Grid Planning Overview

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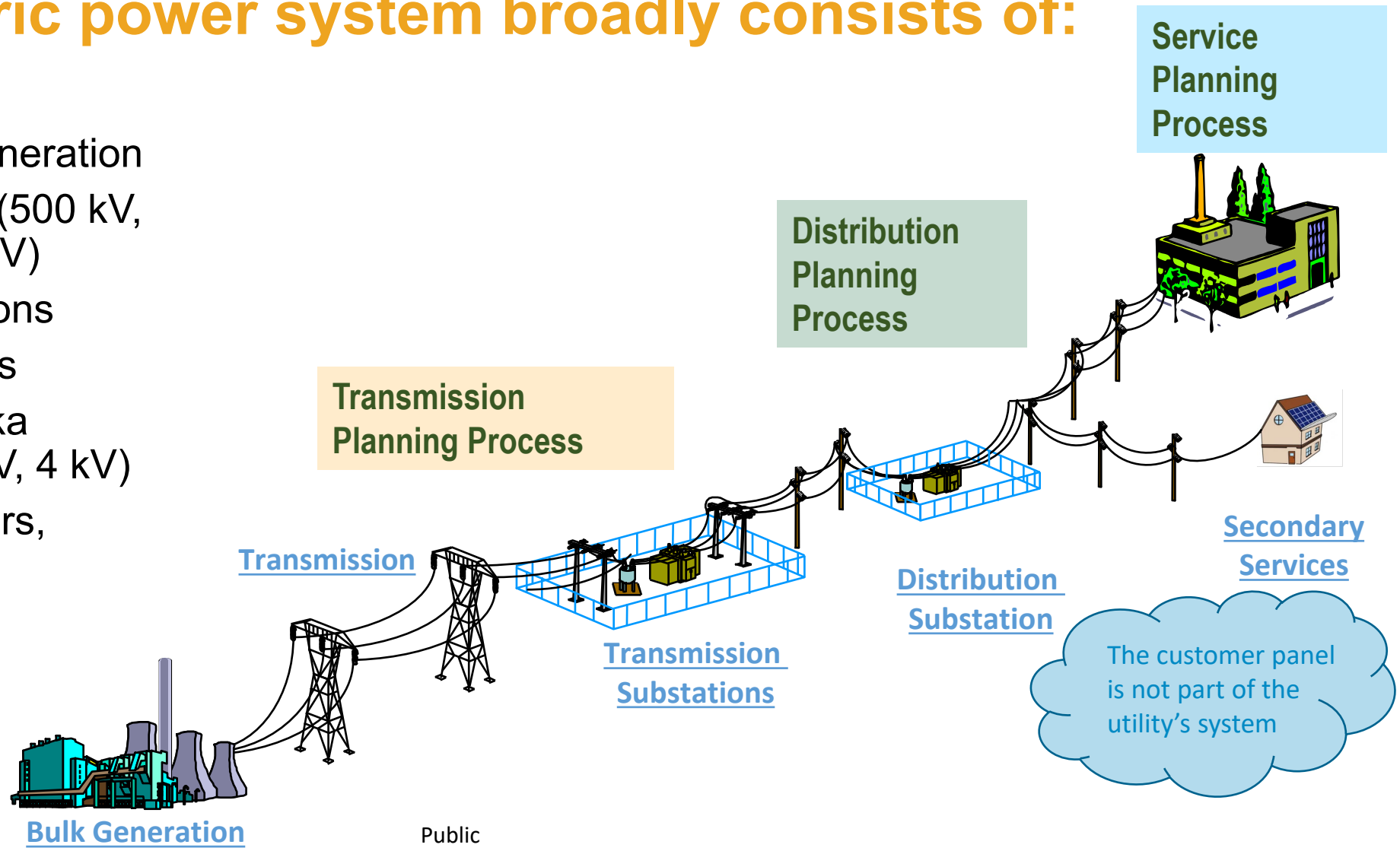
Distribution Planning Process (DPP)

Electric Power System Overview

The electric power system broadly consists of:

- Central-station bulk generation
- Transmission network (500 kV, 230kV, 115 kV, 70/60 kV)
- Transmission Substations
- Distribution Substations
- Distribution Circuits, aka “Feeders” (21 kV, 12 kV, 4 kV)
- Secondary Transformers, Services, and Meters

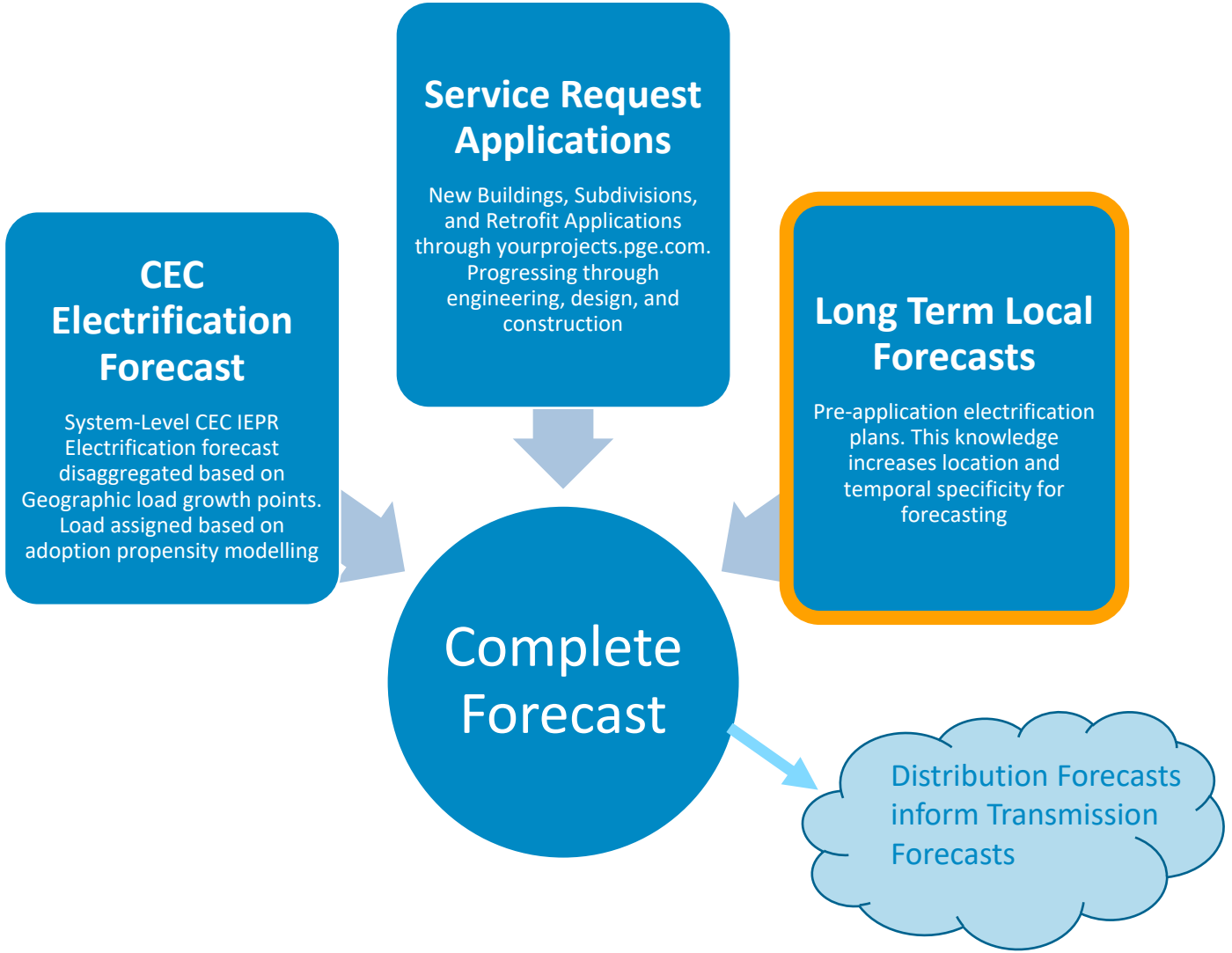


Electric Power System Overview

Responsibility for Capacity Upgrades

- Generation (Resource Adequacy) – Deregulated in CA since 2000, utility or non-utility ownership. Customer Choice Aggregation (CCAs) allow cities and counties to hold contracts with power producers.
- Transmission network and substations – Utilities under CAISO jurisdiction, municipal utility-owned, private transmission lines under Balancing Authority of Northern California; also competitive bid process for new assets.
- Distribution Substations and Circuits – Utilities under CPUC jurisdiction; upgrade costs typically embedded in electric rates except for excess service.
- Service Facilities (Service Transformers, Service Conductor, Service and Transformer Poles, and PG&E Meters) – Upgrade costs split with customers under Electric Rule 16 and customers receive an allowance for new load.
- Facilities Beyond the Delivery Point (Termination Equipment, Service Entrance Conductor, Panel, etc.) – Upgrade costs 100% customer responsibility.

Overview of Building Electrification Distribution Planning Process Inputs



Evaluation of Mitigation Options

Transfers/Operational changes

- Utilize existing capacity, where available

Incremental Upgrades

- Identify smaller system upgrades to enable use of existing capacity

New Capacity

- Determine if a capacity increase is needed (e.g., new circuit, substation capacity increase, new substation)

DER/ Load Flexibility Solutions

- e.g., DIDF sourcing, customer-installed DER projects, customer load shift out of local peak times (not the system peak which is irrelevant for local constraints)

Guiding Principles

Capacity Upgrade Timelines

Due to the long lead times associated with capacity upgrades, collaboration and proactivity will help to ensure capacity is available when and where it is needed

Scope of Work	Est. Timeline	Obstacles
New Transmission Interconnection	3-5 years	Land Acquisition & Environmental permitting
New Substation	5-8 years	Land Acquisition & Environmental permitting
Added Substation Capacity	3-4 years	Material availability
New Circuit	2-3 years	Material availability
Circuit Line Work	2-3 years	Easement acquisition & permitting
Line Extension Work/Service Facility Upgrades (Service Planning Process)	6-12 months	Easement acquisition & permitting

Ongoing Improvements to the DPP

- Engaging with Cities and Counties to obtain multi-year plans for Vehicle and Building Electrification and Reach Code implementation
- Use of CEC's IEPR forecast scenarios that are aligned with state policies on electrification
- Increased complexity is driving the need for more advanced distribution planning tools and processes
- Leveraging existing outreach efforts with communities and customers to better inform the planning process
- Improving web portal data (e.g., ICA/hosting capacity) to better inform customers on interconnection options
- Exploring the use of load flexibility/management to facilitate interconnection and provide bridging solutions
- Explore utilities orchestration of flexible load management and DERs

Why are there outages and interruptions?

- Weather

- Vegetation (trees contacting power lines)

- Animals

- Equipment failure

- Vehicle accidents

- Digging into underground electric lines

Reliability

•What we use to measure reliability:

SmartMeter data

Information from customer calls

Information from PG&E's automated systems

How we track outages:

Outages are logged in PG&E's outage databases

Some data is stored automatically

Detailed data is gathered by PG&E's first responders and field crews

What we do with the data:

Data is grouped into various metrics—SAIDI, SAIFI, CAIDI, MAIFI—so we can learn more about our reliability and how best to improve

How We Manage Reliability

Immediate Response

Restoration crews make repairs and improvements to the electric system due to an outage

Daily Reviews

Previous day outages are reviewed and near-term system improvement projects are identified

Weekly and Monthly Reviews

Trends in electric reliability are reviewed and action items are developed for both near- and long-term system improvement projects

Annual Reviews

Long-term (one year or greater) system improvement projects are identified and planned

Projects that Aid Restoration Switching