

Southern California Edison

Power Briefing

May 23, 2017



Energy for What's AheadSM



Welcome/Safety

Mike Bushey
Director
Business Customer Division

Energy for What's AheadSM



Safety First



**Never Touch or Step in
Water Near a Downed Wire**
Stay Away. Call 911.



Emergency Contact Information

- Report downed wires: **911**
- Report an outage:
 - SCE Outage App
 - SCE.com/Outage
 - Business Customer Division Outage Team: **855-683-9067**
 - Customer Contact Center: **800-611-1911**
 - Email scepoc@sce.com (non-emergency)
- SCE Customer Service: **800-655-4555**
 - Contact this number as well if a generator will be used

AGENDA

Welcome and Safety

- **Michael Bushey**, Director
Government, Institutions, Agriculture & Water

Regulatory & Rate Update

- **Russ Garwacki**, Director
Pricing, Design & Research

Grid Modernization Update

- **Eric Nunnally**, Engineering Manager
Grid Modernization

Transportation Electrification

- **Lisa Arellanes**, Project Manager
Strategic Customer Transportation
Electrification

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www.Twitter.com/SCE_Business

#SCEngageBiz

2017 Regulatory and Rate Update

Russ Garwacki

Director

Pricing, Design & Research

Overview of Revenue Requirement Components

(June 2017 Bundled System Average Rate: 15.7* cents/kWh)

Revenue Requirement = \$12.1 billion

Other

- New System Generation: Cost recovery related to generation resources necessary for system reliability
- Nuclear Decommissioning: Cost recovery associated with decommissioning nuclear power plants following their retirement and shutdown.

DWR Charges/Refunds

- Cost recovery on Bond Charges

Public Purpose Programs

- Legislative mandates (energy efficiency, RD&D, renewables investment, etc.)
- CPUC programs (additional energy efficiency, CARE program, etc.)

Transmission

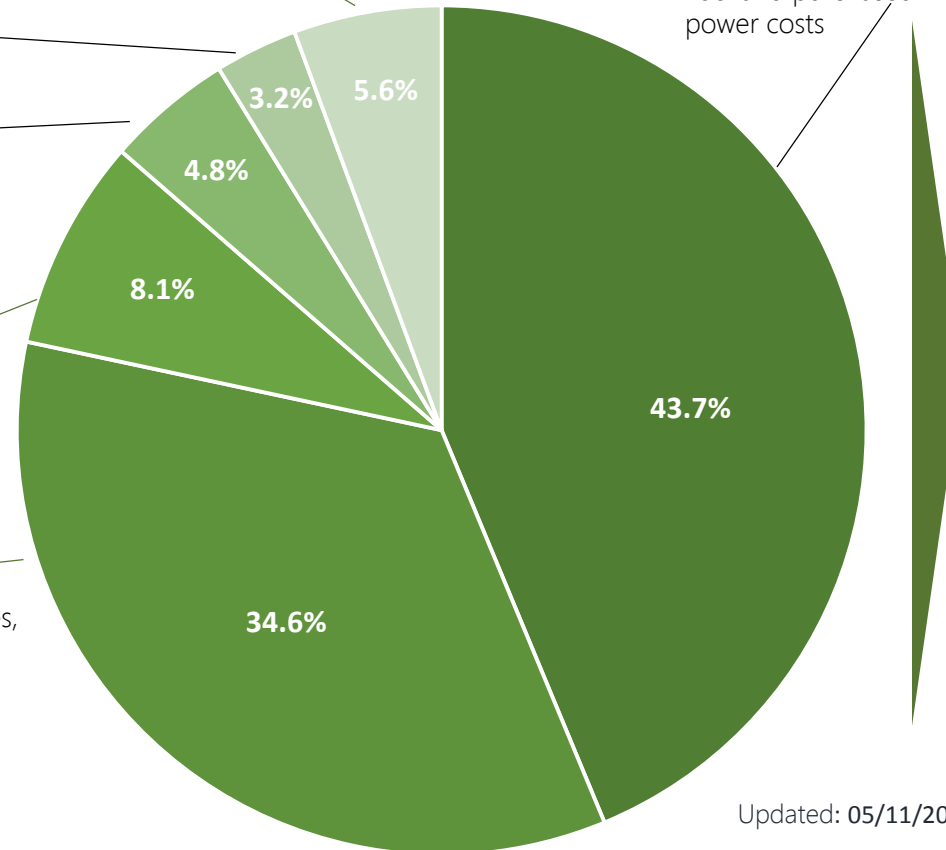
- Investment and O&M in transmission (typically >220 kV)

Distribution

- Investment in distribution: poles, wires, substations, service centers, meters, etc.
- California Solar Initiative
- Demand Response Programs
- Edison SmartConnect®

Generation

- Investment and O&M for utility owned generation (UOG)
- Fuel and purchased power costs



Updated: 05/11/2017

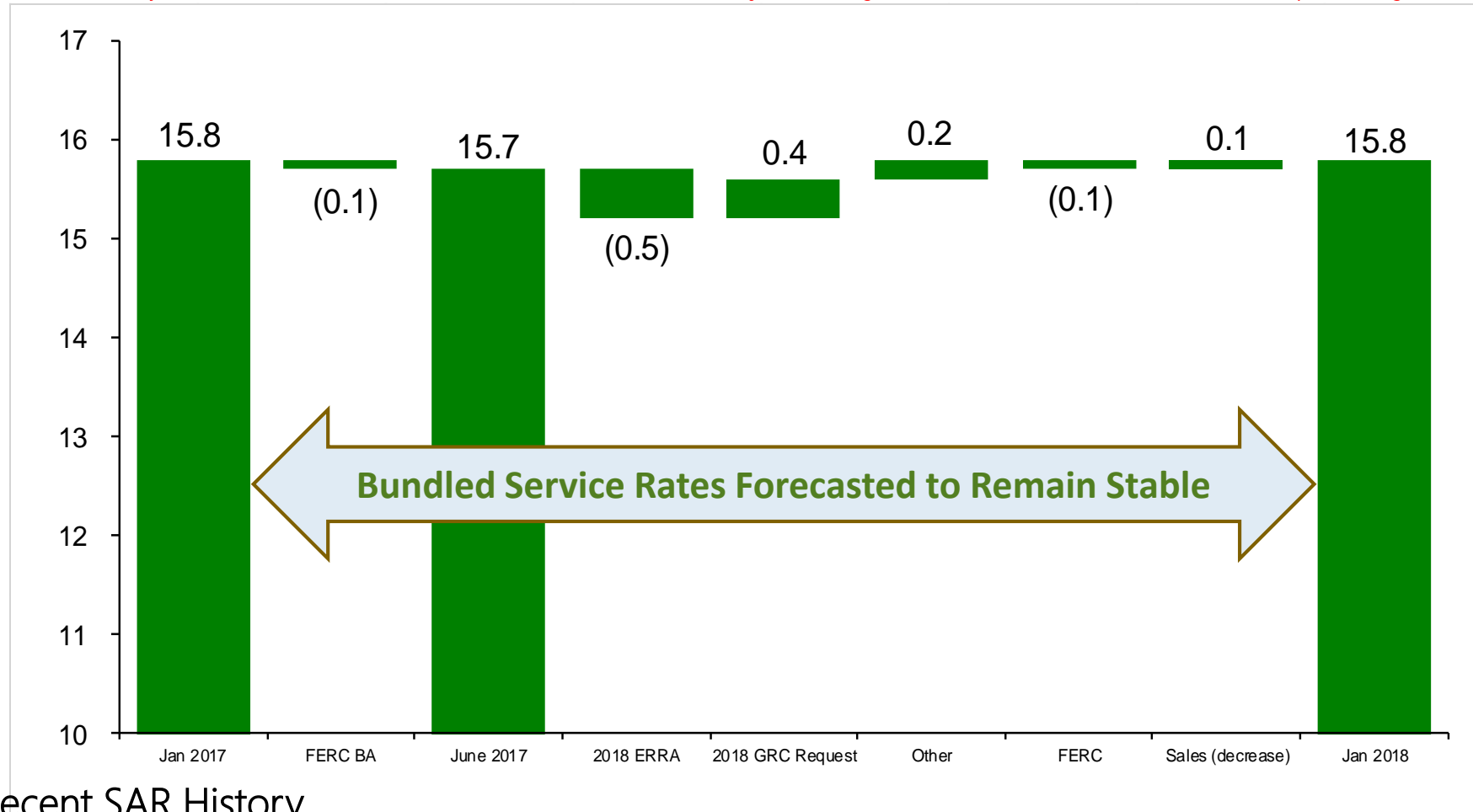
Conclusion

Nearly half of retail revenues fund generation-related activities:
SCE spends the remaining revenues on non-generation services such as distribution and transmission system development and reliability, energy efficiency, demand response, and low income assistance programs

Estimated 2018 System Average Rate*

- Bundled Service (cents/kWh)

Preliminary rate level is estimated based on SCE's latest forecast and is subject to change based on future CPUC decisions in various proceedings



Recent SAR History

January 2015 – 16.2 cents/kWh

January 2016 – 15.0 cents/kWh

Last Update: May 2017

* Rate levels include Greenhouse Gas (GHG) EITE & Climate Credit revenues

2018 Energy Resource Recovery Account (ERRA)

- SCE submitted its 2018 ERRA Forecast Testimony on May 2nd
- Requested revenue requirement in the amount of \$4.6 billion
 - Forecast expected to be ~5% lower than current ERRA revenue requirement
- Major Factors:
 1. **Lower Generation Costs**
 - 12-month average 2018 gas price forecasted to be ~12% lower than 2017
 2. **Higher Hydro Generation**
 - SCE assumes ~ 4,400 GWh (~ 6% of sales forecast) of hydro from Big Creek, Eastern and Eastwood
 3. **Lower Sales**
 - Sales forecast lower ~ 950 GWh, or 1.2%, less than SCE's 2017 ERRA application
 4. **Lower market prices**
 - 2018 forecast market prices ~16% lower than 2017

What is ERRA?

In an ERRA forecast application, SCE forecasts the costs of fuel that it needs to generate electricity, and the costs of additional power it purchases for its customers for the upcoming year.

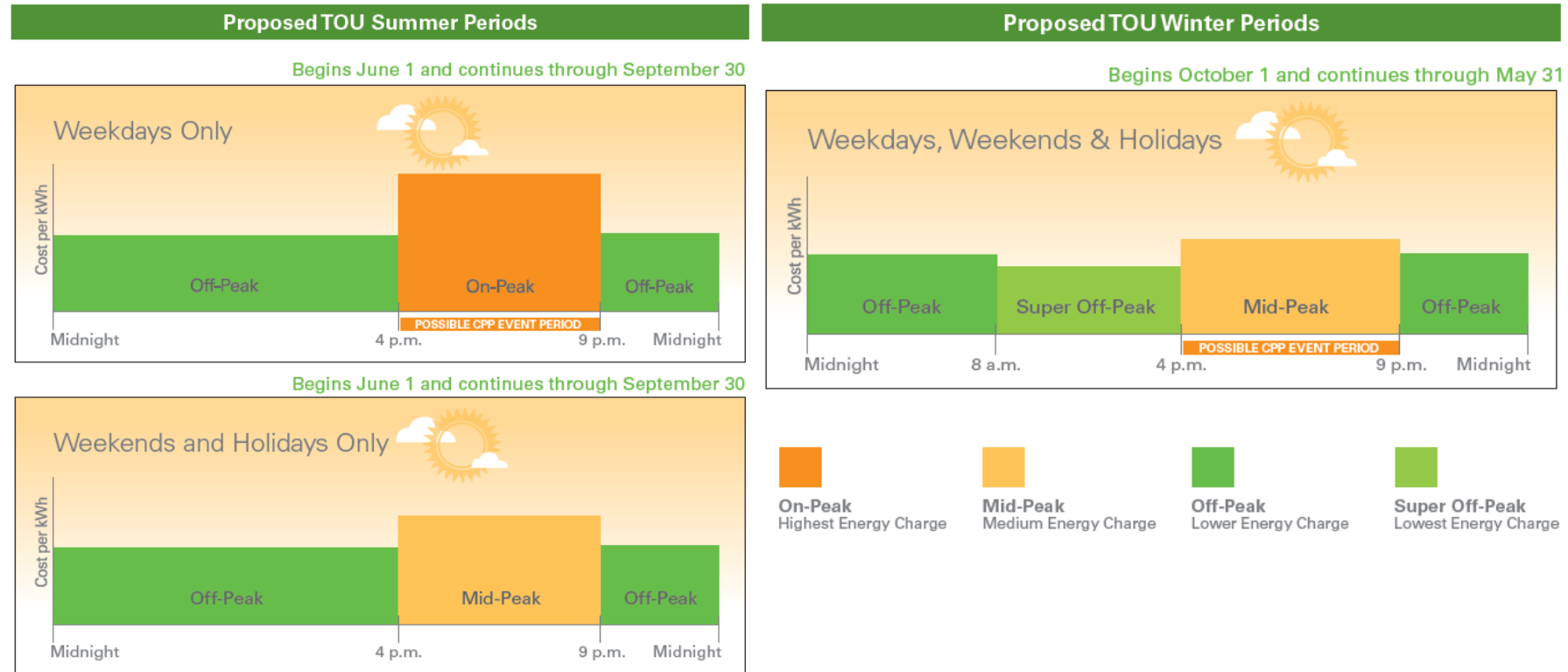
The ERRA application also includes:

- Recovery of balances in ERRA and New System Generation balancing account
- Return of GHG auction revenues to eligible customers

2016 Rate Design Window Summary

- On Sept. 1, 2016, SCE filed its 2016 RDW Application (A.16-09-003), which includes the following key proposals:
 - New standard^[1] TOU periods for all non-residential customers on rate schedules with standard TOU periods;
 - Implement default CPP for TOU-GS-1, TOU-GS-2 and TOU-PA-3 customers
 - SCE proposed an alternative approach of not defaulting TOU-GS-1 customers
 - Maintain optional CPP for TOU-PA-2 customers
 - Simplification of the CPP Program;
 - Revise the RTP rate structure; and
 - Consider eliminating the Option R cap
- Plan to propose to defer implementation date from October 2018 to early 2019

Proposed Standard TOU Periods



- Shifts daily "peak" period to 4-9pm (currently noon to 6pm)
- Introduces "super off-peak" period from 8am-4pm on all Winter days
- Introduces time-differentiated weekend charges (currently all weekend hours are "off-peak")
- Maintains existing seasonal definitions (Summer: June-Sept; Winter: Oct-May)

The proposed Time-of-Use (TOU) peak period proposal applies to "standard" TOU rates defined as follows: TOU-8, TOU-GS-3, TOU-GS-2, TOU-GS-1, TOU-PA-3, & TOU-PA-2.

CPP events occur on weekdays and will take place 12 times per year.

TOU Period Grandfathering

- On Jan. 19, 2017, the Commission issued Decision (D.17-01-006) in the TOU OIR
- The Decision adopts several broad policy guidelines for the development and implementation of new TOU periods
- In general, these findings and principles align with those used in SCE's 2016 RDW application, with one exception:
 - Allows certain behind-the-meter solar customers to maintain the existing TOU periods, but **NOT** rate levels, for a period of five (residential) and ten (non-residential) years^[1]
 - Criteria for grandfathering eligibility:
 - Solar system is designed to offset 15% of the customer's usage
 - Interconnection application is submitted no later than 1/31/2016
 - Interconnection is complete by 7/31/17 (or 12/31/17 for schools)

[1] TOU period grandfathering ends 8/2027 for non-residential customers (1/2028 for schools)

2018 GRC Phase 2 Overview

- SCE's 2018 GRC Phase 2 application modifies revenue allocation and rate designs for all customer classes based on updated marginal costs and new TOU periods
- Rate proposals reflect new system conditions^[1] and the need to facilitate the integration of DERs
 - A two-part grid and peak distribution cost recovery structure
 - The "grid" components facilitate bi-directional flow of energy expected with DER applications while ensuring appropriate cost recovery for components that are not time or peak dependent
 - The time-dependent "peak" component is associated with capacity growth and a pricing signal to reduce peak load conditions
 - Flexible generation capacity
 - Establishes a pricing signal to address requirement for flexible generation that can help the utility avoid steep "ramp" conditions as solar generation tapers off and demand peaks in the late afternoon / evening hours
 - Spreads capacity cost concentration from a few late summer afternoon hours to 4-9 p.m. year round
- Filing application in June 2017 for a proposed implementation date in early 2019

[1] Increased renewables procurement to comply with Senate Bill 350 mandates and the use of advanced metering infrastructure (AMI) data to enable more accurate price signals based on customers' contributions to key cost drivers

Other Proceedings

- Transportation Electrification – Filed January 2017
 - New electrification programs targeted for Port electrification and Medium Duty vehicles
 - Filed new rate structures that include a phase-in of demand rates
- Demand Response (DR) – Filed January 2017
 - Proposed DR rate credits constructed using historical methodologies
 - Proposed a phase-in of some DR program credit reductions in proportion to their updated estimated DR load response (e.g. A/C Cycling)
 - Some DR credits will need reconstruction to be consistent with our updated TOU proposals (e.g. BIP)
- Community Choice Aggregation, Portfolio Allocation Methodology (PAM) – Filed April 2017 (joint w/ PG&E, SDG&E)
 - Per statute, designed to achieve indifference for bundled service customers for customers choosing other providers (e.g. CCAs)
 - General agreement that the existing indifference calculations need updating
 - Proceeding is a natural extension from a workshop process
 - At a high level, proposal allocates a portion of existing generation portfolios to departing load customers in proportion to their load

Questions?

Grid Modernization Update

Eric Nunnally
Engineering Manager
Grid Modernization, Planning & Technology

What Are Distributed Energy Resources?

The distribution grid is core to DER integration

EV
Integration

Battery
Energy
Storage

Rooftop
Solar PV

Flexible
Load
(EE, DR)

Why are we modernizing the grid?

**Increasingly
complex grid**

As Distributed Energy Resources (rooftop solar, onsite energy storage, electric vehicles, energy management systems) are added to the grid, its operation becomes more complex

**State Energy &
Environmental
Policy**

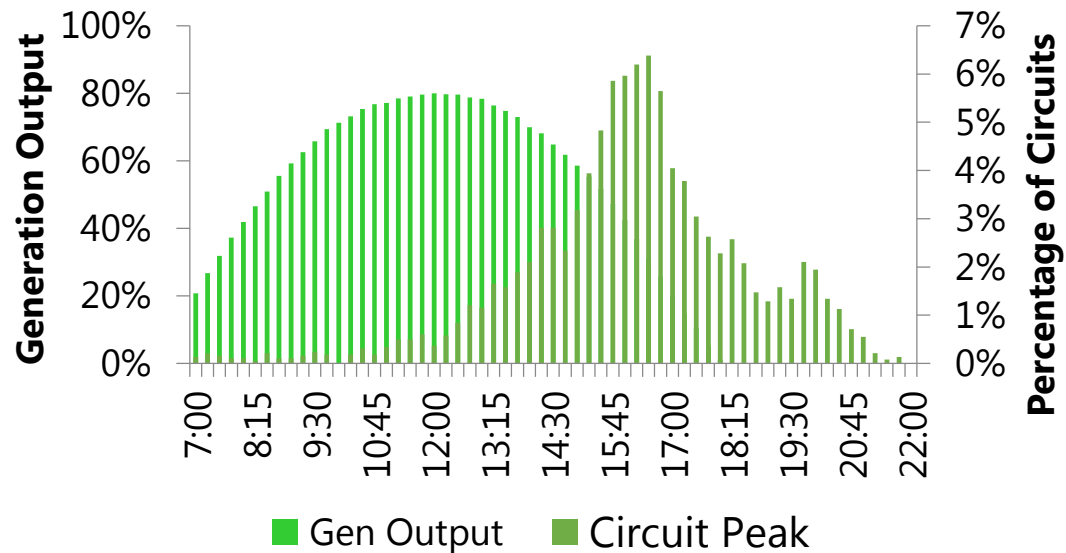
Grid modernization supports state policy objectives to increase energy from renewables and decrease greenhouse gas emissions.

**Customer Choice
& Reliability**

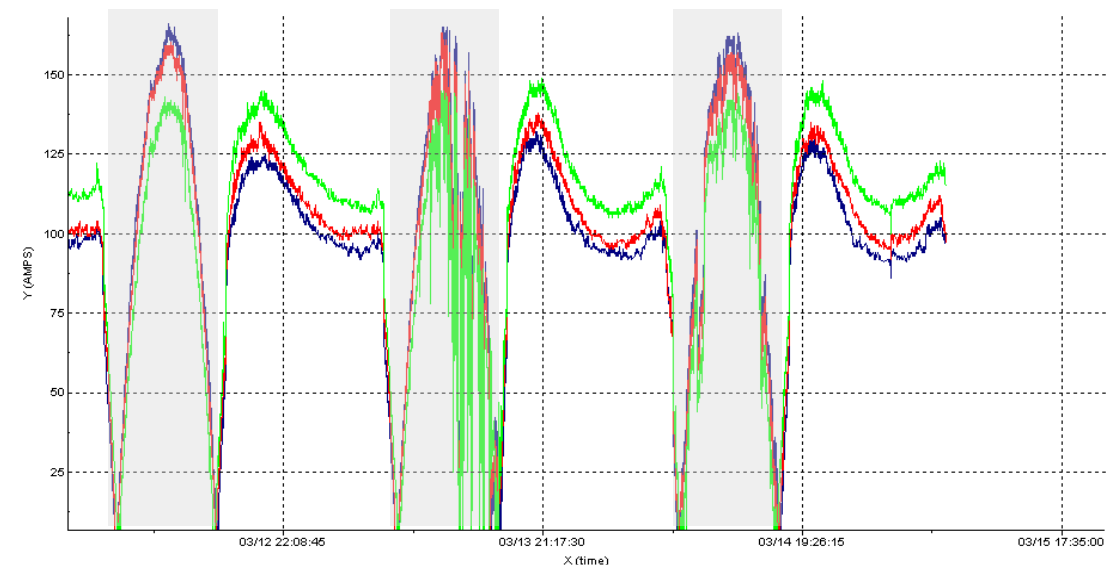
Customers have more choices and are increasingly adopting DERs and have higher expectations for reliability for their electronic-dependent lives.

Key Driver: Increasingly Complex Grid

As distributed energy resources are added to the grid, operating characteristics of the grid are changing, leading to increased complexity.



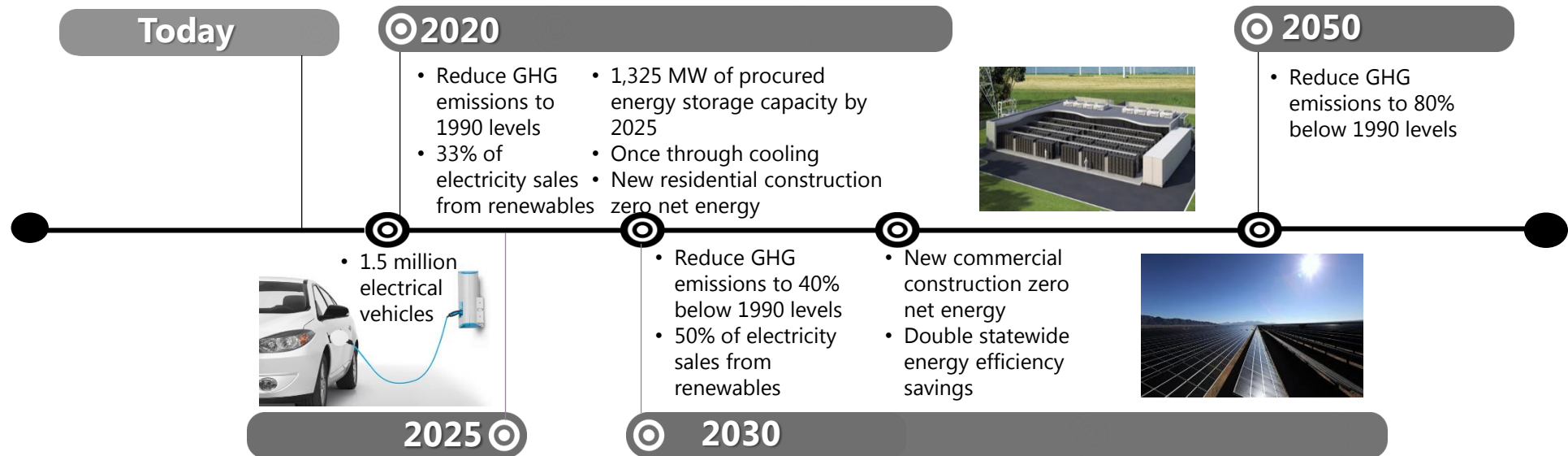
- Peak Time for Distribution Circuits Load and PV do not typically coincide
- The grid needs to accommodate this available power for the benefit of the customer and the grid



- Shaded areas show 3-phase reverse powerflow and intermittent output from PV from an actual circuit, this appears as one-way flow to operators
- Operators need visibility to power flow magnitude and direction

Key Driver: State Energy and Environmental Policy

Achieving our expansive energy and environmental policy goals will require taking foundational steps to evolve the grid.

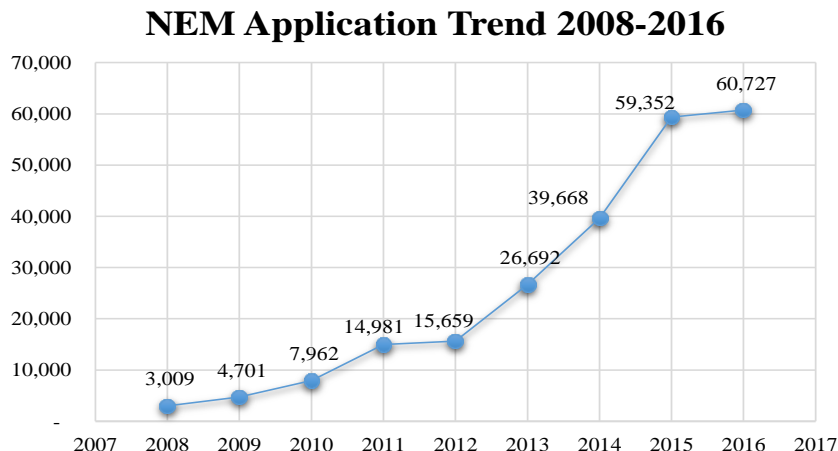


- Due to the size of SCE's system, deploying the required technology will take 10 years to cover 60% of SCE's total distribution circuits (urban circuits)
- SCE's Grid Modernization Program can help meet the stated goals and objectives in the DRP within 10 years

Key Driver: Customer Choice and Reliability

Customers Are Adopting DER

- Electric Vehicles: 70,000 in SCE territory today; expect over 300,000 by 2020
- NEM Applications: In 2008, averaged 250 per month; in 2015, averaged 4,000-5,000 per month
- Federal tax credit increases customer incentives for DERs



Customers Need Reliable Service

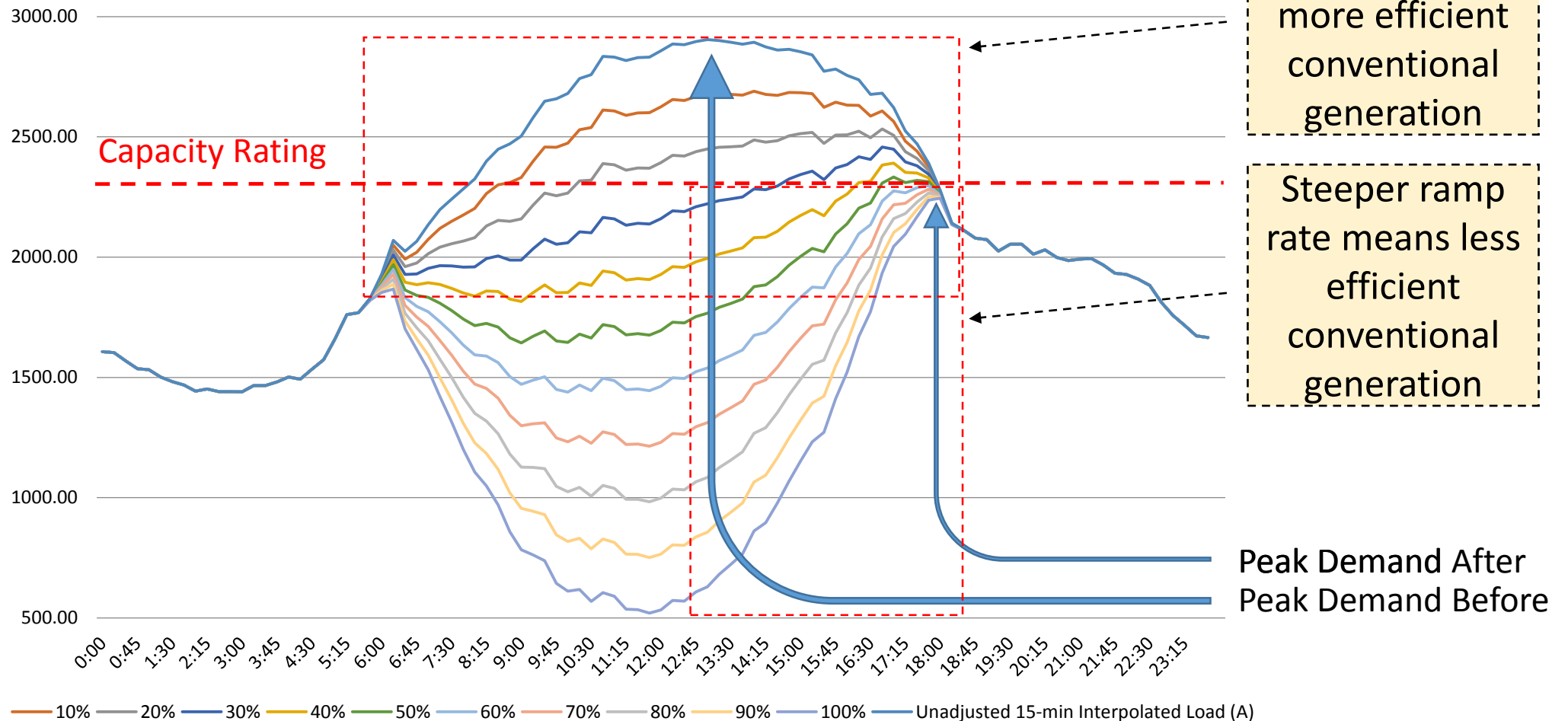
- Modern society is increasingly more dependent on electricity
- 42% of customers in the West would not accept a two-day power outage, even if they were paid as much as \$1,000 for it
- 64% of customers responded that power outages cause "really significant problems" for their households
- 71% of customers with income less than \$40,000, said outages cause "really significant problems"

*Source: T&D World Magazine, Reliability Demand Survey Finds Many Americans Have Low Tolerance for Power Outages (May2012), available at: <http://tdworld.com/smart-energy-consumer/reliability-demand-survey-finds-many-americans-have-low-tolerance-power-outage>

Formation of the Duck Curve

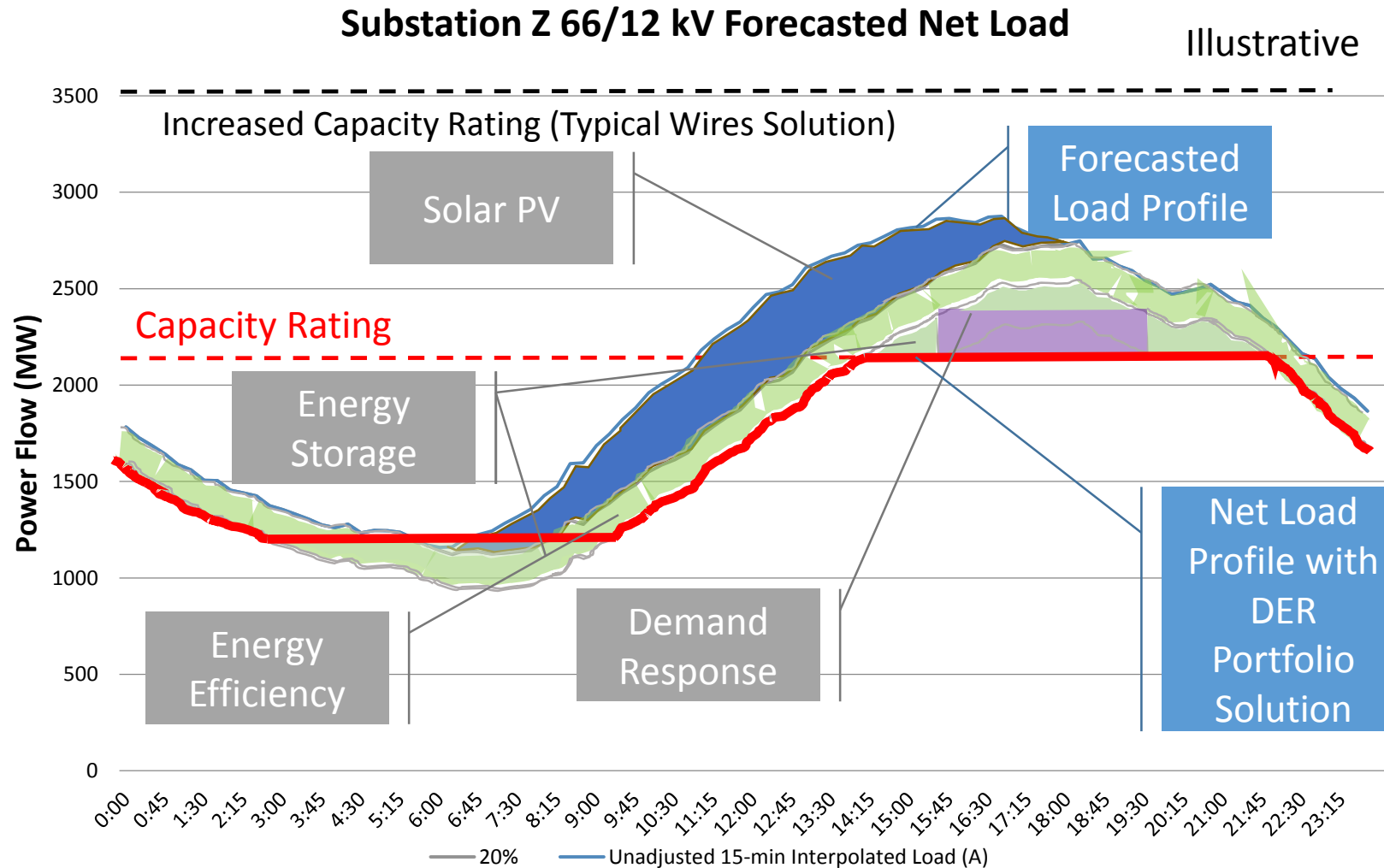
Solar Can Impact Load Profile During Daytime Hours

Substation X 66/12 kV Net Load



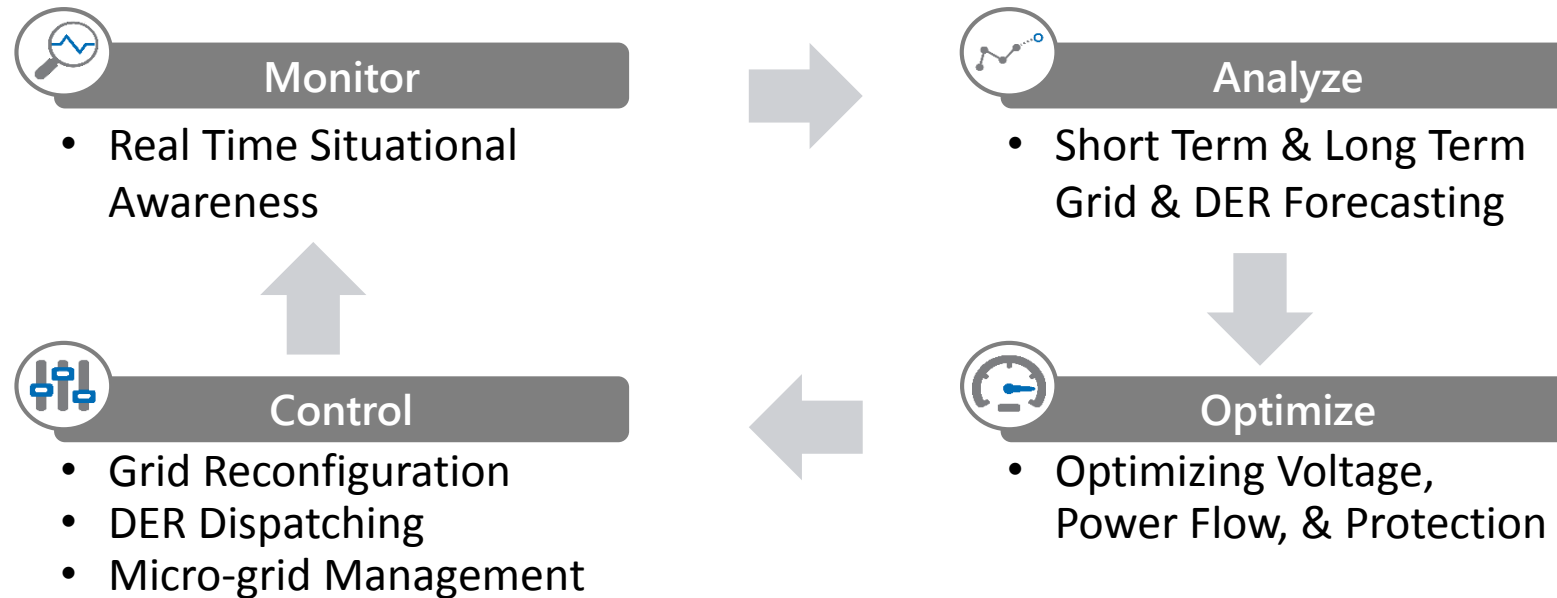
Integrate DERs into Forecasting & Planning

Improve ability to forecast DER adoption and evaluate DER Portfolio solutions as alternatives to conventional wires investments.



Tactical Objectives of Grid Modernization

Increase DER Portfolio dependability by integrating DERs into planning and operations. Capabilities required to meet the growth of Distributed Energy Resources (DERs) on SCE's distribution system.

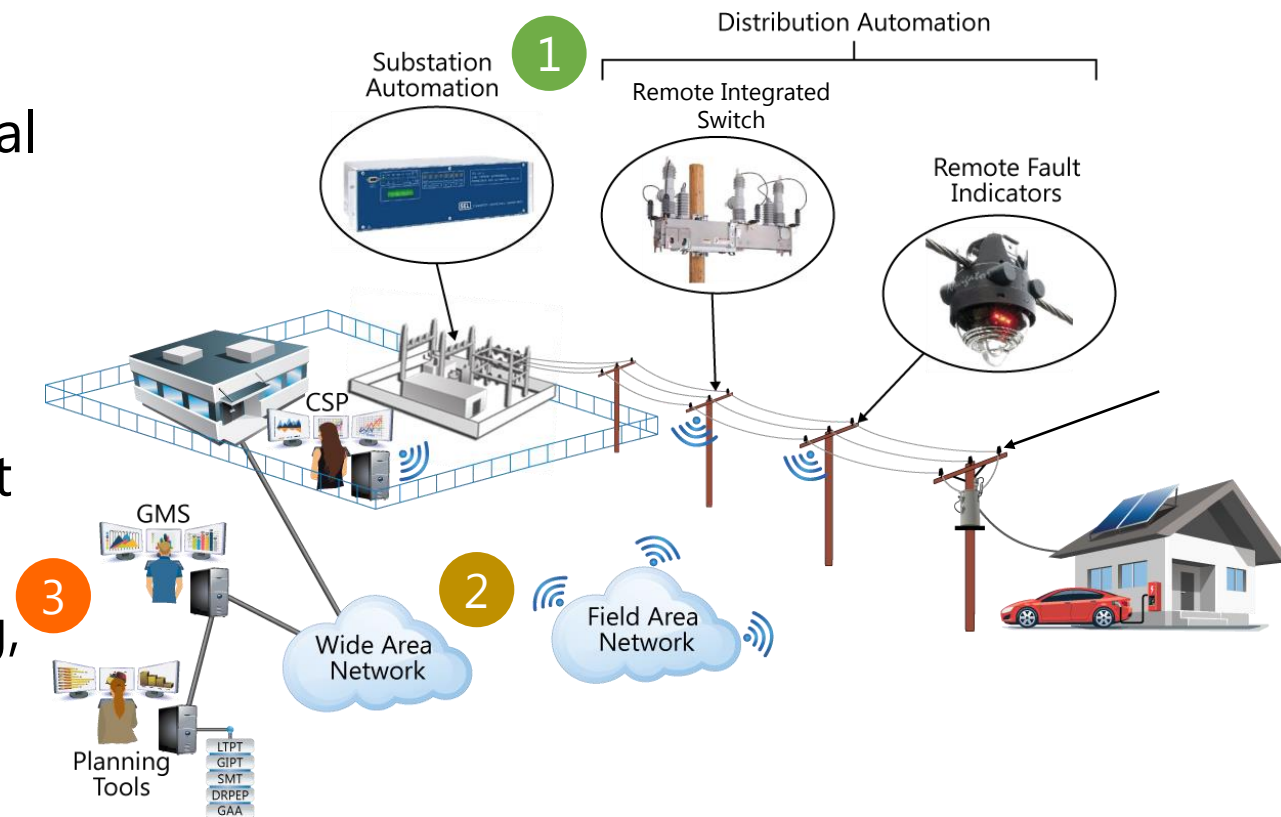


What this means to Distribution Planning and Operations.

- New automated equipment on the distribution system
- Increased levels of inbound data to operations
- New software solutions for operations and planning organizations
- Requires more granular Demand Side Management data for Grid Planning

Grid Modernization Elements

- 1 Automation:** Adding distribution and substation technology to gather data, monitor, and manage grid resources in real time
- 2 Communications:** Upgrading communication networks, such as expanding the fiber optic and field area networks to support timely data transport
- 3 Technology Platforms:** Developing improved analytics platforms for planning, operations, outage management, interconnection, and transparency for customers



Grid Modernization GRC Workshops



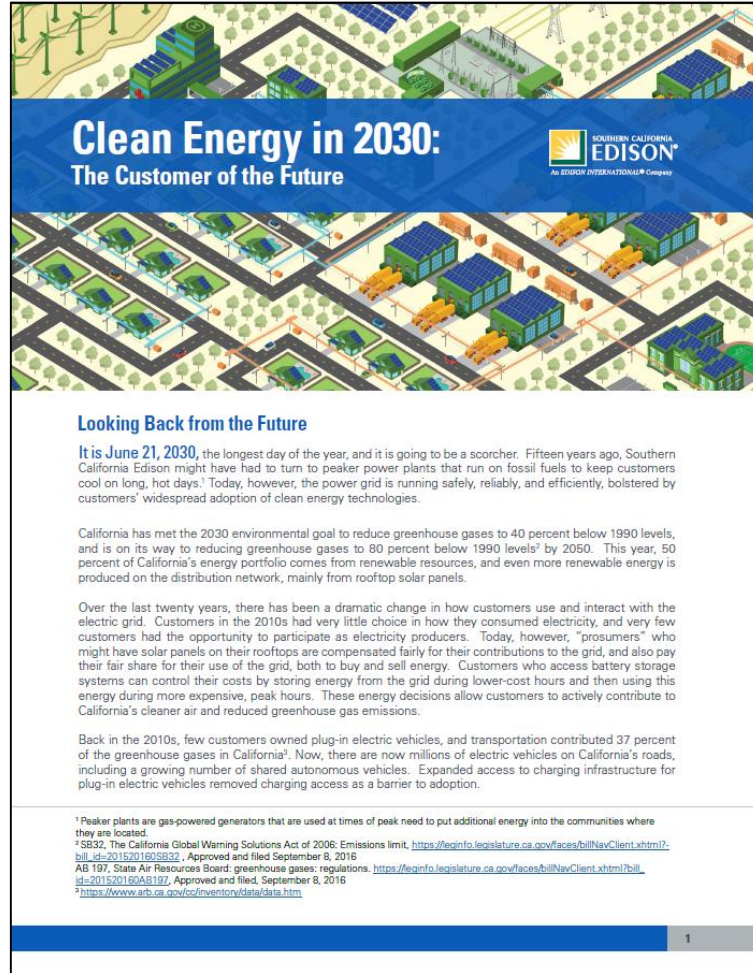
Evolving Our Grid: System Planning and Grid Modernization

GRC Overview

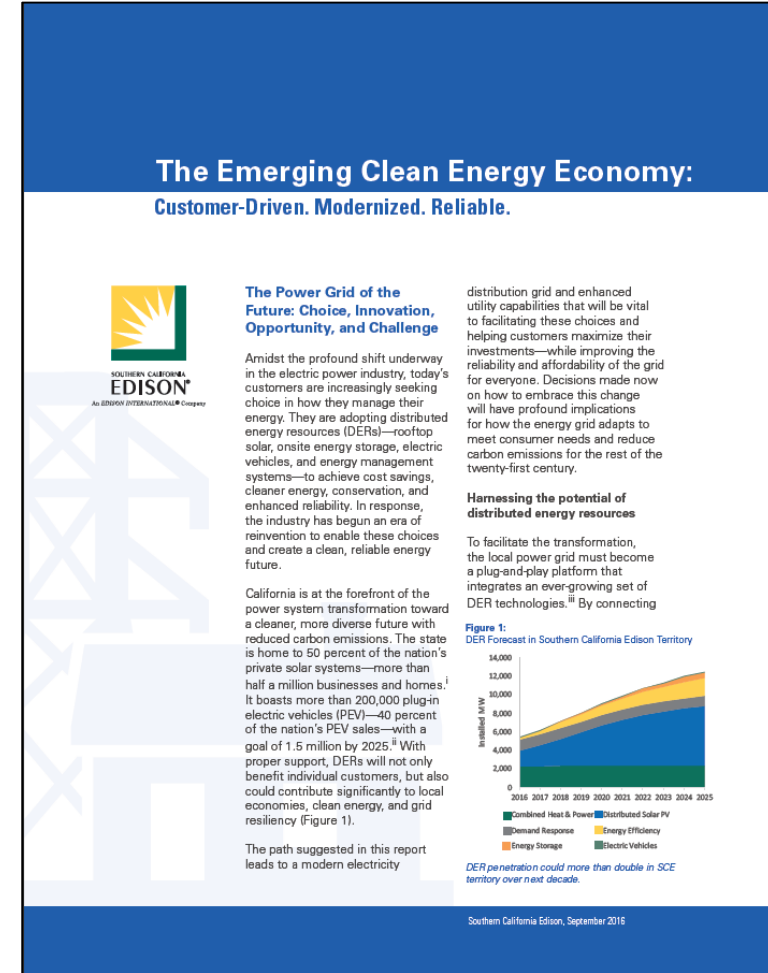
October 24, 2016

Published SCE White Papers

- Clean Energy in 2030: Customer of the Future



- Emerging Clean Energy Economy: Forming the Distribution System Operator



The Future Grid will Benefit all Customers

Thank you.



SCE's DRP, DERiM, and additional information :
<http://www.cpuc.ca.gov/PUC/energy/drps>

Questions?

Transportation Electrification Reducing Emissions, Driving Innovations

Lisa Arellanes, Project Manager
Strategic Customer Transportation
Electrification

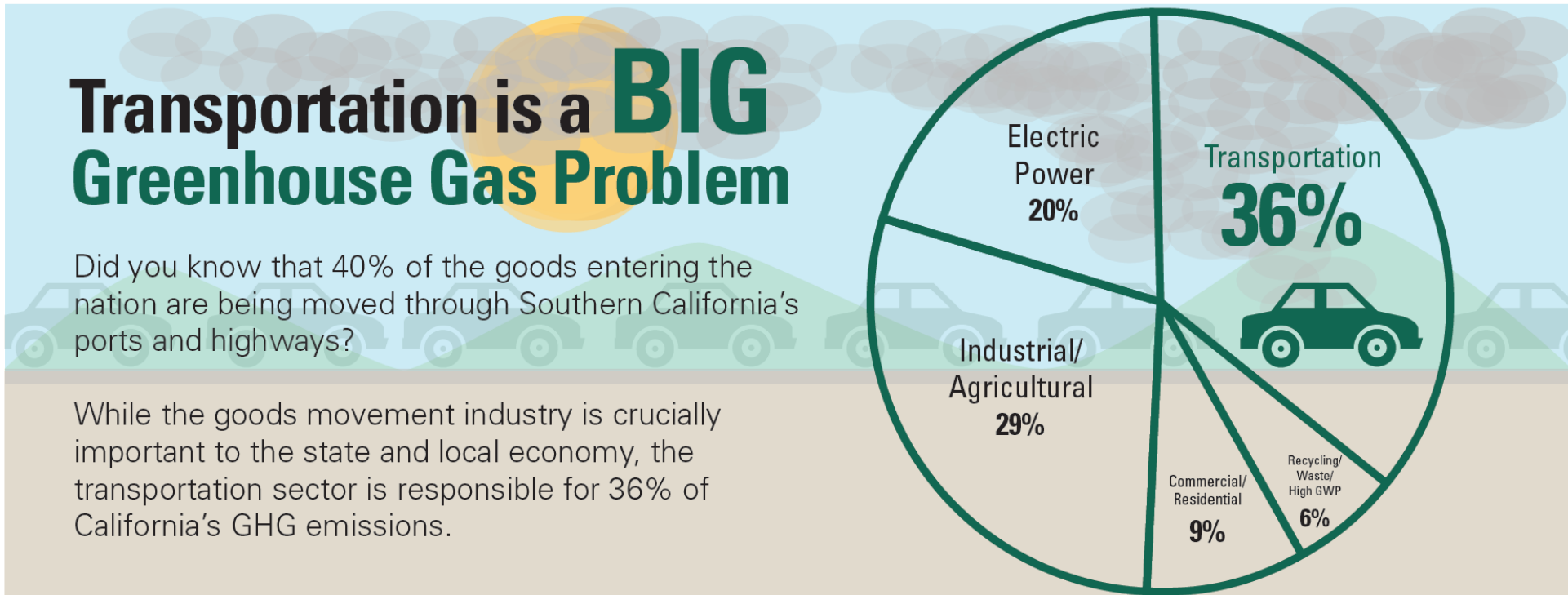
California is raising the bar as a leader in environmental policy and action



- Senate Bill 350 (DeLeon, 2015) established broad and ambitious clean energy policy goals for the electric sector. Specifically, SB 350:
 - Requires 50% of electricity to be generated from renewable resources by 2030
 - Requires a doubling of energy efficiency savings in existing buildings by 2030
- Senate Bill 32 (Pavley, 2016) requires California to reduce emissions to at least 40 percent below 1990 levels by 2030.
- SCE supported these efforts when they were proposed in the legislature, and is working with state agencies to ensure their successful implementation.

Moving the needle on California's environmental goals requires significant investment in TE

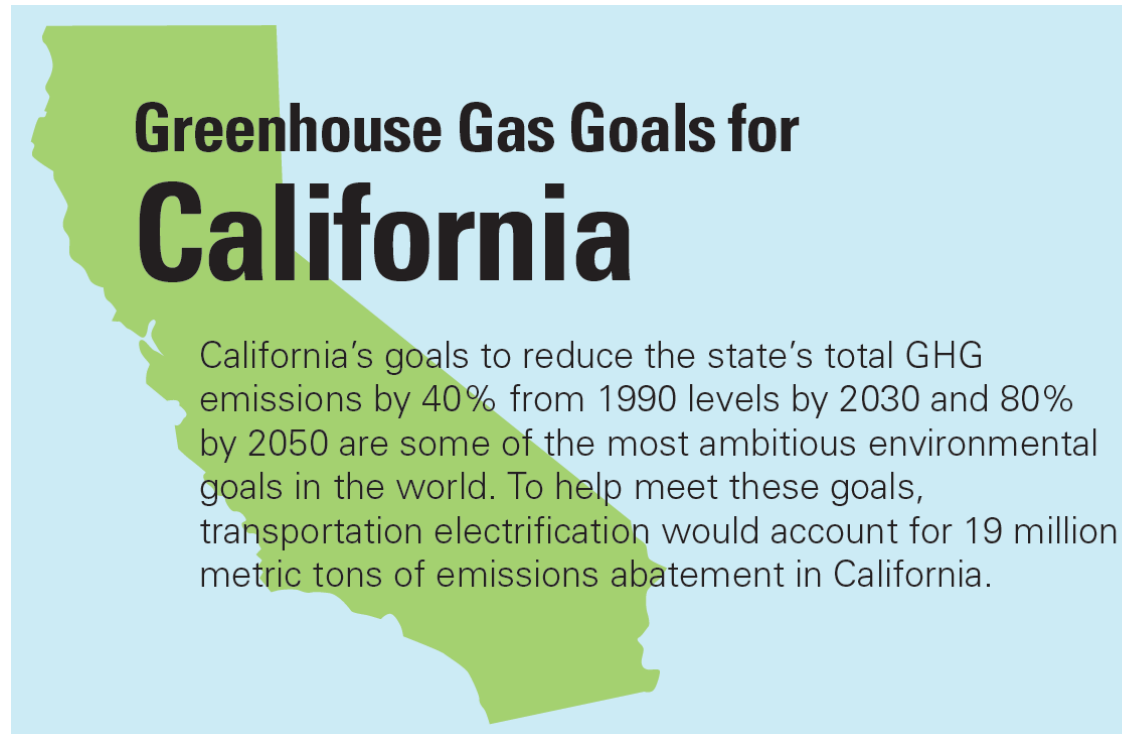
- In California, transportation electrification represents the largest near term opportunity to reduce greenhouse gas emissions and drive down air pollution.
- By fueling a variety of vehicles with clean electric power instead of fossil fuels, we can help meet California's ambitious greenhouse gas (GHG) and clean air goals.



SCE is leading the way in transforming the energy sector

- In line with the state's efforts, SCE filed a wide-ranging plan with the California Public Utilities Commission (CPUC) for expanding electric transportation within its service area.
- SCE's Transportation Electrification (TE) filing demonstrates the company's commitment to supporting California's environmental goals.

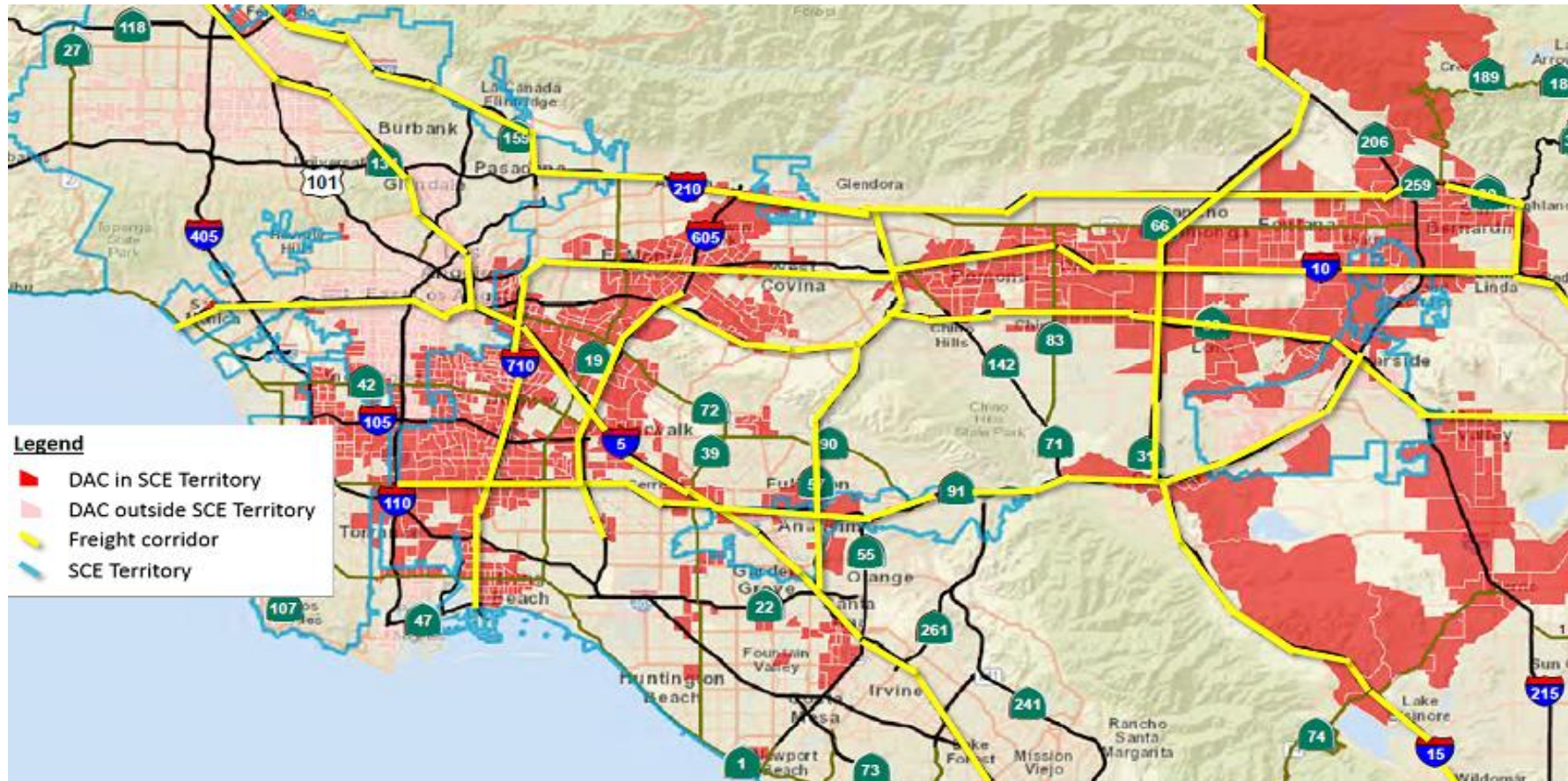
The TE filing lays out SCE's broader vision for TE and proposes a portfolio of projects and programs that expand the use of electricity as fuel.



SCE's TE vision is to provide environmental and economic benefits to all Californians

- **SCE is firmly committed to supporting California's goal** to reduce emissions by ~40% in 2030; to achieve this goal, significant carbon reductions are required in all transportation sectors
- The January 2017 TE application spans **all transportation sectors, with a particular focus on targeting pollution in disadvantaged communities** that are most impacted by medium-duty, heavy-duty and non-road transportation
- Listening to feedback from customers and stakeholders, SCE developed transportation strategies that center around **acceptance, availability and affordability of fueling**
- The proposed portfolio leverages the utility's natural role as an infrastructure provider to **specifically target the most critical barriers** to EV adoption in each segment's stage of development

Disadvantaged Communities are Heavily Impacted by Air Pollution from Freight Corridors – SCE has 45% of CA's DACs



Communities are considered DACs if they are in the worst quartile of environmental & economic burden, as evaluated by the California EPA using CES 3.0. Freight corridors are consistent with those identified by the Southern California Association of Governments in its 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy. A map of freight corridors, warehouses, and rail lines is available in the RTP/SCS Goods Movement appendix, *available at* http://scagrtpsc.net/Documents/2016/final/f2016RTPSCS_GoodsMovement.pdf.

Current & Proposed Transportation Electrification Programs

Charge Ready Pilot Program

- First site completed February 16, 2017
- 984 Charge Ports in Executed Agreements
 - 53% in Disadvantaged Communities
 - High response from Workplaces & Destination Centers
 - Low response from Fleets & Multi-Unit Dwellings
- Goal of 750 Charge Ports installed by end of 2017

Edison installs first electric-car charging stations in low-income community



Southern California Edison is installing a charging station at Lynwood, Calif. City Hall Feb. 16, 2017. The idea is to place charging stations for electric cars in low and moderate income areas. (Photo by Leo Jarzomb, SGV Tribune/ SCNG)

Upon pilot completion, SCE will file for a larger Phase 2 program




Transportation Electrification (TE) Advisory Services

“One-stop shop” for specialized education, awareness, and support on TE issues.

- Full services launching in Q3 2017

Service	
Education & Outreach	1. TE Technologies and Benefits
	2. Vehicle-Grid Integration
Assessment	3. Fleet conversion
	4. Charging Infrastructure Planning
Planning	5. Rate Analysis/Bill Impact
	6. Vehicle Selection Assistance
Funding	7. Financial Incentive Support
	8. Grant Writing Assistance
Beyond TE	9. GHG Audit/Compliance

Proposed programs in the Jan application span transportation sub- sectors, targeting both GHG and air-quality abatement opportunities

	Description	Cost	Duration	Key Partners ¹	
 Light duty	Customer rebate for residential charging station installation - Offer rebates to expand make-ready program to residences (not covered by Charge Ready)	\$4M	1 Yr	EV Owners, Site Hosts, Charging Station Provider/Operator, ED, CARB, Environmental Orgs, Environmental Justice Groups SCAG, COGs, Advisory Board Participants (where applicable)	Electricians,
	Building urban DC Fast Charger (DCFC) clusters - Deploy cluster of five DC fast charge stations to test if those who don't have access to nighttime charging can use this instead (also ridesharing drivers and others)	\$4M	1 Yr		Community leaders, MUDs, Rideshare and Taxi Companies
	Bonus reward to rideshare/taxi drivers who use EVs - Offer driver bonus to incentivize ridesharing (with focus on low-income)	\$4M	1 Yr		Rideshare & Taxi companies
 Trucks, Buses, Forklifts	Rates designed to incentivize EV adoption - Propose a new rate ² to mitigate demand charge barriers to stand-alone DC fast charge stations, fleets and other commercial	N/A	10 Yr		C&I customers, Transit Agencies AQMD
	Funding for medium- and heavy-duty vehicle charging infrastructure ³ - Build make readies and charging station rebates ³ for electric trucks, buses, shuttles, port and material handling equipment	\$553M	5 Yr		
	Building vehicle charging infrastructure for electric transit buses – Provide infrastructure and charging station rebates ³ for early-adopter transit agencies	\$4M	1 Yr		
 Port	Two Port of Long Beach electrification projects - Make readies for Port of Long Beach gantry crane and yard tractor electrification	\$3.5M (total)	1 Yr (each)		POLB, Terminal Operators

¹ Program also supports public funding programs: IRS (tax credits), ARB (CVRP, LCT, HVIP), SCAQMD (Carl Moyer)

² New rate design proposal contains new tariffs for three customer classes based upon demand size

³ Rebates will only be available in sectors with technology that meets applicable standards

How SCE Can Assist Today...

- While we await the launch of TE Advisory Services, as well as future pilots and programs, please reach out to us for assistance with:
 - Rate analysis support & review of rate structure
 - When is separate metering beneficial?
 - How will EV charging impact my bill?
 - Electrical infrastructure capacity checks to assess need for infrastructure upgrades
 - Load management and other considerations

Visit [SCE.com](https://www.sce.com) or contact your Account Manager for assistance

Questions?

Thank you for attending SCE's Power Briefing!



Energy for What's AheadSM

