Rhode Island Power Sector Transformation

Technical Meeting on Distribution System Planning

May 26,2017

22 May 2017

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The California Experience – Distribution Resources Plan & Integrated Distributed Resources Plan

- The DRP and the IDER (R. 14-08-013, R.14-10-003)
  - DRP = **Where** on the system to put DER and **what services** can they provide
  - IDER = **How** do you get those DER to **show up** and **how are the services valued?**
- The DRP – What is it?
  - Integration Capacity Analysis
  - Locational Net Benefit Analysis
  - Demonstration Projects
- How is the DRP impacting the utility distribution planning process?
- Lessons Learned

Distribution Resources Plans (DRP) – A bit of history

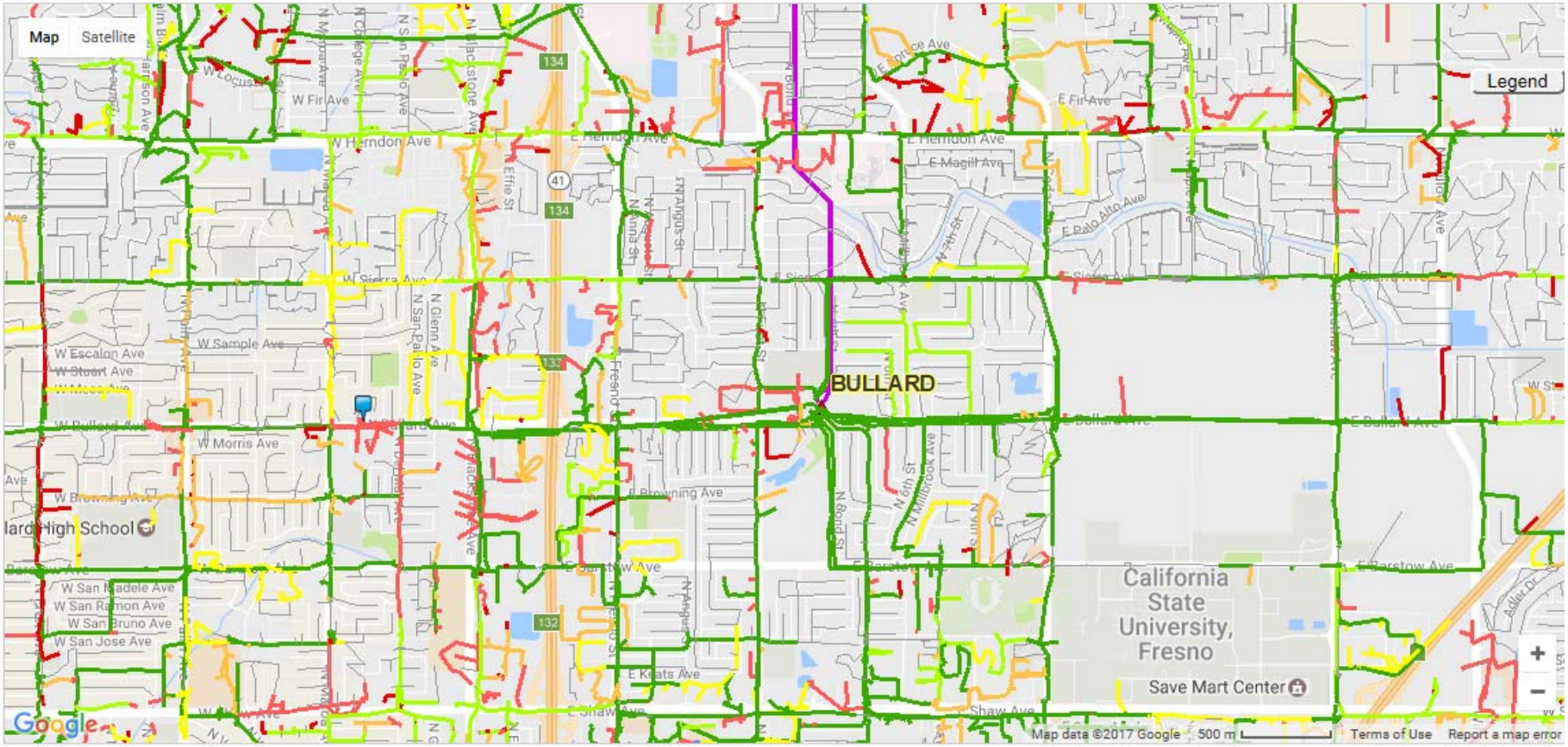
- **Omnibus energy policy bill**, passed in 2013, established Public Utilities Code 769
- Electrical corporations to **filed "distribution resources plan proposals" on July 1, 2015**:
  - Identify **optimal locations** for the deployment of distributed resources by **evaluating locational benefits and costs** of distributed resources located on the distribution system.
  - Evaluation based on **reductions or increases in local generation capacity needs, avoided or increased investments in distribution infrastructure**, safety benefits, reliability benefits, any other savings.
- "**Distributed resources**" means distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies.

DRP Order (February, 2015)

- Provided guidance to the IOUs on what was to be included in their DRP filings. They were directed to:
- Propose Integration Capacity Analysis (ICA)* methodology and conduct initial ICA across all feeders in system (down to a node level)
- Propose a Locational Net Benefit Analysis methodology for determining avoided costs of DER at each location in the distribution system.
- Utilities were also ordered to conduct demonstration projects where distribution system upgrades were deferred by distributed energy resources.
- Much more, but not directly relevant here…

*AKA “hosting capacity”

The ICA (Hosting Capacity) Map (PG&E version)



Interconnection and hosting capacity data

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Asset Info | DER Capacity

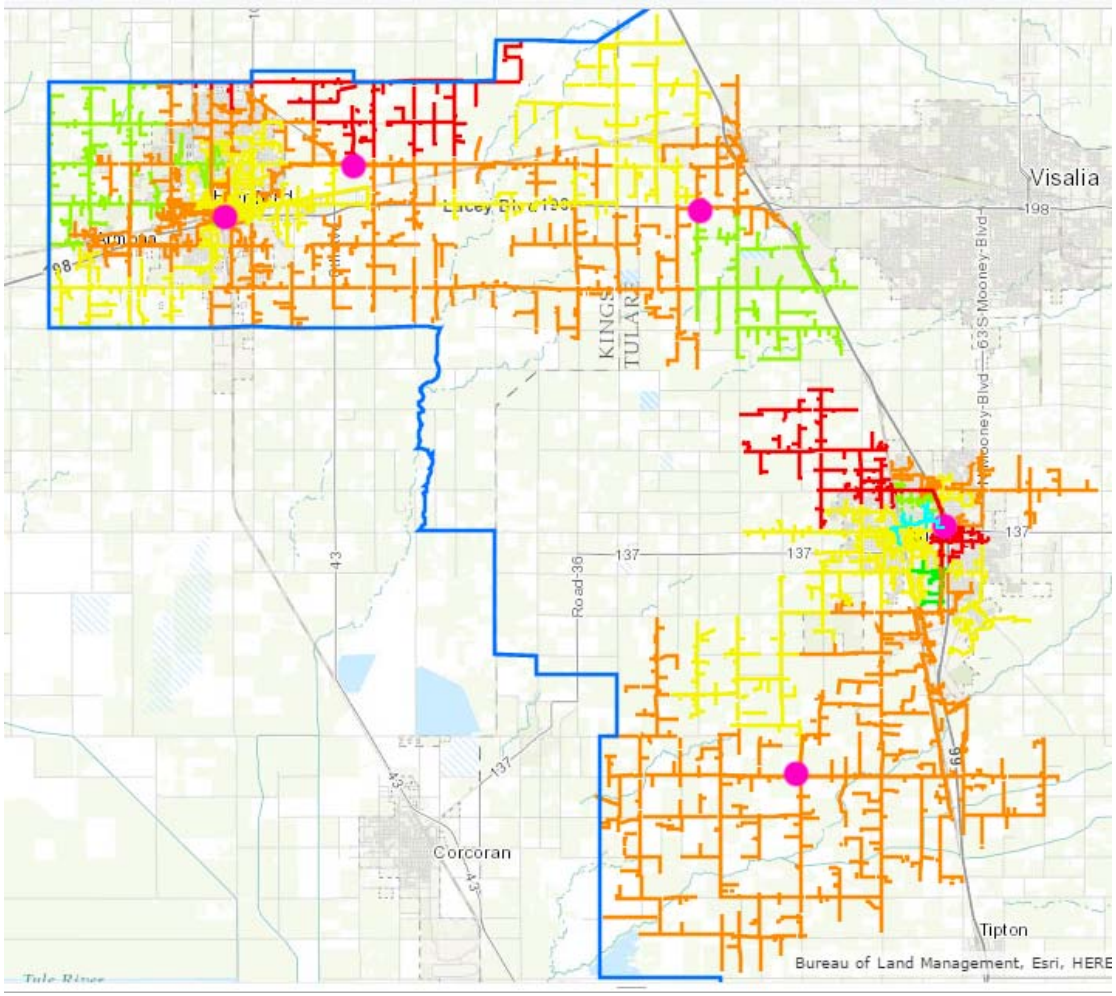
Shape	Polyline
Feeder Name	BULLARD 1110
Feeder Number	253961110
Nominal Circuit Voltage (kv)	12
Circuit Capacity (MW)	10.37
Circuit Projected Peak Load (MW)	8.47
Substation Bank	2
Substation Bank Capacity (MW)	53.8
Substation Bank Peak Load (MW)	42.5
Existing Distributed Generation (MW)	0.1461
Queued Distributed Generation (MW)	0
Total Distributed Generation (MW)	0.1461
ZoneId	253961110.013

Asset Info | DER Capacity

Feeder name: BULLARD 1110 Zone Id:253961110.013

	Zone DER Capacities (kW)		Substation DER Capacities (kW)	
DER	Minimal Impacts	Possible Impacts	Feeder Limit	Substation Bank Limit
Uniform Generation (Inverter)	474	-	2,202	10,252
Uniform Generation (Machine)	474	-	1,604	7,614
Uniform Load	2,161	-	2,609	3,420
PV	1,037	-	3,492	15,519
PV with Storage	1,153	-	3,885	17,232
PV with Tracker	824	-	2,779	12,486
Storage - Peak Shaving	708	-	2,396	10,622
EV - Residential (EV Rate)	2,161	-	6,075	19,000
EV - Residential (TOU Rate)	2,161	-	4,213	6,804
EV - Workplace	2,161	-	3,626	8,900

LNBA Demonstration project



LNBA values the identified locations based on need

Project	DER Scenario	Time Period	LNBA Result
Goshen Substation Project	Planning	Short-term	$
Goshen Substation Project	Planning	Mid-term	$$$
Goshen Substation Project	Planning	Long-term	$
Goshen Substation Project	Very High DER	Short-term	$
Goshen Substation Project	Very High DER	Mid-term	$
Goshen Substation Project	Very High DER	Long-term	$
Laton Circuit Capacitor Project	Planning	Short-term	$$
Laton Circuit Capacitor Project	Planning	Mid-term	$
Laton Circuit Capacitor Project	Planning	Long-term	$
Laton Circuit Capacitor Project	Very High DER	Short-term	$$
Laton Circuit Capacitor Project	Very High DER	Mid-term	$
Laton Circuit Capacitor Project	Very High DER	Long-term	$
Mascot Substation 66 kV Capacitor Bank	Planning	Short-term	$$
Mascot Substation 66 kV Capacitor Bank	Planning	Mid-term	$
Mascot Substation 66 kV Capacitor Bank	Planning	Long-term	$
Mascot Substation 66 kV Capacitor Bank	Very High DER	Short-term	$
Mascot Substation 66 kV Capacitor Bank	Very High DER	Mid-term	$
Mascot Substation 66 kV Capacitor Bank	Very High DER	Long-term	$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Planning	Short-term	$$$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Planning	Mid-term	$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Planning	Long-term	$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Very High DER	Short-term	$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Very High DER	Mid-term	$
New Rector-Goshen-Liberty 66kV Subtransmission Line	Very High DER	Long-term	$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Planning	Short-term	$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Planning	Mid-term	$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Planning	Long-term	$$$$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Very High DER	Short-term	$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Very High DER	Mid-term	$
Rector-Lourich-Octol-Tipton-Tulare 66kV Subtransmission Line Reconductor	Very High DER	Long-term	$

Project Name	Project Area	Program/Project Type	Location and Overloaded Equipment	Key Driver of Need	Expected Overload Magnitude	E
Goshen Substation Project	San Joaquin Region, Rector System, Goshen Substation	Distribution Substation Plan	Two 14MVA transformers and one old 12 kV Lattice type switchrack for four existing 12 kV circuits	Load growth in the area has triggered the need for more capacity at Goshen Substation and a new distribution circuit. A capacity increase will allow future growth and will allow future transfers to offload Oak Grove Substation. A new circuit will require a 12 kV switchrack rebuild at Goshen Substation.	• Goshen Substation: 2019 0.77MW 2020 1.37MW 2021 2.07MW 2022 2.67MW 2023 3.87MW 2024 4.47MW 2025 5.17MW • Curtis Circuit: 2019 0.00MW 2020 0.00MW 2021 0.20MW 2022 0.30MW 2023 1.10MW 2024 1.30MW 2025 1.40MW • Monson Circuit: 2019 1.92MW 2020 2.22MW 2021 2.62MW 2022 2.82MW 2023 2.92MW 2024 3.02MW 2025 3.12MW	Th fro
Laton Circuit Capacitor Project	San Joaquin Region, Rector System, Hanford Substation	Distribution VAR Program	N/A	Load growth in the area has triggered the need for more capacitance on the Laton circuit out of Hanford Substation in order to maintain an efficient power factor. This will require the installation of a new 1200 kVAR overhead capacitor.	2017 2.43MW 2018 2.45MW 2019 2.48MW 2020 2.52MW 2021 2.56MW 2022 2.60MW 2023 2.65MW 2024 2.70MW 2025 2.75MW	Th fro

e	Expected Overload Timing	Known Forecast Uncertainties	DER Growth Forecast Sensitivity	New/Upgrade Equipment & Location	Associated Load Transfer	Expected Equipment In-service Date
	The expected timing of the need is from March to October.	As part of the load growth is driven by the increased agricultural pumping load due to drought condition. The level of Drought and surface water availability in the next few years will impact the actual load growth. In addition, economic growth factors can also influence the actual load growth in the area.	Under the very high DER growth scenario published in SCE's DRP, the expected load growth in this area can be offset by the growth of DERs and this project is no longer needed during the study period from 2016 to 2025.	Two 28 MVA transformer, one new 12 KV switchrack and one new 12 KV circuit at Goshen Substation	• Offload Curtis to the new circuit – 1.9 MVA load transfer • Offload Harrell to the new circuit – 2.4 MVA load transfer • Offload Tagus to the new circuit – 1.7 MVA load transfer • Offload Monson to the new circuit – 1.8 MVA load transfer (Goshen Substation to absorb 1.8 MVA from Oak Grove Substation via this transfer)	6/1/2019
	The expected timing of the need is from May to September.	As the project is driven by the expected load growth in the area, economic growth factors can influence the actual load growth.	Under Very High DER scenario, the overload magnitude is: 2017 2.27MW 2018 2.22MW 2019 2.15MW 2020 2.08MW 2021 2.01MW 2022 1.93MW 2023 1.85MW 2024 1.76MW 2025 1.67MW	One 12 kV 1200 kVAR switched overhead capacitor on existing wood pole 4226842E.	None	6/1/2017

The Bottom Line

- The Distribution Resources Plan development fundamentally changed the distribution planning processes of the CA IOUs.
- IOUs must now evaluate DER alternatives to traditional utility capacity upgrades
- Distribution deferral projects are solicited using a competitive solicitation process
- These projects are valued based on identified needs within the distribution system
- Southern California Edison is now going through this process as part of its rate case
- In its DRP, Edison proposed a “Distribution Planning Review Group” that would evaluate DER alternative projects under the supervision of an independent engineer.

Thank you!

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