The Increasing Importance of Integrating System Planning

Breakthrough Energy/ESIG/GPST
Integrated Planning Workshop

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Energy+Environmental Economics

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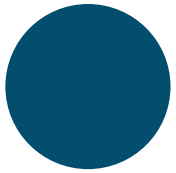
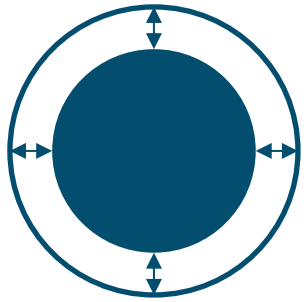
The energy transition will require massive investments in electricity systems

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
- Electrification
- Industrial and data center load growth
- Aging infrastructure
- Wildfire risks

This creates opportunities and challenges for meeting planning goals

Reliable

Affordable

Clean

Equitable

Need to ensure that planning identifies

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

System planning should be customer-centric

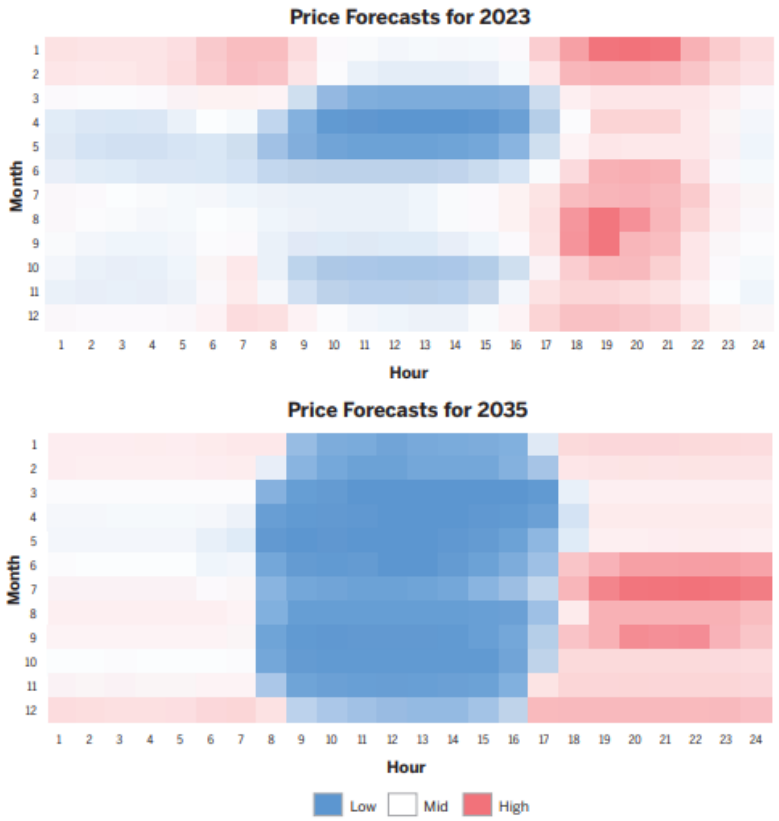
- **Customer energy needs are growing rapidly**
  - Large industrial and data center loads
  - Electrification
- **Customers are adopting technologies that can provide flexibility to the system**
  - Electric vehicles
  - Smart thermostats
  - Storage
- **Customers want choice!**
  - Manage bills
  - Onsite and offsite renewable generation
  - Programs and rate plans

Customers & DERs

Generation and customer/DER planning should be integrated

Average prices in 2023 and forecast for 2035

CAISO SP15 zone



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

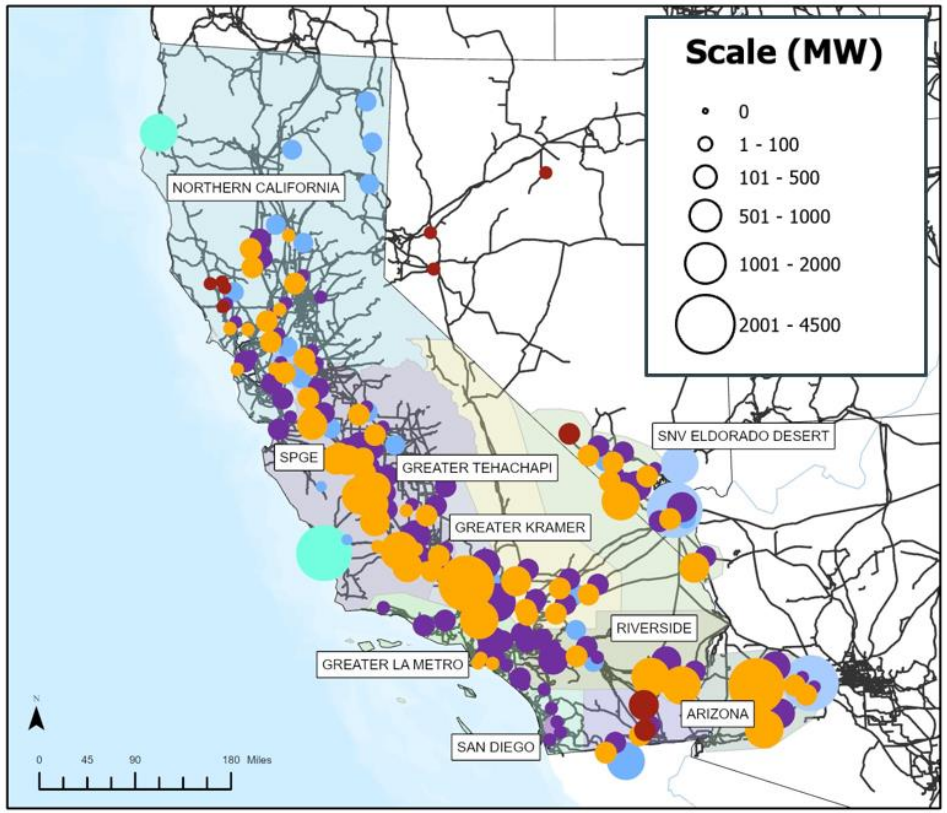
→ Customer actions and DERs can reduce the need for system investments

→ The cost and availability of utility-scale generation (and transmission) impacts the value of customer actions

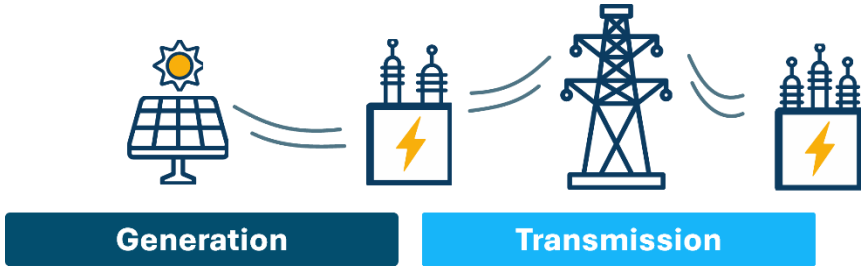
Generation and transmission planning should be integrated

CPUC IRP Resource Additions by Substation

2024-25 Transmission Planning Process, 2039 Snapshot



Solar Battery Wind Offshore wind Geothermal



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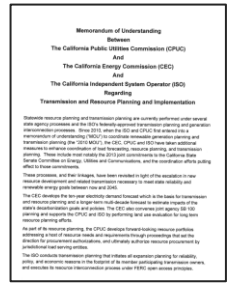
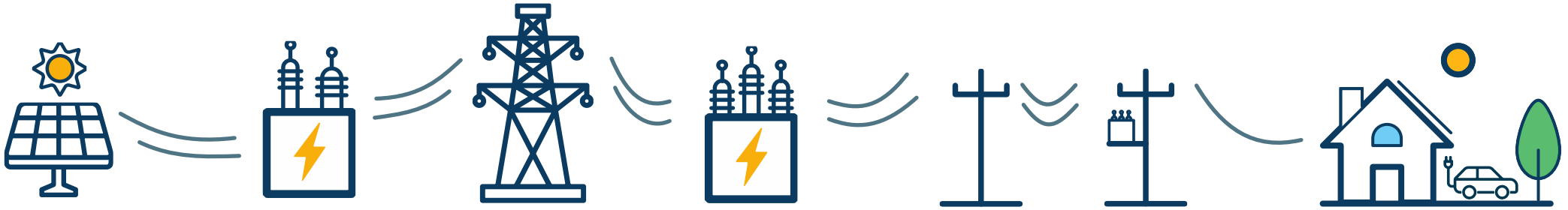


Significant amounts of new resources need to be integrated onto the transmission system

→ 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

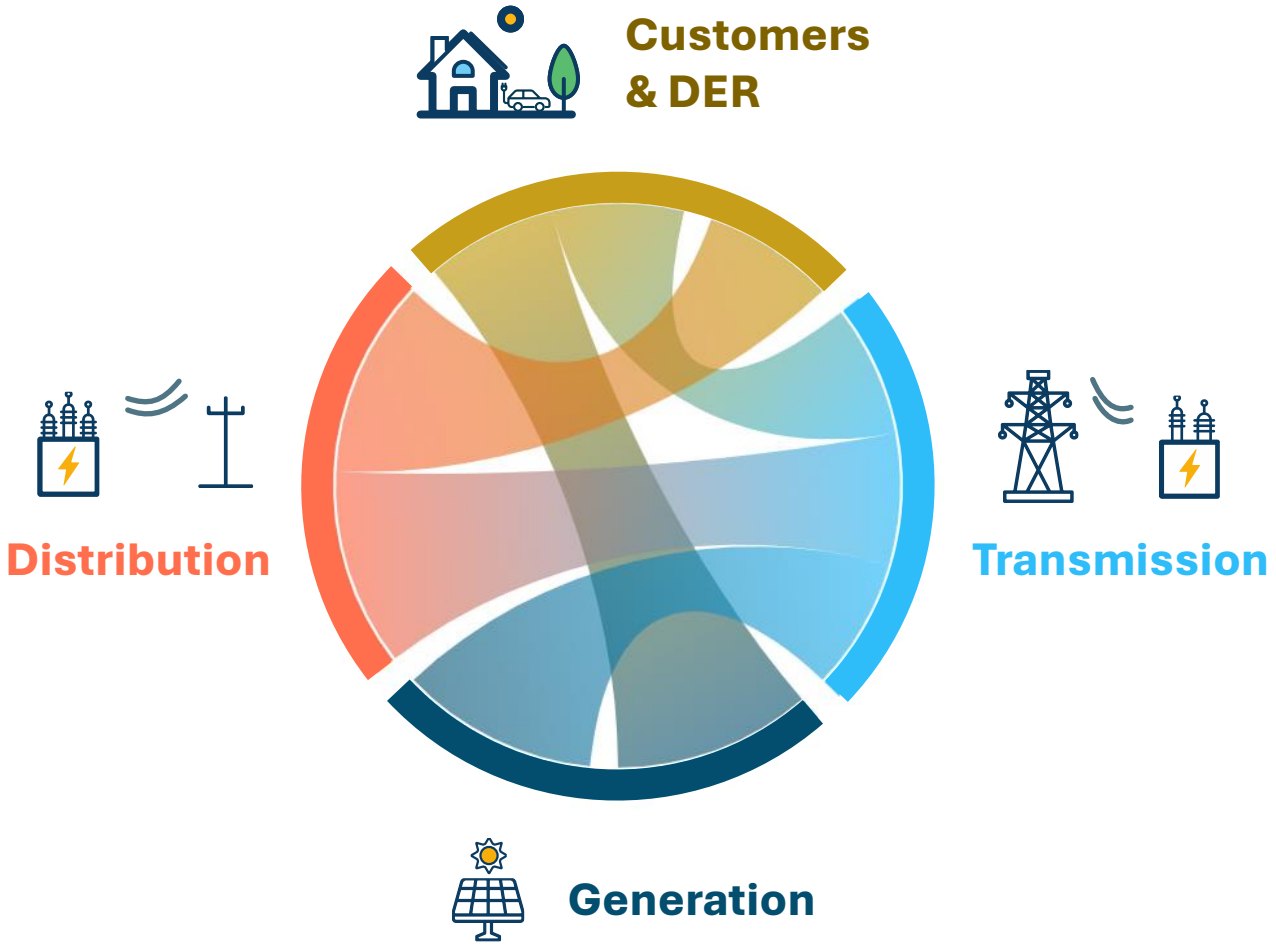
System planning is largely siloed today



Generation	Transmission	Distribution	Customers & DERs
• 20+ year IRP • Requests for proposals	• 10-year plan • Interconnection studies	• 3- to 10-year studies	• Simple, coarse forecast • Programs evaluation

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**



Integrated system planning is not just about utilities

Utilities

Harmonize planning across all parts of the system

Regulators

Ensure system planning considers a holistic perspective

Developers

Anticipate system needs and favorable locations for projects

Stakeholders

Allows transparency + input on how the entire system is planned

ISOs/RTOs

Proactively plan transmission to get ahead of grid needs

Thank You!

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