

Integrated System Planning: A New Planning Paradigm

ISP Webinar Series

Energy and Environmental Economics (E3) and
Salt River Project (SRP)

July 29, 2024



Energy+Environmental Economics

Agenda

| ITEM | SPEAKER |
|--|---|
| Motivation for integrated system planning 15 min | Arne Olson E3, Senior Partner |
| SRP's first Integrated System Plan 25 min | Angie Bond-Simpson SRP, Sr. Director of Resource Management |
| Considerations for system planners 5 min | Joe Hooker E3, Director |
| Q&A 15 min | |

Integrated System Planning webinars and whitepapers

Next webinar (September 18th):

Integrated System Planning: From Vision to Reality

**Arne Olson, Lakshmi Alagappan,
Joe Hooker & Aaron Burdick, E3**

E3 ISP whitepaper

In September, E3 will publish a whitepaper with perspectives on how to make integrated system planning a reality. The case study will include analytical approaches, case studies, and considerations for how to do integrated system planning.

ESIG ISP Task Force and whitepaper



E3 will support ESIG in leading the Integrated System Planning Task Force, which provides a platform for planners and system operators to discuss and advance the integration of electric system planning, culminating in a whitepaper.

Motivation for integrated system planning

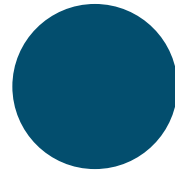


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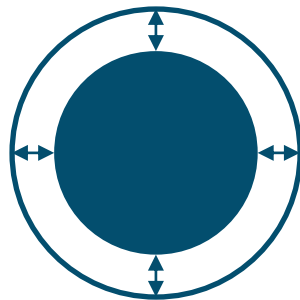
The electric system requires massive investments

Decarbonization will require massive investments in the U.S. electric system

>\$2 trillion
2025-2035



\$3-6 trillion
2035-2045



Source: Princeton Net-Zero Carbon America Study

Many forces are driving high investment needs over the coming decades



Decarbonization of power system



Industrial and data center load growth



Electrification



Aging infrastructure



Wildfire risks



Cybersecurity

This creates opportunities and challenges for meeting goals

Planning goals:



Reliable



Affordable



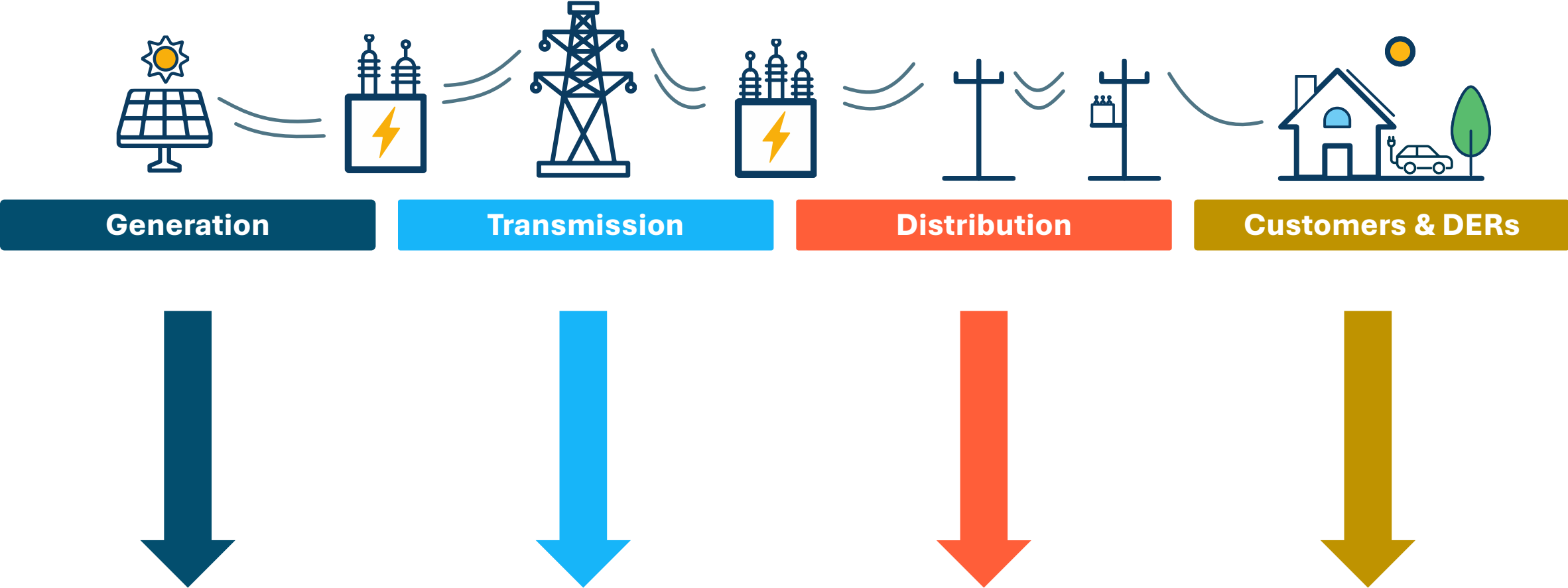
Clean



Need to ensure that planning identifies

- The right investments...
- in the right locations...
- at the right times

System planning is largely siloed today



Why system planning should be customer-centric

+ Customer energy needs are growing rapidly

- Large industrial and data center loads
- Electrification

+ Customers are adopting technologies that can provide flexibility to the system

- Electric vehicles
- Smart thermostats
- Storage

+ Customers want choice!

- Manage bills
- Onsite and offsite renewable generation
- Programs and rate plans



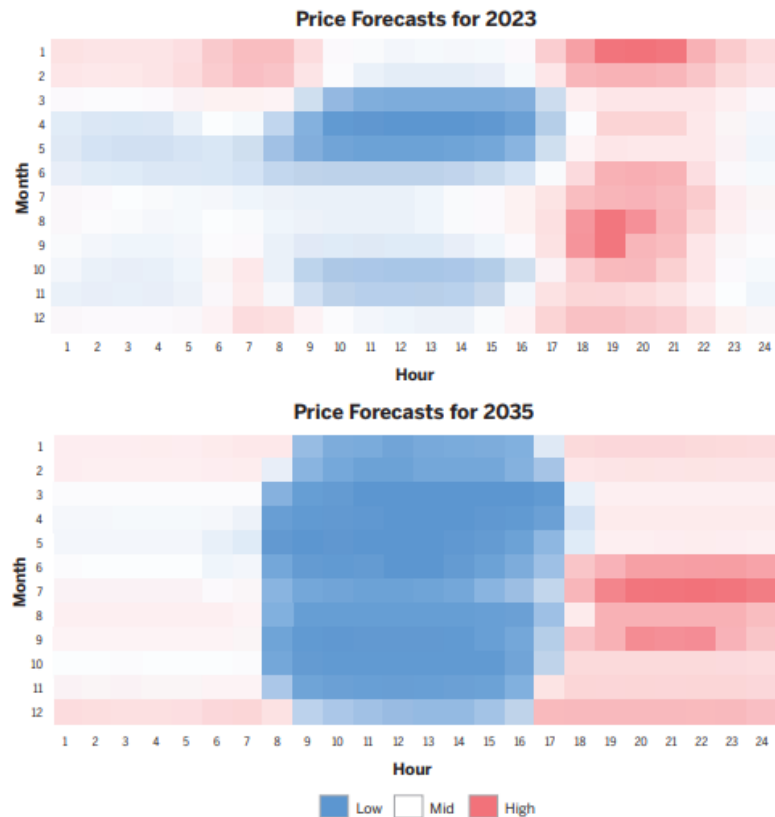
Customers & DERs



Example: integrating generation and customer/DER planning

Average prices in 2023 and forecast for 2035

CAISO SP15 zone



Generation

&



Customers & DERs

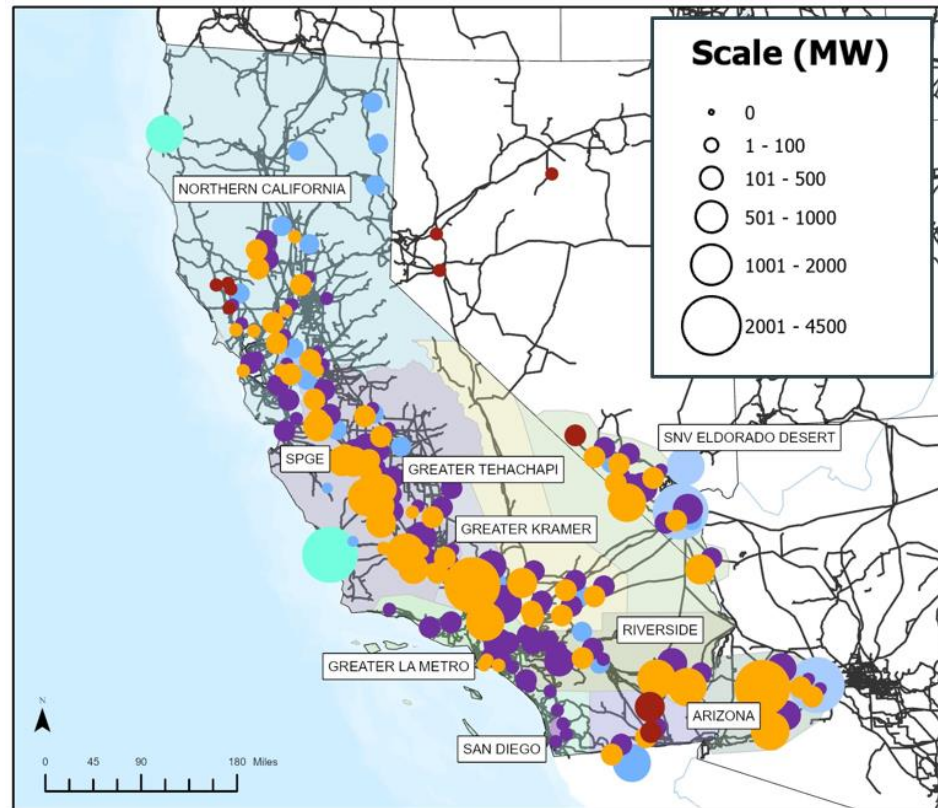
Utility-scale generation, customers, and DERs all have a role to play in the energy transition

- Customer actions and DERs can reduce the need for system investments
- The cost and availability of utility-scale generation (and transmission) impacts the value of customer actions

Example: integrating generation and transmission planning

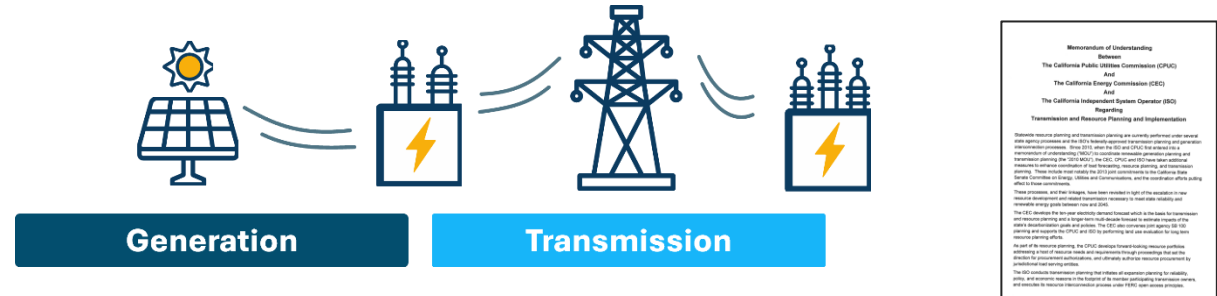
CPUC IRP Resource Additions by Substation

2024-25 Transmission Planning Process, 2039 Snapshot



■ Solar
 ■ Battery
 ■ Wind
 ■ Offshore wind
 ■ Geothermal

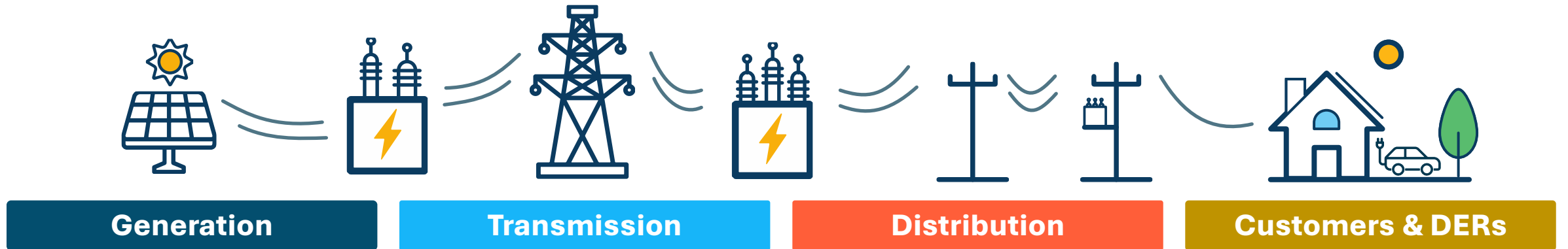
MOU



Significant amounts of new resources need to be integrated onto the transmission system

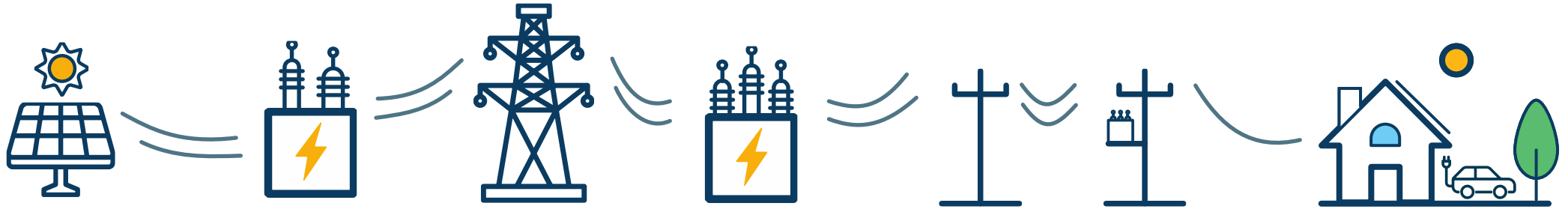
- Existing transmission and future transmission options—including for remote renewable resources—should inform which generation resources are added and where
- Resources, such as storage and local renewables, can be sited to reduce or mitigate transmission needs

Integrated system planning considers the system as a whole



The goal of integrated system planning is to **harmonize planning processes** to ensure that investments are optimal from a **system-wide planning perspective**

Many investments have impacts across all parts of the system

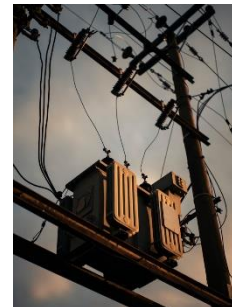


Generation

Transmission

Distribution

Customers & DERs



Integrated system planning across the industry



In April 2024, SRP published its first-ever Integrated System Plan (ISP), which included full system planning through 2035. SRP is currently planning the next ISP cycle.



**Hawaiian
Electric**

In 2023, Hawaiian Electric filed its first Integrated Grid Plan (IGP), which included detailed analysis of Hawaiian Electric's five island grids through integrated planning of utility-scale generation, distribution, transmission, and customer DERs.



In 2022, Xcel Energy created a centralized Integrated System Planning (ISP) team – combining generation, transmission, distribution, and natural gas into a single department. The modeling function of each team was also combined under central leadership

SRP's first Integrated System Plan



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Delivering water and power®

ABOUT SRP

SRP is a community-based not-for-profit providing water and power to 1.1 million customers in the Phoenix metro area.



**Top
3**

**IN THE U.S. FOR
RELIABILITY,
AMONG POWER
UTILITIES
SERVING 1-2M
CUSTOMERS
(2022 SAIDI)**

#1

**RESIDENTIAL
CUSTOMER
SATISFACTION AMONG
LARGE WESTERN
UTILITIES
(J.D. POWER 2022)**

#3

**BUSINESS CUSTOMER
SATISFACTION
AMONG LARGE
WESTERN UTILITIES
(J.D. POWER 2022)**



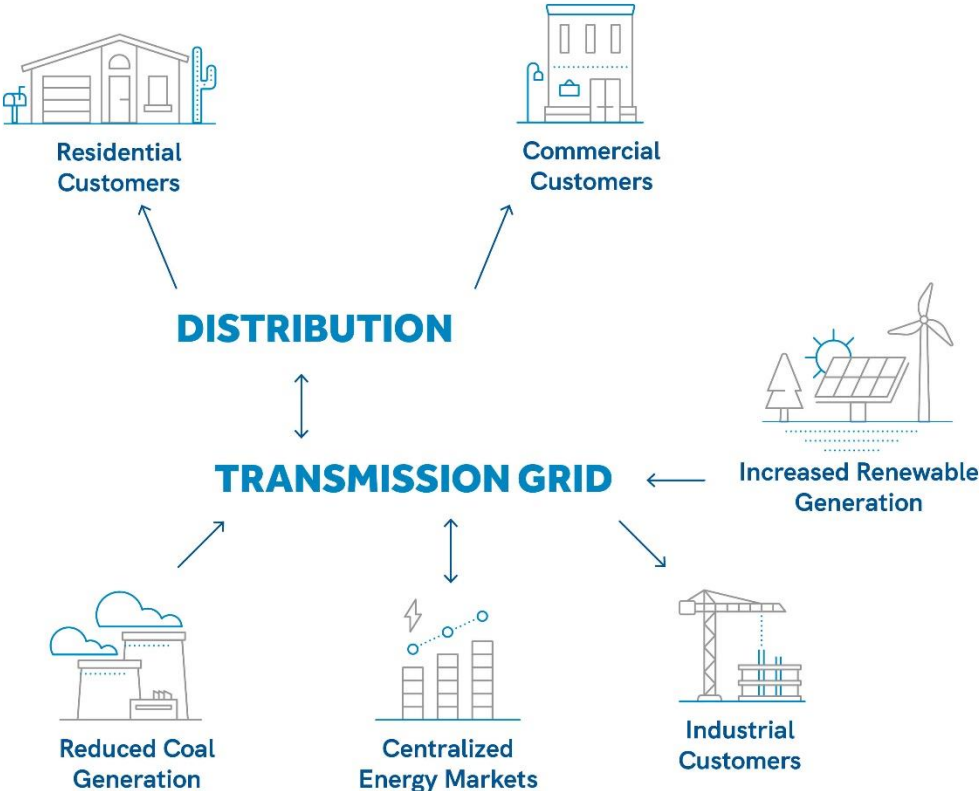
**PHOENIX WAS AMERICA'S
HOTTEST MAJOR CITY IN 2023**

ABOUT THE VALLEY

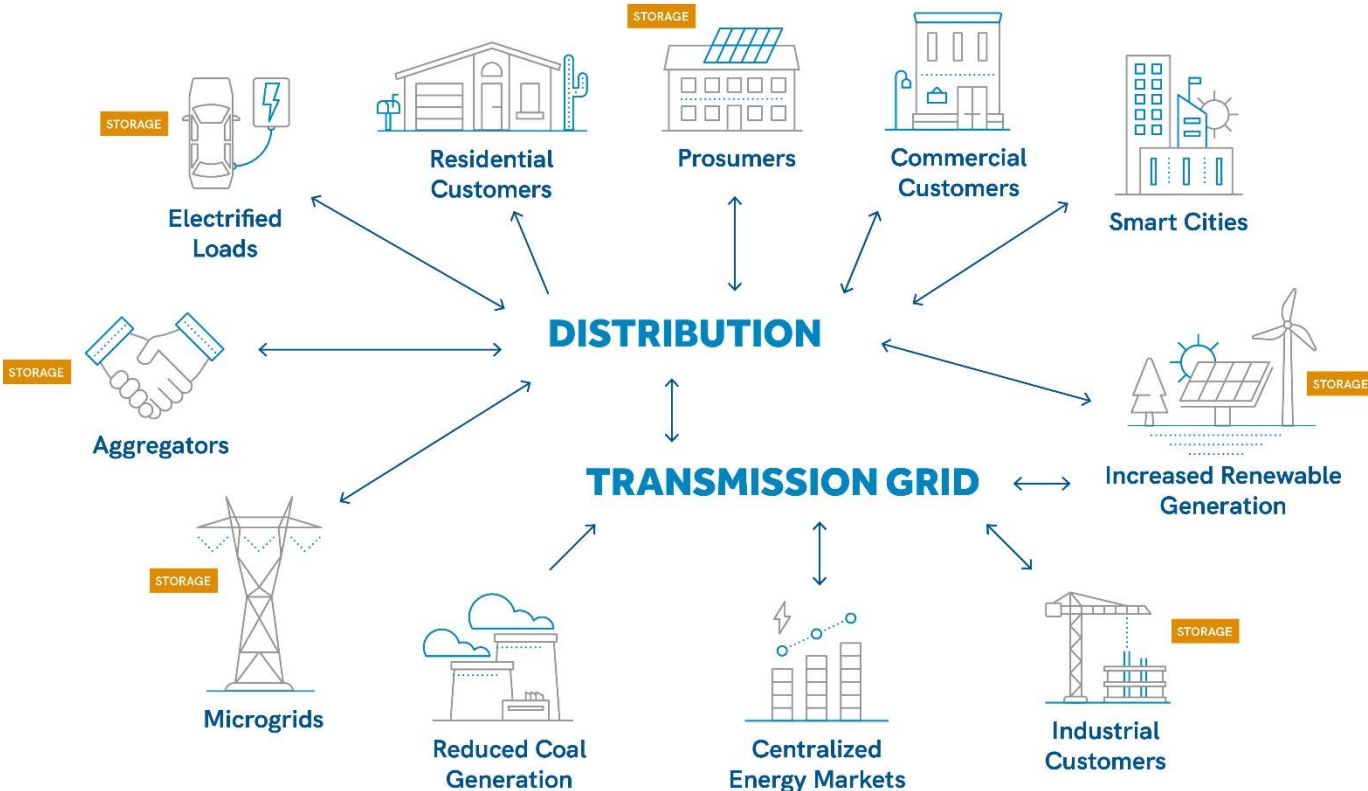
- Population Growth:
 - 11.2% population growth between 2010 and 2020
 - 25% projected growth in SRP service area by 2030
- Temperatures in 2023:
 - 55 days at 110 degrees or higher
 - 131+ days at 100 degrees or higher
- Affordability comprises 3 of the 5 biggest issues facing the state

Motivation for Integrated System Planning

Traditional Power System



Power System of the Future

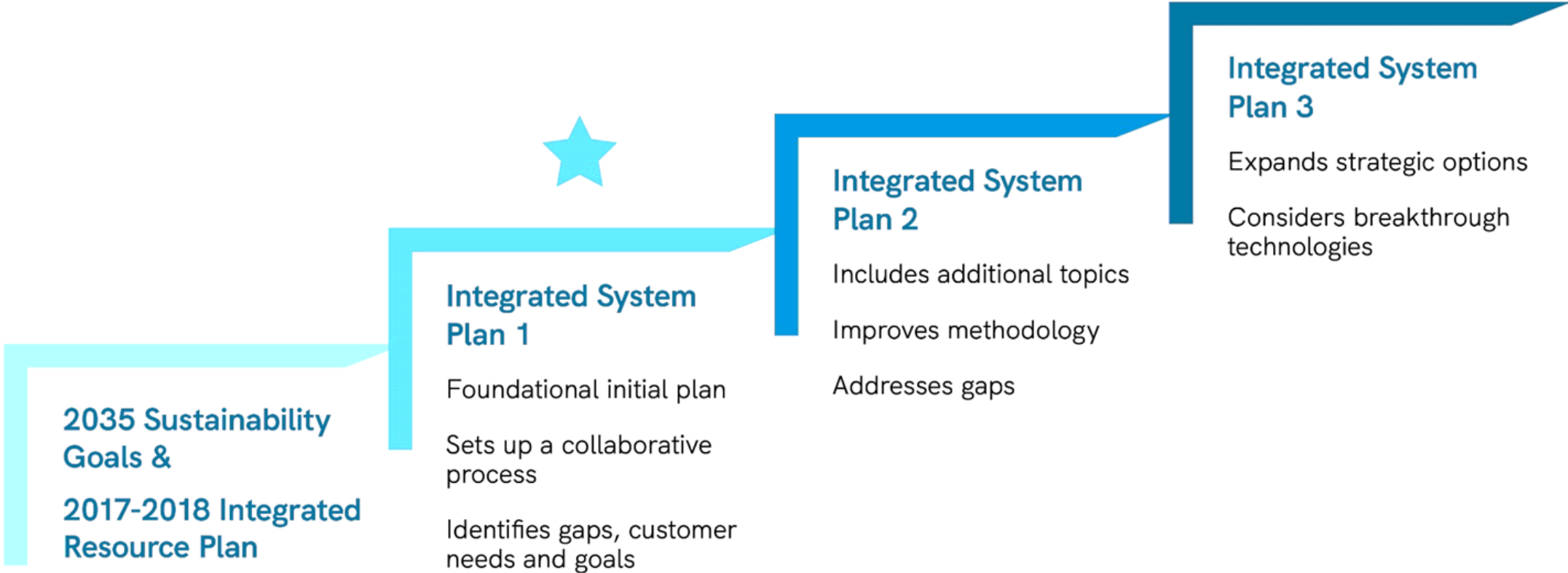


SRP's Integrated System Plan

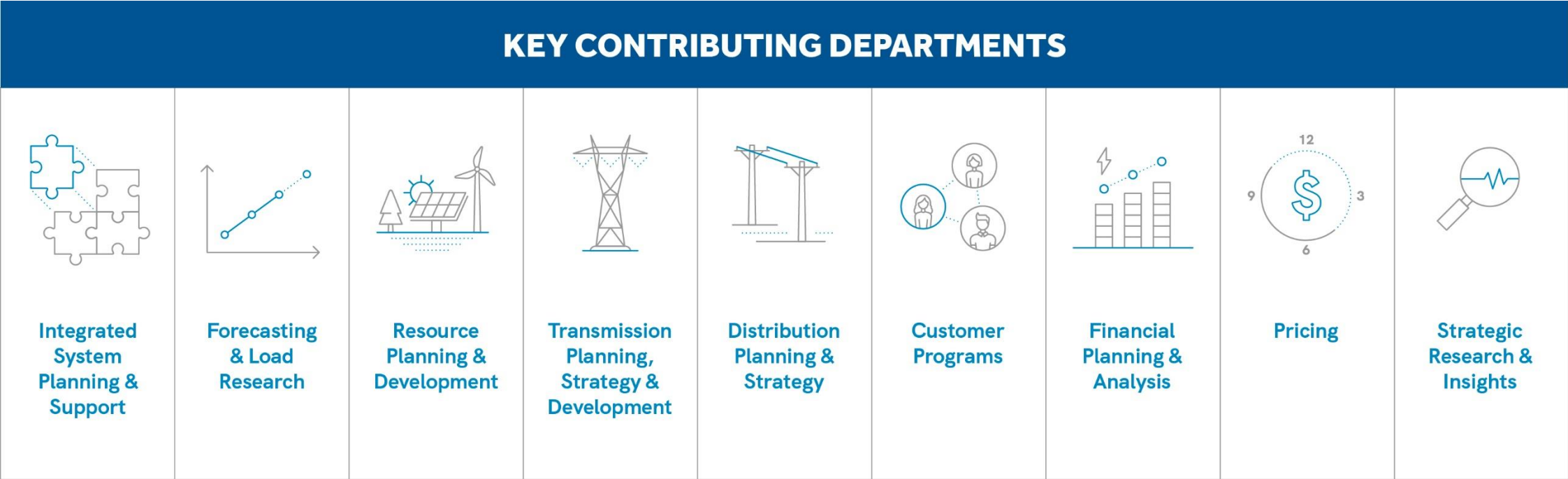
An Integrated System Plan is the holistic **roadmap** for the **power system of the future**, which considers **evolving customer needs** for **reliability, affordability and sustainability** and achieves our 2035 goals.



Progression of the ISP



ISP Project Team



Coordination,
Leadership Guidance,
Analysis & Support

Customer
Research Team

Leadership Guidance & Analysis Teams

Consultant:
bellomy

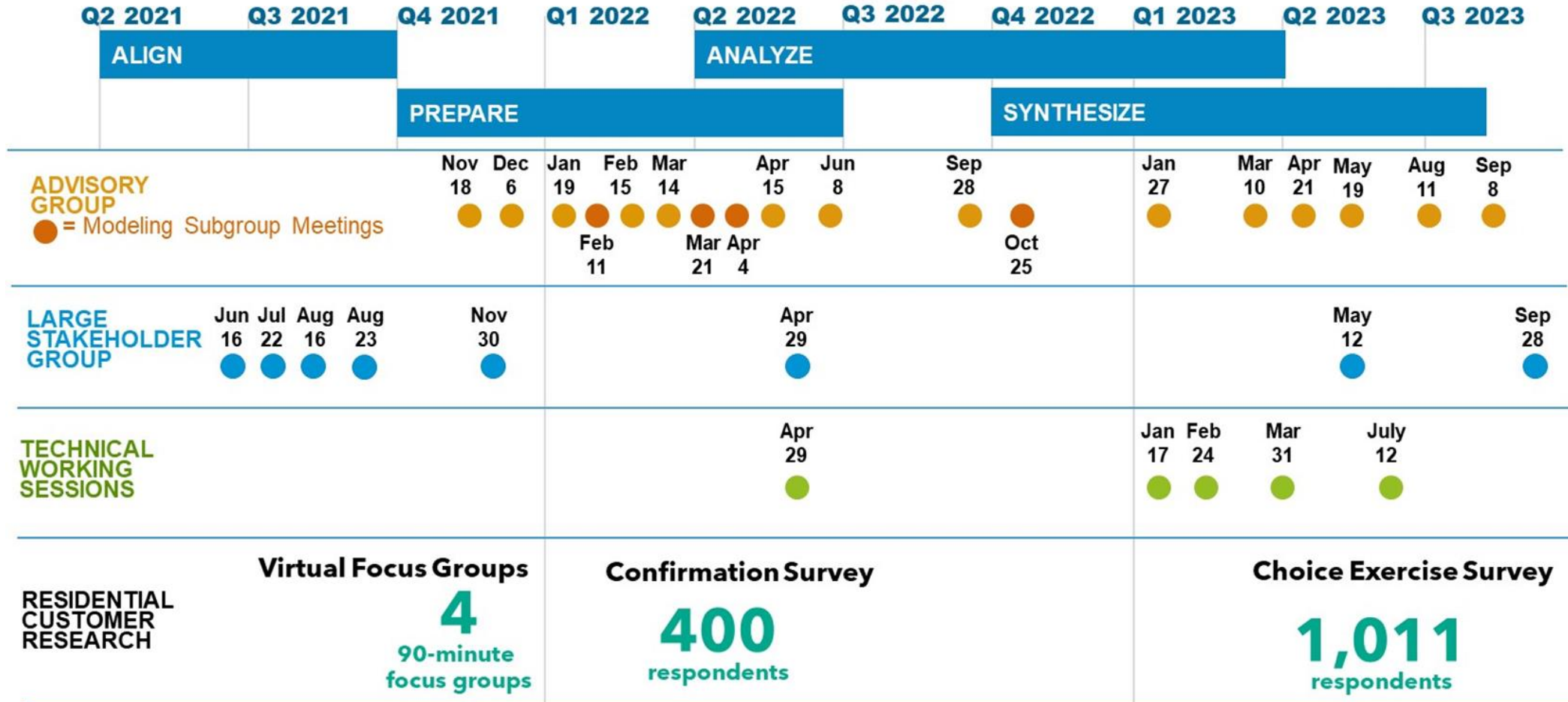
Consultants:

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KEARNS WEST

Stakeholder and Customer Engagement



System-Wide Analysis

Strategic Approaches

Scenarios

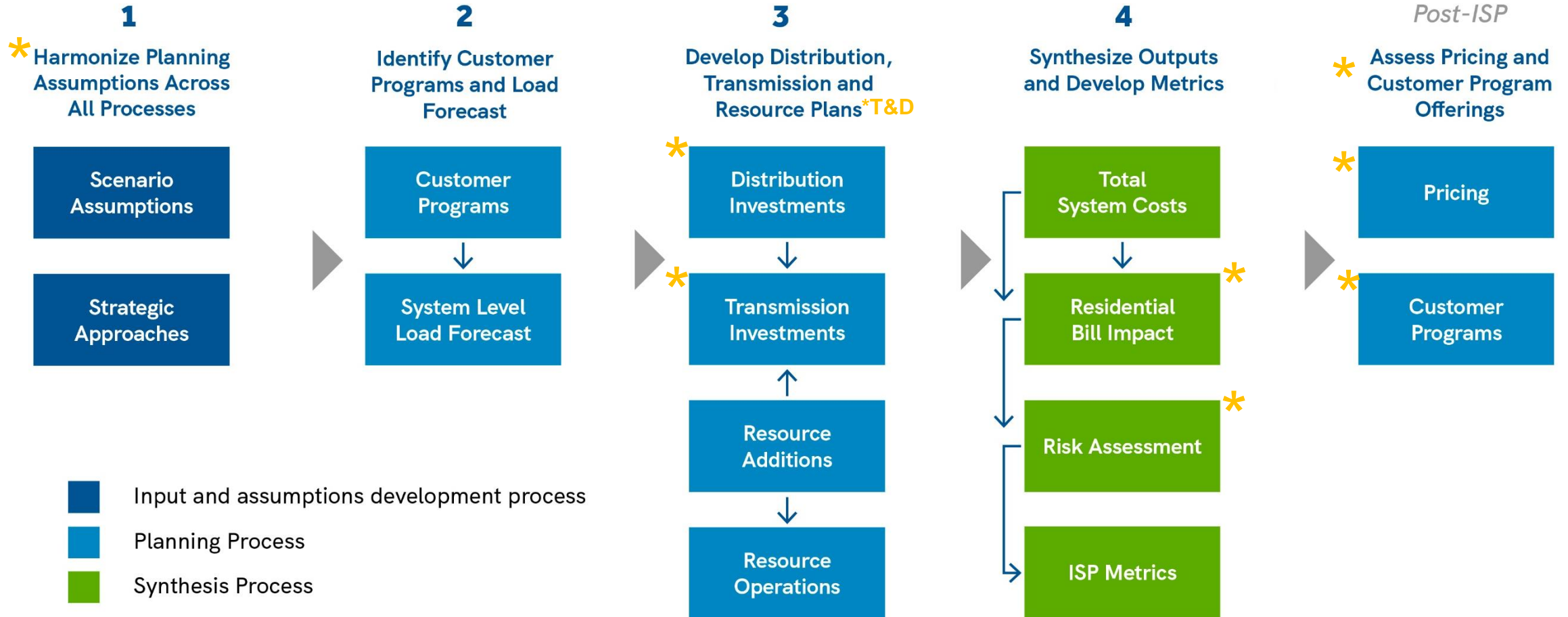
| | Technology Neutral | No New Fossil | Min. Coal |
|-----------------------|--------------------|---------------|-----------|
| Desert Contraction | ● | ● | ● |
| Current Trends | ● | ● | ● |
| Strong Climate Policy | ● | ● | ● |
| Desert Boom | ● | ● | ● |

12 Scenario-Based System Plans



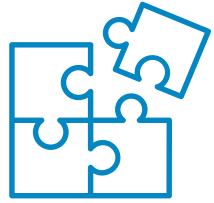
30 Sensitivity Cases

Modeling / Analytical Framework



* New for the ISP

ISP Outputs



System Strategies – Long-term strategies for planning and operating the power system to achieve SRP’s 2035 goals.

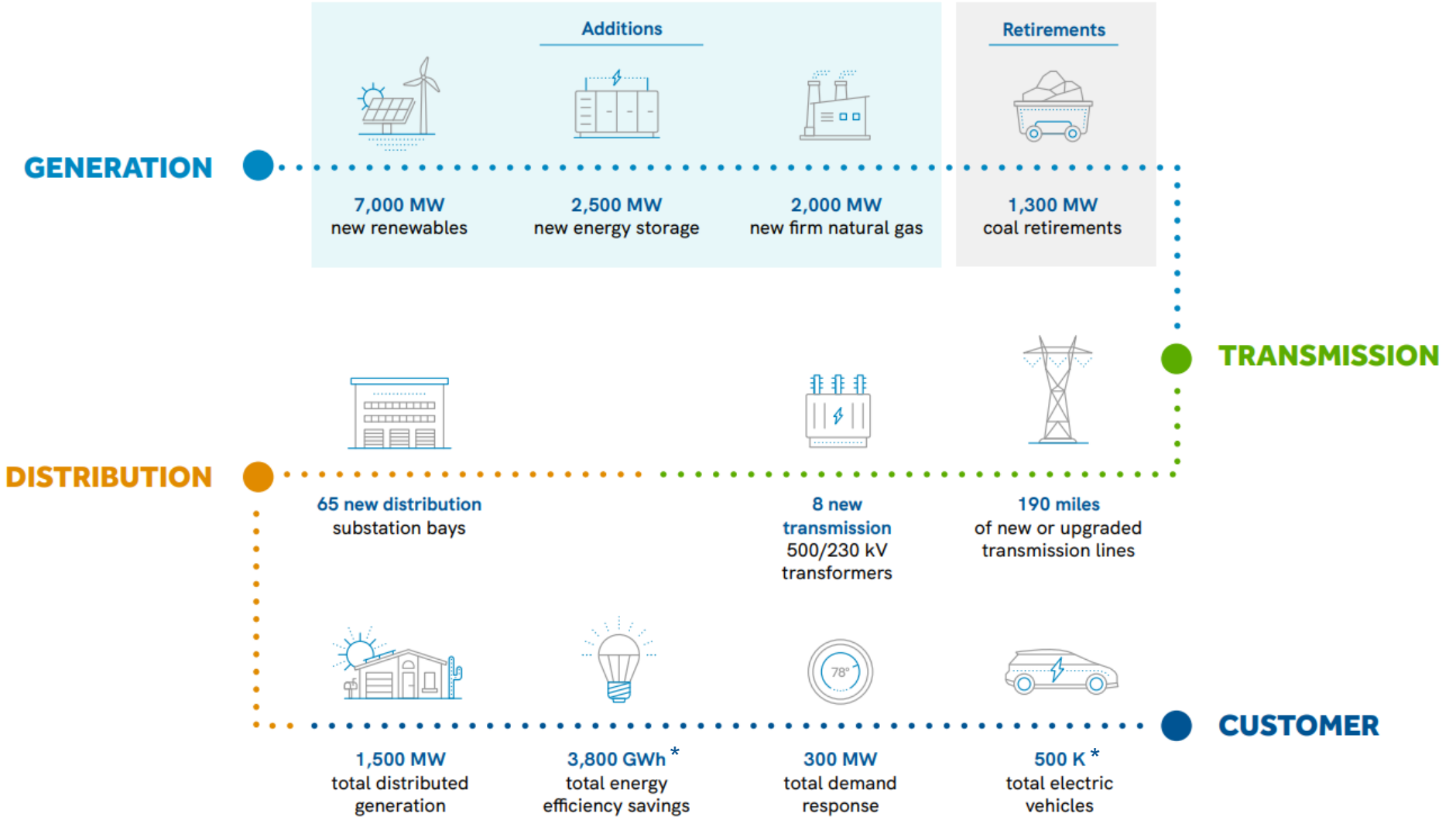


Balanced System Plan – Illustrative path for SRP’s system that is consistent with the ISP System Strategies.



Actions – Set of near-term actions that the SRP team will complete following the publication of the ISP.

Balanced System Plan (2035)



*Targets for 2035 have been adjusted with new goals

ISP Actions

Customer Grid Focused Actions

1. Residential Time-of-Use Pilot
2. Time-of-Use Evolution
3. Customer Program Refresh
4. EV Managed Charging Roadmap
5. Electrification
6. Distribution Enablement Roadmap

Bulk Grid Focused Actions

7. Resource Request for Proposals/Information
8. Coal Transition Plan
9. Proactive Siting
10. Regional Transmission



Lessons Learned

- Executive support and alignment is critical
- Respect the process and the people; change is challenging
- Celebrate the light bulb moments and take feedback
- More is not always better
- You won't know what is achievable until you do it
- Timing requires balance, patience, and adaptability
- Alignment, alignment, alignment

First-Ever ISP Published April 2024



Scan for the Integrated System Plan

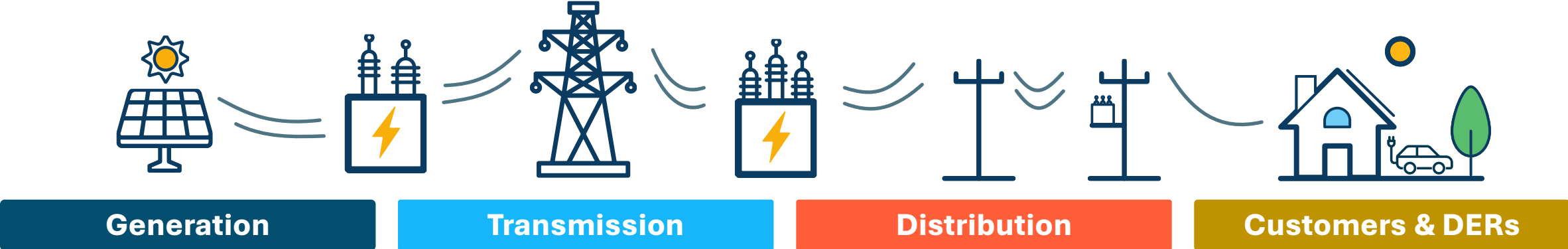


Considerations for system planners



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Alignment benefits of SRP's first ISP



Long-term planning



Common planning scenarios



Common inputs & assumptions



Coordinated modeling processes

Considerations for system planners

- + Integrated system planning will look different for each system
- + It takes time to build up to integrated system planning
- + Focus on the most valuable integration points first
- + Spend ample time upfront on goals, team structure, process, and analytical framework

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E3 whitepaper on integrated system planning



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Q&A



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Thank You



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