Los Angeles Department of Water & Power

CUSTOMERS FIRST

Basin Generation and Transmission Reliability

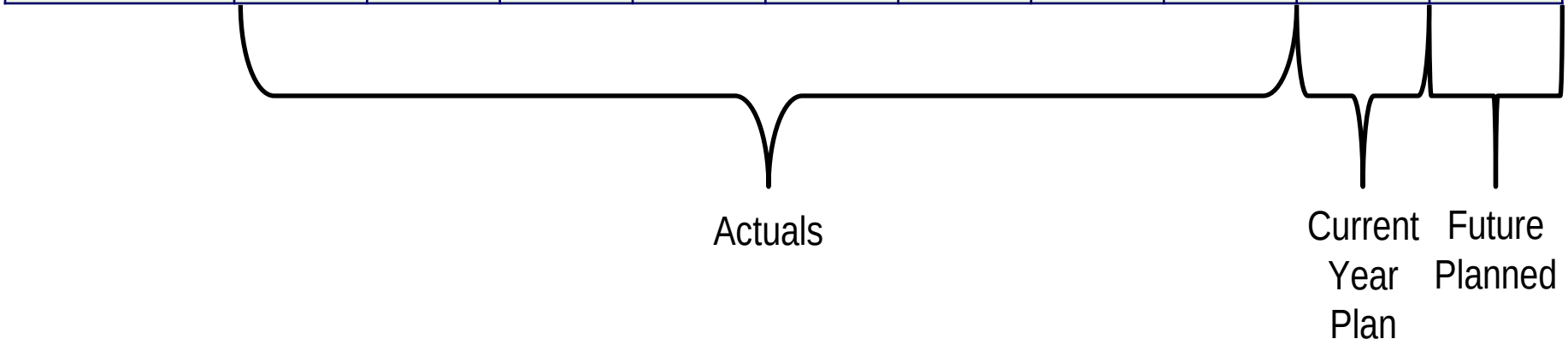
Board of Water and Power Commissioners

January 22, 2019

Energy Efficiency:
A Sustained Effort to Achieve 15% by 2020

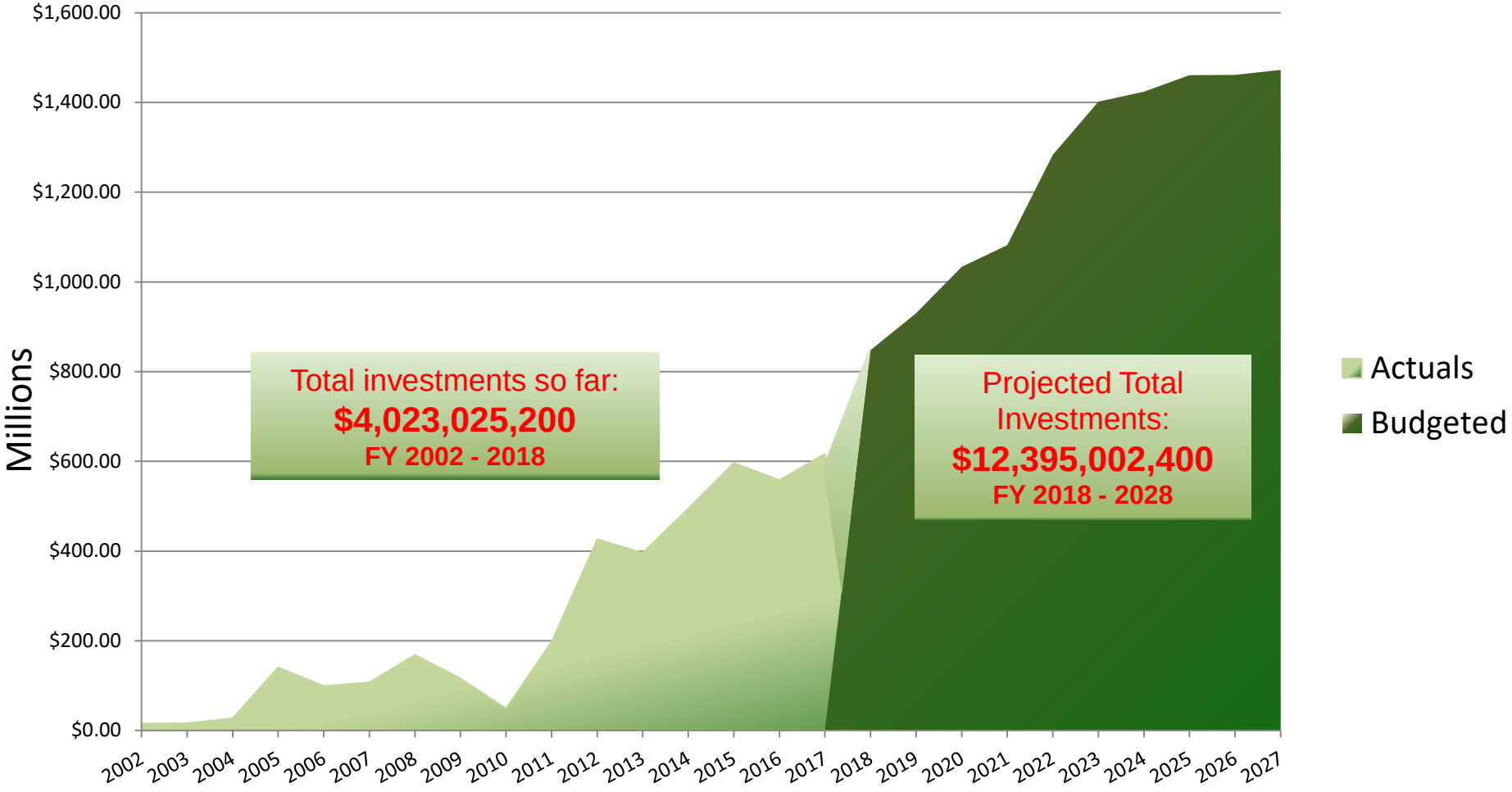
Annual EE Investment and Goals: 2010 – 2020

Fiscal Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Budget (millions)	$49.5	$37.3	$50.0	$78.0	$79.0	$73.0	$133.0	$168	$177.0 (+$20)	$163.0 (+$20)
GWh Savings	265	228	319	337	343	412	480	477	396	359
Portfolio Savings Cum'l	1.1%	2.1%	3.4%	5%	6.5%	8.2%	10.4%	12%	13.7%	15.1%



$16.4 Billion – LADWP RPS Investments

Fiscal Years 2002 to 2028 Actuals* & Projected



Renewable Portfolio Standard Resources Include:

- Solar, Wind, Geothermal, Small Hydro, Feed-in-Tariff Solar, Biomass, Biomethane, and others as regulated by California Energy Commission

* FY 2012 to 2018 actuals, FY 2002 to 2012 will be higher

Solar Programs

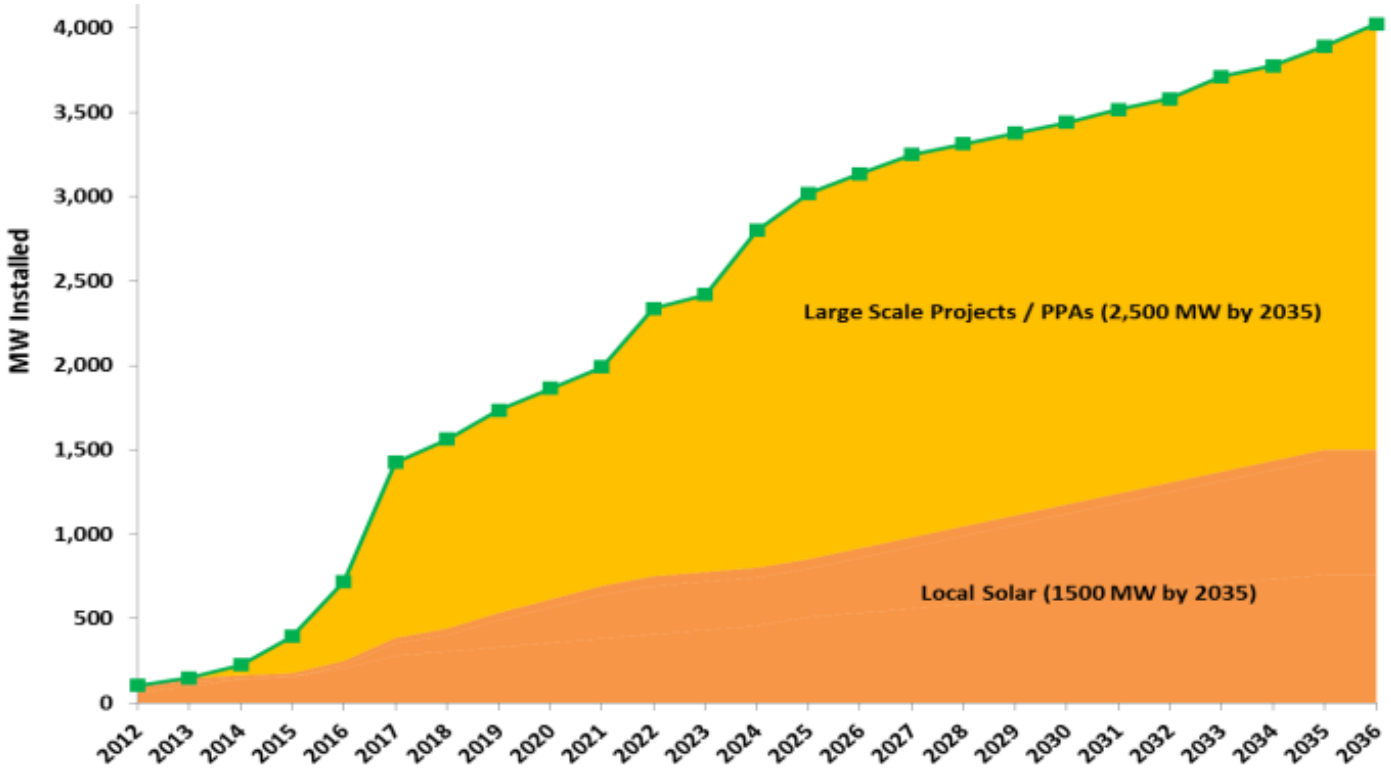
In-Service, Under Construction, and Planned Projects

Solar Incentive Program & Customer Net Metering

Feed-in Tariff

Community Solar Programs

Utility Scale Solar



Wind, Hydro & Geothermal – 4,000 MW

In-Service, Under Construction and Considerations

- 997 MW of active Wind Energy Agreements and Projects since 2006
- Geographically Diverse Wind Resources – Tehachapi, Lancaster, Utah, Oregon, Washington, Wyoming
- Over 700 MW of Wind Energy under consideration including New Mexico and Wyoming wind resources
- Over 345 MW of Geothermal and Biomass in-service and under construction in Imperial Valley, Northern California, and Nevada
- Over 255 MW of Small Hydro in-service – RPS eligible
- Zero-Carbon Resources – 1,771 MW of Large Hydro from Castaic and Hoover

Energy Storage – 1,500 MW

In-Service, Under Construction, and Planned Projects

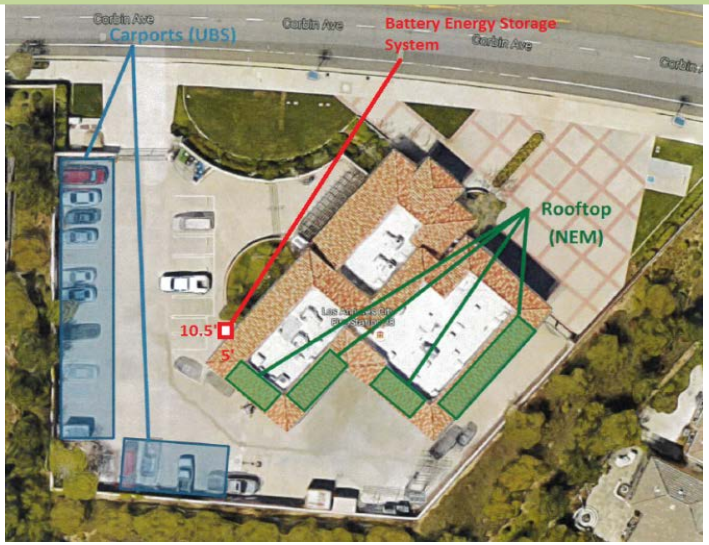
Achieved

- Castaic Pump Storage Plant, 1275 MW, upgraded 21 MW in 2013
- Beacon Battery Energy Storage System, 20 MW – in service, 2018
  - Fully integrated and provides flexibility
- Fire Station 28 Microgrid, 12 kW - Completed 2/2018
- La Kretz Innovation Center Microgrid, 60 kW - Completed 7/2016

In Progress & Planned

- LADWP HQ : 200 kW Battery Energy Storage System
- Over 500 Interconnection applications totaling over 2.4 MW
- Grid-connected installations at LAPD, Rec & Parks, Distributing Stations, and others
- 200 MW – 4hr Utility Scale Battery Energy Storage combined with Solar
- Boulder Canyon Pump Storage at Hoover – under Feasibility Study

Fire Station 28 Solar & Battery Energy Storage



Vision of 100% Renewable Future

- Goal: Eliminate Basin gas-fired generation
- Because Basin Transmission was never intended to be reliably operated without Basin gas-fired generation
- DWP has to completely re-design and re-construct Basin Transmission system to maximize its power-carrying capability
- In order to reliably operate without Basin gas generation in the future

Reliability

- Federal (NERC) Reliability Standards mandate how DWP operates ***Transmission*** System
- DWP must comply to ensure, and demonstrate through evidence that, under all conditions, an 'outage' of any generator or line does not jeopardize the grid
- The grid interconnects many utilities
- Evidence is audited in detail every 3 years
- Penalty up to $1 million per day per violation

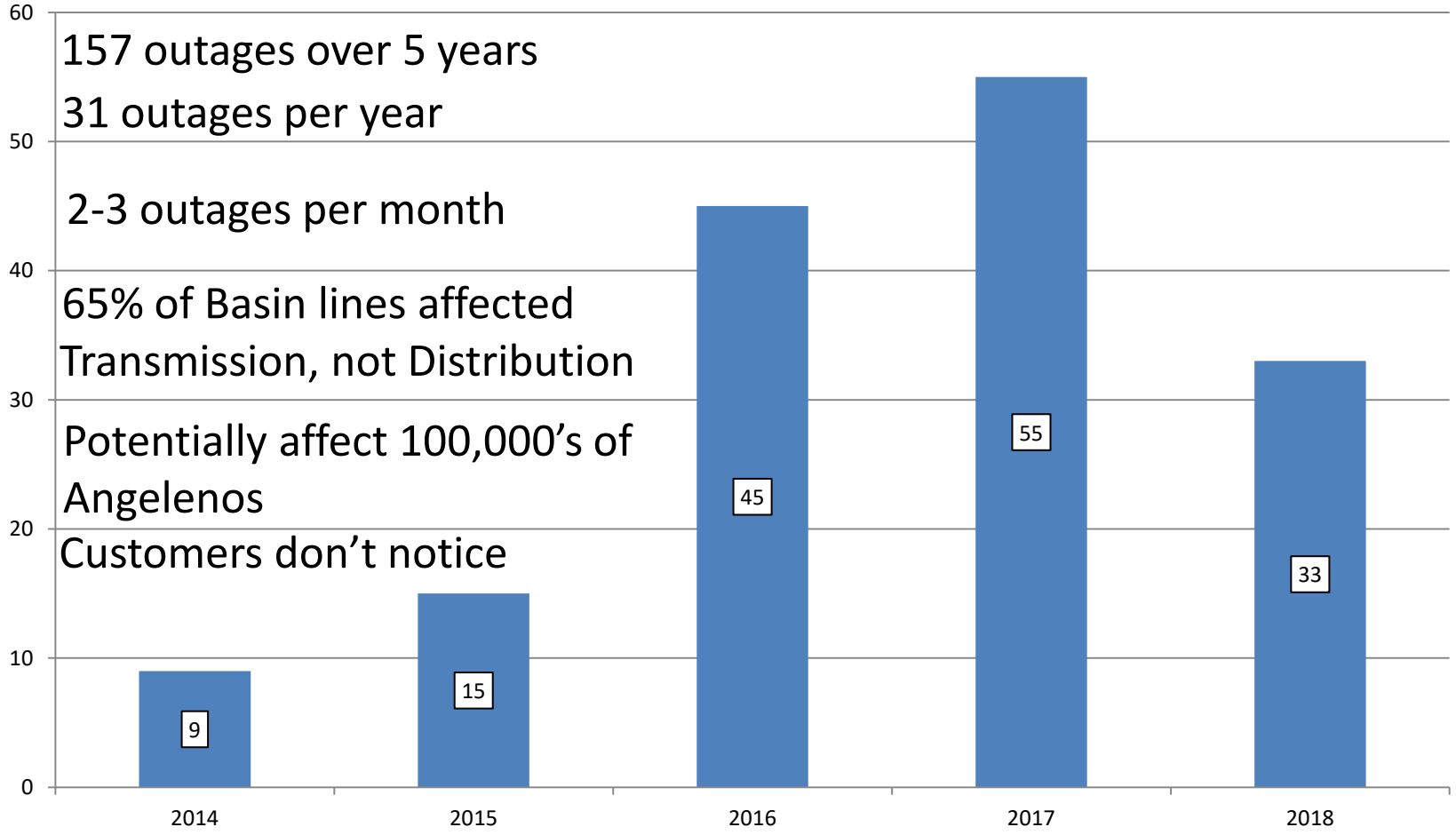
Reliability

- ‘Unplanned Outage’: line or generator is unexpectedly, instantly, and automatically turned off due to its failure, to prevent its permanent damage
- More than 850 miles of Basin Transmission
- Outage can last minutes, days, or months
- Line are a few miles up to 600 miles long
- DWP must report all outages to Federal Authorities

Question

You may be wondering how many Basin Transmission Outages DWP has had over the last five years

Basin Transmission Outages

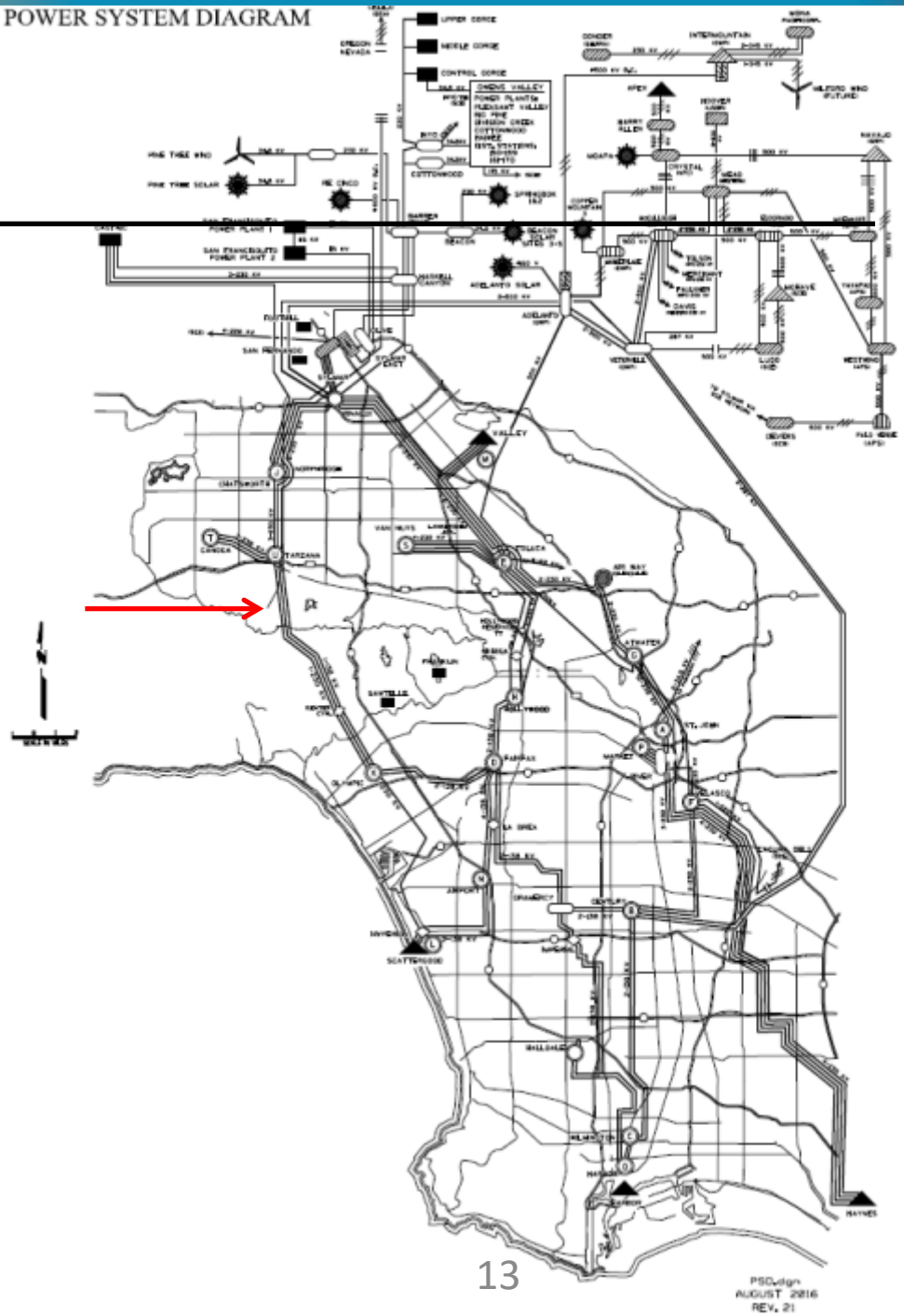


Reliability Compliance

- Why don’t customers notice?
- There is tremendous amount of work done behind the scenes to ensure compliance and continuity of service in spite of outages
- An example of response to a recent outage
- West LA Transmission Line
- On December 20, 2018

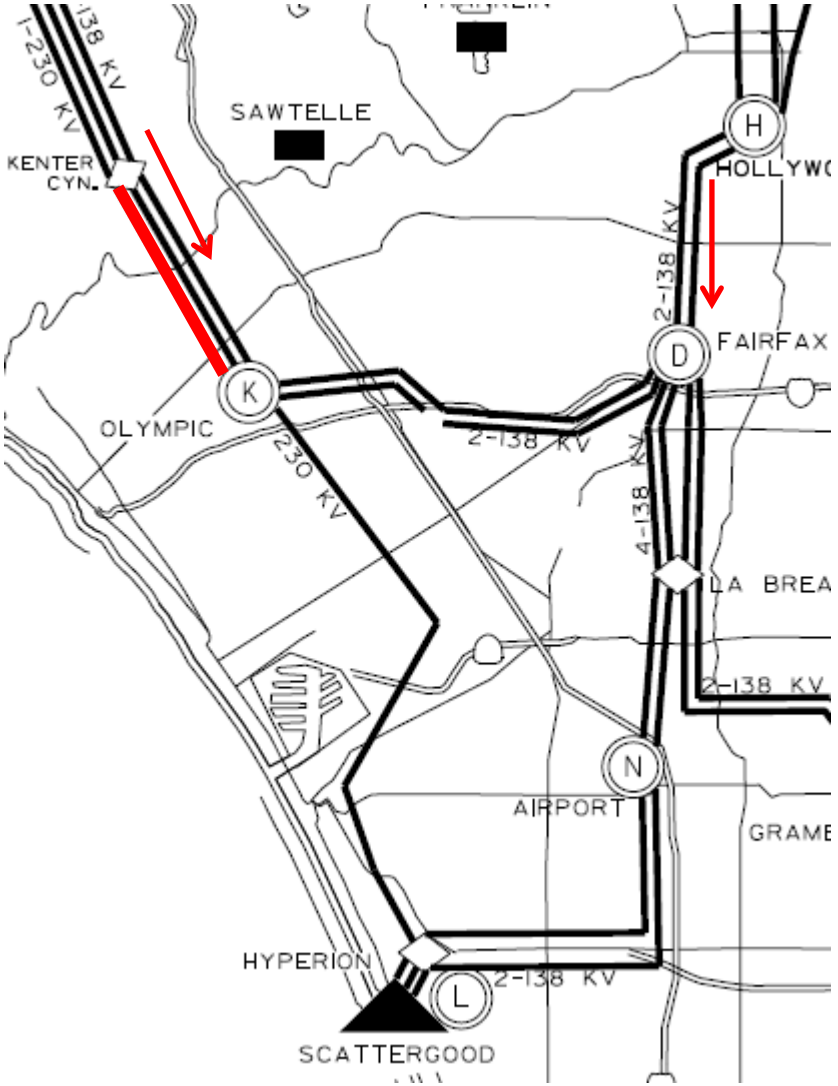
Response to Outage

- Outage happens
- Ensure Continuity of Service
- Contain effects of outage
- Determine cause and estimate length of outage



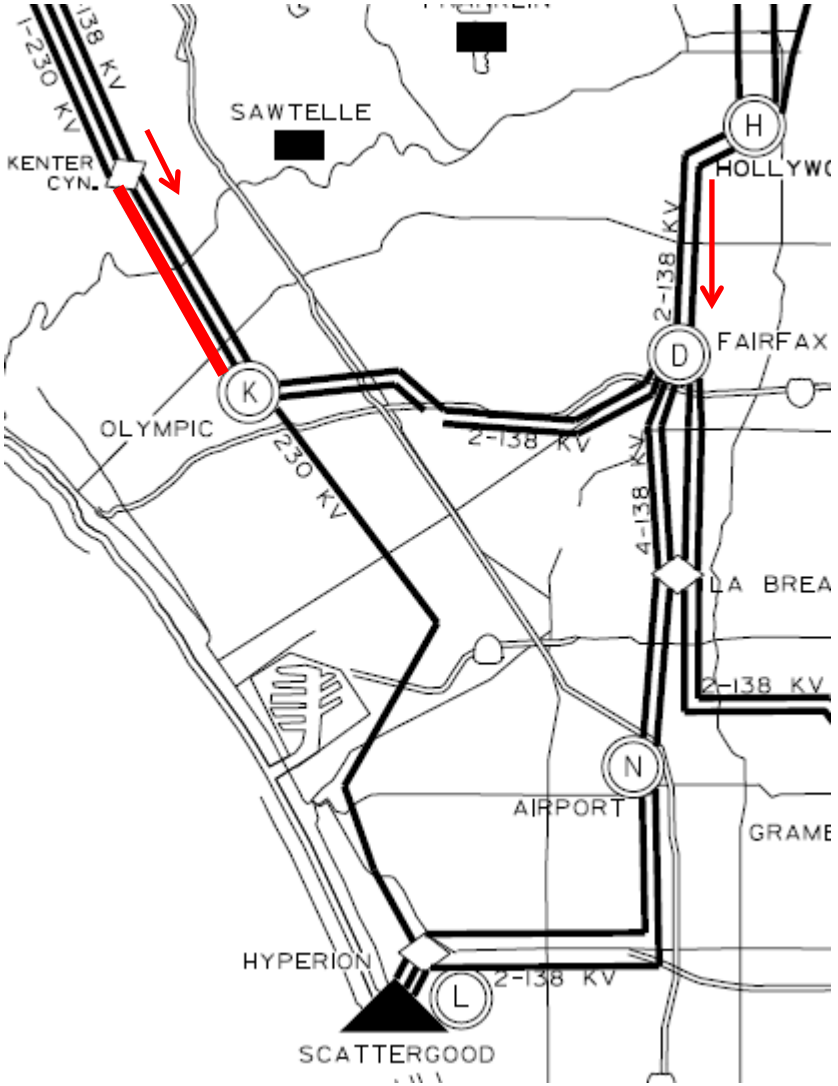
More Detail

- West LA customers supplied by power shown as arrows
- Power Flow N to S
- Outage



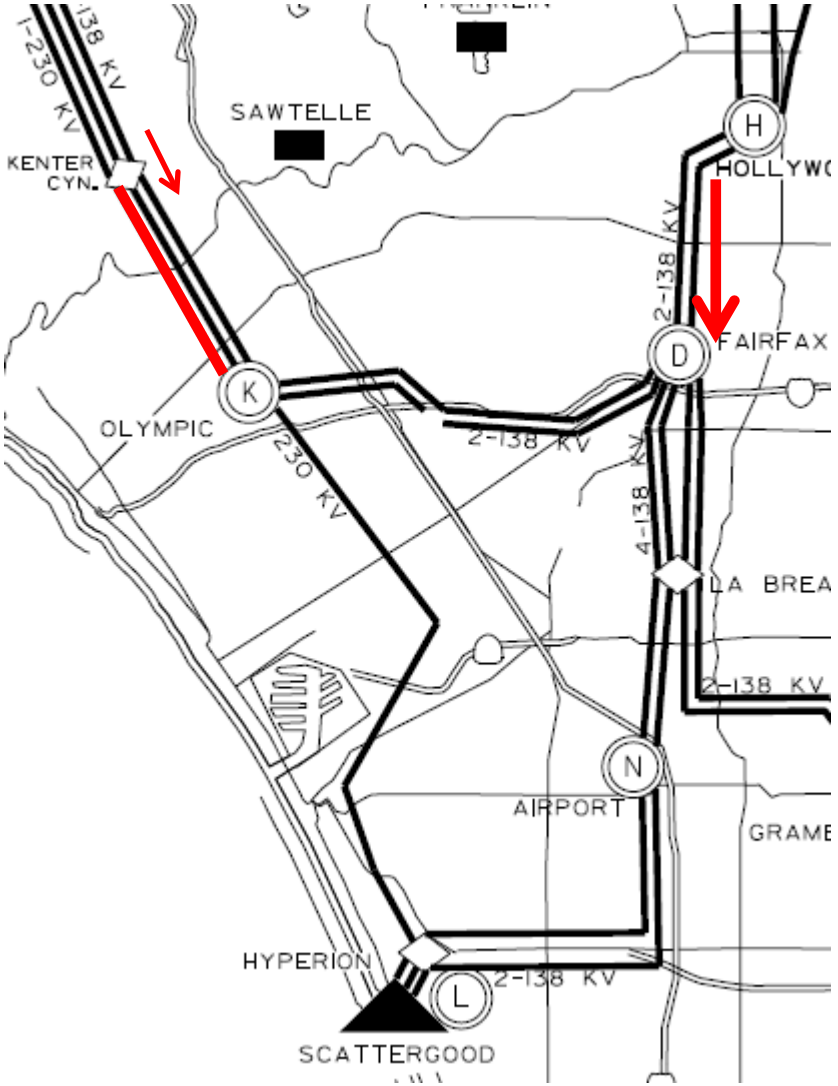
More Detail

- West LA customers supplied by power shown as arrows
- Power Flow N to S
- Outage
- Power disrupted
- Customers don't notice because



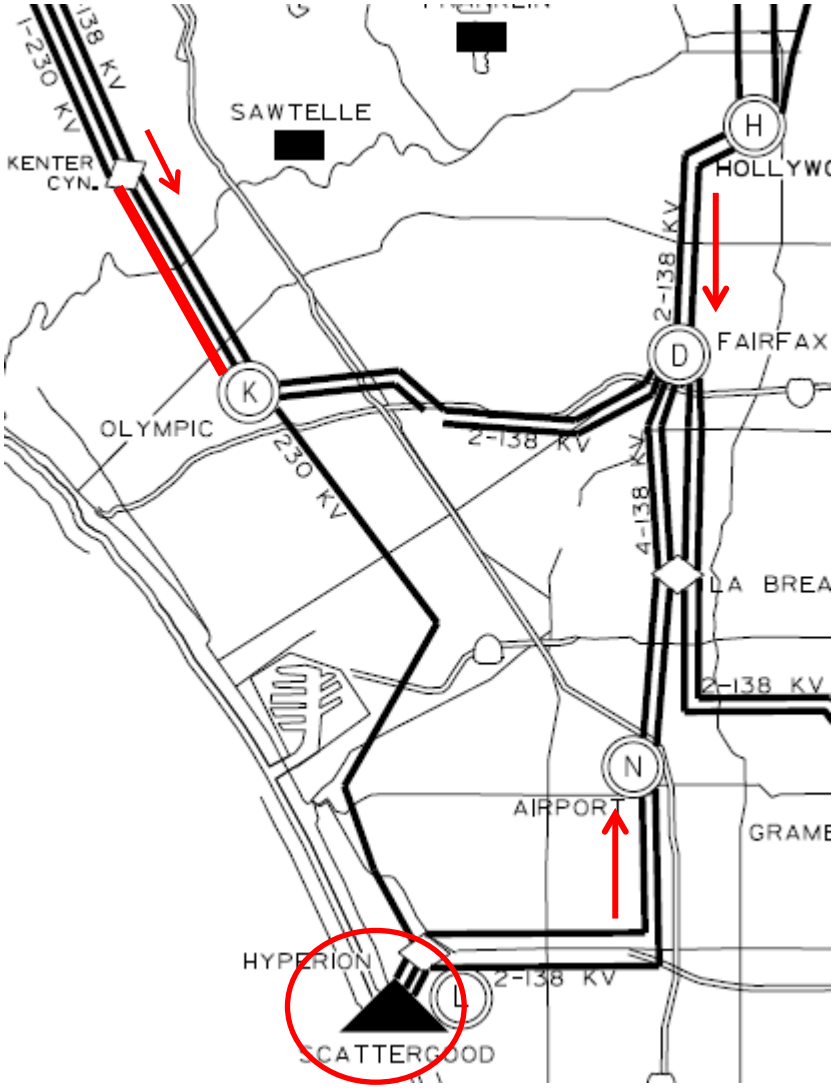
More Detail

- More power flows here
- Lines overload
- Turn on Scattergood generation to serve West LA customers



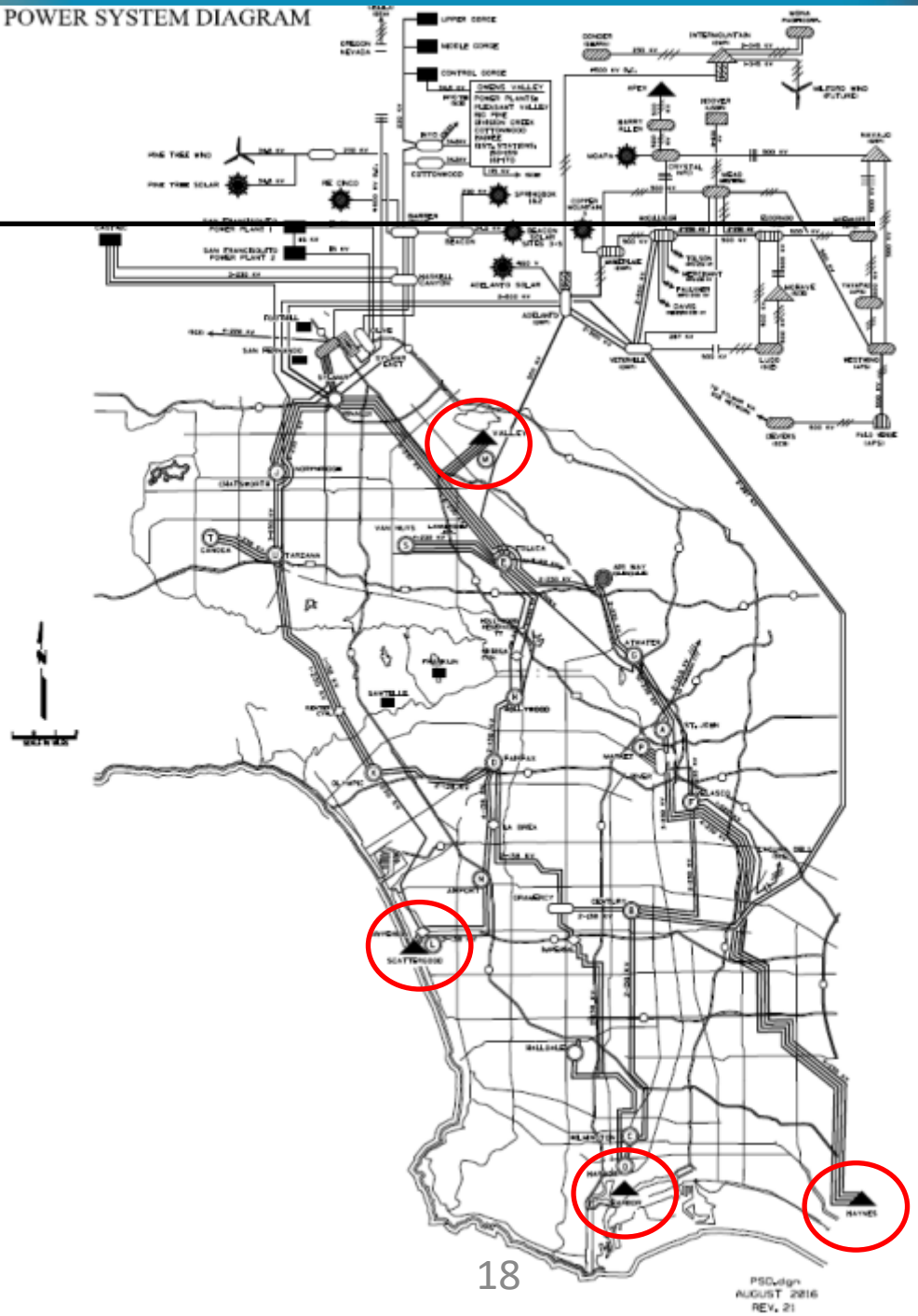
More Detail

- More power flows here
- Lines overload
- Turn on Scattergood generation to serve West LA customers
- Reducing overload



Response to Outage

- All local Basin Generation is the reason customers are unaware of the 2-3 Basin Transmission outages DWP experiences every month



The Journey Ahead of Us….

- Senate Bill 100 is the law of the land
- DWP is committed to transitioning to a 100% Clean Energy future while providing reliable service during transition

A successful journey will include:

- Re-design and Re-construction of legacy Basin Transmission
- Must turn off lines to re-construct
- Basin Generation maintains reliability whether a line is turned off for re-construction or due to failure
- Basin Generation is critical to reliability while DWP transitions to 100% Clean Energy