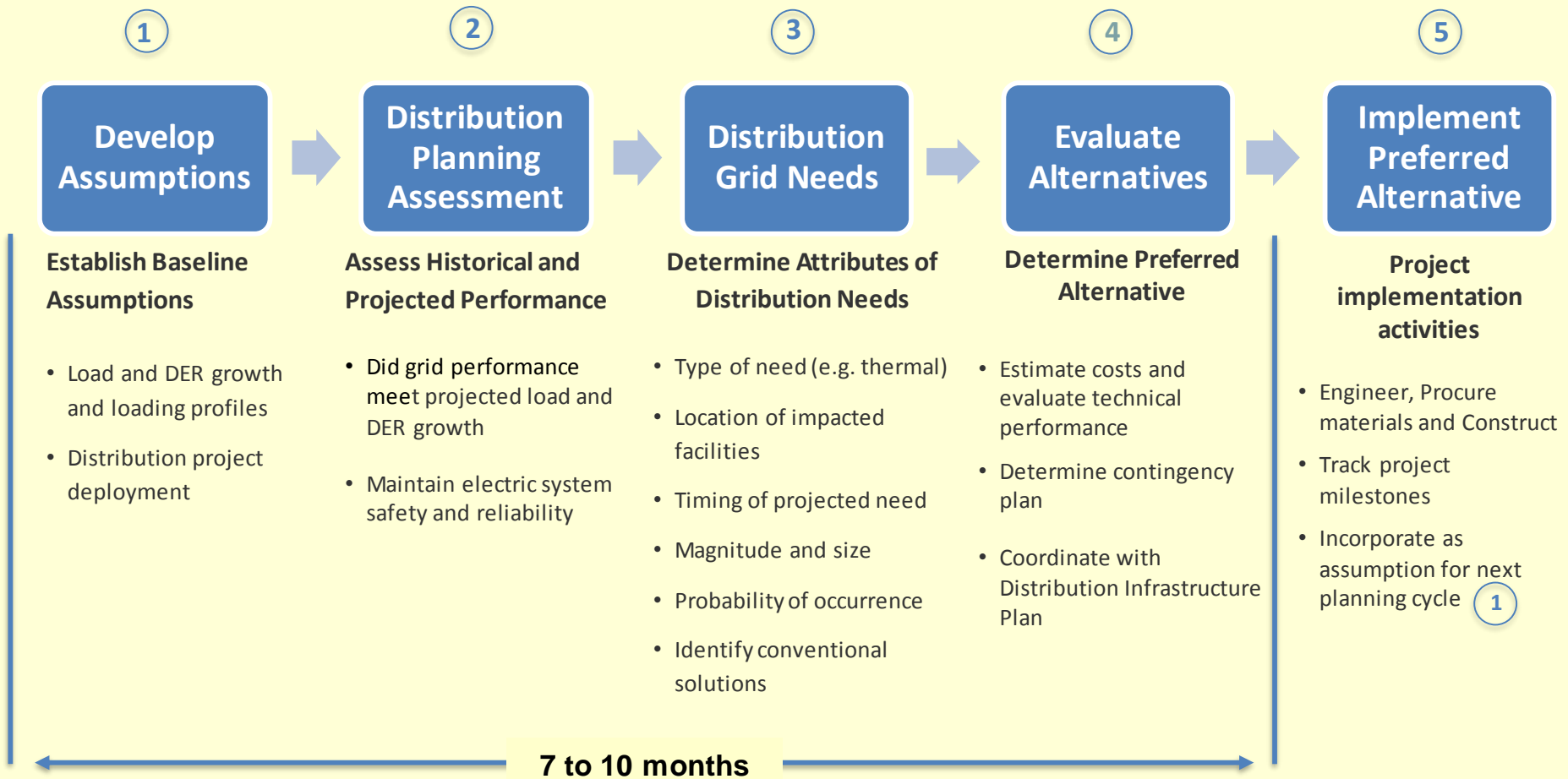


# Distribution Planning Overview

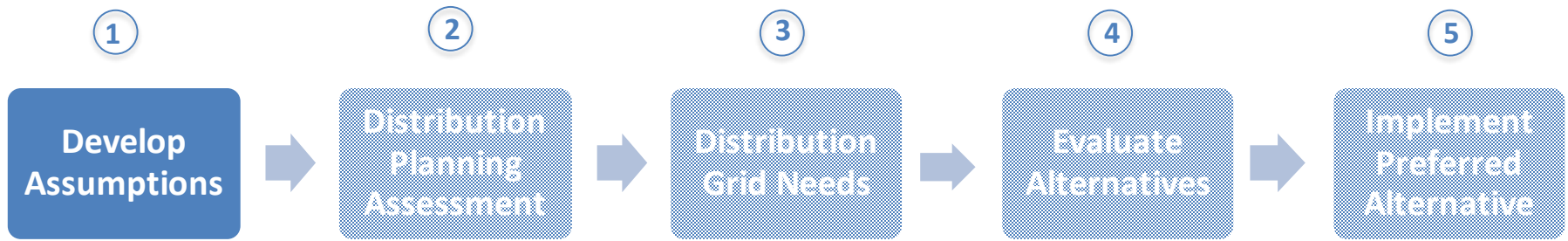
April 17, 2017



# Current State - Distribution Planning Process (DPP)



**The annual Distribution Planning Process (DPP) spans approximately 7-10 months and identifies projected distribution capacity deficiencies and mitigation plans to address projected deficiencies**



# Develop Assumptions

# Develop Assumptions

## Load Forecast

### • System Level

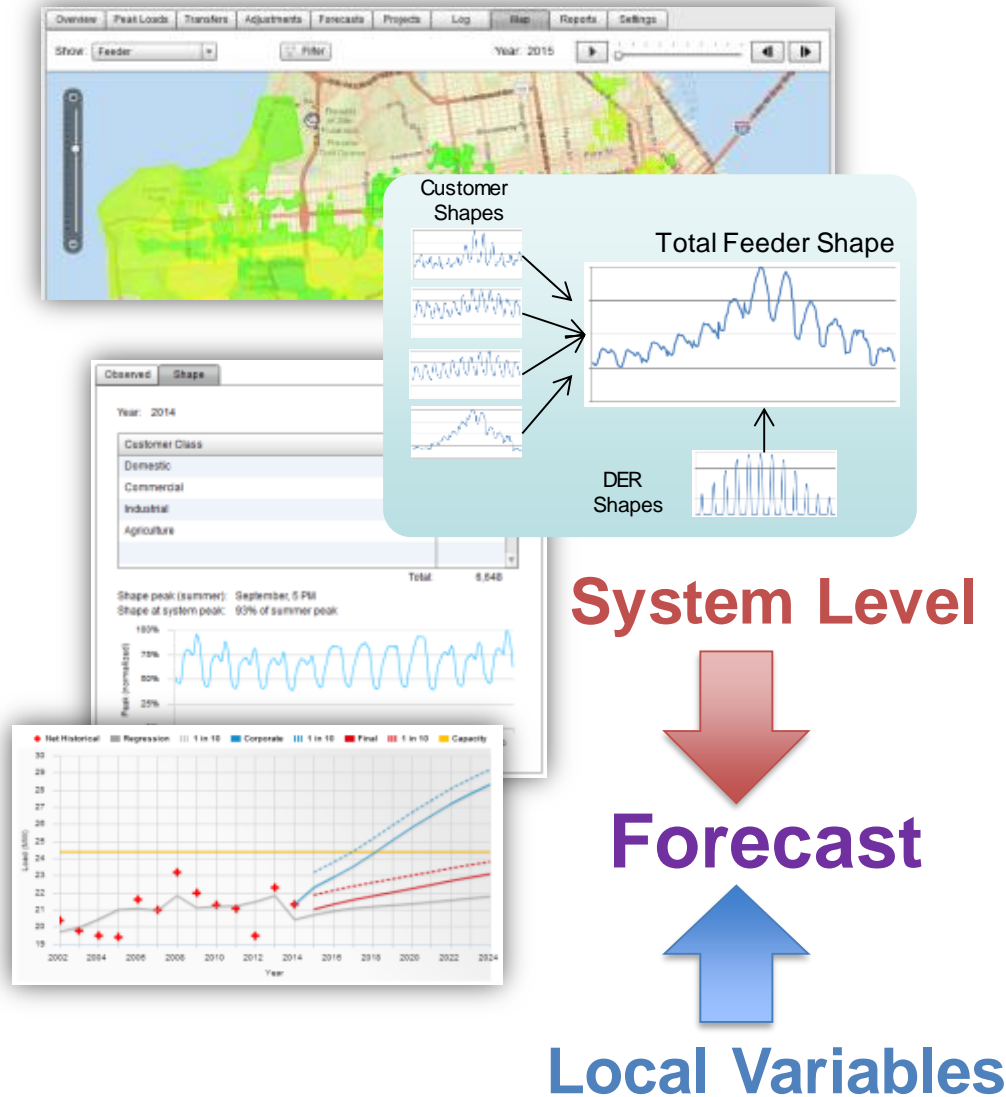
- Utilize a system level forecast to establish a benchmark for distribution system load growth
  - » IEPR or Corporate forecast as appropriate
- Adjust the system level forecast as needed to match the topology of the distribution system
  - » System level forecasts are often at the transmission system level and need to be adjusted to accurately reflect distribution topology

### • Develop forecasts for all Distribution Substations and Feeders

- Utilize local demographic, economic, and customer information to properly reflect local area load growth diversity
- Utilize local temperature data and local load shapes to properly reflect local area temporal diversity

## DER Forecast

- Includes both existing and projected DER adoptions from programs, tariffs, procurements, codes and standards
- Future efforts
  - DER shapes can be incorporated into the load shapes to more appropriately reflect the localized impacts of DER adoptions.





# Distribution Planning Assessment & Distribution Grid Needs

# Distribution Planning Assessment Drivers

## Electric Distribution Capacity Program

- Substation and distribution line infrastructure necessary to meet customer demand
- Program divided into distribution line and substation work

## Program drivers include:

- Equipment loading greater than normal capability ratings
- Equipment loading greater than emergency capability ratings during an event that de-energizes one or more pieces of equipment
- Primary or secondary voltage outside of Rule 2 limits
- Support for Transmission Planning or Substation Asset Management related projects
- DER related system upgrades
- Projects to support decreasing number of customers served per feeder, which will reduce number of customers impacted during a feeder outage
- Completion of distribution line “Mainline Loops”
- Grid Modernization through Volt-VAr Optimization (VVO)

# Distribution Assessment to Determine Grid Needs

## General Process

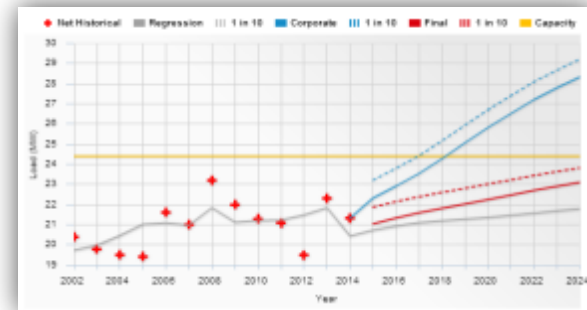
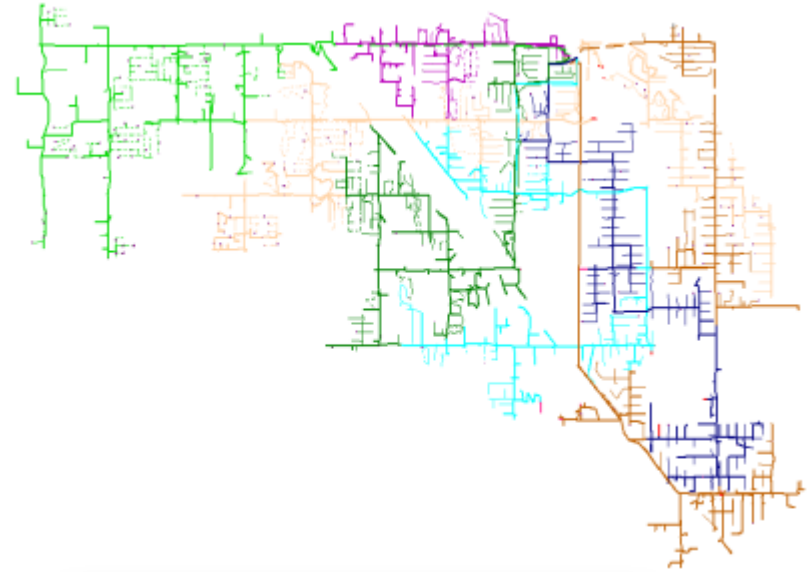
- Determine Thermal Capacity Needs
- Evaluate Voltage and Power Quality Needs
- Analyze Protection Needs
- Ensure Safety and Reliability Needs

## Determine Distribution Grid Need Attributes

- Type of need (e.g. thermal, voltage, reliability, etc.)
- Location of impacted facilities
- Timing of projected need
- Magnitude and size (% overload or voltage level)
- Probability of occurrence
- Conventional solutions

## Timeline

- Process is performed on a yearly basis, but additional studies performed year round for “emergent work”
- Needs are based on expected timeline
  - Near Term: 1-3 Years (*i.e. primary distribution lines*)
  - Mid Term: 3-5 Years (*i.e. substation transformers*)
  - Long Term: 5-10 Years (*i.e. new substations*)

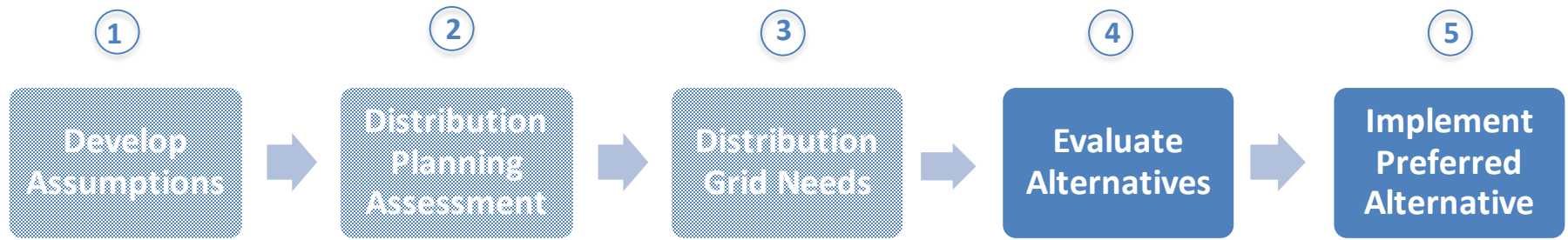


# On-Going Updates to Distribution Infrastructure Plan

- **Distribution Infrastructure plan is dynamic and requires close coordination between Distribution Planning, Distribution Asset Management and Distribution Operations**
- **Many factors can influence the plan, such as:**
  - New “Emergent Work”
  - Clearance availability
  - Rescheduling of work for a later date due to lower demand
  - Rescheduling of work for an earlier date due to higher than expected demand
- **Revisit existing planned projects with updated assumptions to confirm timing and need of project (Prioritization)**







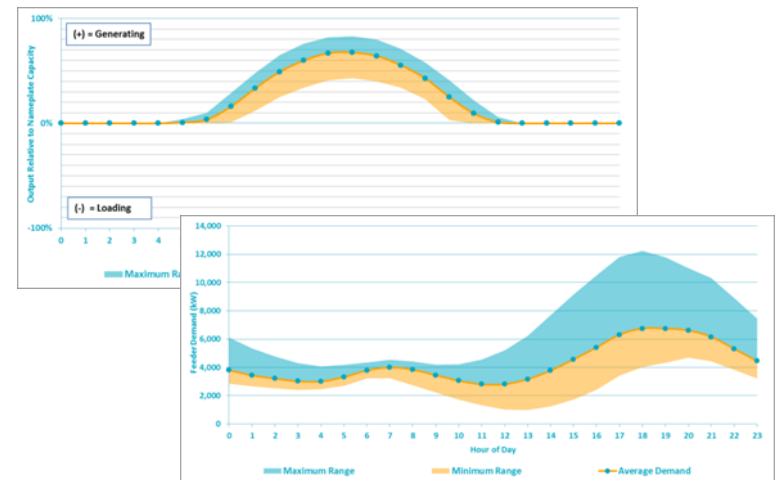
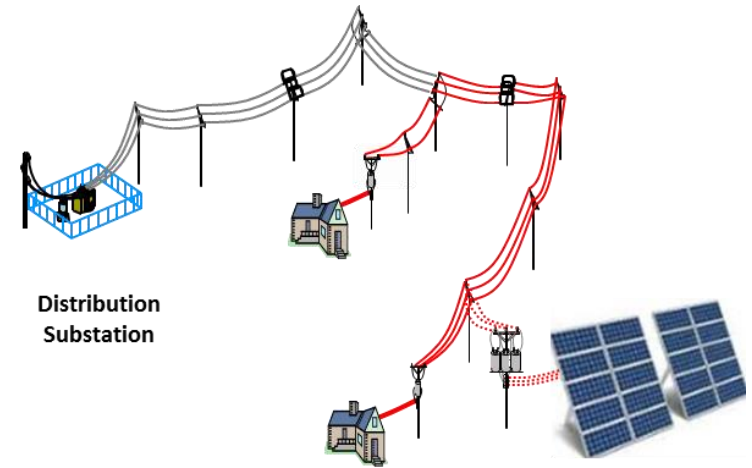
# Evaluate Alternatives and Implement Preferred Alternative

# Evaluate Alternatives

**Objective: Select Least Cost/Best Fit Alternative**

**Process:**

- Identify alternatives and determine cost estimate ranges
- Alternatives may involve reconfiguring, replacing existing and/or installing new facilities
  - Emphasis on alternatives that maximize utilization of existing assets to achieve least cost solution
  - Typical order for alternative progression
    - Utilizing existing equipment through phase balancing or switching
    - Distribution plan betterment
    - Distribution circuit upgrades
    - New distribution circuits
    - Substation expansion projects
- Prioritize feasible alternatives using least-cost/best fit approach and select preferred alternative
- Technical feasibility of proposed traditional solution reviewed by cross functional utility teams responsible for engineering design, construction, as well as operations and maintenance of the distribution system



# Implement Preferred Alternative

- Track project milestones
- Engineer, Procure Materials and Construct Project
- Incorporate project as assumption for next planning cycle

