



Emerging Technologies – ET and EM&T

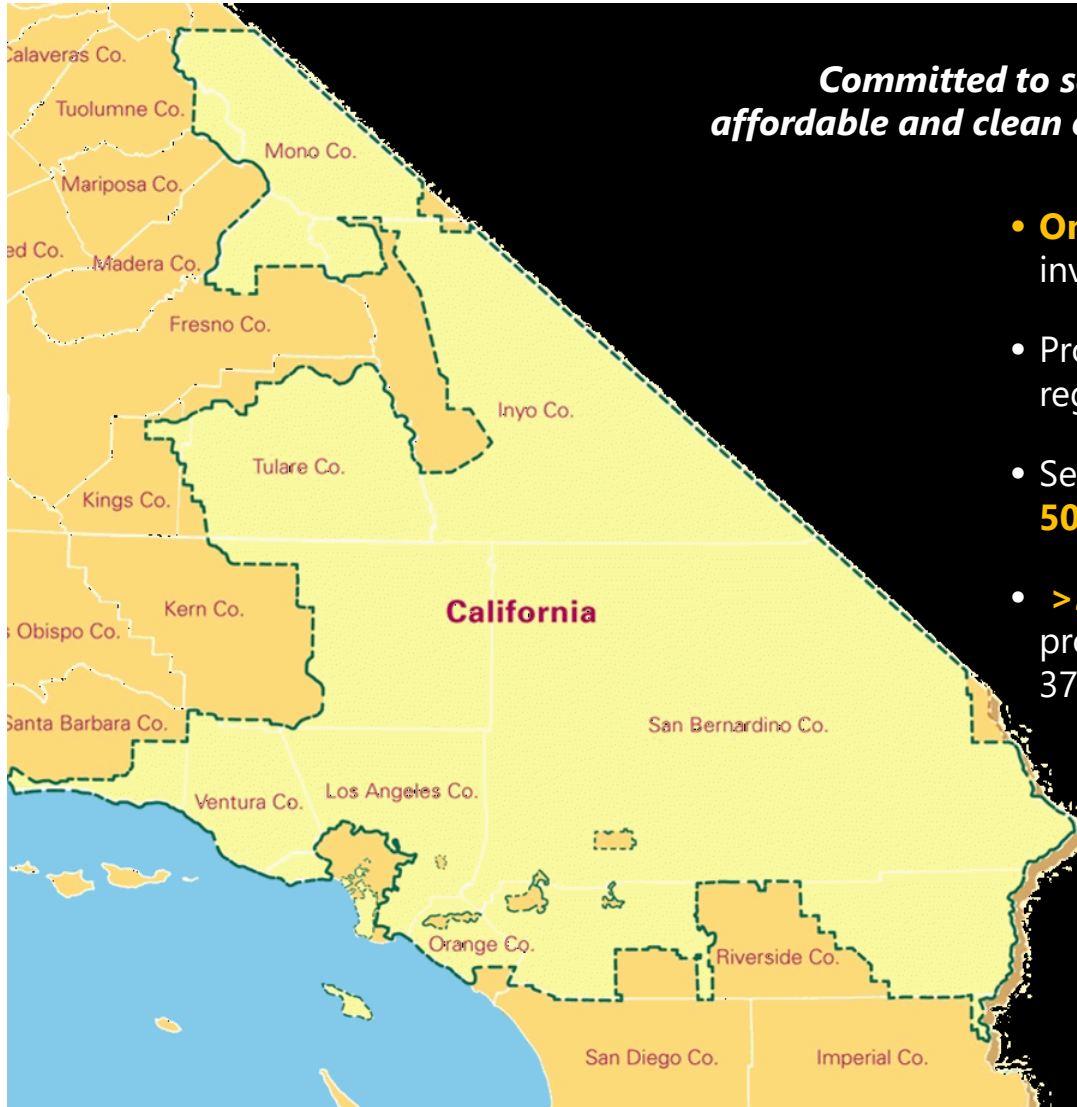
May 15, 2017
WCEC Affiliates Forum
UC Davis, CA

Jerine Ahmed
Southern California Edison

Topics

- SCE
- Drivers
- ET and EM&T Program

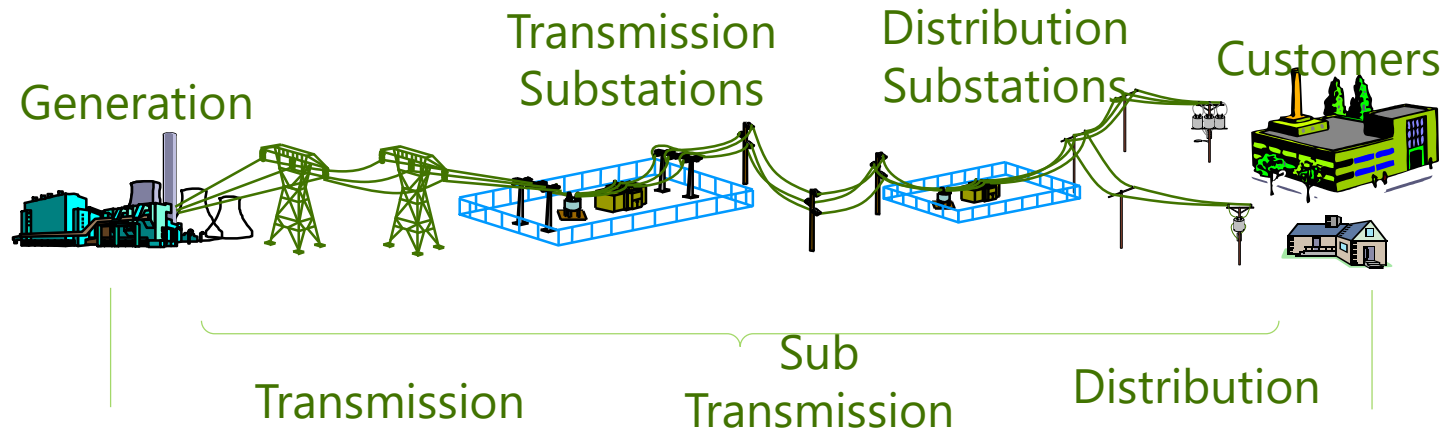
SCE Highlights



Committed to safely delivering reliable, affordable and clean energy to our customers.

- **One of the nation's largest** investor-owned utilities.
- Providing electric service in the region for more than **125** years.
- Serving **15 million** residents in a **50,000-square-mile** service area.
- **>23% Renewable Energy** procured in 2014; 37% predicted for 2020.

SCE and the Utility Business



3,100 MW owned generation

- SCE owns less than 20% of its power generation needs
- The rest is procured on a competitive market

Our "Wires Business"

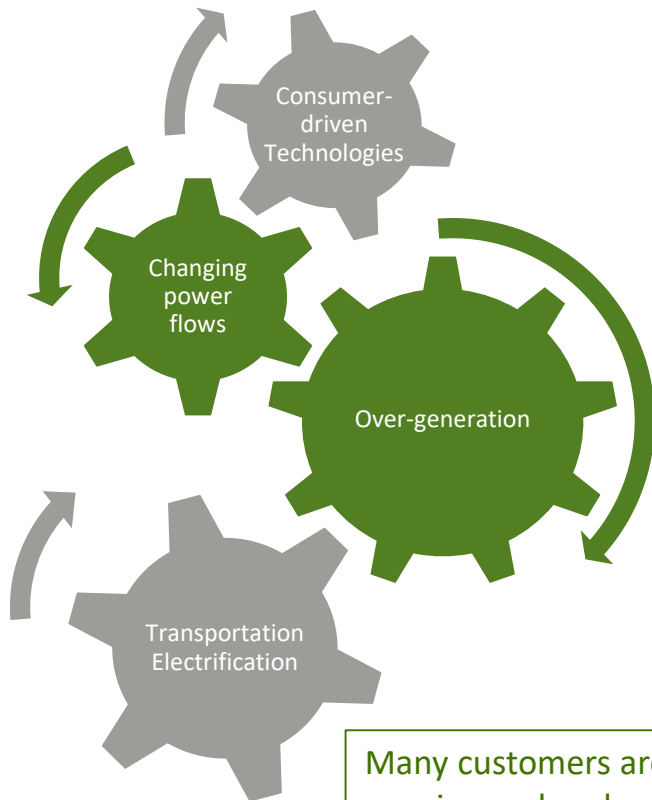
- 1.4 million power poles
- 725,000 transformers
- 103,000 miles of power lines

Revenue Decoupling

- SCE earnings are not affected by changes in electricity sales
- Promotes energy conservation

Impact of Distributed Energy Resources (DER's)

Increasing Grid Complexity



Many customers are becoming “prosumers” drawing power off the grid during the evening and early morning hours, but exporting power to the grid during mid-day hours when they produce more than they consume.

Evolving EE & DR Role in DSM

- Demand-side programs can be helpful to right size the local grid infrastructure and optimize investment
- DSM programs and smart technologies can be important tools in reliably operating the local system
- Load shifting DSM can be a valuable tool for addressing over-generation challenges
- The electrification of transportation could drive sudden and immense changes in the power system. Dispatchable DSM can be a valuable tool to help reshape the grid.

SCE's Guiding Principles

- Promoting customer choice and customer engagement are key objective
- The distribution grid can play a key role in reducing carbon in California
- Safety, reliability and resilience must remain paramount objectives
- Cost of electric service must remain affordable and equitably-apportioned to customers
- Competitive processes for the selection of DSM should be utilized to the greatest extent possible





Drivers

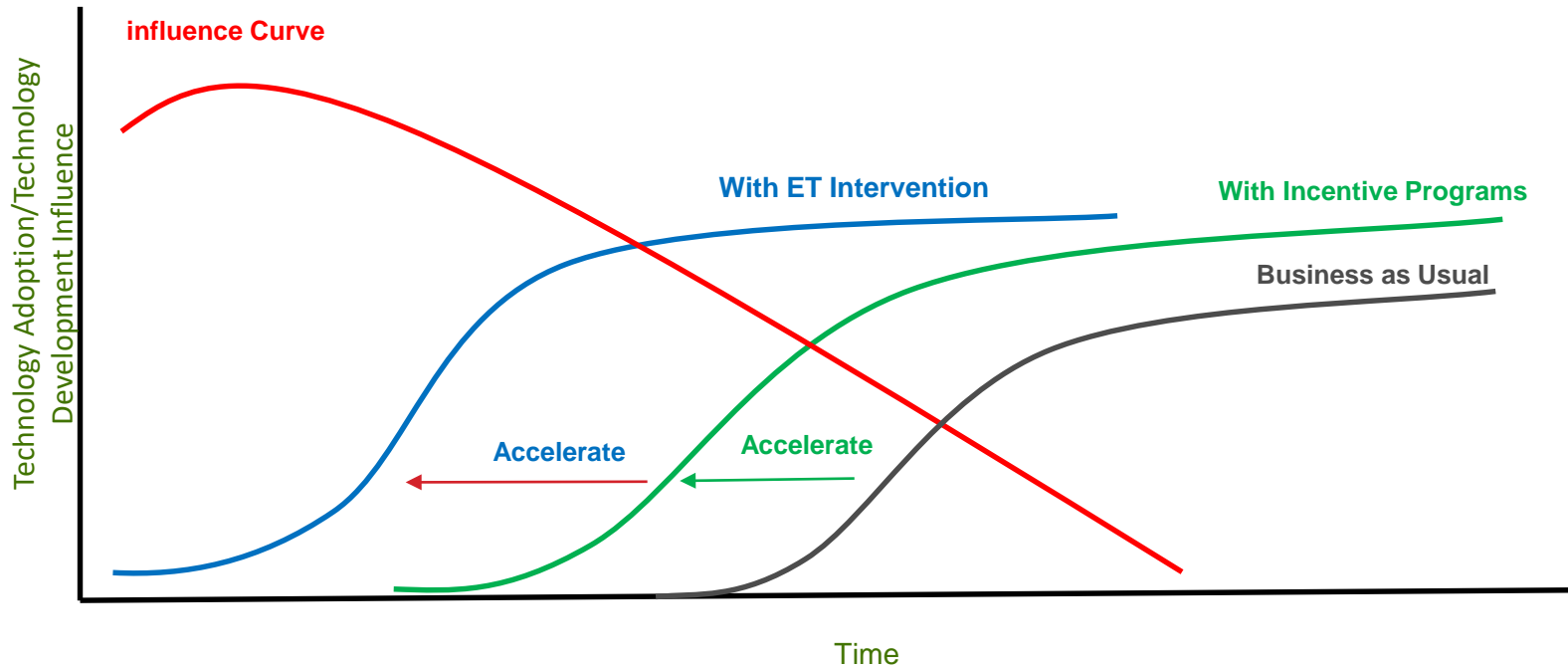
Drivers and Policies

- AB 32 and SB32 – 2050 GHG reduction targets
- California Long Term Energy Efficiency Strategic Plan
 - ZNE goals
- AB 758 & the California Energy Commission's (CEC)
 - Existing Buildings EE Action Plan
- AB 793
 - Promoting Access to Energy Management Technologies
- SB 350
 - Double the EE savings in electricity and natural gas by 2030
 - Increase the Renewable Portfolio Standard (RPS) to 50% by 2030
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 - Increase the Renewable Portfolio Standard (RPS) to 50% by 2030
- AB 802
 - Count "to-code" savings for goals and incentives
 - Pay for performance – leverage metered energy consumption
 - Include operational, behavioral, and retrocommissioning savings
 - Increase transportation electrification
- Rolling portfolio and Business Plan Development



ET Program

Technology Influence and Adoption Life Cycle – Conceptual



Emerging Technologies Program

Purpose: ETP supports increased energy efficiency market demand and technology supply by contributing to the development, assessment, and introduction of new and under-utilized EE measures. (i.e., technologies, practices, and tools).



Program Strategies

TECHNOLOGY DEVELOPMENT SUPPORT

GOAL:
Increase Energy Efficiency Technology Supply

OBJECTIVES:
Engage in Targeted Technology Support Efforts
Increase Developer Outreach

TECHNOLOGY ASSESSMENTS

GOAL:
Increase the Number of Measures Offered by Programs

OBJECTIVES:
Assess Energy Efficient Technologies
Support Technology Transfer Process

TECHNOLOGY INTRODUCTION SUPPORT

GOAL:
"Seed" Market Demand

OBJECTIVES:
Conduct Demonstrations and Targeted Field Deployments
Help Increase Market Knowledge of New Technologies

ETs Role

Integrated Priorities and The Future for Statewide ET Program Administration



ETP Support for Integrated Priorities

Support Long Term Energy Efficiency Strategic Plan Goals

Zero Net Energy

Deep Retrofits

HVAC Market Transformation

Lighting Market Transformation

Support For Integrated Solutions

Technical Feasibility

Occupant Impacts

Whole Building

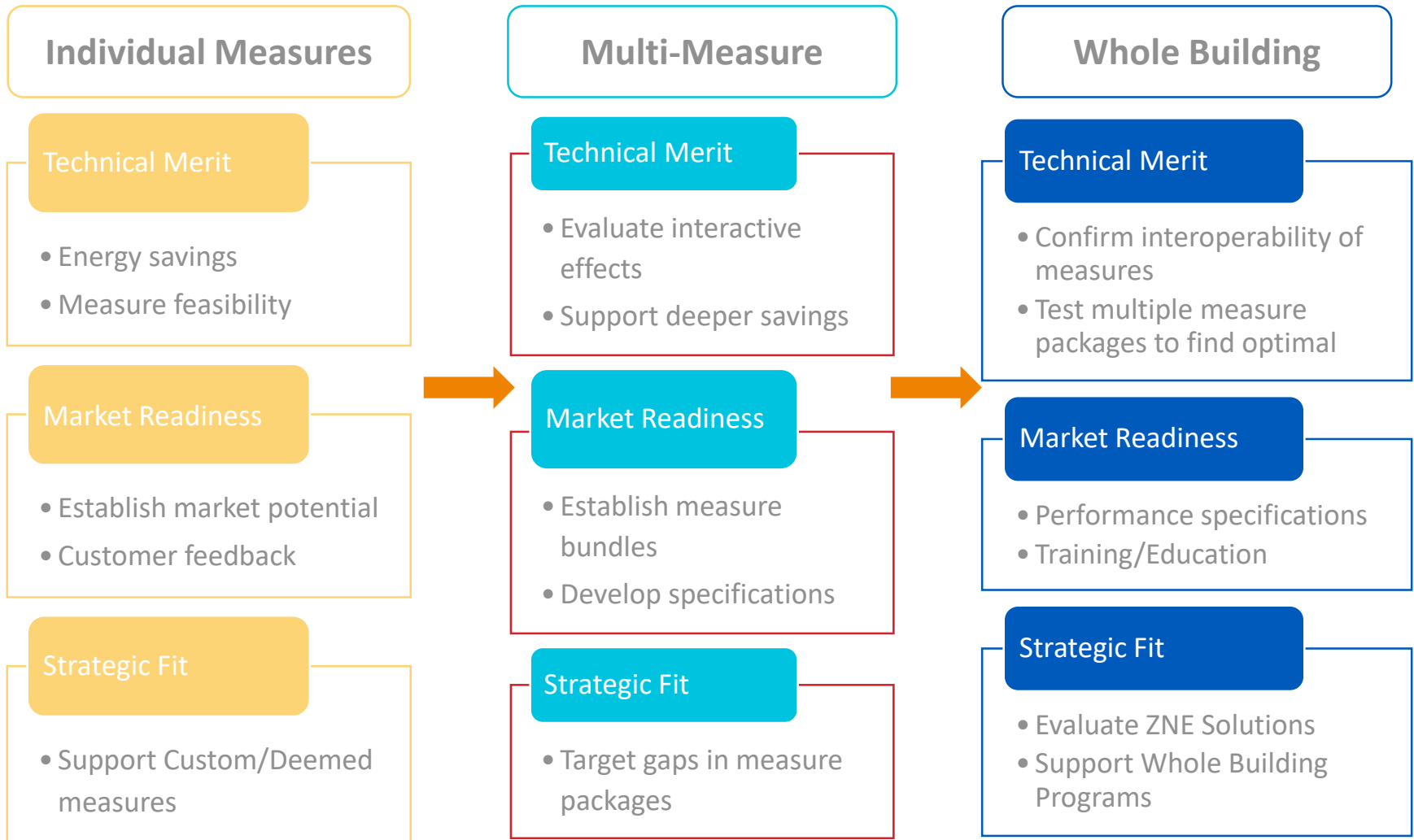
Support for Efficiency Measures

Deemed Measures

Custom Measures

Code Readiness

Continued Tactical Support



ET Business Plan Proposal - Key Features

- Business Plans files by IOUs in January 2017
- Transition to two ET statewide administrators:
 - Electric – Southern California Edison
 - Gas: Southern California Gas Company
- Statewide program to be directed through Technology Priority Maps (TPMs)
 - Planning function
- SW Program Constraints
 - Implementers to “design and implement” the program leveraging TPMs
- No more sub-program boundaries
 - focus on objectives

ETP Core Activities

- Continue leveraging current program core competencies
 - Assessment and validation of technologies and solutions
 - Demonstrations and showcases of potential new solutions
 - Other

Technology Priority Maps

- Purpose
 - Ensure “high priority” areas are identified addressed
 - Avoid duplication of research across IOU PAs
 - ETCC coordination supports coordination across state

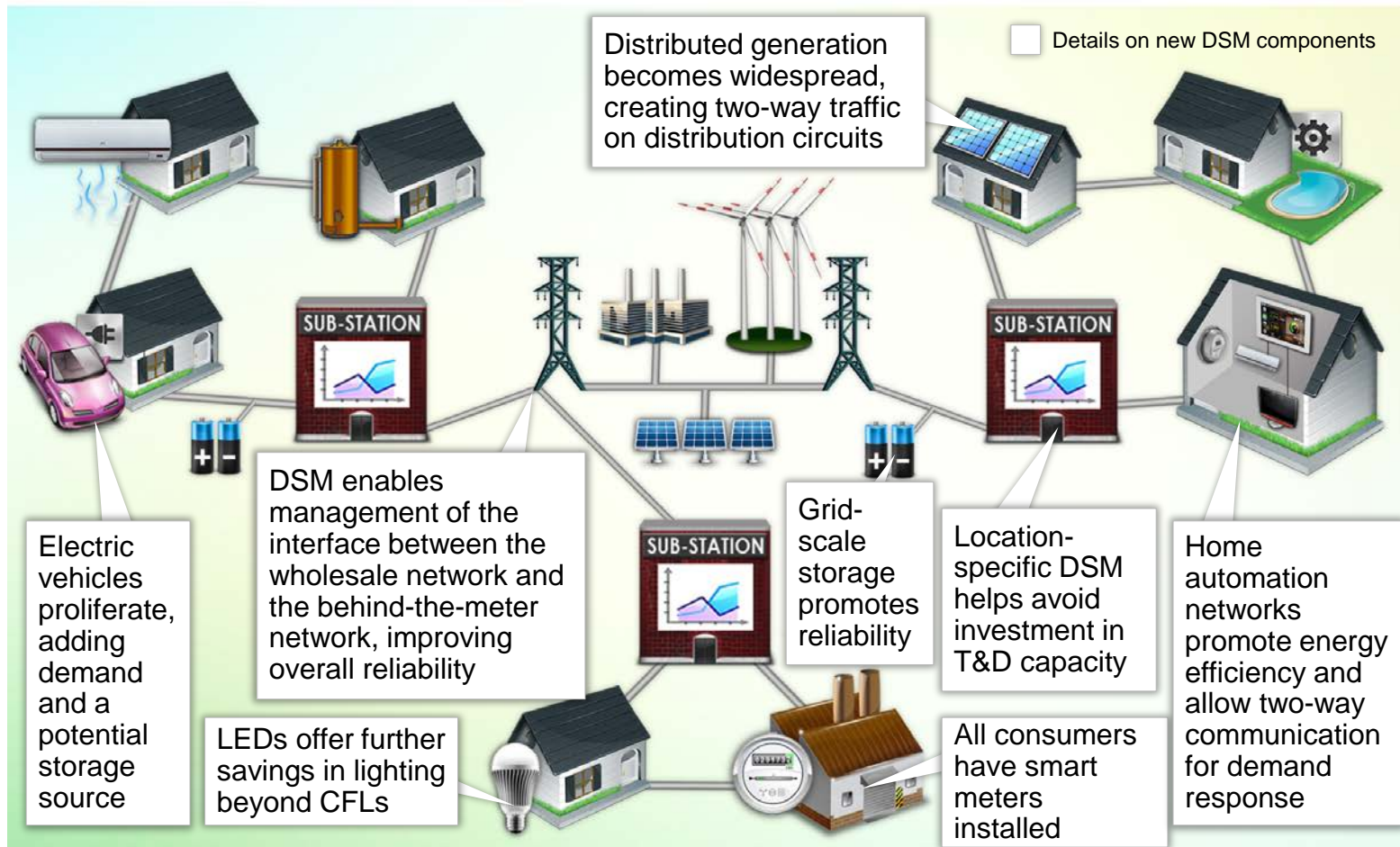


EM&T Program

Emerging Markets and Technology (EM&T)

- Mission
 - To develop and deliver emerging, technology-driven demand response measures that facilitate customer engagement of DR programs and tariffs
- Origination
 - Initiated in 2005 to enhance the portfolio of DR programs and advance the TI and TA program
- Strategic Focus
 - Coordinate and collaborate with the ETCC program framework, EPIC, EPRI, and DR/IDER OIRs
 - Discover new trends, benchmark other IOUs and RTOs, and drive DR innovation in the market
 - Work with internal teams and external stakeholders
 - Address SCE program emerging DR technology opportunities for today's policies and SCE's vision of rate design and grid modernization

Why? In the future, DR technologies ~~may~~ *will* be integrated throughout the SCE grid

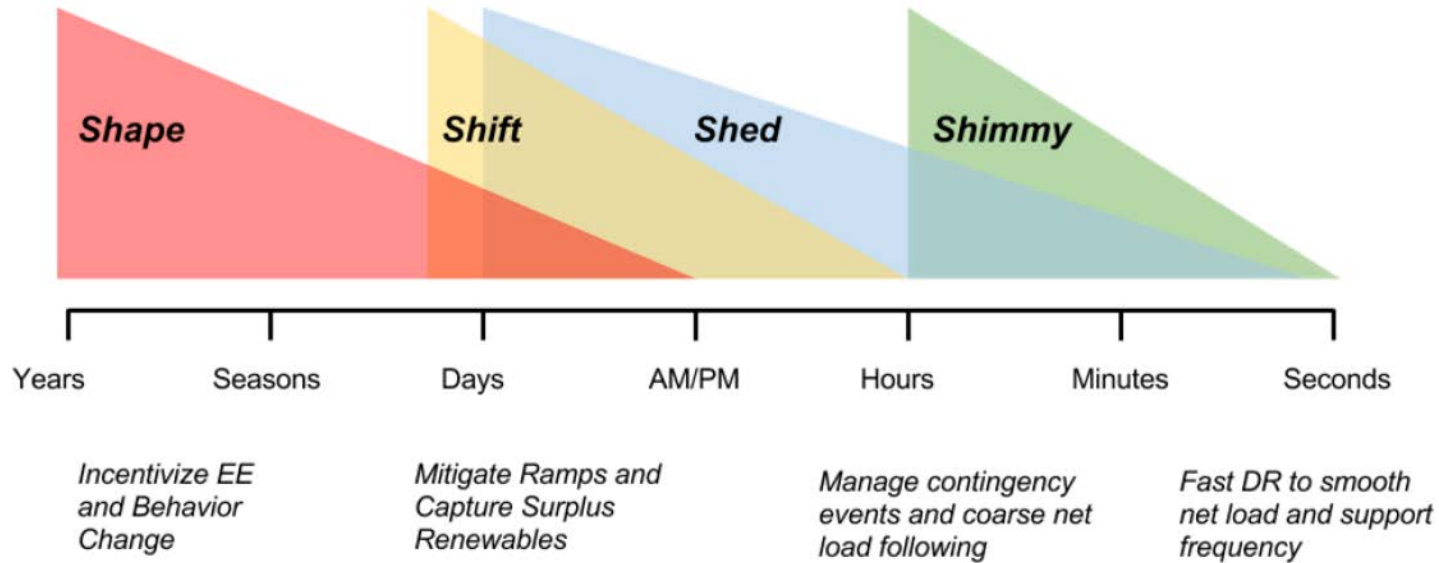


EM&T Areas of Focus in 2017

- Collaborations with Stakeholders
 - LBNL, UC Regents, EPRI, USGBC, CEE, ASHRAE
- DR Codes & Standards
 - Title 24, Title 20, DOE/EPA, OpenADR 2.0b, SEP2.0
- Expanding Residential DR enabling technologies
 - Appliances, IHD's, PCTs, PEV chargers, Inverters, storage (EWH, batteries)
- Commercial and Industrial Customer Solutions
 - AutoDR, Innovative DR Strategies, Storage, VFR, HPWH
 - Overgeneration solutions with the water sector
- Integrated Demand Side Management
 - Integrating EE and DR Technology measures (dimming ballasts, ZNE)
 - Combine EE and DR Program Delivery (DR IDSM)
- Enabling Retail and Wholesale Market Integration
 - Telemetry and Market based communications
 - Metering & Settlement solutions and software
 - Cloud based services for broader aggregation opportunities
- Collaboration with DR EPIC projects
 - Transactive Energy pilot in Thousand Oaks (tech advisory)
 - Nine other projects worth \$27M



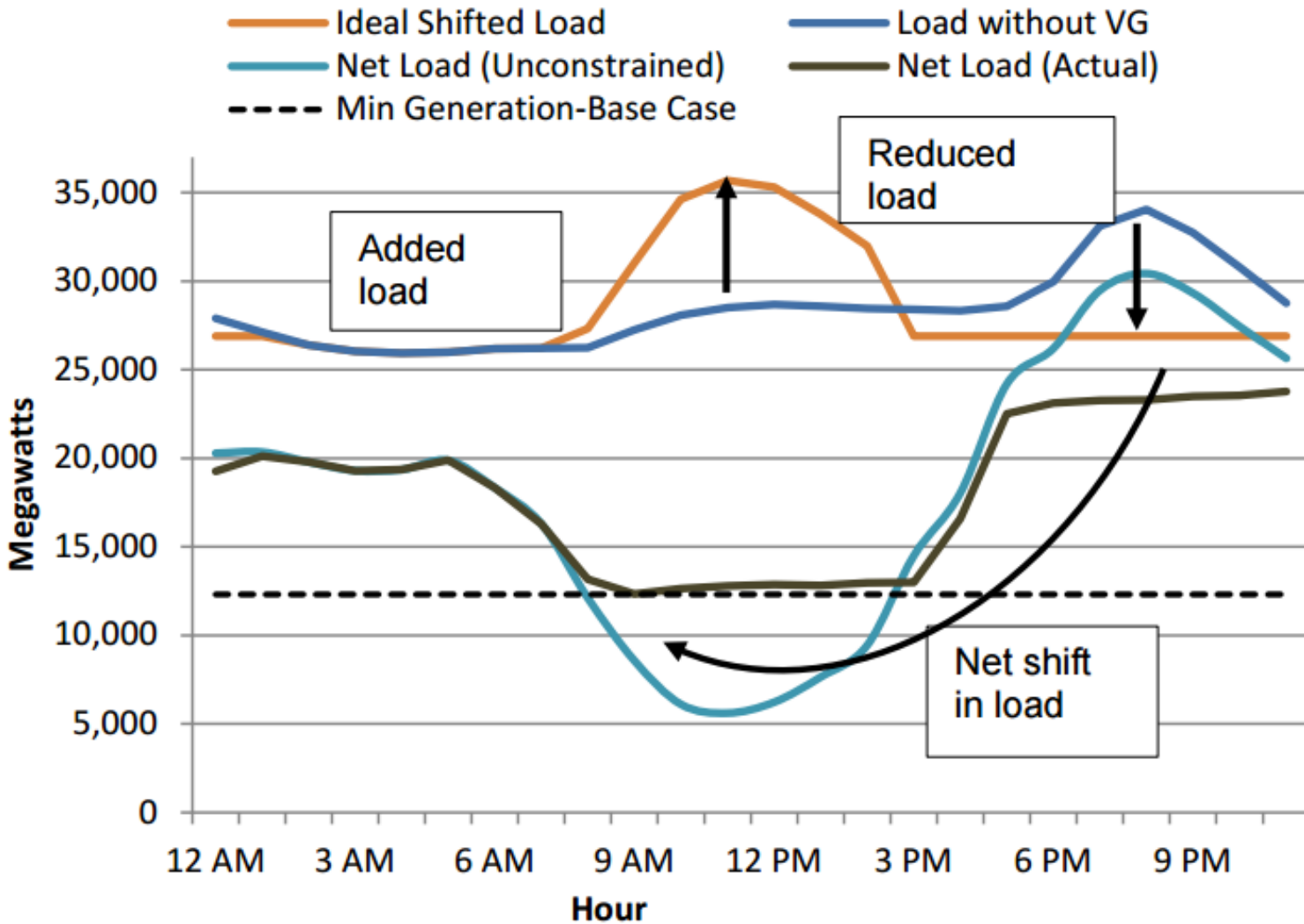
Roadmap for New DR Products for 2025



Service Type	Ancillary Services Market	Energy Market	Capacity and RA Payments	Flexible (Ramping) Capacity Payments	Reverse DR (future)
Shed		✓	✓		
Shift	*	*	*	*	*
Shimmy	✓				

** Denotes a market where participation may be possible in the future, but due to uncertainty in the expected prices and markets not calculated in this study*

Overgen – Shape & Shifting strategies



ET Dissemination Efforts

Emerging Technologies Coordinating Council (ETCC) - WWW.ETCC-CA.COM



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[TRIO Symposium: Technology Innovation and Utility Engagement](#)

October 31, 2016
SCE Energy Education Center, 6090 Inwindale Ave, Inwindale, CA



[ETCC Quarterly Meeting: Crunching Numbers, Shrinking Megawatts, Energy Efficiency of Data Centers](#)

December 7, 2016
UC Davis, Activities and Recreation Center, 232 One Shields Avenue, Davis, CA 95616, and via Webinar.



[2017 Emerging Technologies Summit](#)

April 19, 2017 to April 21, 2017

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