



CUSTOMERS FIRST

LA100 Assumptions and Power System Reliability Program (PSRP)



September 30, 2021

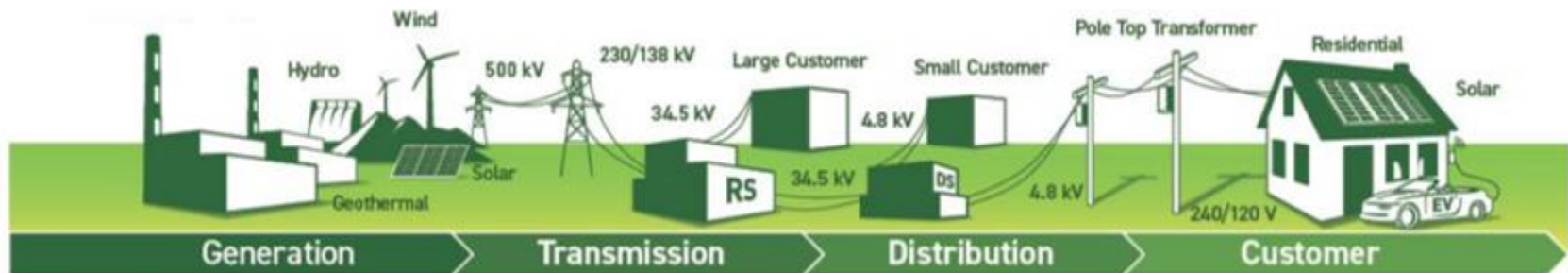
LA100 Assumptions and Caveats

- Existing distribution overloads were mitigated by 2020
- Future distribution overloads mitigated by new circuits and transformer banks (no new substations)
- Transmission Projects identified in 10-Year Plan will be completed on time
- Land acquisition and community engagement not considered
- Considerations for Distribution Voltage Upgrade was not part of the study

Power System Reliability Program (PSRP)

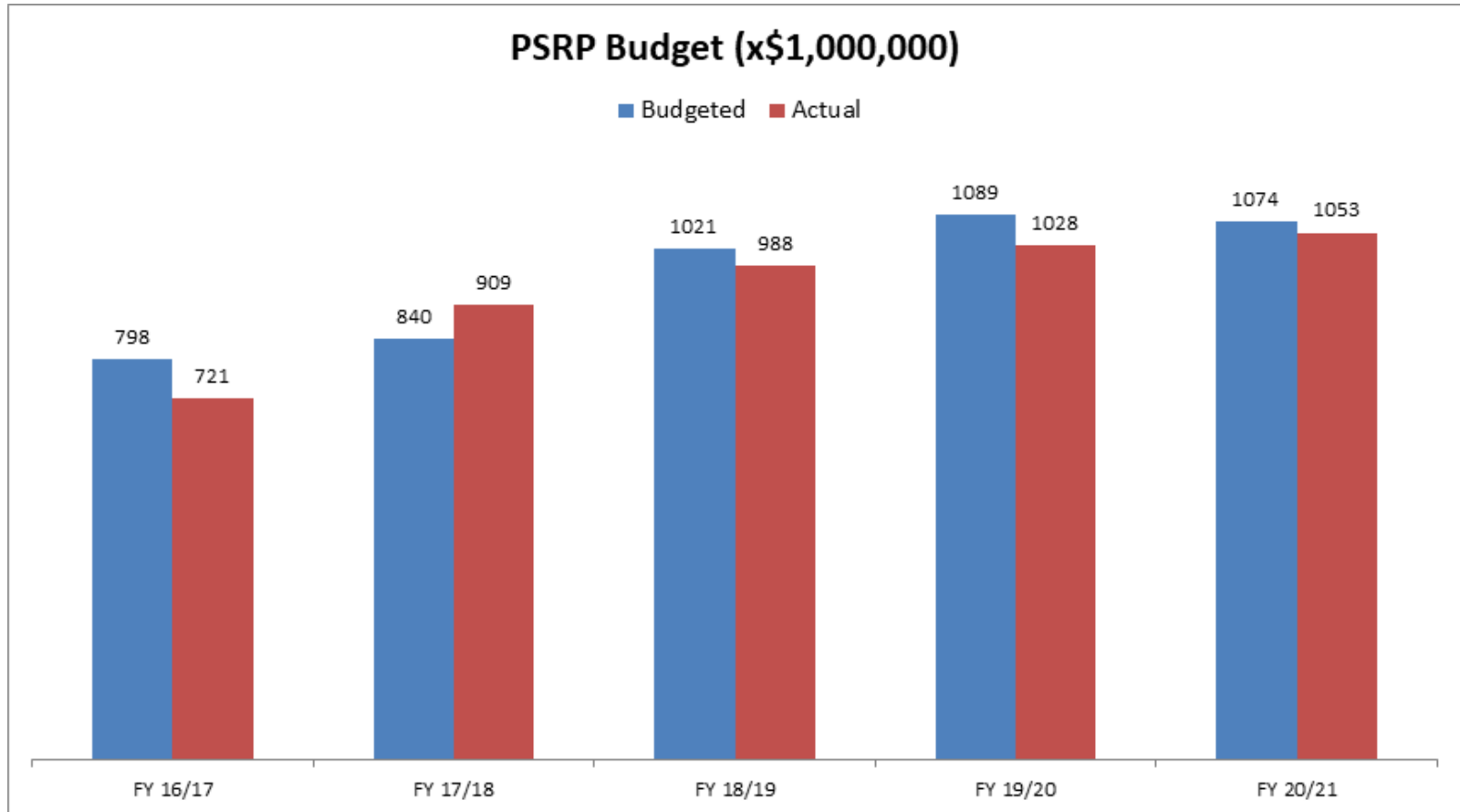
History and Objectives

- LADWP is responsible for power delivery that is safe, reliable, and cost-effective
- In 2007, LADWP implemented the Power Reliability Program (PRP) to address **Distribution** system reliability concerns
- In 2014, LADWP replaced the PRP with the PSRP which expanded the program to include other sectors of the electric power system:
 - **Generation**, **Transmission**, Substation, and **Distribution**



PSRP Budget

Previous 5-Year Budget



Distribution & Substation Accomplishments

- Met established targets over the last five years for Distribution Assets (poles, crossarms, cables, and transformers)
- Strived to Achieve Substation Asset Replacement Targets (Transformers, Circuit Breakers, Substation Automation) despite competing capital projects and recent COVID challenges

Distribution Accomplishments

PSRP Replacement Actuals



■ Substructures ■ Cables (miles) ■ Transformers ■ Poles ■ Crossarms



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Substation Accomplishments

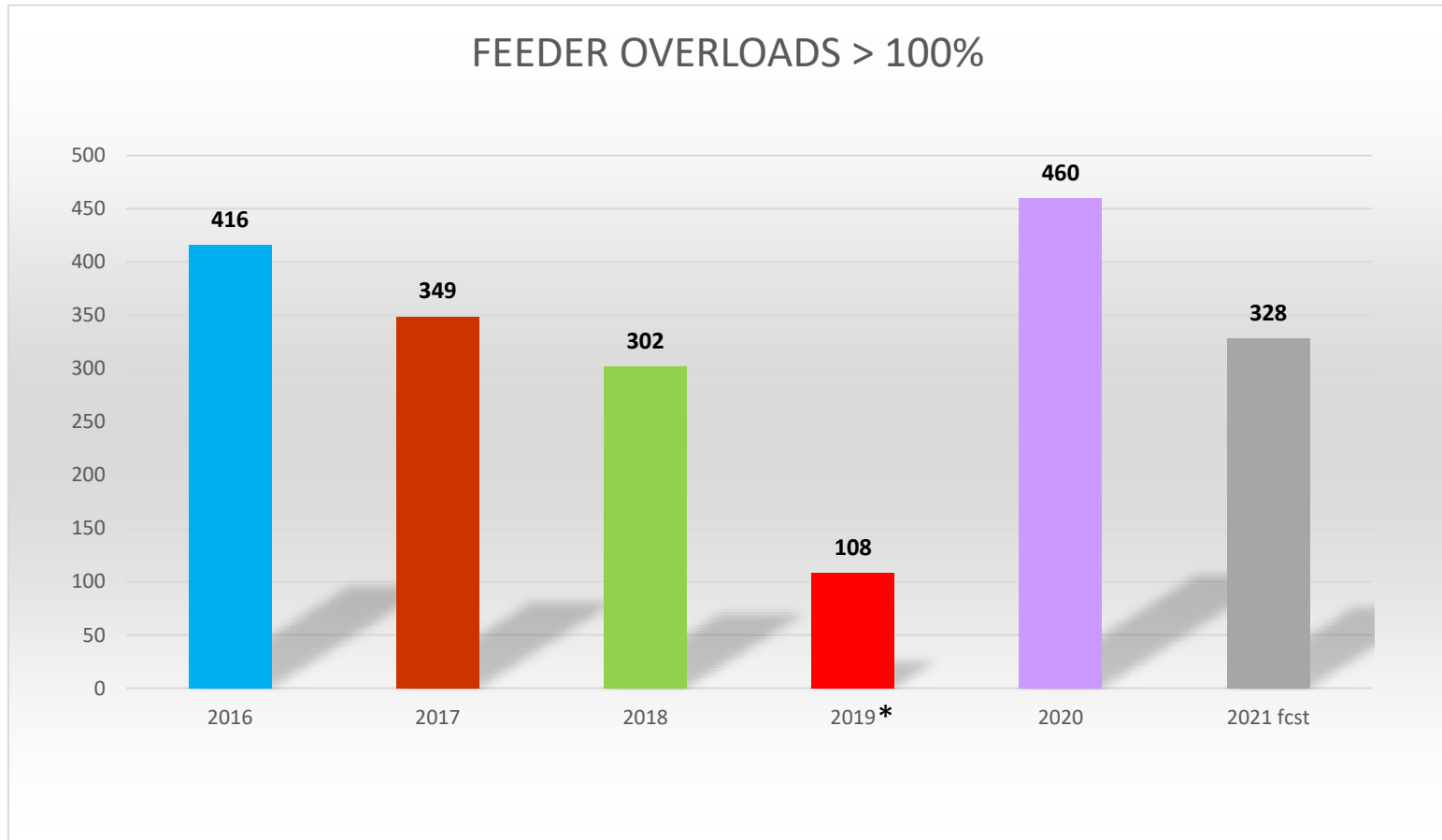
FY 19-20 Replacement Targets	FY 19-20 Achievements
2 Receiving Station (RS) and 2 Switching Station (SS) transformers	1 RS transformer *
21 Distributing Station (DS) transformers	15 DS transformers * Completed 3 DS Transformer Bank life extension jobs
36 Circuit Breakers (4.8-kV, 34.5-kV, and >100kV)	15 Circuit Breakers replaced * Completed 121 Circuit Breaker life extension jobs
12 Substation Automation (SAS-2) Upgrades	7 SAS-2 upgrades completed *



230 kV Circuit Breaker at RS-F

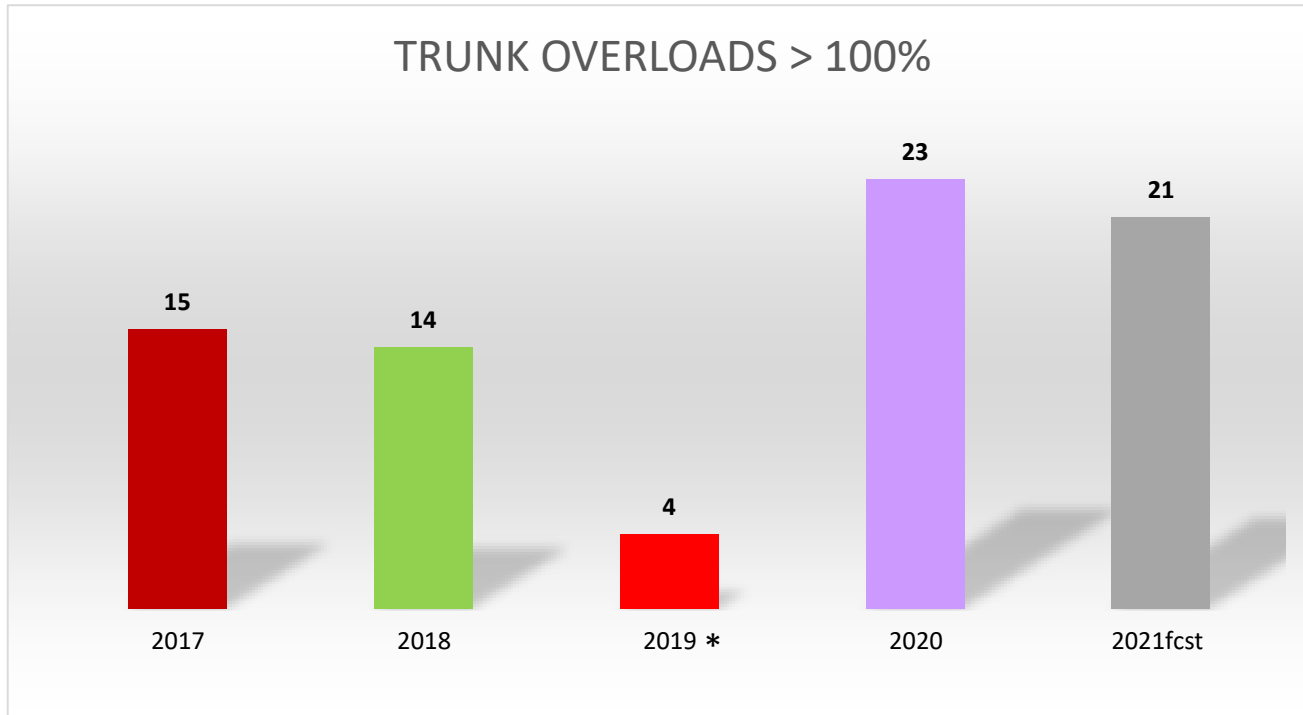
** Competing capital projects and COVID impact on resources*

4.8kV Feeders (Circuits)



*Mild Summer Loading in 2019

34.kV Trunks (Circuits)



*Mild Summer Loading in 2019

Distributing Station Load Relief

- Over 27 Distributing Station Overloads
 - Increase Size of Transformers
 - Add Additional Transformers
 - Transfer Load to Other Distributing Stations
 - Build New Distributing Stations
 - Consideration for Future Voltage Conversion

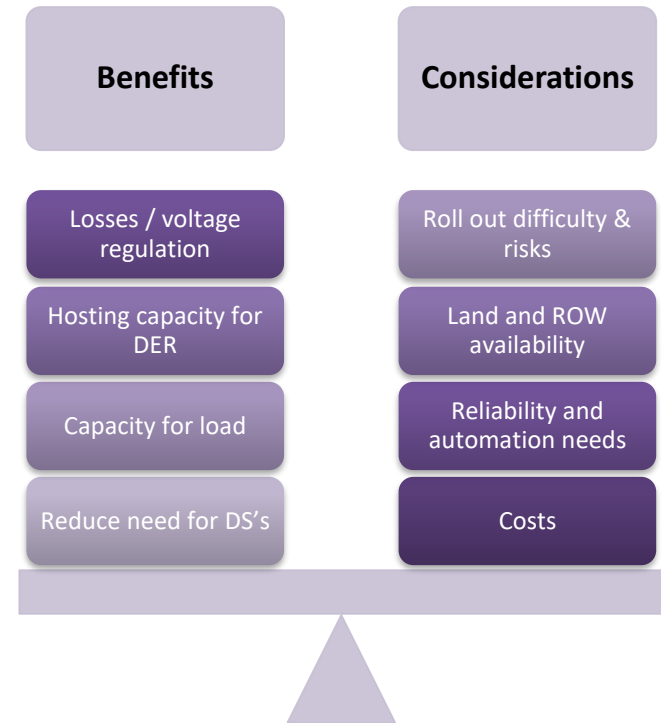
Preparing our Distribution System (2022 – 2035)

Component
Upgrade 4.8 kV Feeder Capacity
Expand 34.5 kV Circuit Capacity
New 4.8 kV Distribution Station Capacity
Upgrade and New Receiving Station Capacity
New Distribution Voltage Conversion

Voltage Upgrade Initiative

Evaluate options for converting the 4.8kV system to a higher voltage level to address:

- Increasing Load Growth
- DER adoption (Solar & Energy Storage)
- Constrained Footprint



Study Components



Qualitative Analysis

Identify key consideration and select five voltages & configurations for detailed study



Modeling & Technical Analysis

Derive DS and feeder models and assess capacity & performance of identified voltage options



Economic Assessment

Calculate and compare projected capital, operational, and reliability costs



Recommend Actions

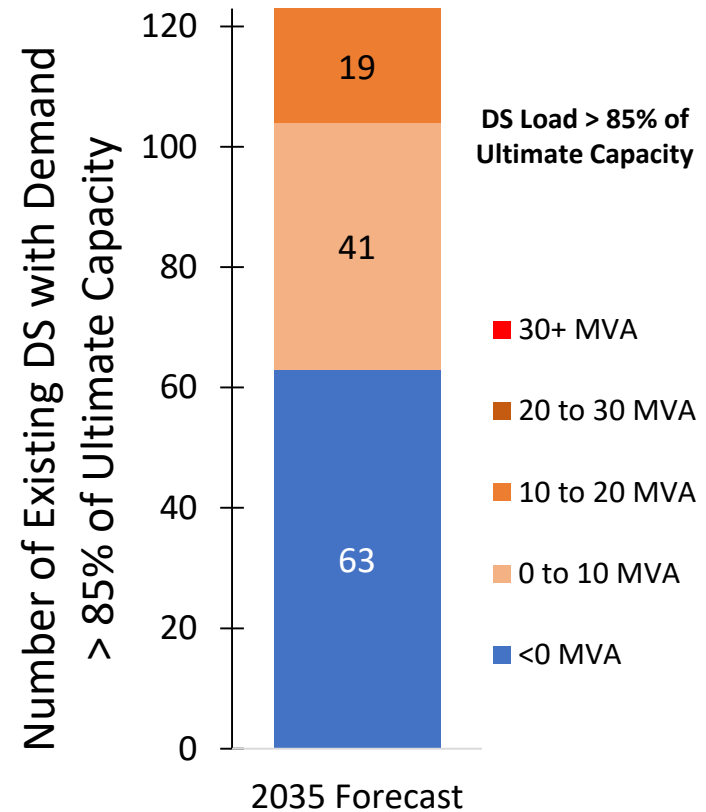
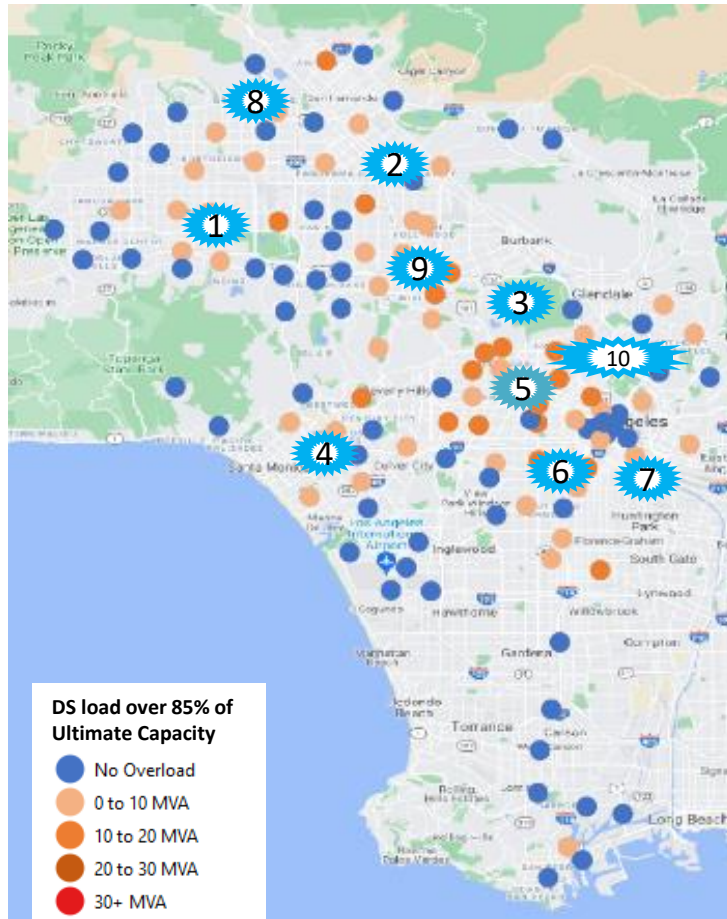
Summarize findings, identify key considerations, and provide recommendations



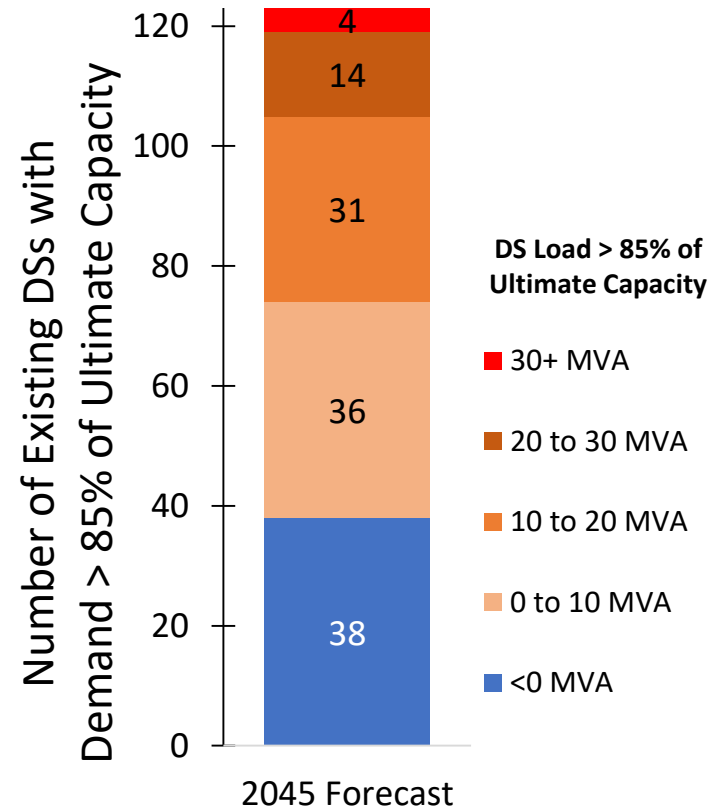
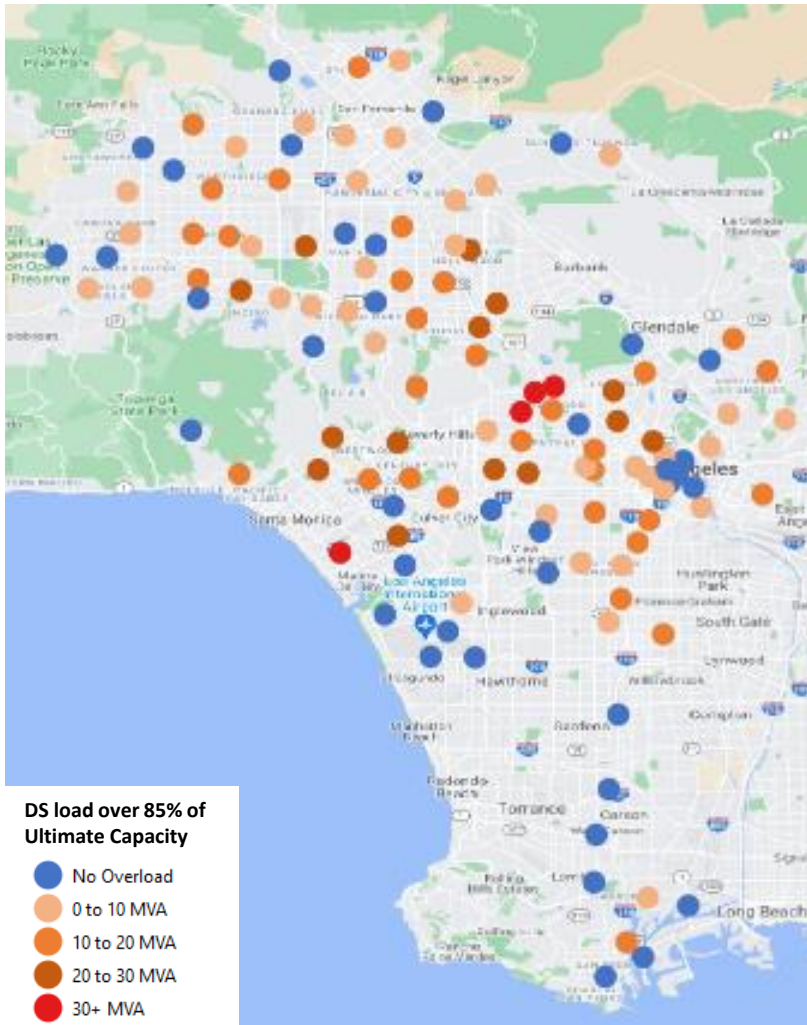
Investigate Alternatives

Identify new Voltage Upgrade areas for program Initiation, refine costs, schedule, and utilize industry best practices

2035 Distributing Station Load Forecast

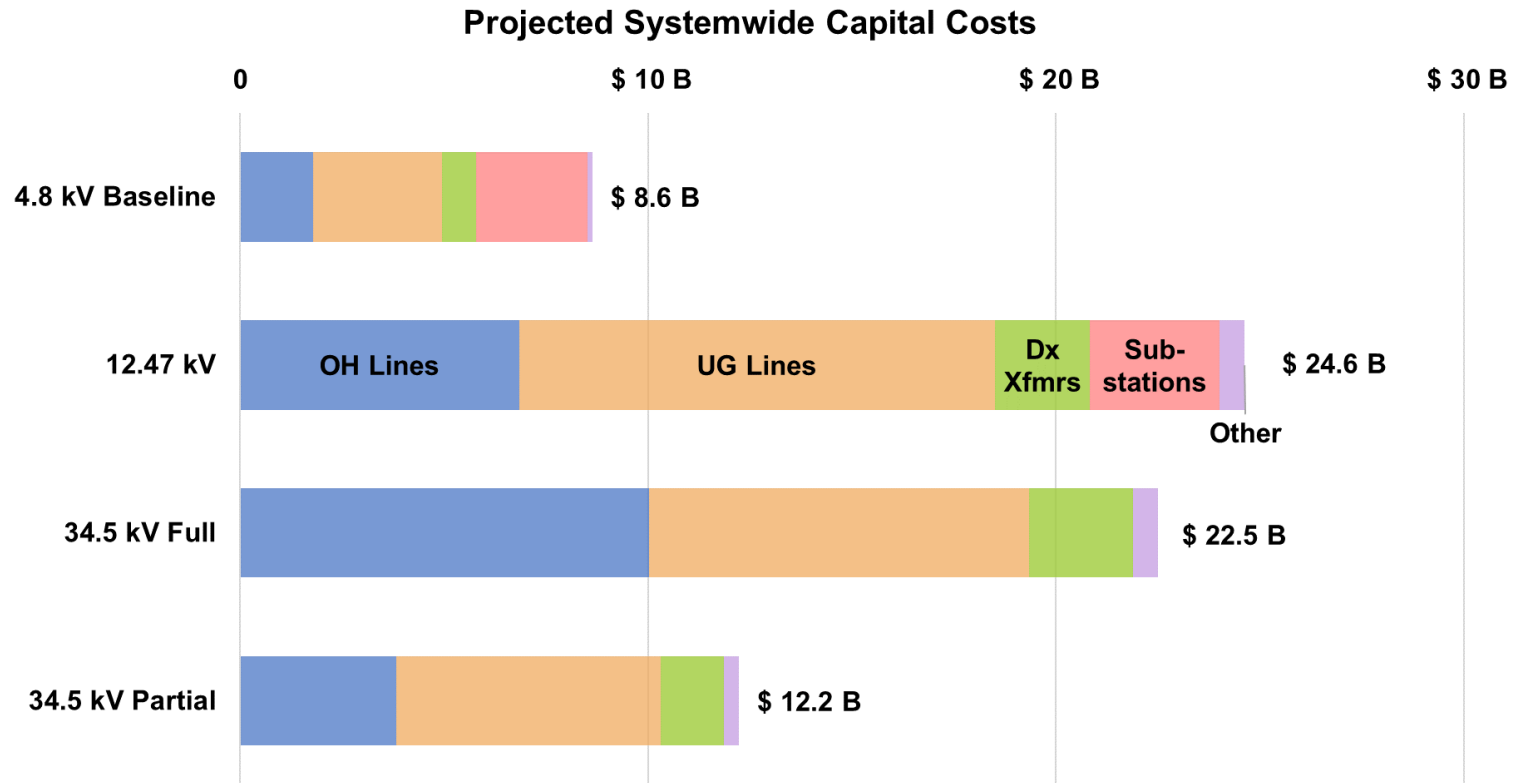


2045 Distributing Station Load Forecast



New DS Count Estimates	
4.8kV Baseline	61
12.47kV Conversion	46

Capital Cost Breakdowns



Substation Expansion

- New Distributing Stations (DS) or Expansions Needed
 - Potentially 60 DSs exceed firm capacity in 15 years
 - New DS or Expansion
 - New DS (\$40M each)
 - Expansion Costs Vary
 - Ten New DSs required by 2035
- New Receiving Stations (RS) or Expansions (Racks) Needed
 - Five RSs exceeding firm capacity by 2030
 - RS-A Rebuild (10-years) - \$130M
 - Seven new Racks (\$20M each)
 - New RS may be needed after 2035
 - Six More RSs exceed capacity by 2040

PSRP Targets

- PSRP Needs to be Revamped
 - Address LA100 overloads assumed to be complete
 - Meet LA100 requirements/goals
- Increase Distribution Asset Upgrades by Four to Six fold
- Several New Distributing Stations will have to be built by 2045
- Build New Receiving Stations for increased load growth
- Expand Distribution and Substation Automation to improve reliability

Next Steps

- Discuss Targets with Stakeholders
- Verify Schedule
- Determine Labor Resources
- Determine Material Resources Needed
- Secure Budget
- Outreach/Approvals

Questions?

