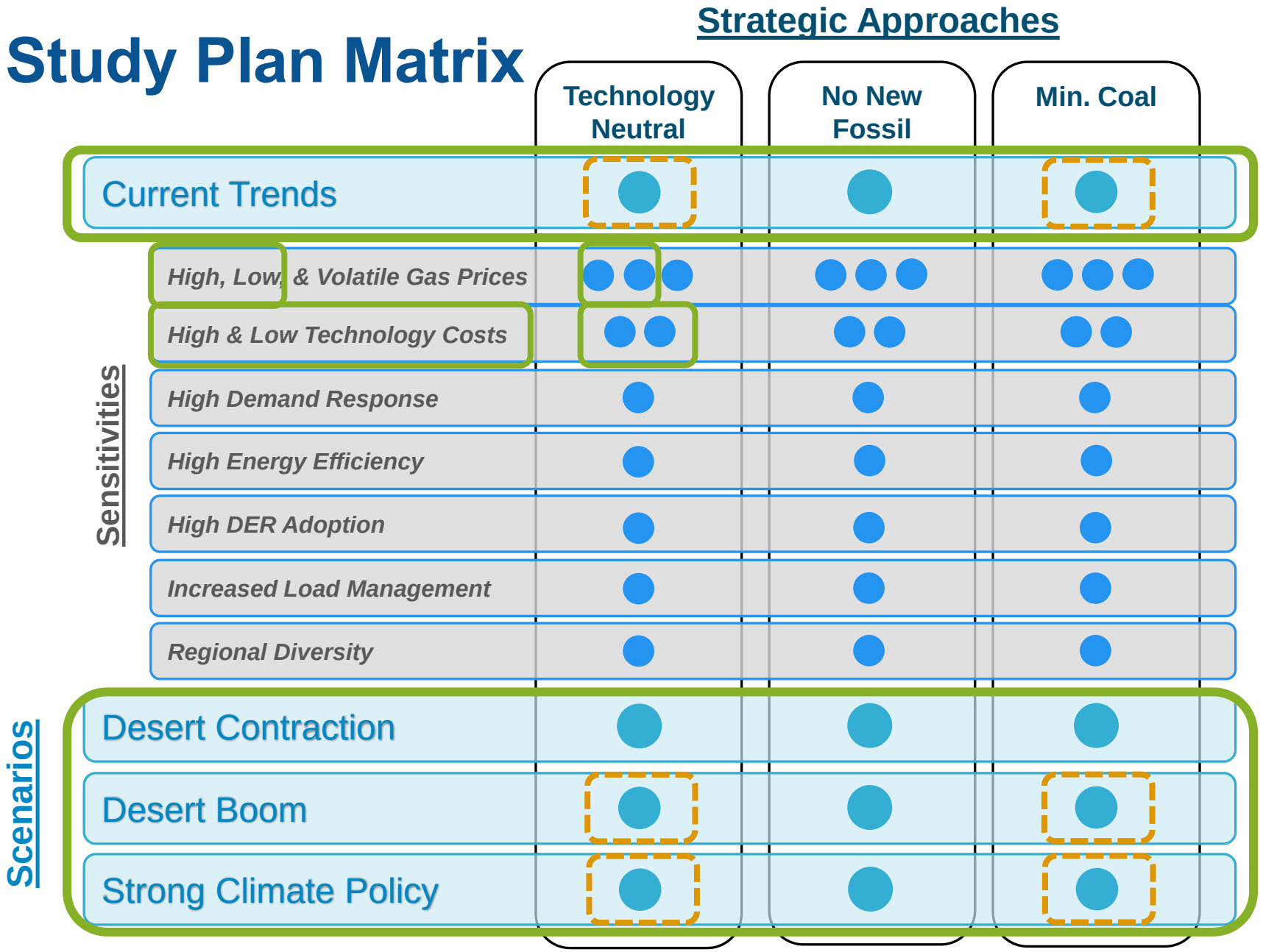
Long-Term Capacity Expansion Modeling

What generation resources does SRP need to add to its system to maintain reliability and achieve SRP's 2035 sustainability goals?

Key Findings

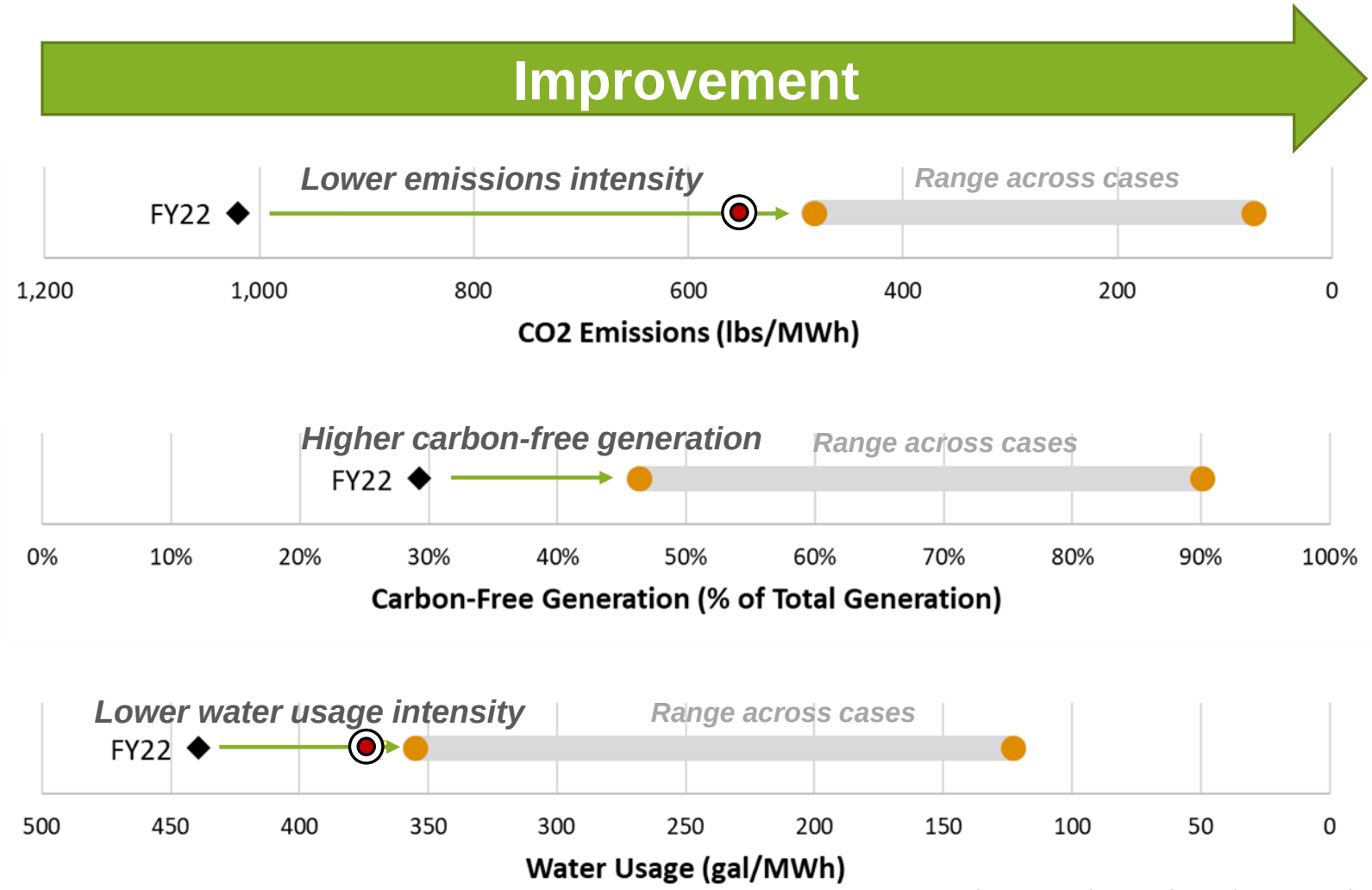
- SRP will need to build up to 7 times as many resources in the next decade than in the last decade to serve customers while achieving reliability and sustainability goals
    - Solar plus storage and wind provide low-cost energy, while firm resources (e.g., natural gas, hydrogen) serve reliability needs at lowest cost
- SRP is well positioned to surpass its 2035 Sustainability Goals for carbon emissions reductions and water usage reductions at power plants across all system plans
- Without new firm capacity, the system cannot satisfy reliability requirements under a high load growth scenario (Desert Boom)
- If the US government enacted a mandate for 85% CO2 reductions by 2035 (Strong Climate Policy), SRP would need to accelerate renewable & storage deployment significantly

Study Plan Matrix



- On March 10 we discussed six cases
- Today, we will discuss long-term capacity expansion results for the 12 core cases and 4 sensitivities

Range of Sustainability Metrics in 2035 for 12 Cases*



Early findings

All system plans result in significant improvements in carbon emissions and water usage relative to today's system

SRP's 2035 Sustainability Goal

** These metrics are based on capacity expansion modeling. Detailed operational analysis through production cost modeling will follow and set the basis for the final metrics. The ranges comprise the 12 core cases (4 Scenarios x 3 Strategic Approaches) and do not include sensitivity cases.*

Emerging Technology Additions

- Green hydrogen is only selected in the Strong Climate Policy scenarios, where it is available in 2034.
- There are no nuclear small modular reactor (SMR) or carbon capture and storage (CCS) additions by 2035 in the cases studied.

	Strategic Approach		
Scenario	**Technology Neutral**	**No New Fossil**	**Minimum Coal**
Current Trends	**No Emerging Technology Additions** Green hydrogen and nuclear SMR not available by 2035 CCS only available by 2035 in Technology Neutral		
Desert Contraction			
Desert Boom			
Strong Climate Policy	**~200 MW Green Hydrogen**	**~200 MW Green Hydrogen**	**850 MW Green Hydrogen**

Planning Reserve Margin in 2035

All cases achieve planning reserve margin (PRM) target, except cases that have high load growth but no firm capacity options by 2035.

	Strategic Approach		
Scenario	**Technology Neutral**	**No New Fossil**	**Minimum Coal**
Current Trends	✓	✓	✓
Desert Contraction	✓	✓	✓
Desert Boom	✓	**~ 500 MW Short**	**~ 930 MW Short**
Strong Climate Policy	✓	✓	✓

Achieve PRM

Fail to Achieve PRM

Potential Options to Mitigate Reliability Challenges: No New Fossil and Minimum Coal, Desert Boom

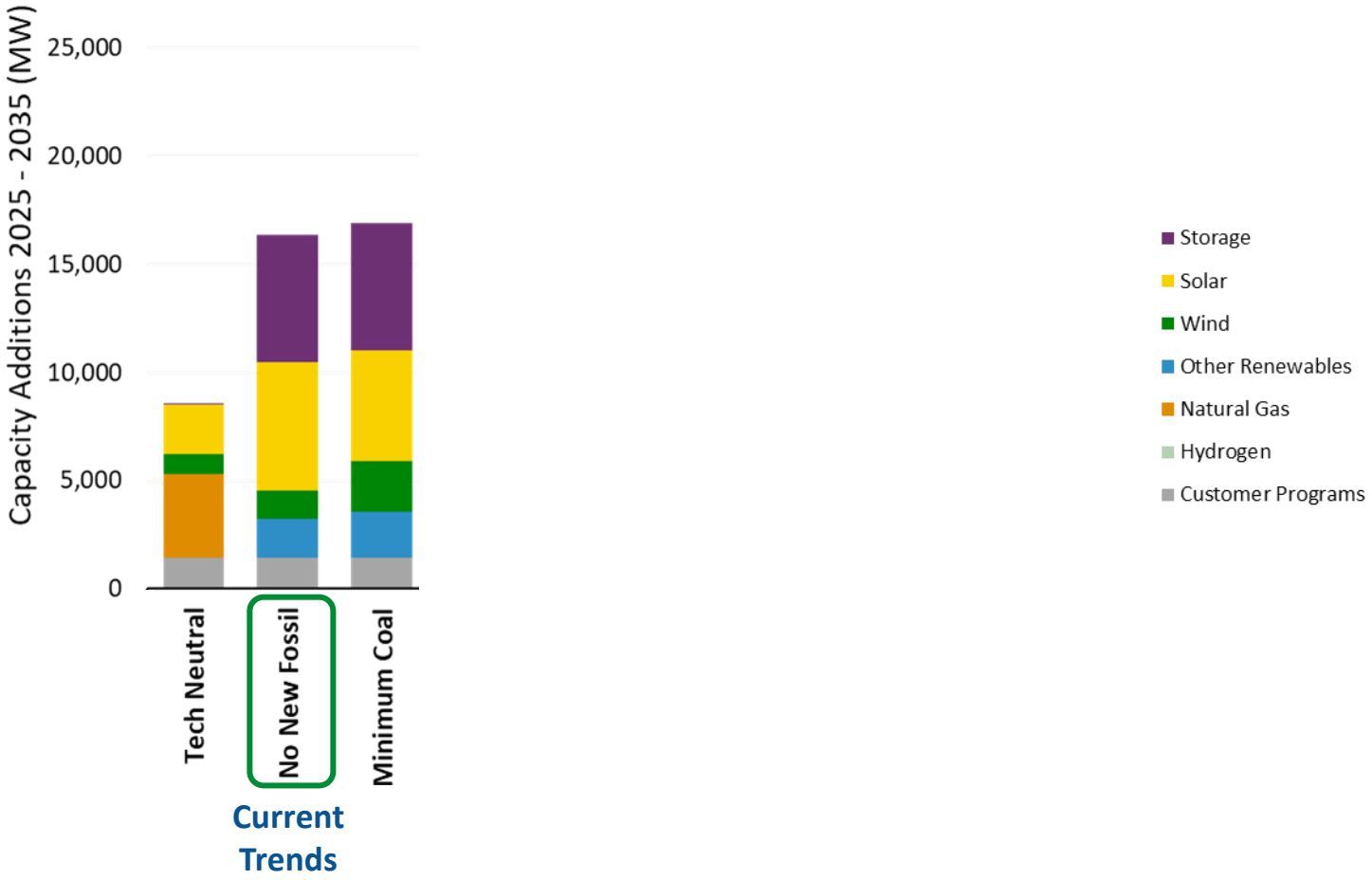
Option	Limitations	Mitigation Potential
Energy Efficiency & Demand Response	Wouldn't provide sufficient scale	Could not address entire shortfall
Battery Storage & Renewables	Requires more capacity than could be deployed by 2035	Would help to mitigate, but with declining contribution at scale
Hydrogen	Reliance on technology not currently deployed at scale	Firm capacity additions would satisfy reliability requirements
Natural Gas	Not allowed in these cases	

Next Steps:

- As these cases do not meet the reliability standards, they will not be compared to remaining cases in the ISP.
- SRP can continue to monitor options in future planning cycles to understand their feasibility.

Modeled Capacity Additions, 2025-2035 (MW)

Current Trends: *Natural gas (when available) and renewables are part of a least-cost portfolio. Without firm resource options, higher levels of renewables and battery storage are required.*



Under **Current Trends**, **solar** and **wind** are part of a least-cost portfolio.

When allowed (*Technology Neutral*), **natural gas** is added for firm capacity.

Without new gas or other firm resources available (*No New Fossil* and *Minimum Coal*), the system requires higher additions of **solar**, **battery storage**, **wind** and **other renewables***.

By assumption, **customer programs**** help manage load.

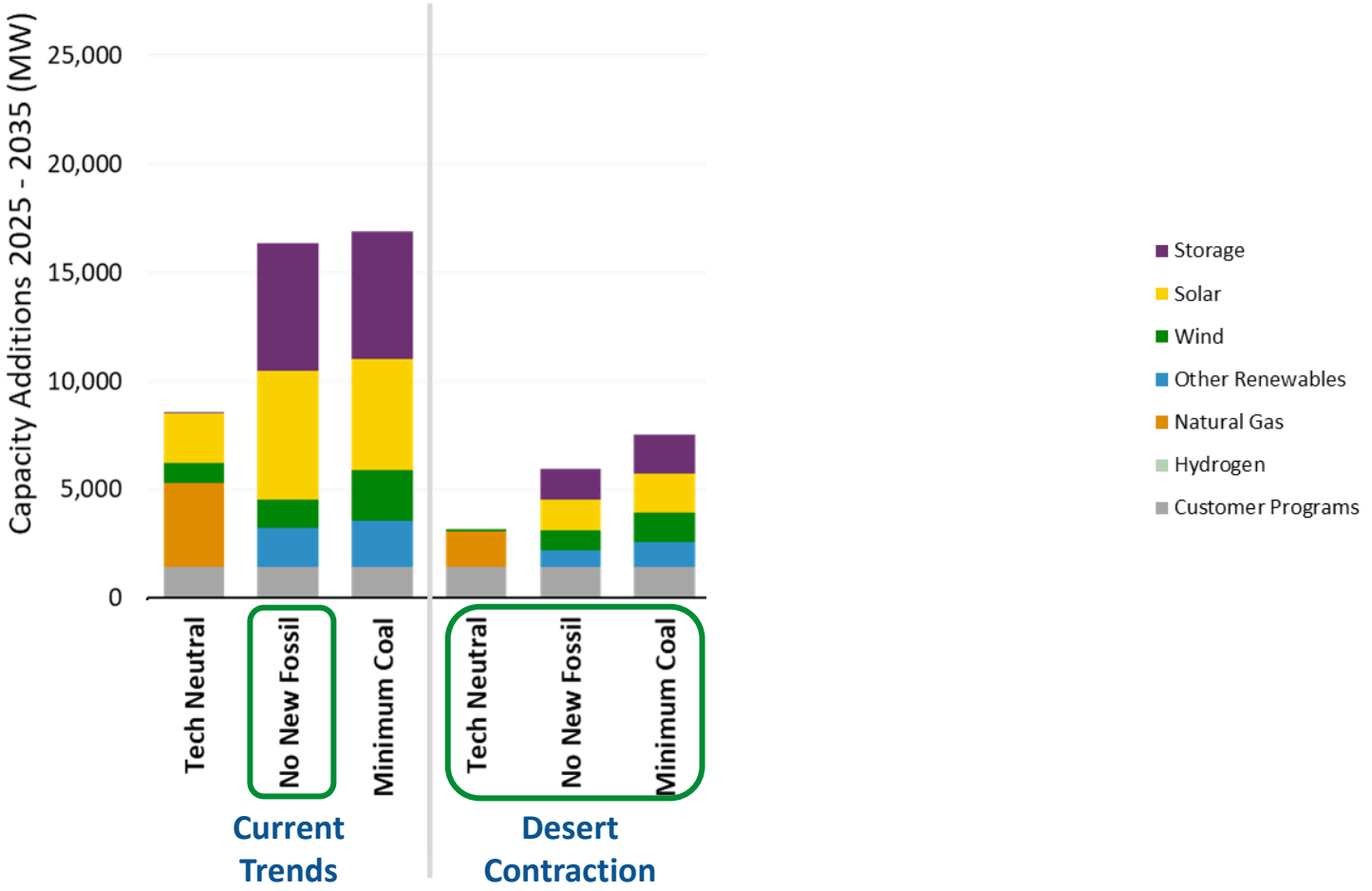
Modeled capacity additions do not include SRP's planned capacity additions.

* Other renewables includes geothermal, biomass, and pumped storage;

** Distributed generation and demand response shown, but energy efficiency also contributes to load reduction

Modeled Capacity Additions, 2025-2035 (MW)

Desert Contraction: *Lower load growth greatly reduces additional capacity needs, particularly for renewables when natural gas is available*



Under **Desert Contraction**, total capacity additions are greatly reduced.

When **natural gas** is allowed (*Tech Neutral*), no additional **solar** and **battery storage** are added.

Without new gas or other firm resources available (*No New Fossil and Minimum Coal*), the system requires additions of **solar**, **battery storage**, **wind**, and **other renewables***.

By assumption, **customer programs**** help manage load.

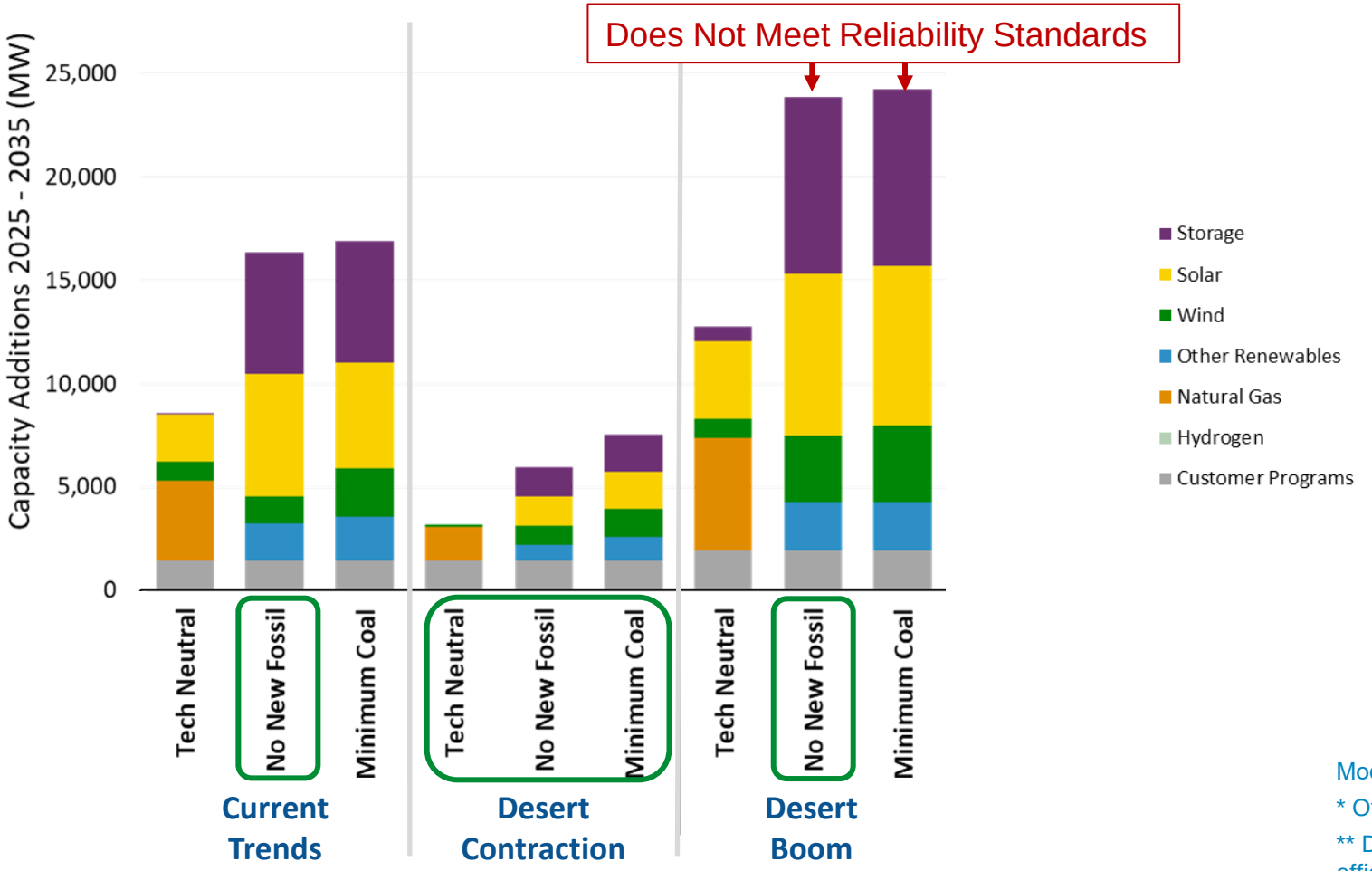
Modeled capacity additions do not include SRP's planned capacity additions.

* Other renewables includes geothermal, biomass, and pumped storage;

** Distributed generation and demand response shown, but energy efficiency also contributes to load reduction

Modeled Capacity Additions, 2025-2035 (MW)

Desert Boom: *High load growth requires significant capacity additions. Without firm resources available, the system is unable to meet reliability requirements.*



Under **Desert Boom**, total capacity additions are greatly increased.

Without new gas or other firm resources available (*No New Fossil and Minimum Coal*), the system fails to meet reliability requirements despite very high additions of **solar**, **battery storage**, **wind**, and **other renewables***.

By assumption, higher levels of **customer programs**** help further manage load.

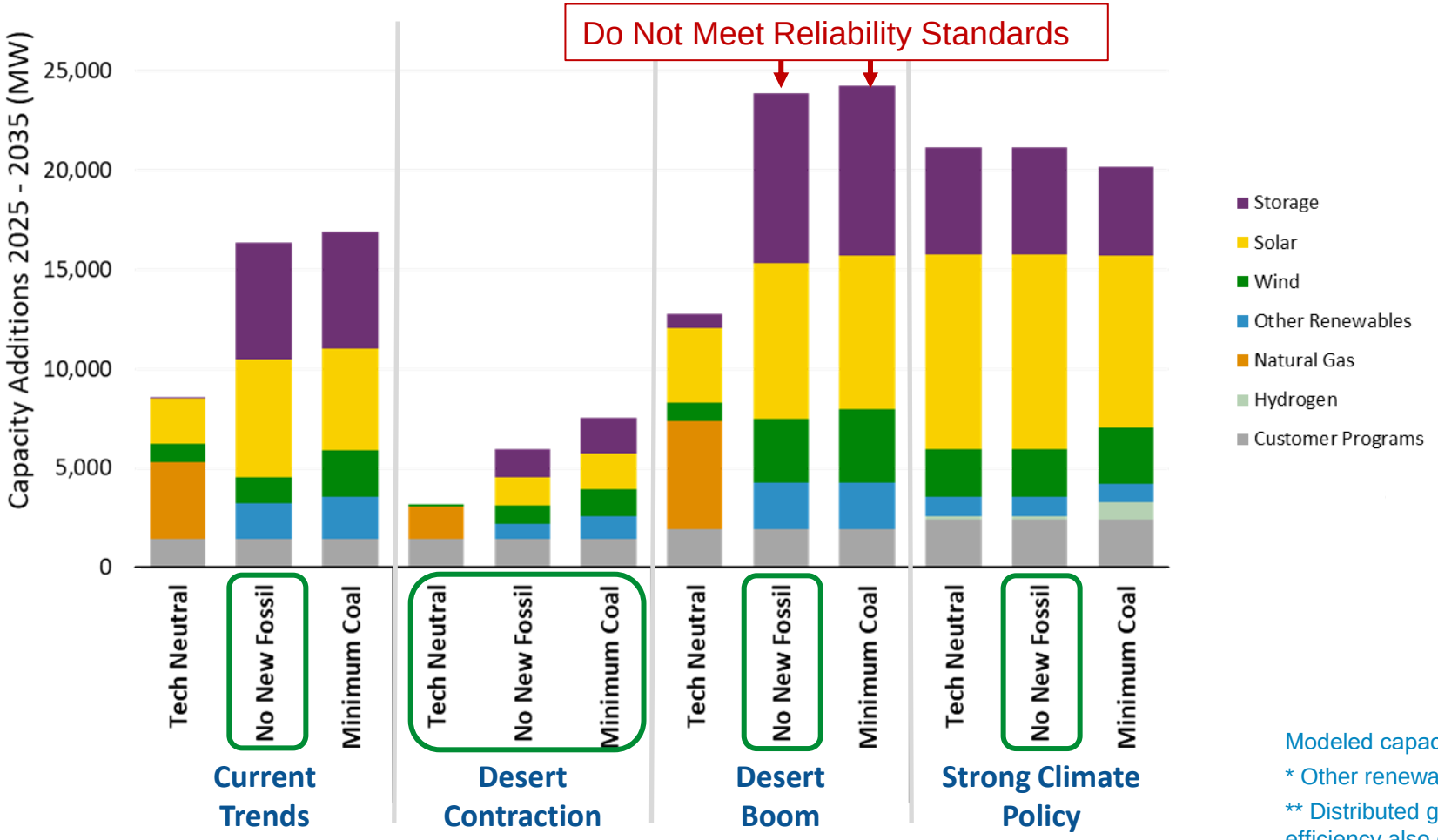
Modeled capacity additions do not include SRP's planned capacity additions.

* Other renewables includes geothermal, biomass, and pumped storage;

** Distributed generation and demand response shown, but energy efficiency also contributes to load reduction

Modeled Capacity Additions, 2025-2035 (MW)

Strong Climate Policy: *In all cases, meeting strong climate goals requires high levels of renewables and battery storage as well as reliance on emerging technologies that provide clean, firm power.*



Under **Strong Climate Policy**, very high levels of **solar** and **battery storage** are added in each case.

Hydrogen is also added in each case (the highest amount under Minimum Coal due to early retirement of Springerville).

The system also relies on additions of **wind**, and **other renewables***.

By assumption, the highest levels **customer programs**** help further manage load.

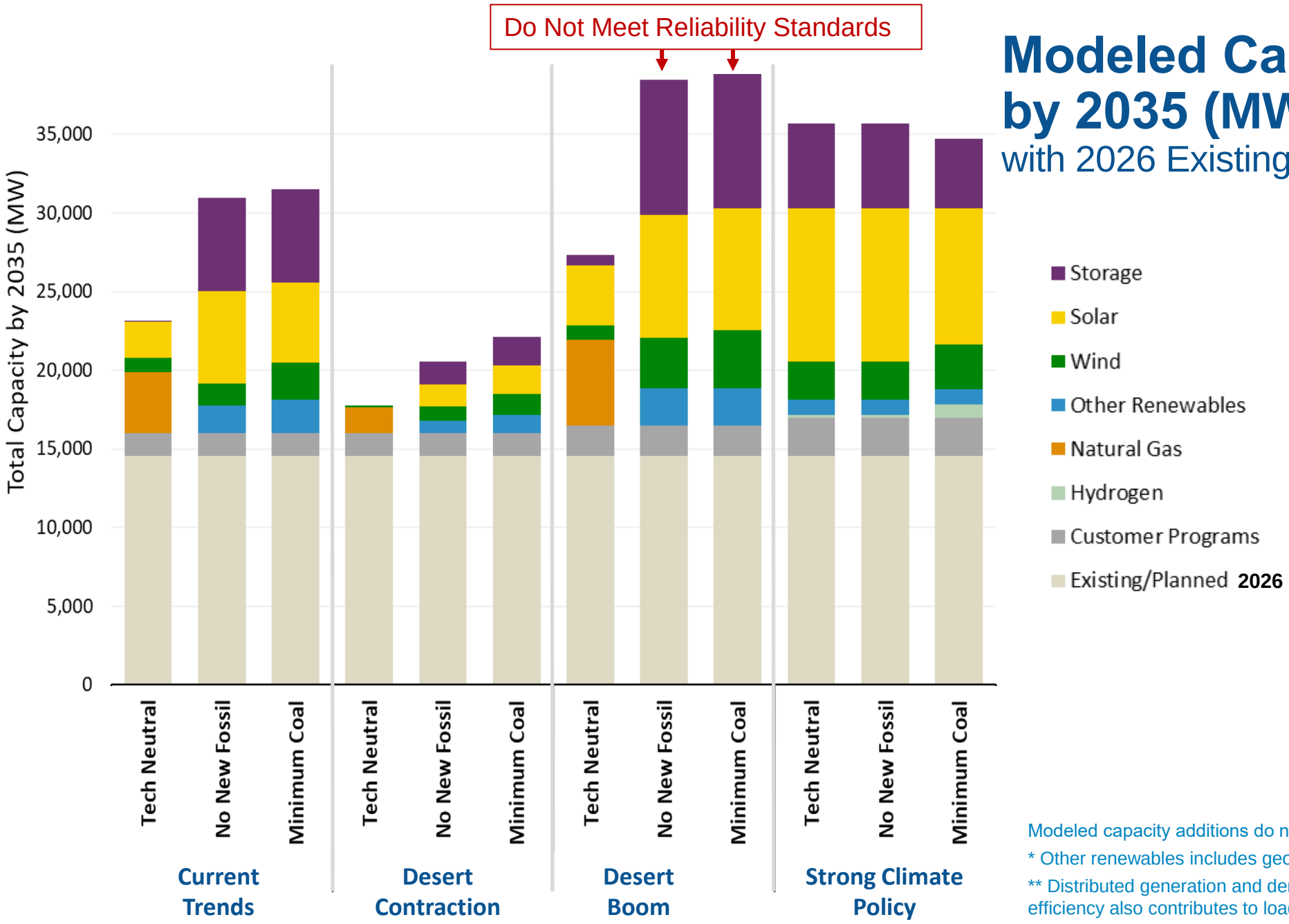
Modeled capacity additions do not include SRP's planned capacity additions.

* Other renewables includes geothermal, biomass, and pumped storage;

** Distributed generation and demand response shown, but energy efficiency also contributes to load reduction

Modeled Capacity Additions by 2035 (MW)

with 2026 Existing and Planned Capacity



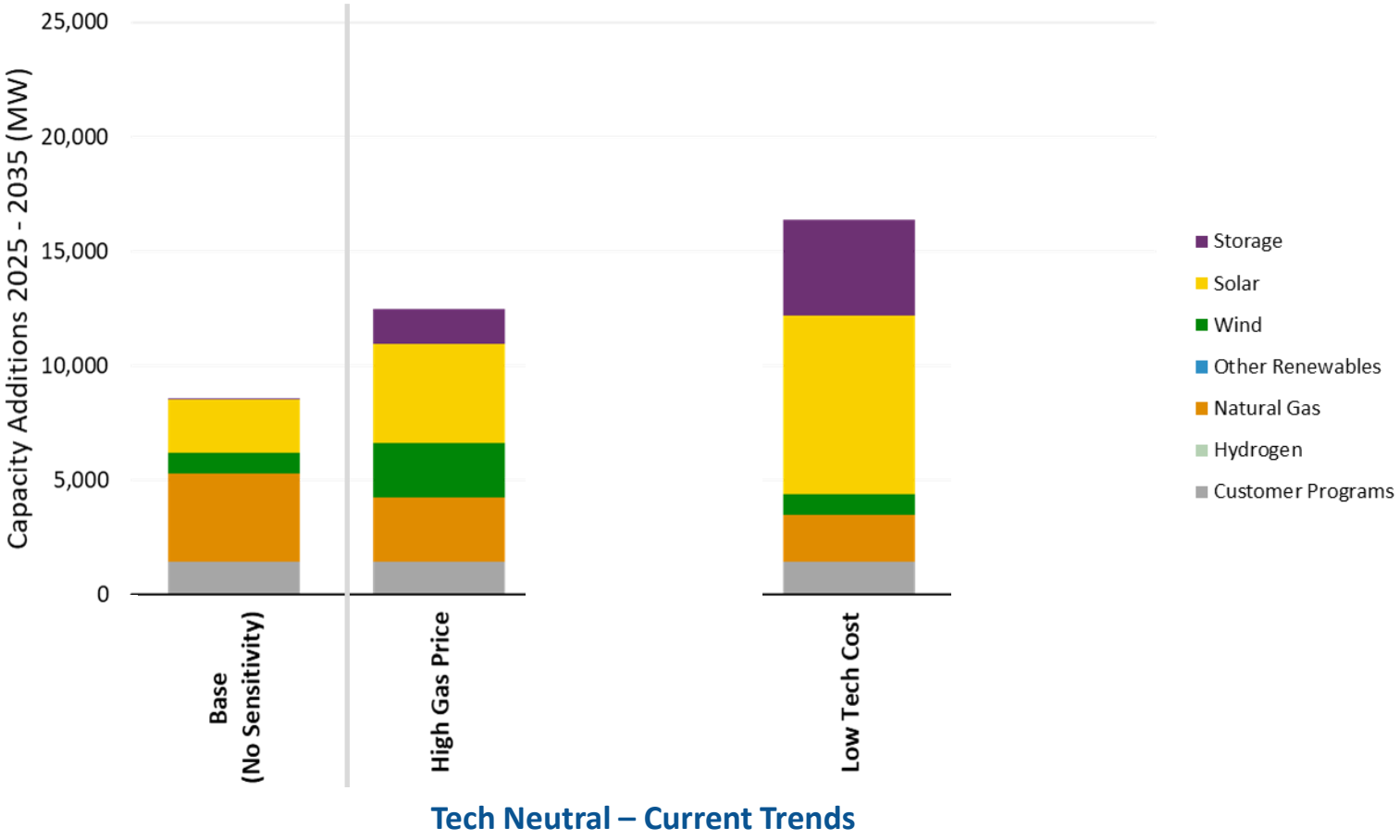
Modeled capacity additions do not include SRP's planned capacity additions.

* Other renewables includes geothermal, biomass, and pumped storage;

** Distributed generation and demand response shown, but energy efficiency also contributes to load reduction

Key Findings from Sensitivities

Relative additions of natural gas and renewables/storage depend on gas prices and technology costs, but in all cases new firm capacity is still needed.



Tech Neutral – Current Trends

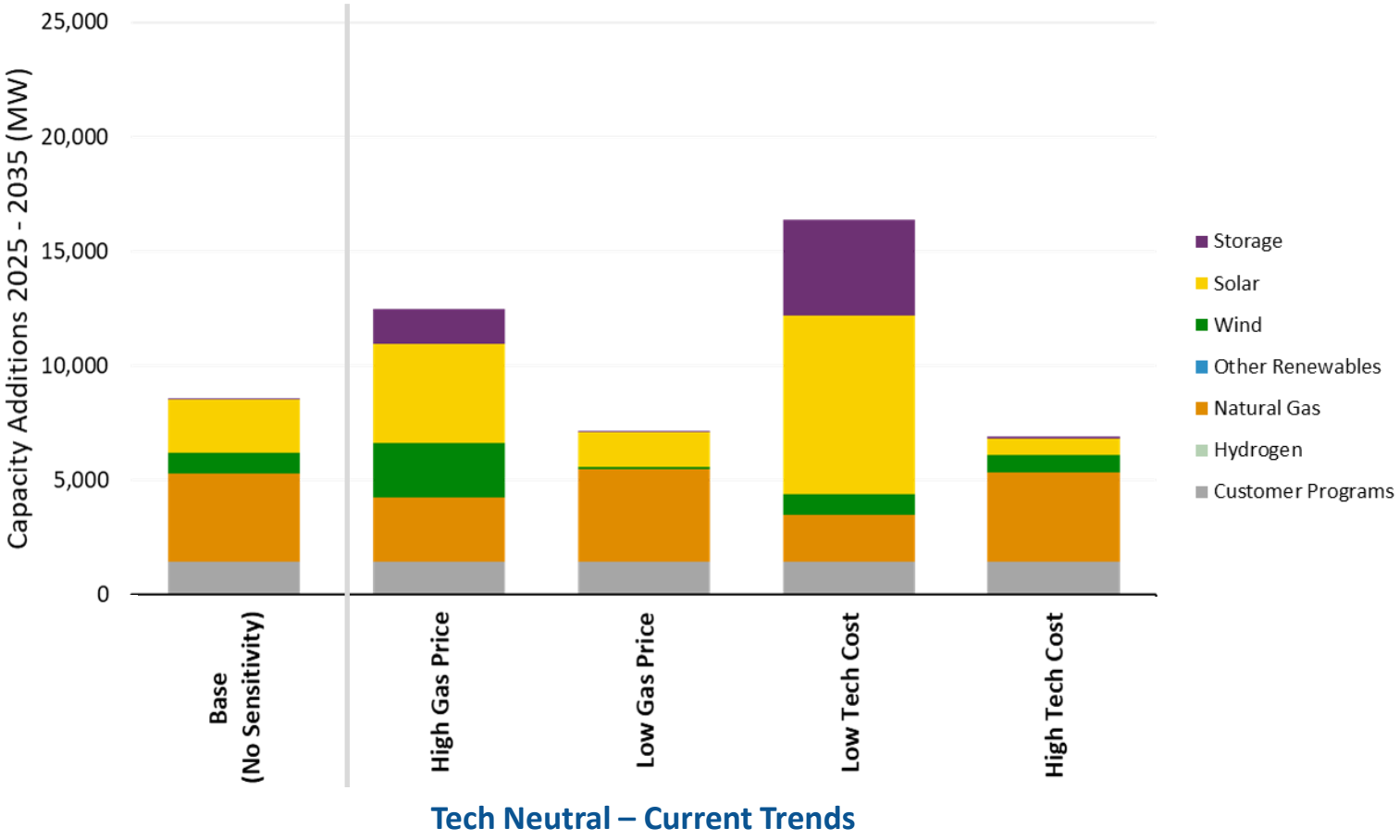
Higher natural gas prices and **lower renewables/storage technology costs** increase total capacity additions, each driving increase of renewables and **battery storage** while offsetting **natural gas** additions.

- Lower technology costs drive large increases in additions of **solar** and **storage** (but not **wind**)
- Higher gas prices also drive **wind** additions

All sensitivity results described are relative to the base Tech Neutral Current Trends case.

Key Findings from Sensitivities

Relative additions of natural gas and renewables/storage depend on gas prices and technology costs, but in all cases new firm capacity is still needed.



Higher natural gas prices and **lower renewables/storage technology costs** increase total capacity additions, each driving increase of renewables and **battery storage** while offsetting **natural gas** additions.

- Lower technology costs drive large increases in additions of **solar** and **storage** (but not **wind**)
- Higher gas prices also drive **wind** additions

Lower natural gas prices and **higher technology costs** reduce total capacity additions, each driving slightly higher additions of **natural gas** while offsetting **wind** and **solar** additions.

- Higher technology costs have larger impact, primarily on **solar**

All sensitivity results described are relative to the base Tech Neutral Current Trends case.

Key Findings

- SRP will need to build up to 7 times as many resources in the next decade than in the last decade to serve customers while achieving reliability and sustainability goals
    - Solar plus storage and wind provide low-cost energy, while firm resources (e.g., natural gas, hydrogen) serve reliability needs at lowest cost
- SRP is well positioned to surpass its 2035 Sustainability Goals for carbon emissions reductions and water usage reductions at power plants across all system plans
- Without new firm capacity, the system cannot satisfy reliability requirements under a high load growth scenario (Desert Boom)
- If the US government enacted a mandate for 85% CO2 reductions by 2035 (Strong Climate Policy), SRP would need to accelerate renewable & storage deployment significantly

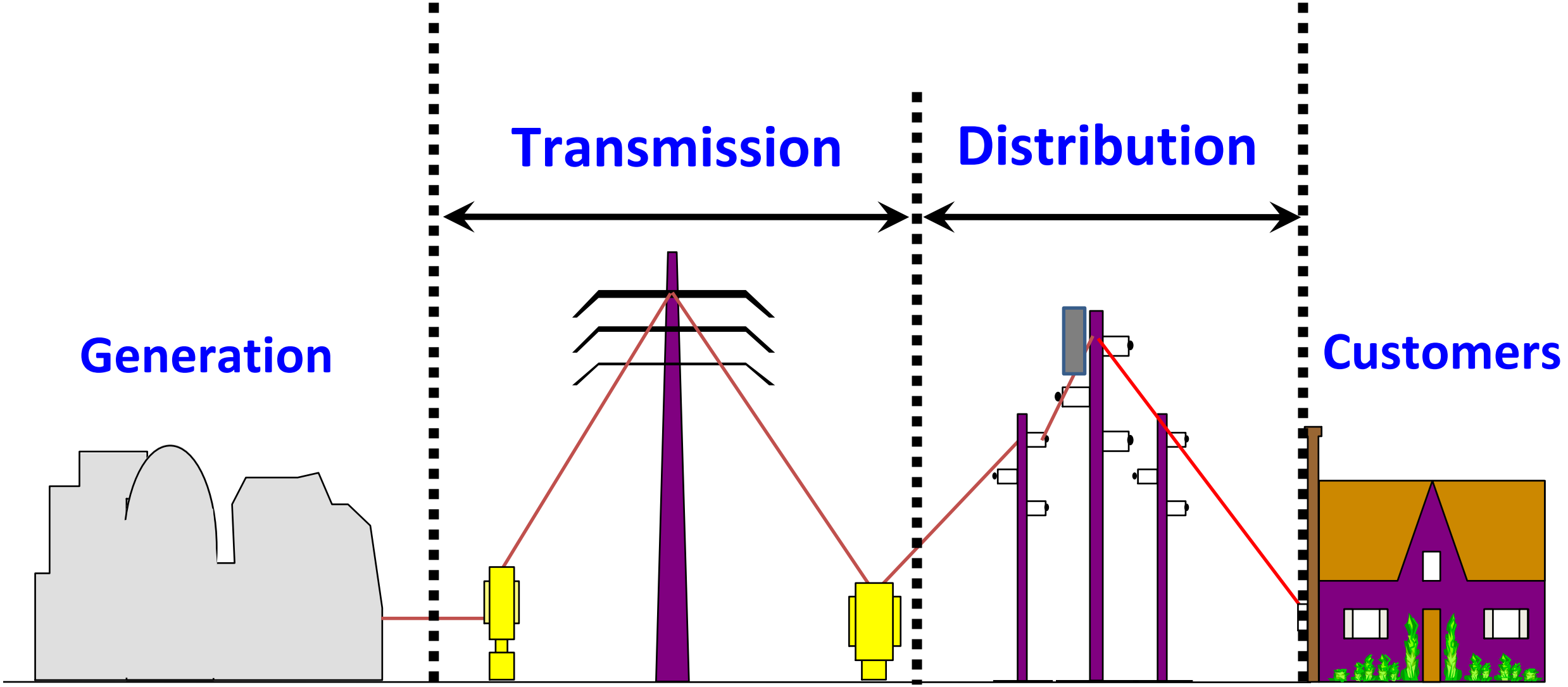
Transmission Planning Early Findings

Justin Lee
Manager, Transmission System Planning (SRP)

Pre-discussion Notes

- Transmission Analyses are ongoing
  - Today's results are limited to Technology Neutral strategic approach
- Focused on SRP Transmission System 100kV and above
  - Upgrades on neighboring utility systems in Arizona are out of scope
  - Transmission for remote renewable resources is accounted for in resource analysis

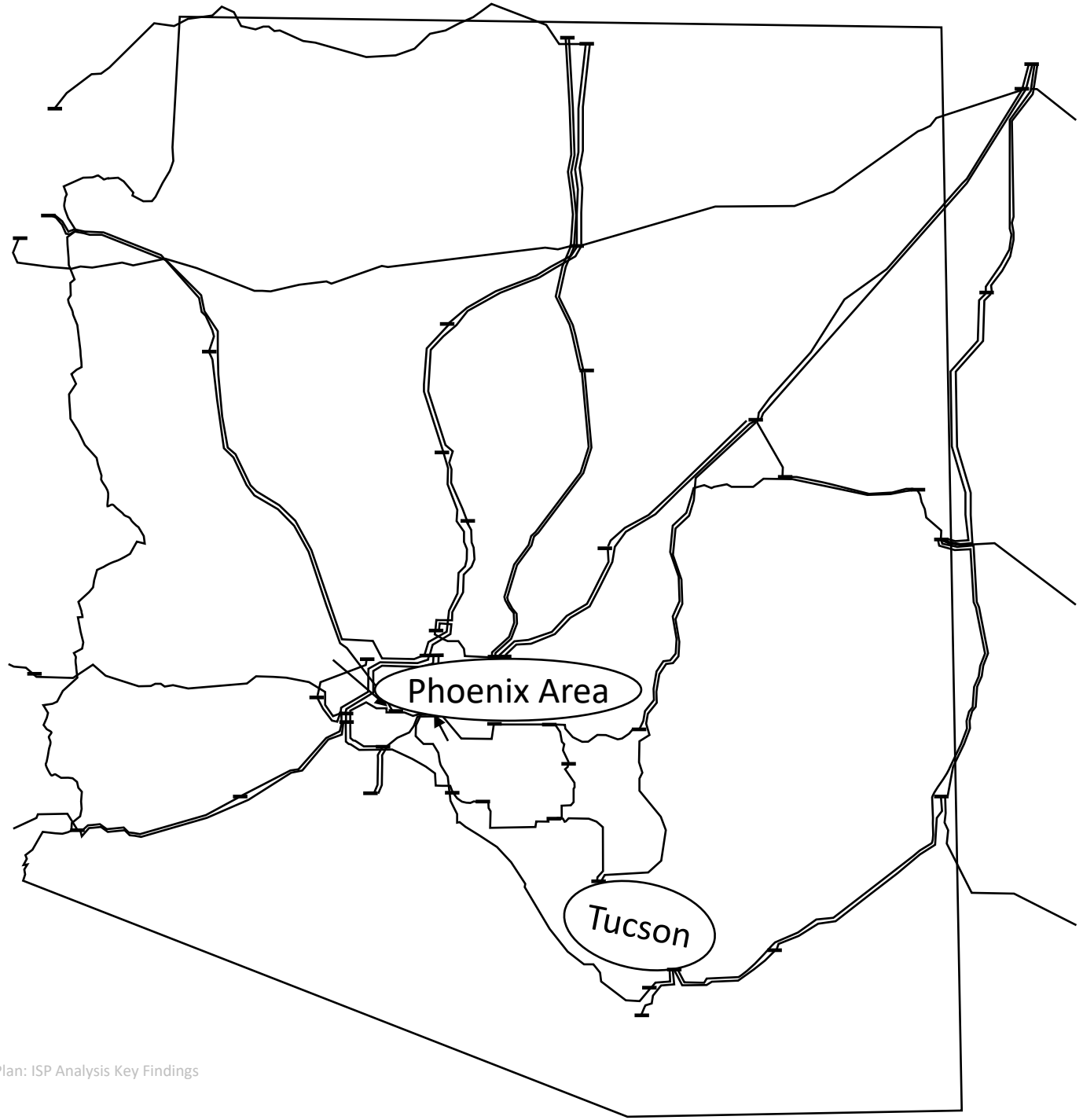
Power Delivery System



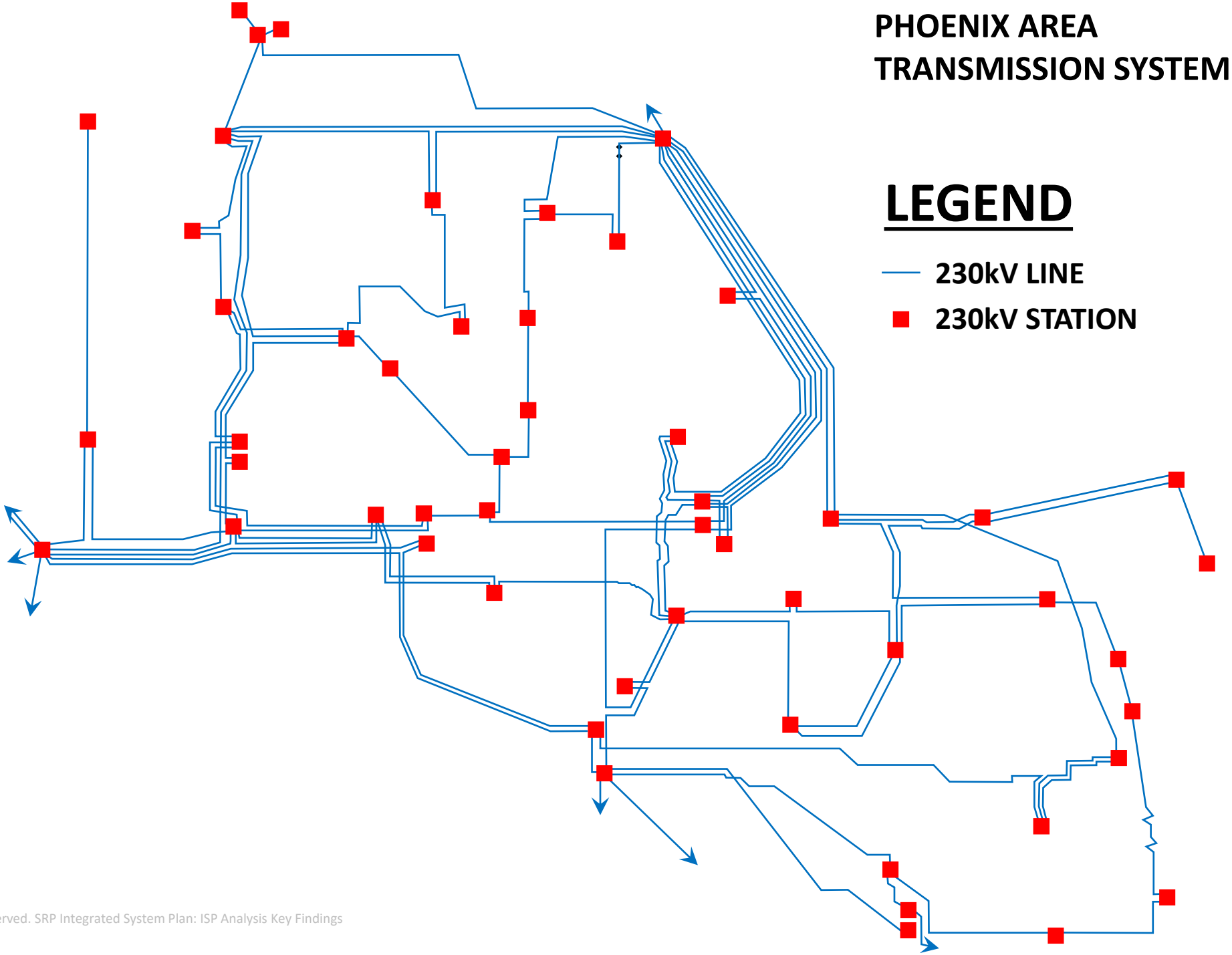
LEGEND

— EHV LINE

▬ EHV STATION

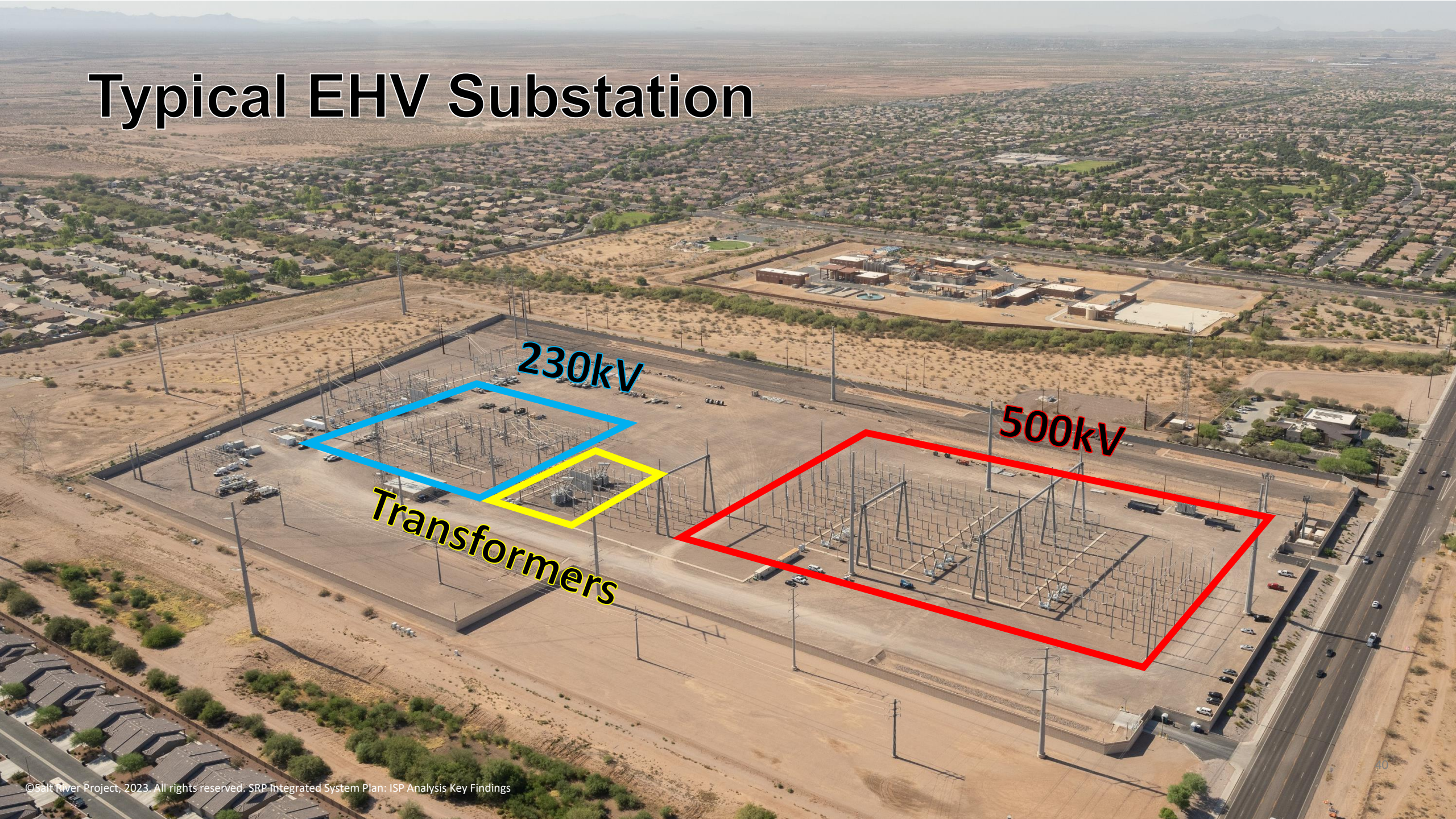


PHOENIX AREA TRANSMISSION SYSTEM

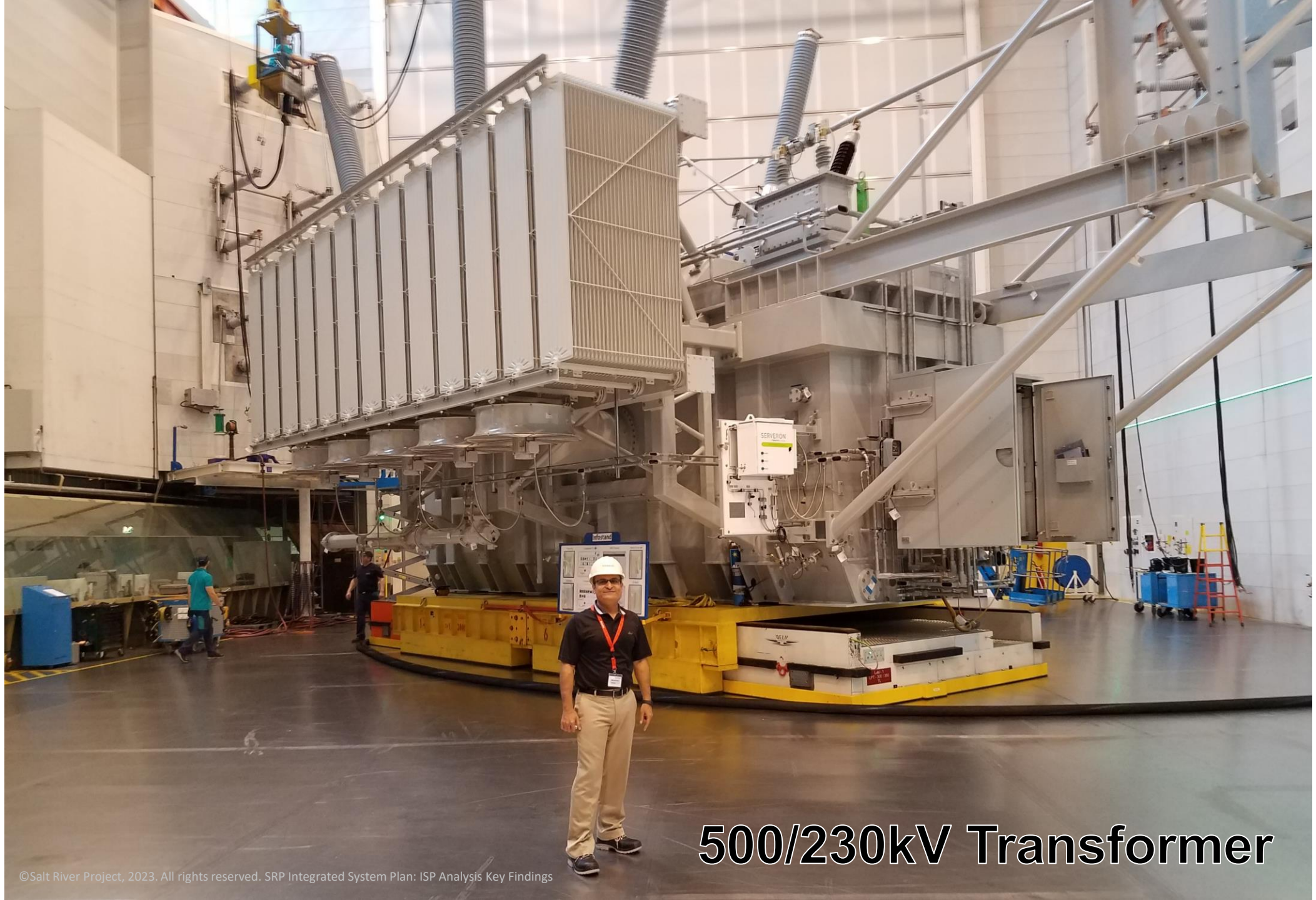


Typical 500kV Transmission Lines

Typical EHV Substation



500/230kV Transformer



500/230kV Transformer

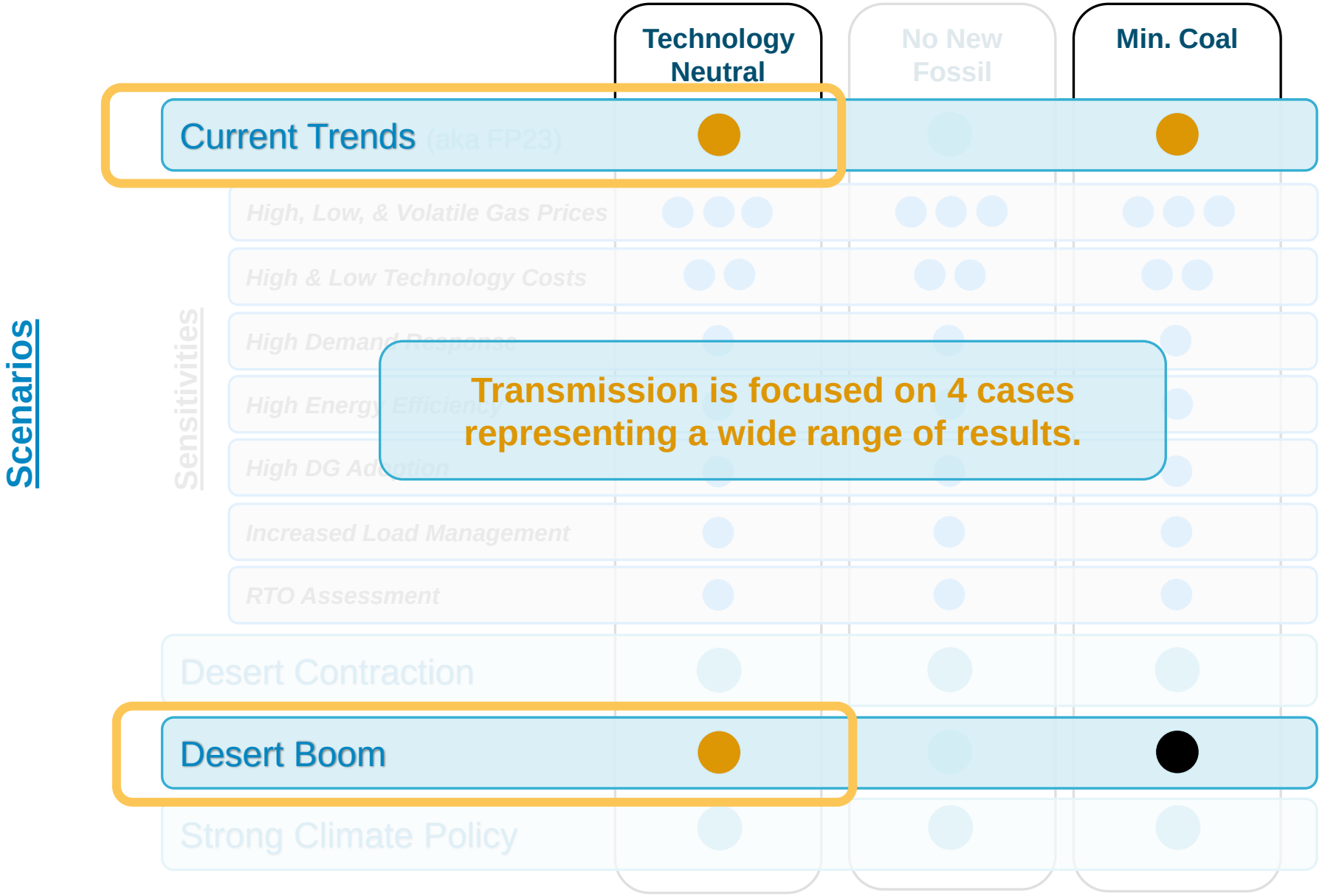
Transmission Planning

What new transmission infrastructure is needed to deliver energy reliably to SRP's Service Territory?

Transmission Early Findings

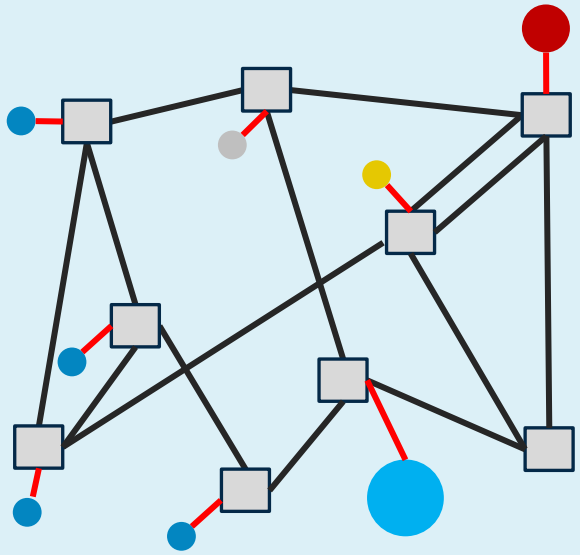
- Location of Generation Matters
  - Especially as load increases
  - 500/230kV transformers additions
- Most Impact on 230kV Transmission System
  - Some 230kV transmission lines needed across both Current Trends and Desert Boom
  - Some 230kV transmission needs tied to load growth
    - Needed in both scenarios
    - Not near generation locations
- Additional Transmission Analyses Will Provide a More Complete Picture

Cases Being Analyzed



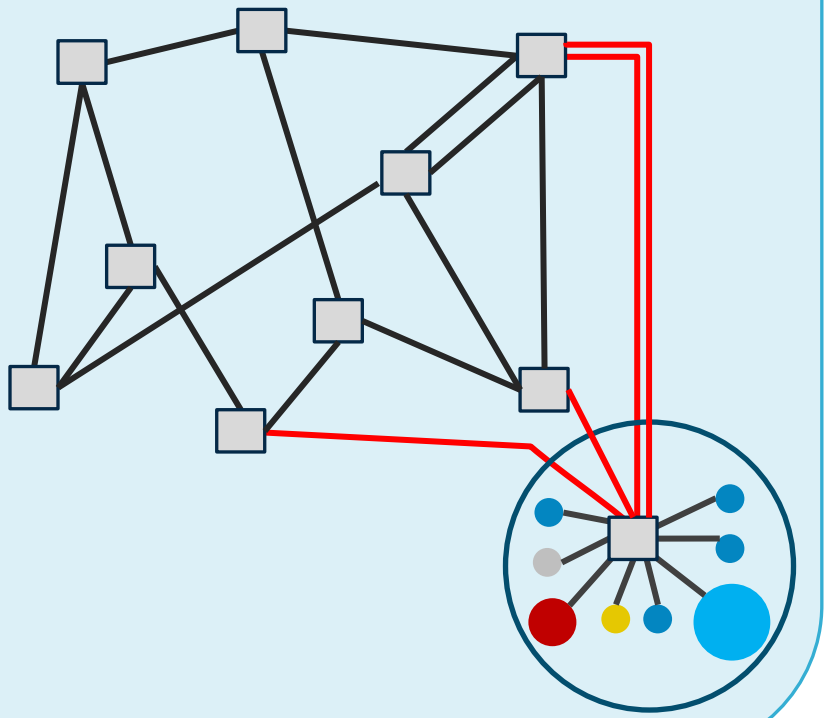
Two Methods for Modeling New Local Resources

1 **Distribute resources pro-rata per interconnection queue**



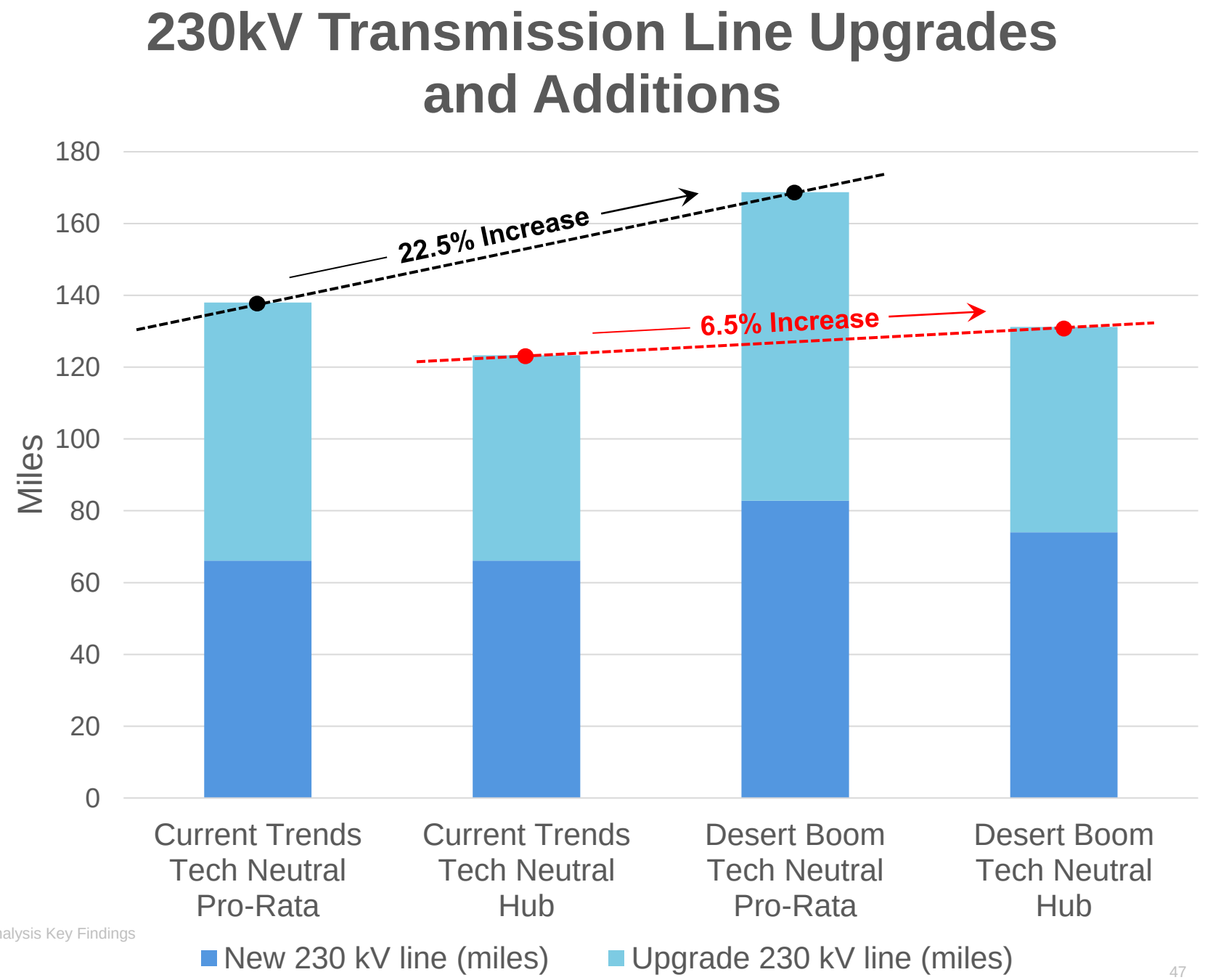
New Resource
Transmission Station
Existing Transmission
New Transmission

2 **Centralize resources in a single hub**



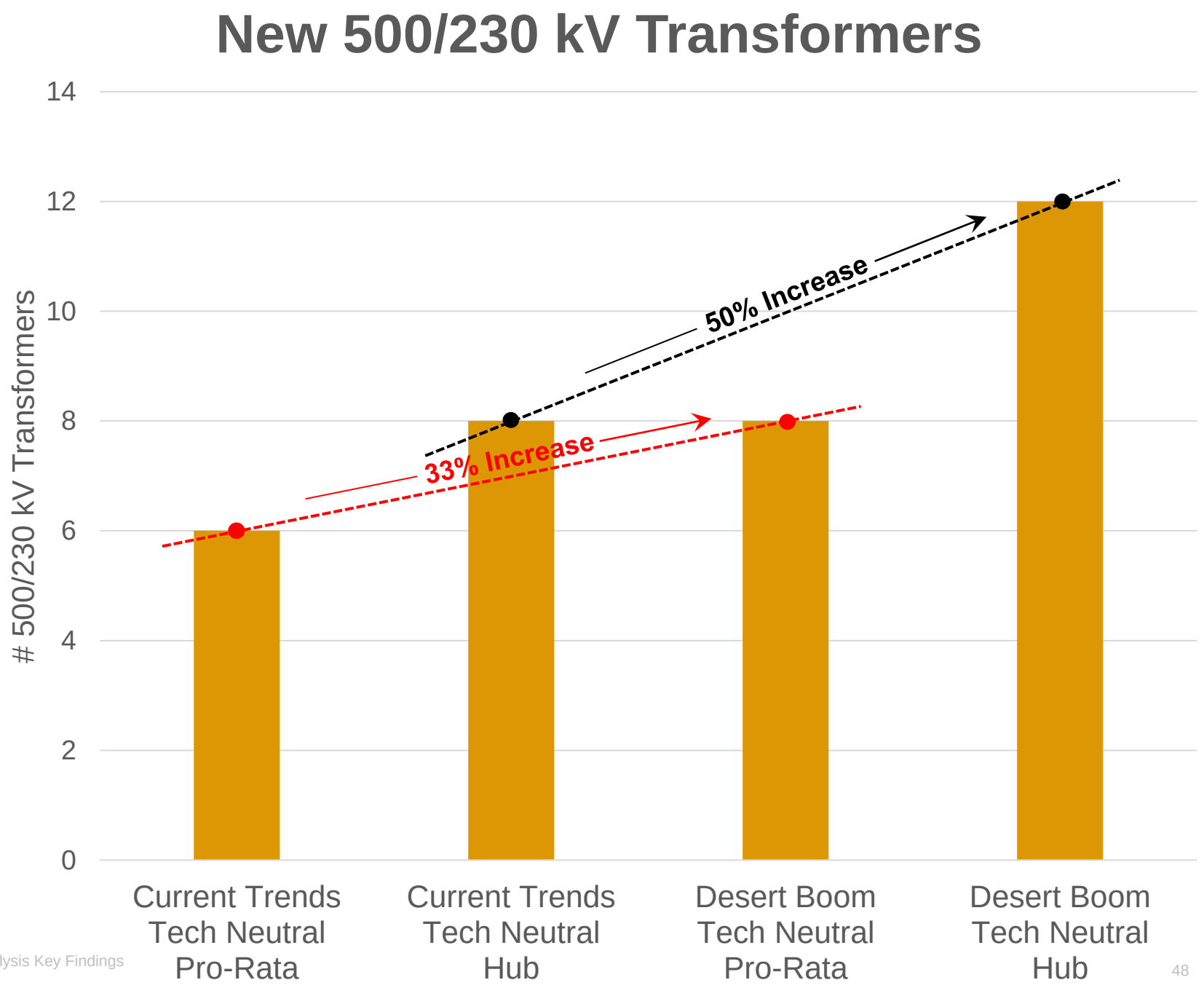
Early Findings

- Increase in load increases need for 230kV line upgrades and additions
- Pro-rata generation location results in more 230kV transmission line upgrades and additions
- Need for upgrades and additions grows faster when generation located pro-rata



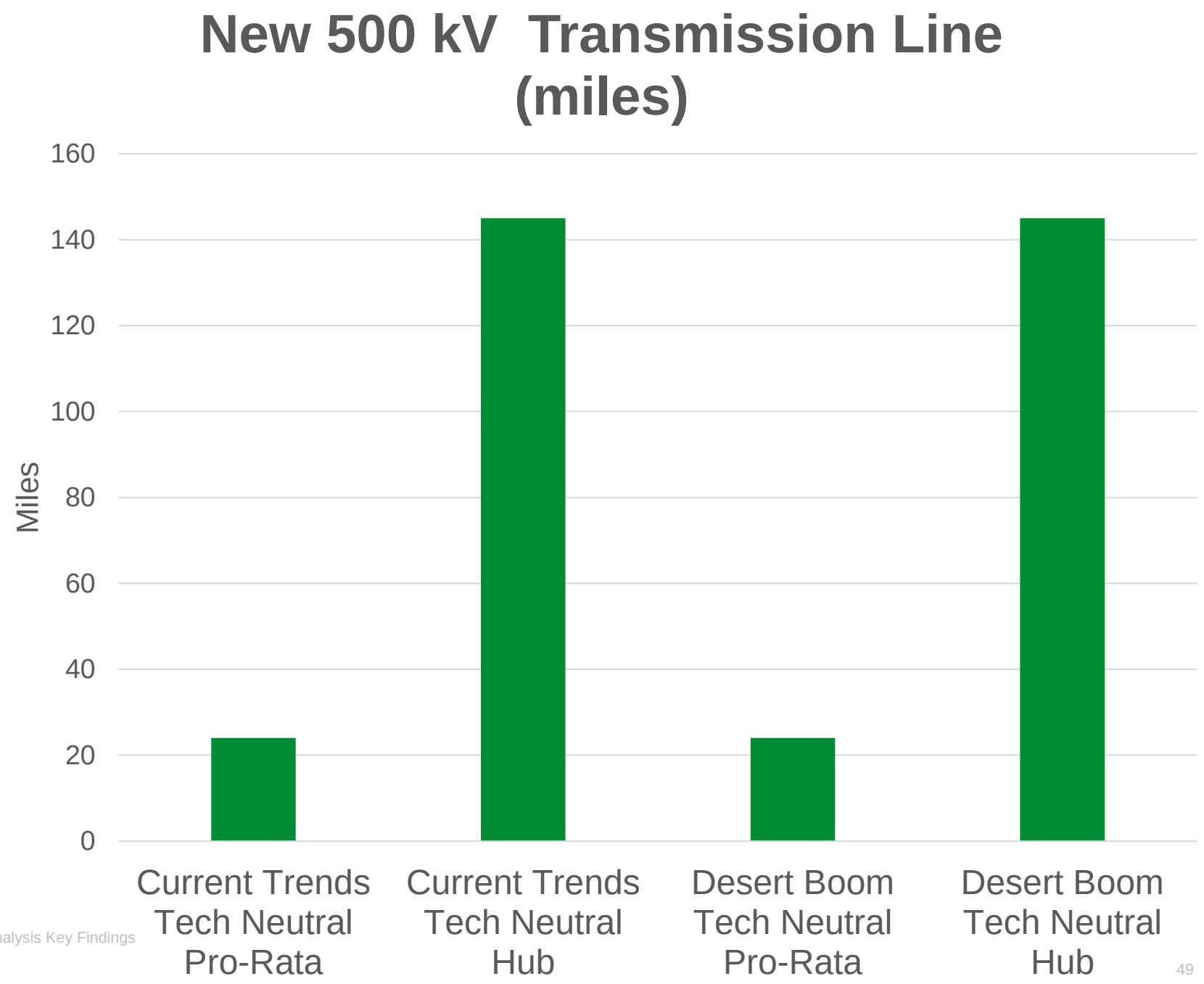
Early Findings

- Increase in load increases need for 500/230kV transformer additions
- Hub generation location results in more 500/230kV transformer additions
- Need for 500/230kV transformers grows faster when generation is located at a hub



Early Findings

- Some 500kV transmission is needed in all four cases
- 500kV transmission line additions needed to connect the hub to the existing system are approximate and would depend on hub location



Transmission Early Findings

- Location of Generation Matters
  - Especially as load increases
  - 500/230kV transformers additions
- Most Impact on 230kV Transmission System
  - Some 230kV transmission lines needed across both Current Trends and Desert Boom
  - Some 230kV transmission needs tied to load growth
    - Needed in both scenarios
    - Not near generation locations
- Additional Transmission Analyses Will Provide a More Complete Picture

Coffee Break

Distribution Planning Key Findings

Melissa Martinez
Manager, Distribution Planning (SRP)

Distribution Planning

What new distribution infrastructure is needed to deliver energy reliably to customer homes and businesses?

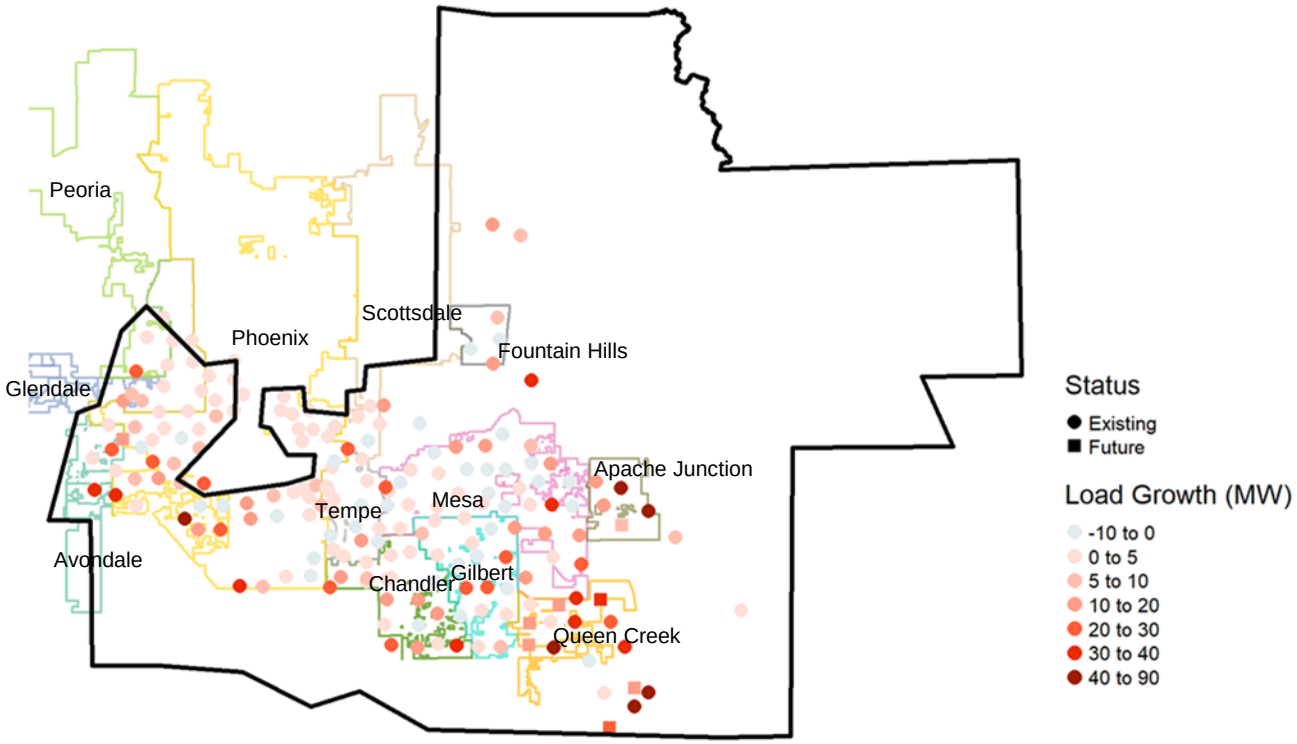
Summary of Key Findings

- Capacity constraints occur in heavily developed areas
- Increased variability with customer type changes
- Consistent large growth patterns in the Southeast valley
- Uncertainty with electric vehicle location and charging patterns during the day
- Non-wire alternatives may provide temporary solutions in future years

Current Trends Scenario Key Findings

- Follows closely with current planning process
- Variability in customer types and rezoning (residential, commercial, industrial)
- Larger load growth patterns emerge in the Southeast valley

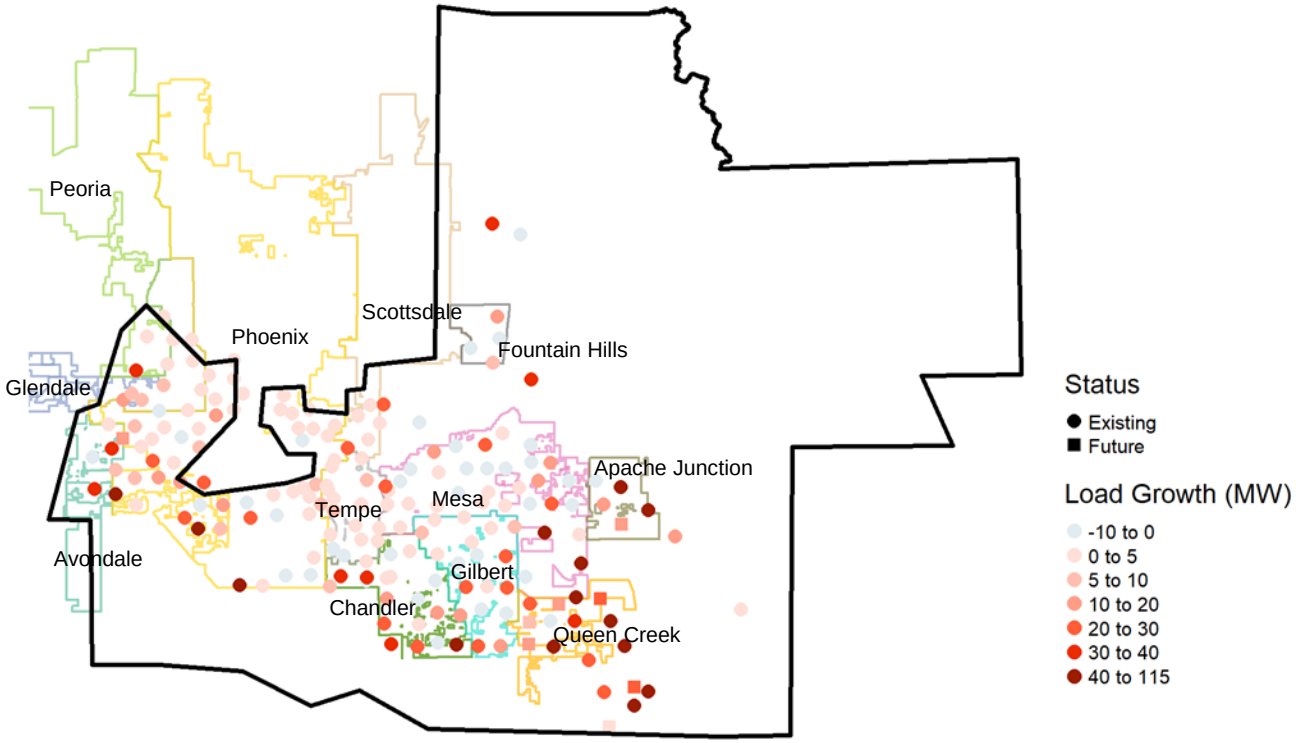
Load Growth Through 2035 by Distribution Substation
Current Trends Scenario



Desert Boom Scenario Key Findings

- Load growth occurs in areas with more land availability
- More infrastructure required due to overloads on current infrastructure
- Larger load growth patterns emerge in the Southeast valley

Load Growth Through 2035 by Distribution Substation
Desert Boom Scenario

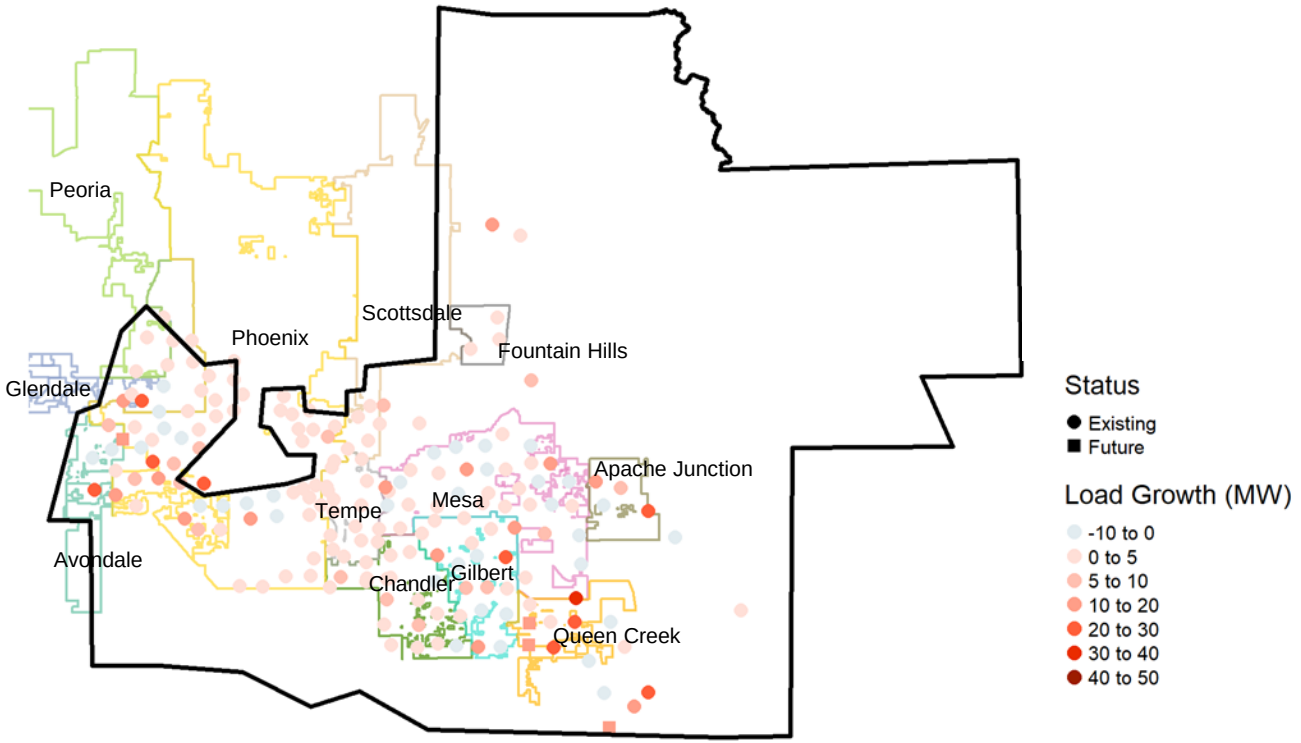


Desert Contraction Scenario Key Findings

- Less infrastructure required to support load growth
- Ability to leverage current infrastructure to address overloads in central areas
- Larger load growth patterns emerge in the Southeast valley

Load Growth Through 2035 by Distribution Substation

***Desert Contraction* Scenario**

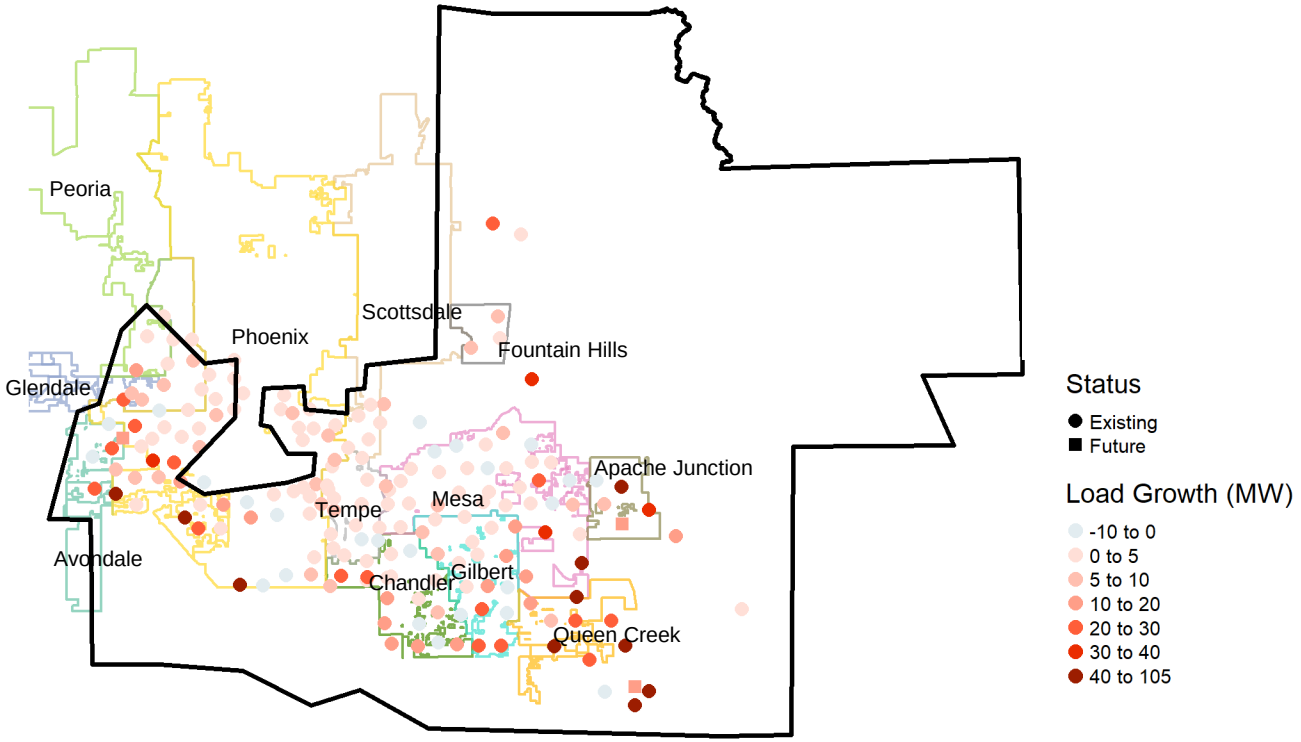


Strong Climate Policy Scenario Key Findings

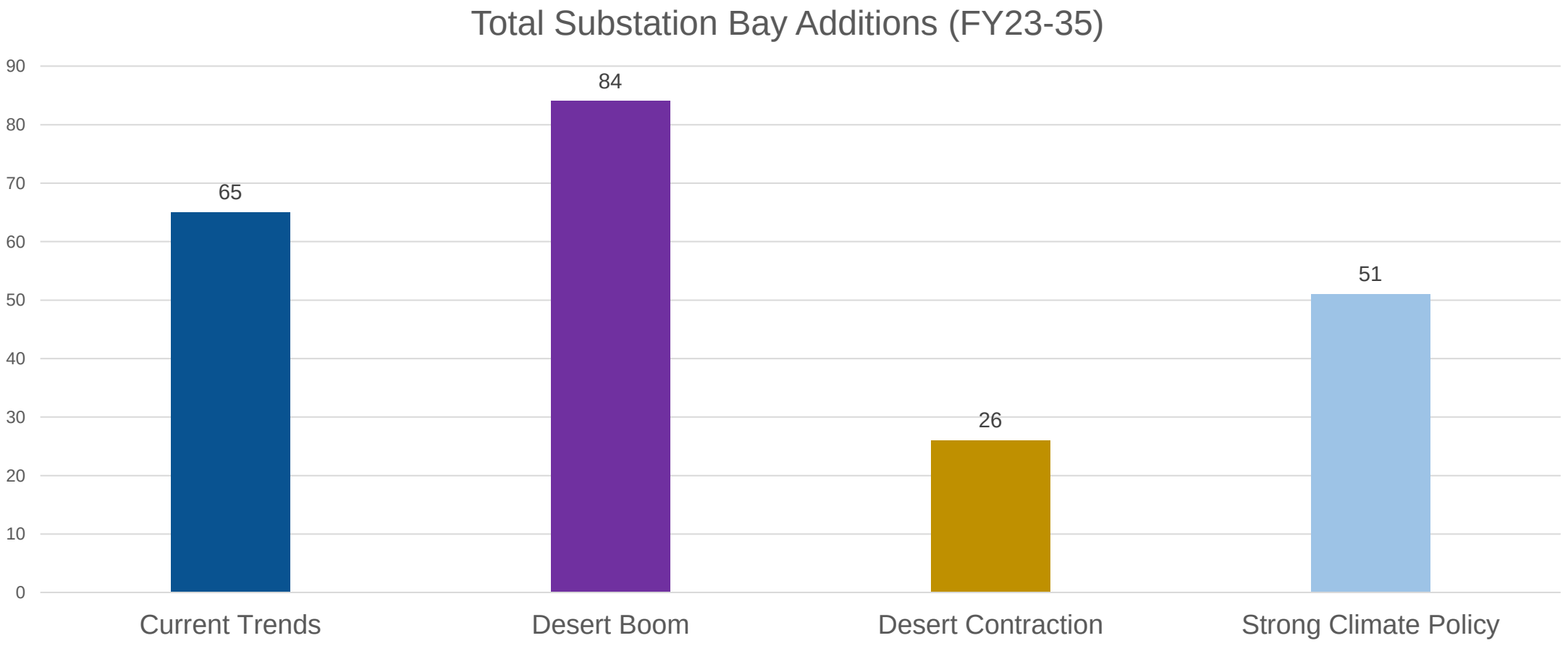
- Forecasted load growth is expected to materialize in Northwest, Southwest and Southeast regions
- Less distribution infrastructure required due to climate policy changes and incentives
- Larger load growth patterns emerge in the Southeast valley

Load Growth Through 2035 by Distribution Substation

Strong Climate Policy Scenario

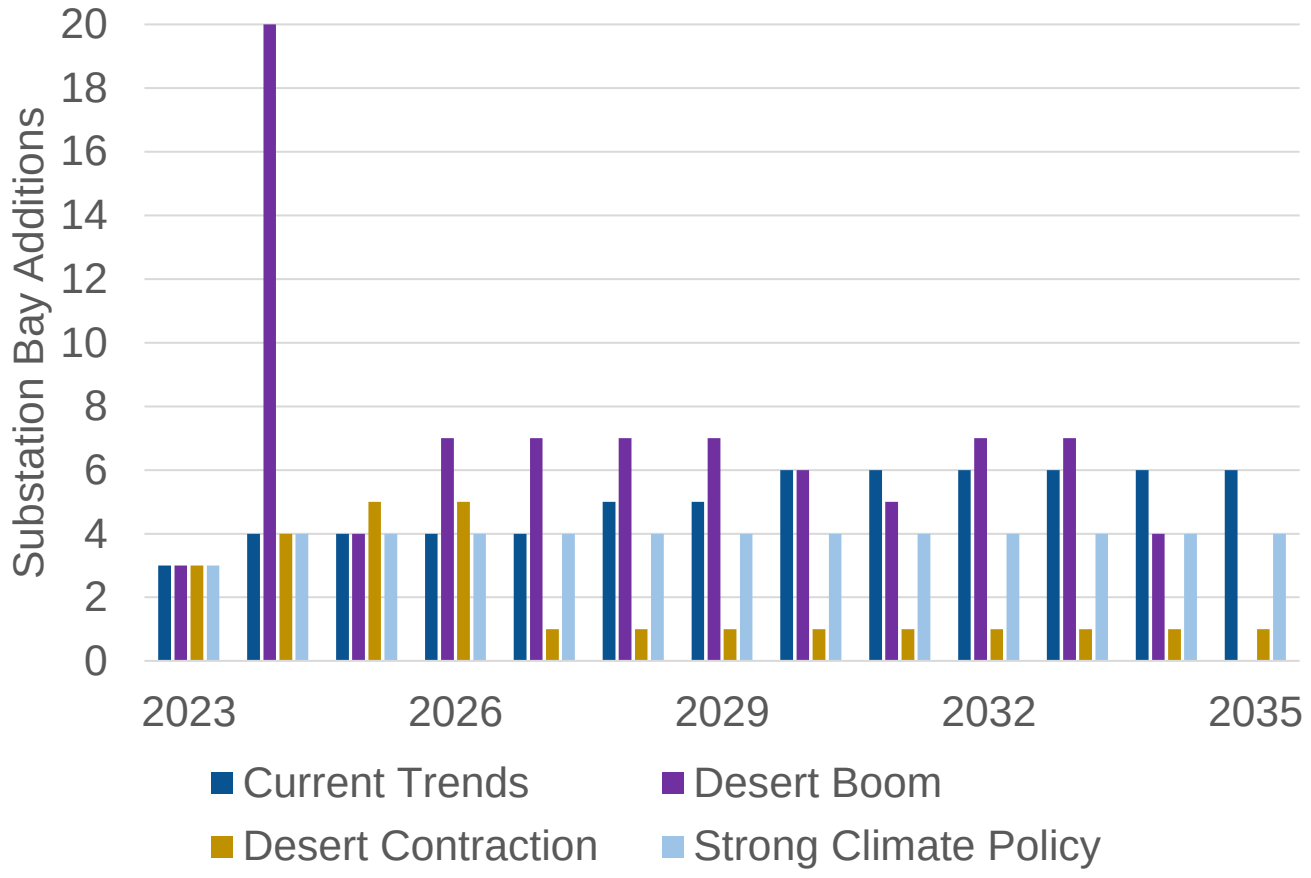


Total Substation Bay Additions



Substation Bay Additions by Scenario per Year

- Results align with scenario forecasts
- 2024 Desert Boom infrastructure required to support overloads and growth spike in Southeast valley
- Most scenarios follow historical and consistent growth rates aligned with ISP scenario forecasts.



Key Takeaways and Future Considerations

- Distribution Planning, Customer Programs and Pricing partnership key to leverage distribution system to provide value
  - Key studies and alignment required to increase understanding of value
- Consider hosting capacity impacts between transmission and distribution system
- Large timing dependency on technology maturement, market maturement, customer demand, and system health and reliability
- Anticipation of future regulatory impacts at the distribution level

Customer Programs Key Findings

Nathan Morey
Manager, Product Development (SRP)

Customer Programs

How do SRP's customer programs need to evolve during the plan period?

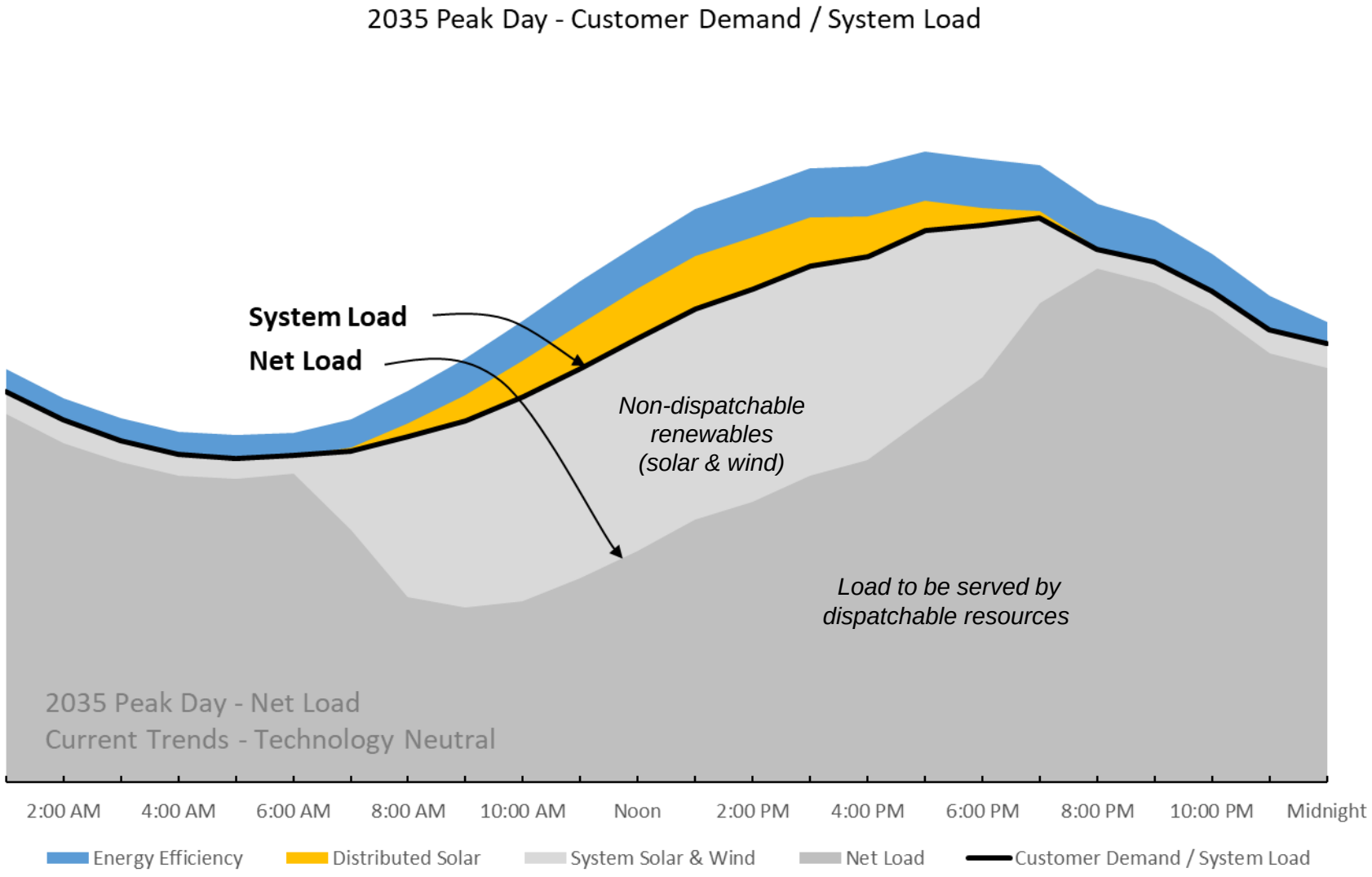
Customer Programs Key Findings

- Program and price plan design focus will shift to Net Load in most cases
- Educational campaigns and initiatives will be needed to reset customers' understanding of when to consume and when to conserve
- Energy Efficiency & Demand Response will evolve to target later evening hours
- Distributed Solar with Storage will become more valuable to customers and the system as the peak shifts later
- Transportation and Beneficial Electrification programs can leverage mid-day hours to shift EV charging behaviors and to maximize carbon reduction impacts

2035 Peak Day – Shifting Target

Takeaways:

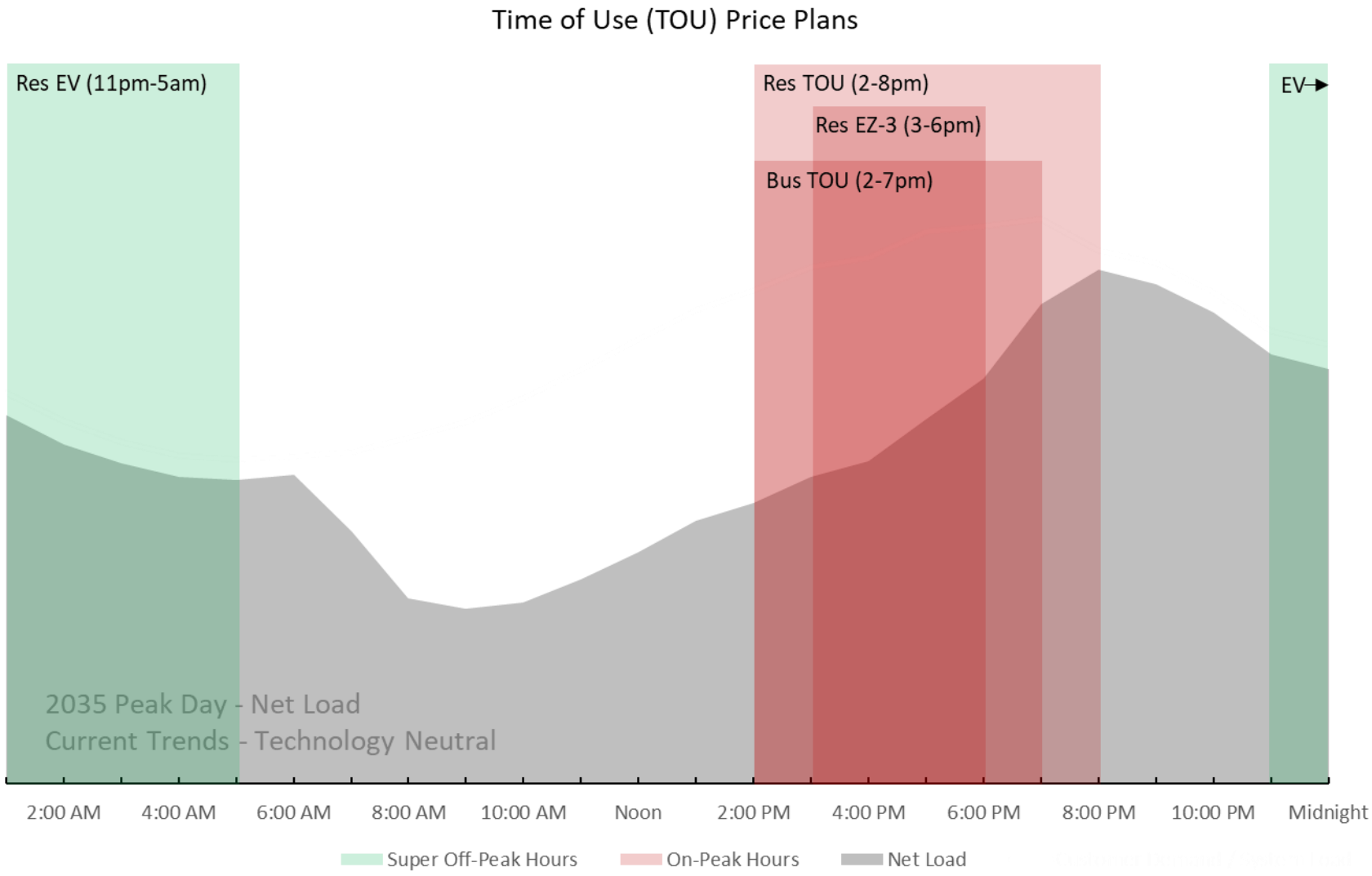
- Net Load is the new target for pricing and programs
- Late evening and overnight load reduction becomes more important
- Opportunity to build or shift load to mid-day



Load Shifting through Price Plan Design

Takeaways:

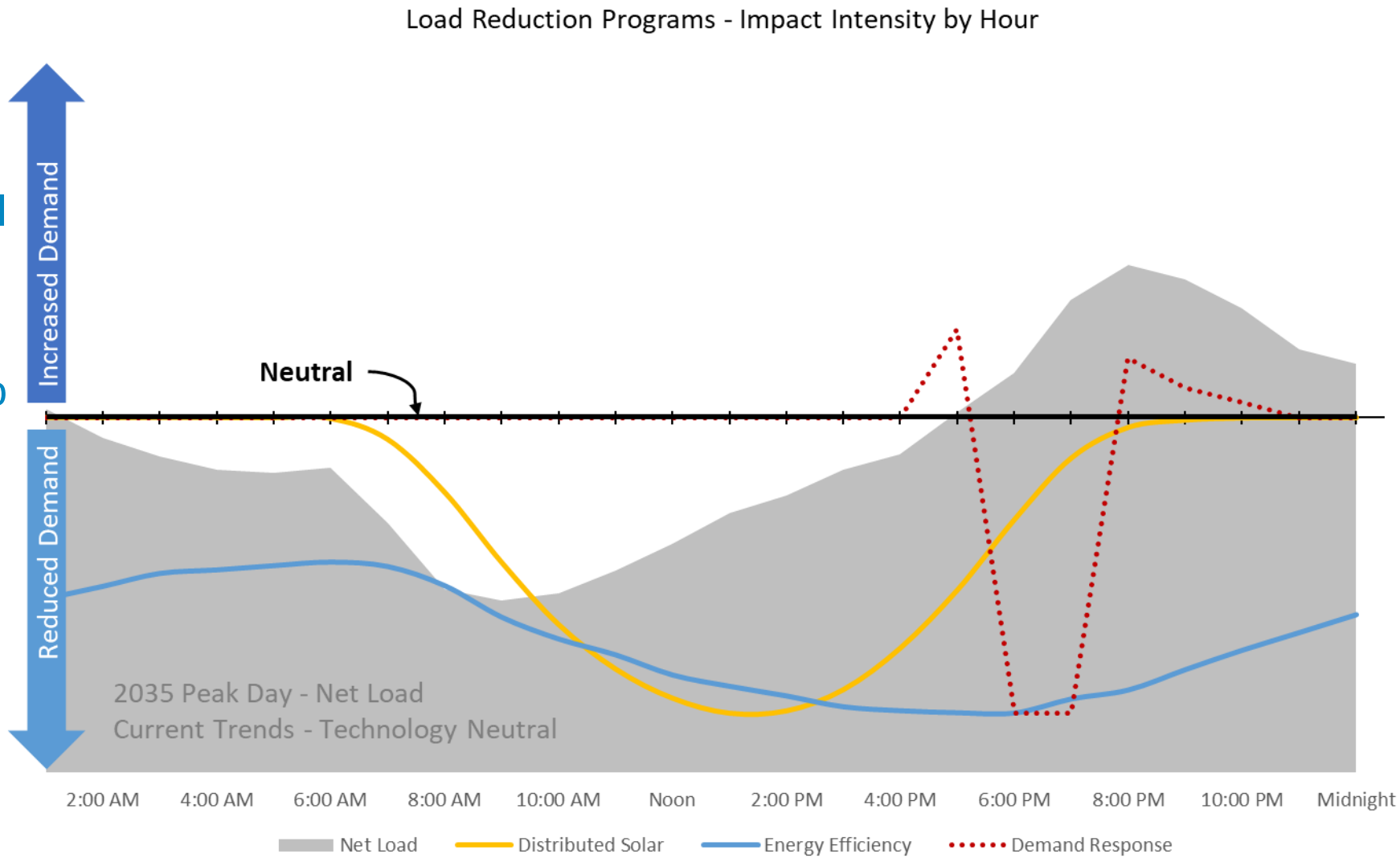
- Potential for later on-peak hours
- Potential for mid-day Super Off-peak hours



Load Reduction Programs

Takeaways:

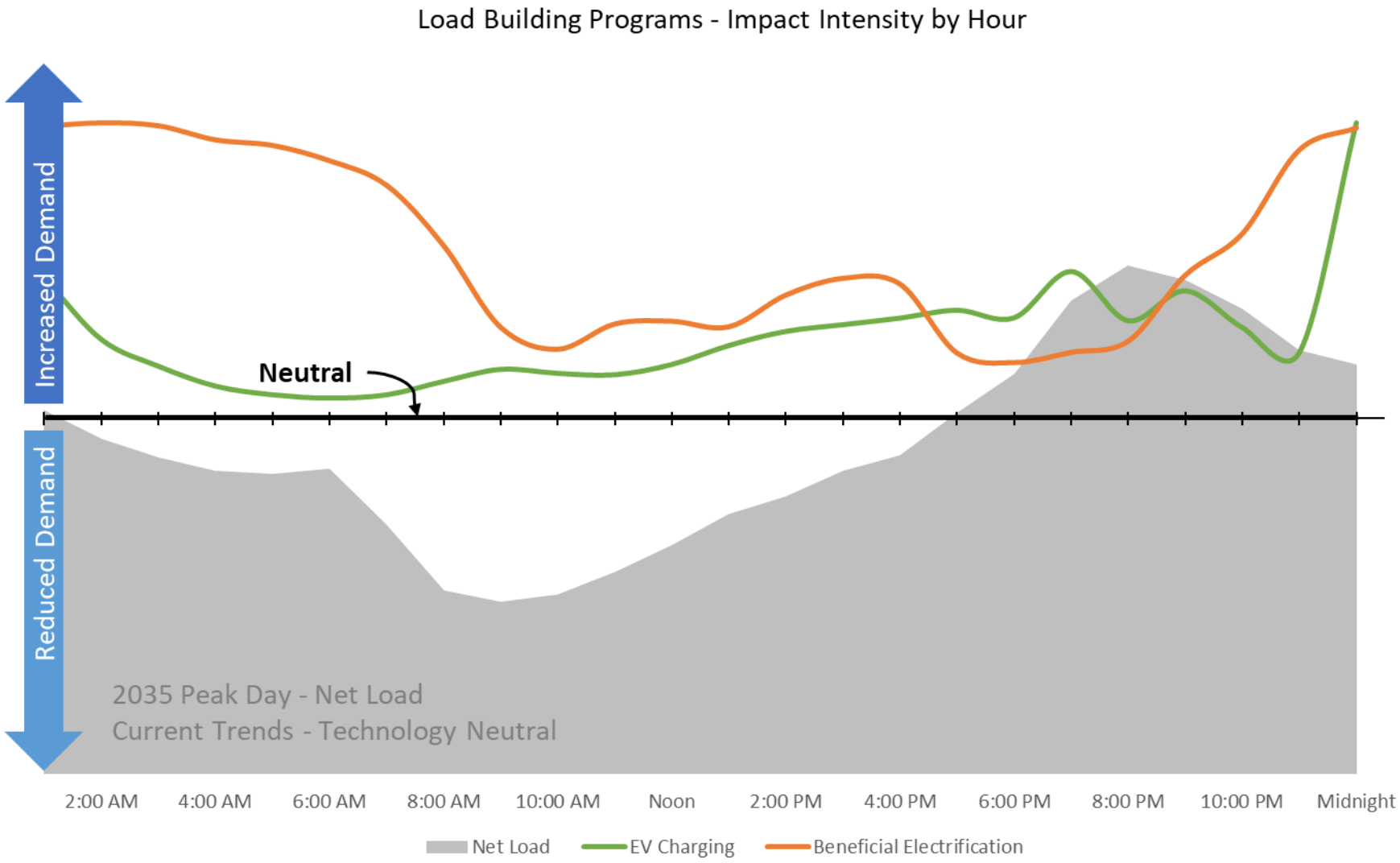
- Energy efficiency will continue to be beneficial over peak hours.
- Demand response events will likely slip into the late evening hours.
- Distributed solar will likely rely on storage to provide greater value over the later peak hours.



Load Building Programs

Takeaways:

- Electric vehicle programs will encourage mid-day charging.
- Beneficial electrification programs shift focus to mid-day electrification opportunities.
- Lower mid-day cost and carbon impact is likely to drive electrification.



Customer Programs Key Findings

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Turn and Talk
Key Findings: (5 Minutes)

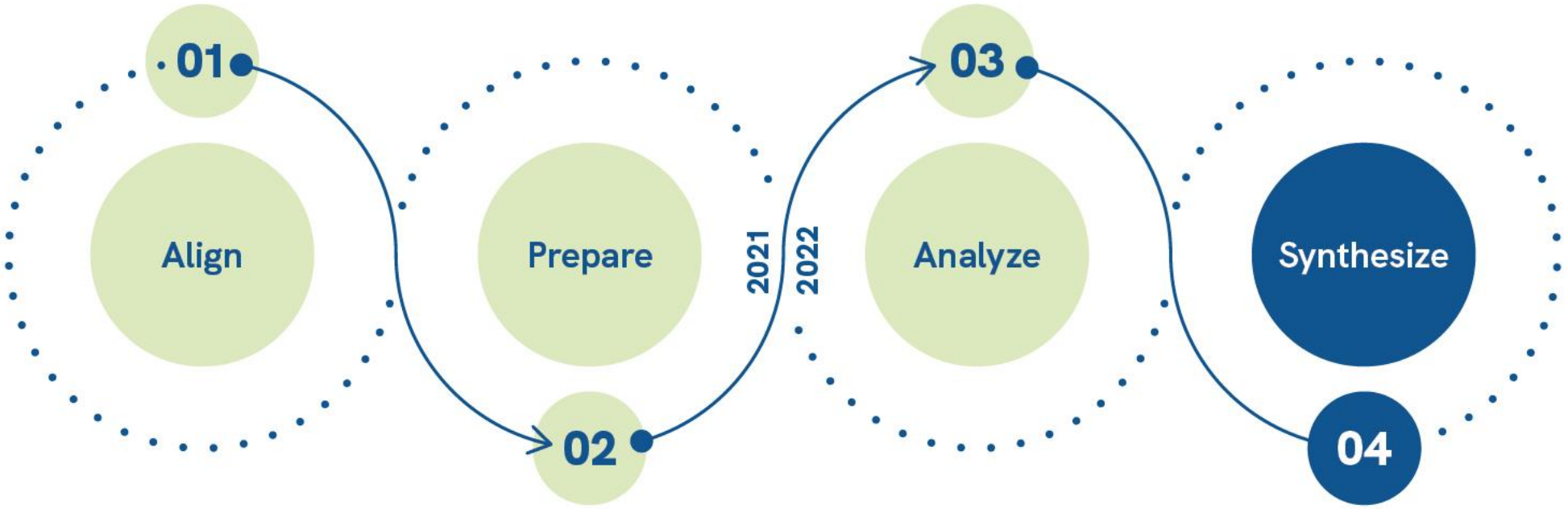
What's a key finding that you see as important for the ISP?

Turn and Talk
Key Findings:

Roundtable (10 Minutes)

Initial System Strategy Themes
Small Group and Roundtable Discussion

Angie Bond-Simpson
Director, Integrated System Planning & Support (SRP)



SRP ISP ROADMAP

Stakeholder Engagement and Public Outreach

Align on Objectives of the first ISP

Collaboratively develop Study Plan:
Scenarios & Sensitivities
Strategic Approaches
Metrics

Gather input data

Perform system analysis

Validate and share results

Recommend new SRP system strategies

Recommend near term actions

Draft Products of the ISP

Today's Discussion

1. Develop System Strategies

2. Draft a Balanced System Plan

3. Identify ISP Actions

System Strategies

The System Strategies are the **Board approved**, **long-term strategies** for planning and operating the power system through 2035.

How they will be used:

- Provide **guidance** for how to plan and operate the system in the future
- **Transparency** to customers and other stakeholders of what strategies SRP plans to employ to evolve its system.
- Focal point for **prioritizing** SRP's investment decision making
- Creates foundation for other ISP deliverables (Balanced System Plan and ISP Actions)

Draft System Strategy Themes

- Evolve Customer Programs & Price Plans
- Develop and Preserve Optionality
- Build and Leverage Partnerships
- Proactive Siting for System Investments/Additional Infrastructure
- Prepare and Equip the Workforce

Grounded in ISP analysis results and Guiding ISP Principles

Guiding Integrated System Plan (ISP) Principles

The purpose of the Guiding ISP Principles is to balance all important considerations in developing an Integrated System Plan. SRP strives to understand the inherent tradeoffs between reliability, affordability and sustainability for the principles and seeks to establish an Integrated System Plan in **accordance with these Guiding ISP Principles.**

Integrated Long-Term View

Develop a holistic view, including resources, transmission, distribution and customer program perspectives for meeting **evolving** customer needs and achieving our Corporate Goals for **2035 and beyond**. The long-term view ensures that SRP is making the right decisions today to support its customers and stakeholders in the future.

Transparency

Engage customers and other stakeholders in a system planning process that is responsive to questions and input.

Measure Success Through the Eyes of Our Customers

Maintain industry leading customer satisfaction by responding to evolving customer needs by providing sustainable, safe, reliable, and affordable power while equitably recognizing the different needs, challenges, and perspectives of our customers

Manage Costs

Deliver exceptional System energy value **by minimizing impacts from the energy transition and future uncertainties to the average retail prices** through diligent, long-term oriented cost management.

Build an Adequate and Reliable Power System

Meet, and in some cases, exceed industry standards to provide a dependable supply of electricity to all SRP customers. Provide a reliable grid that is able to prepare for and recover from both anticipated and unanticipated disruptions to ensure energy availability

Adapt Toward a More Sustainable Future

Meaningfully reduce carbon emissions **and generation water usage to achieve SRP's 2035 Sustainability Goals to help address climate change and create less waste.**

What We Heard from Advisory Group Members:
How does your organization plan for transformational change?

We try to be very open and aware of all that's out there, what different answers we can come up with historically versus now.

There is so much information, you can get lost.

We ask how to make decisions today that have ramifications long into the future.

We have to be comfortable with uncertainty and mitigate risks.

We look at what works with the pre-existing system and balance different considerations.

Small Group Discussion

Based on these five themes, what are potential strategies SRP could consider for the ISP?

Guides for Brainstorming

- Aim to capture as many ideas as possible
- Focus on generating ideas rather than providing feedback
- Encourage ideas from all group members

Small Group Discussion: Process

1. As you brainstorm possible strategies, consider how themes relate to the Guiding ISP Principles.
2. With 2 minutes to go, each person indicates top five most important strategy ideas for the ISP using sticky dots.
3. Identify a volunteer to share out.

Based on these five themes, what are potential strategies SRP could consider for the ISP?

Roundtable

Based on these five themes, what are potential strategies SRP could consider for the ISP?

Wrap Up and Next Steps

Angie Bond-Simpson
Director, Integrated System Planning & Support (SRP)

Next Steps

- Perform detailed operational analysis to refine generation mix, emissions, water usage and cost metrics
- Complete transmission system analysis
- Quantify sustainability, affordability and avoided cost metrics
- Develop draft system strategies

2023 Engagement Calendar

Next Steps

Advisory Group

- May 12th ISP Large Stakeholder Group Meeting: ISP Analysis Key Findings & ISP Strategies
- May 19th ISP Advisory Group Meeting: ISP Analysis Key Findings & ISP Strategies

SRP Team

- Rescheduling Evolution of Time of Day (use) Programs Technical Working Session (TBD)
- Complete ISP Analysis
- Develop draft system strategies

Stakeholder Communication Email:

IntSysPlan@srpnet.com

Integrated System Plan: Informational Portal

https://srpnet.com/about/integrated-system-plan.aspx

Working Lunch

Technical Working Session: Regional Market Developments Debrief

Arne Olson
Senior Partner (E3)

Technical Working Session: Regional Market Developments

E3 Summary of Presentations

Moderator- Arne Olson

Senior Partner

Energy + Environmental Economics

David Hurlbut

Senior Analyst

National Renewable Energy Laboratory (NREL)

Regional Electricity Markets: Why Do It, What to Expect

- As the power system evolves, benefits of regional coordination are increasing to support reliable and cost-effective decarbonization
- The degree of coordination can vary and determines benefits to dispatch and load balancing, reliability and transmission planning

Sarah Edmonds

President and CEO, Northwest Power Pool Corporation

Western Resource Adequacy Program (WRAP)

Western Resource Adequacy Program (WRAP) and Other Regional Grid Initiatives

- Foundation for regional resource adequacy is lacking but needed to ensure real-time and day-ahead markets can operate smoothly
- WRAP will offer centralized framework for binding, shared capacity, allowing lower planning reserve margins and investment costs

Kelsie Gomanie

Advocate, Climate & Clean Energy Program

Natural Resources Defense Council (NRDC)

Regional Markets: Environmental Benefits

- Regional markets support decarbonization, reliability, and affordability goals through more efficiency resource sharing and planning
- RTOs provide greatest efficiency gains and improve transparency, stakeholder engagement, and independent governance

Tony Clark

Senior Advisor, Wilkinson| Barker| Knauer| LLP

Former Commissioner

Federal Energy Regulatory Commission (FERC)

Regionalization in Wholesale Electricity Markets

- Changing electricity system dynamics challenge ability of RTOs to create sufficient price signals for reliability, transmission, etc.
- Strong governance, flexibility, and creative solutions are crucial to meet needs of regional market participants

Colton Kennedy

Director, Energy Portfolio Planning

Omaha Public Power District

Portfolio Planning within an Integrated Market

- Integrated markets enable economic efficiencies, but face challenges and limitations such as lower marginal cost resources that reduce benefits of coordinated energy markets; financial signals to ensure reliability may shift to other market services

E3 takeaways from panel discussion

An evolving power system has led to **growing desire** for regional market coordination

- Expanding coordination of real-time and day-ahead electricity markets
- Developing resource adequacy programs
- Advocates for full RTOs and regional transmission coordination

Regional markets offer **opportunities** to bolster decarbonization, reliability, and affordability

- Economic efficiency gains from resource and planning sharing
- Mitigate fluctuations in variable energy resources and net demand

Many **challenges** will need to be addressed for successful regional coordination

- Increasing levels of low marginal cost resource reduce energy prices and efficiency gains from coordinated electricity markets
- Diverse and expansive geographies and needs

Numerous **solutions** can mitigate the uncertainty and risks of regional markets

- Binding commitments for delivering promised capacity resources
- New market products to support necessary price signals for reliability
- Strong governance, transparency, and stakeholder engagement to navigate diverse needs of market participants

Roundtable Discussion

thank you!

Advisory Modeling Subgroup Meeting : ISP Analysis Results

Part 1- Technical Q&A Session

April 21st, 2023

Agenda:

Advisory Modeling Subgroup Meeting: ISP Analysis Results
Part 1 - Technical Q&A Session

Time		Topics	Discussion Lead
12:30-12:45	**15 min**	Coffee Break	
12:45-2:30	**135 min**	Forecasting & Customer Programs- Technical Q&A	Jed Cohen (SRP) Nathan Morey (SRP)
		Distribution Planning- Technical Q&A	Melissa Martinez (SRP)
		Transmission Planning – Technical Q&A	Justin Lee (SRP)
		ISP Long-Term Capacity Expansion Results — All Cases	Nate Lee (E3)