Building Electrification at Southern California Edison

2018 E Source Forum

Session: Strategic Electrification and the Next Generation of Efficiency Programs

ABOUT SOUTHERN CALIFORNIA EDISON (SCE)

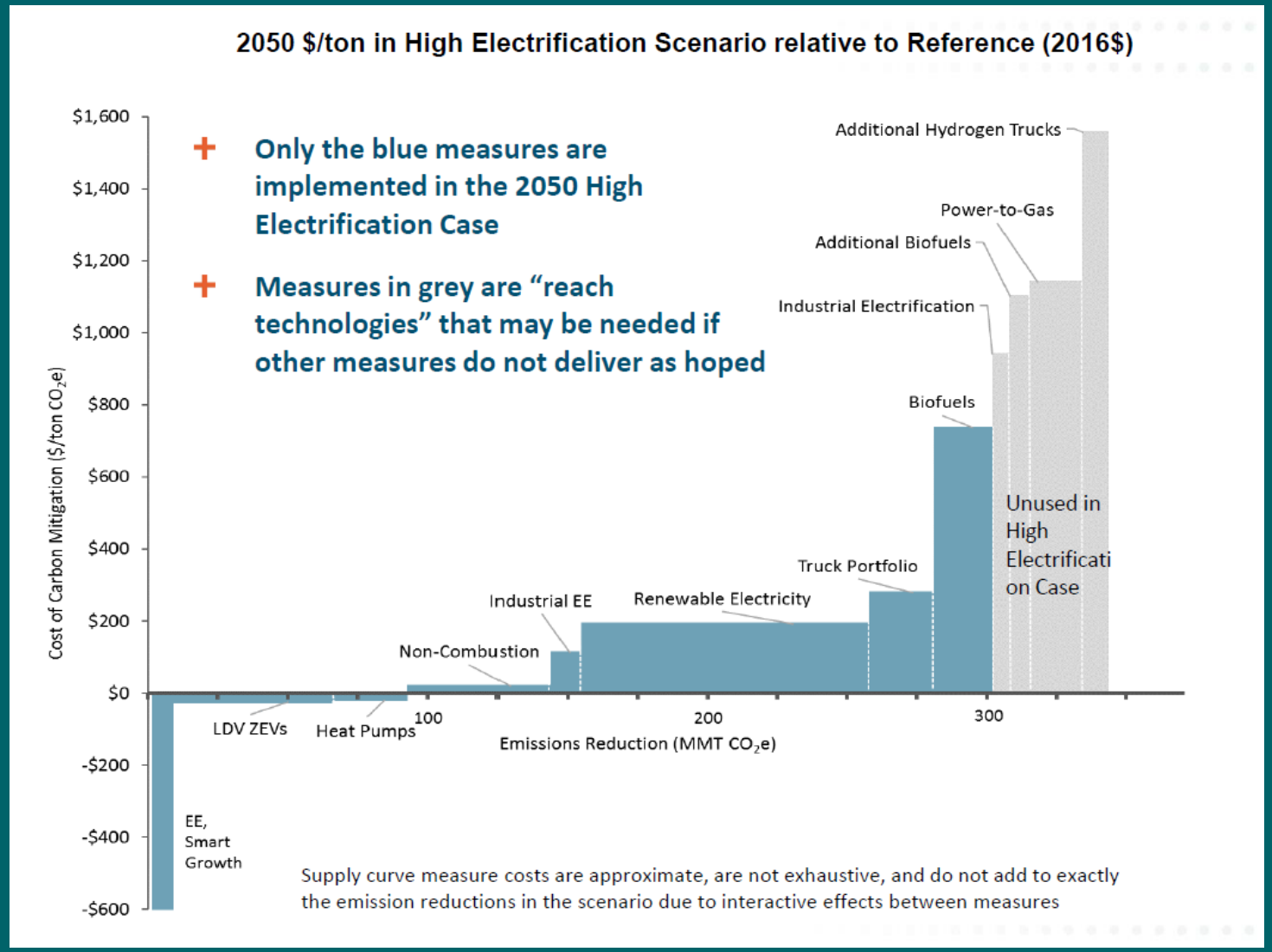
- **50,000** square mile service territory
- Over **5 Million** customer accounts with **15 Million** customers served
- **118,000** miles of transmission and distribution lines, with **4,600** distribution circuits
- More than **12,000** full-time employees
- **$12.3** Billion in total operating revenue
- **23,700 MW** of record peak load
- **46%** of electricity delivered comes from carbon-free resources
- Leader in energy efficiency, demand response, customer solar, storage and EV charging
- **SCE's Clean Power and Electrification Pathway** focuses on clean energy, efficient electrification, grid of the future and customers' technology choice

Energy for What's Ahead®

THE CLEAN POWER AND ELECTRIFICATION PATHWAY

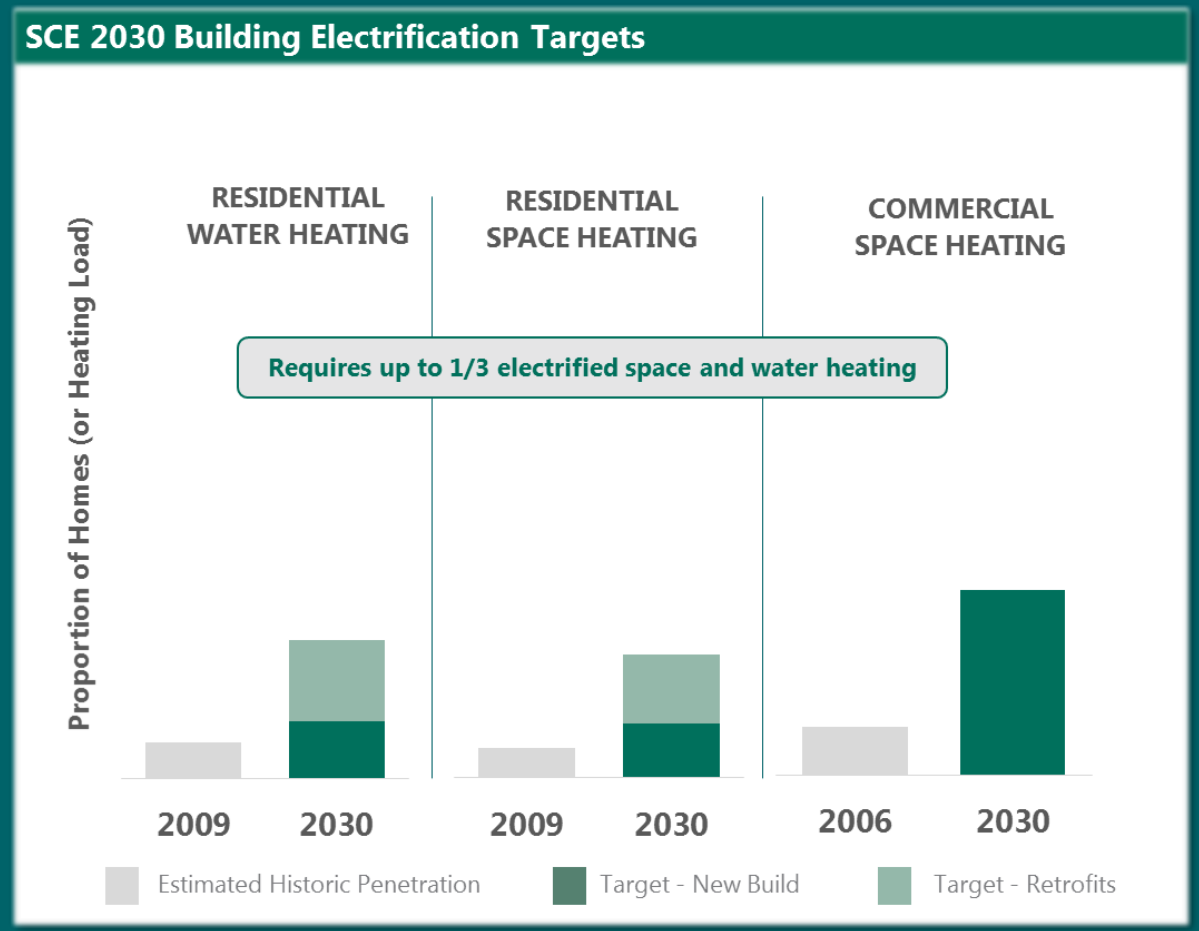
E3's Analysis for California Energy Commission Supports SCE's Conclusions

- Source: Energy+Environmental Economics "Deep Decarbonization in a High Renewables Future, May 2018
- High electrification case includes electrification of buildings and transportation, high energy efficiency, renewables, limited biomethane



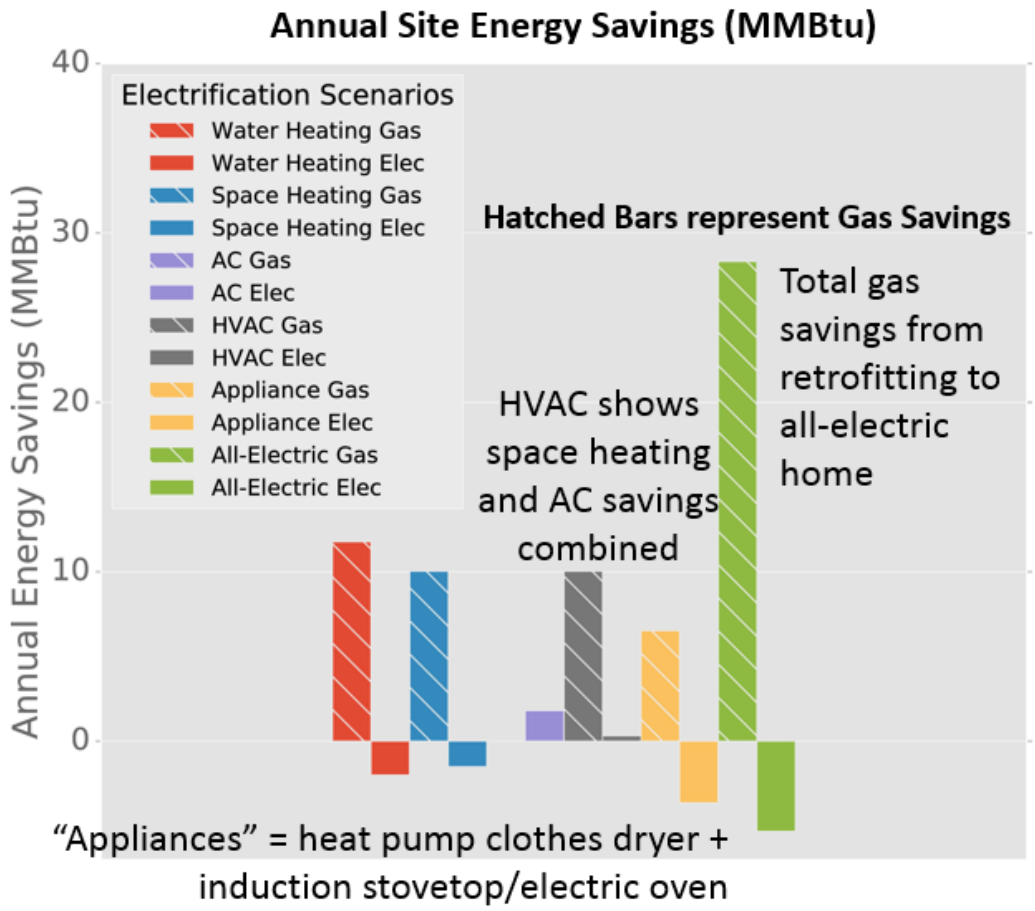
Building electrification is required to meet CA's ambitious policy goals but it won't happen organically

- SCE's Clean Power and Electrification Pathway calls for using electricity to power up to one-third of space and water heating in buildings by 2030.
- Natural adoption of building electrification is insufficient to reach target.
- Adoption barriers include, natural gas market inertia, potentially higher up front costs, and low customer awareness of electrification technology.
- Gas suppliers are actively attempting to shape public view.



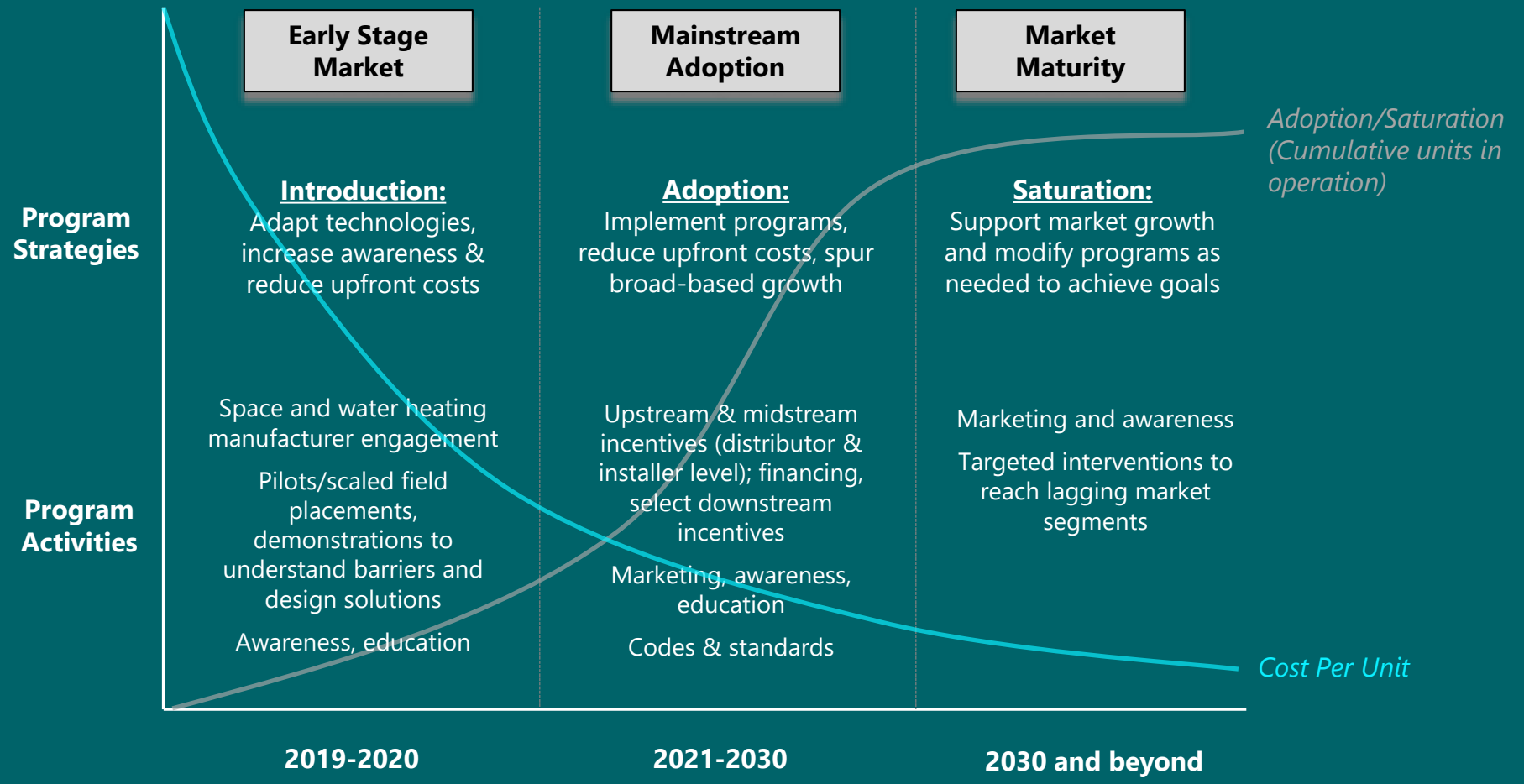
Annual Site Energy Savings from Electrifying 1990s Single Family Home in CZ09 (Los Angeles, Inland)

Positive values indicate site energy decrease (savings); **Negative** values indicate site energy increase



- Electrification of water heating saves a similar amount of energy as electrifying space heating in the Los Angeles region
- Electrifying cooking and clothes drying ("appliances"), even with heat pump clothes dryers and induction stove as shown here, results in larger increase in electricity consumption than electric water heating or electric space heating

Near term activities will catalyze early stage market transformation for building electrification retrofits

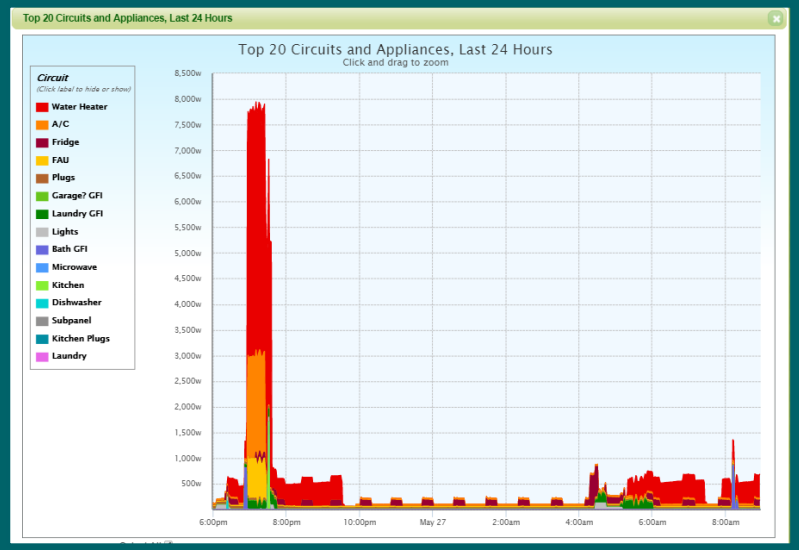


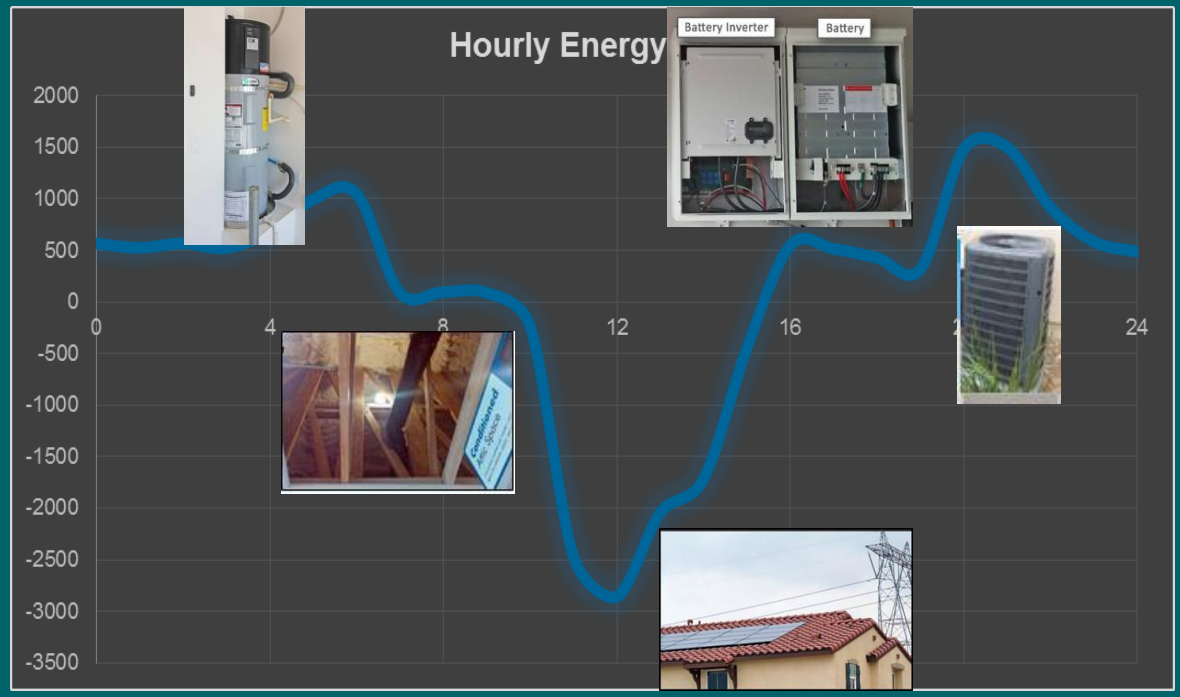
External momentum grows for building electrification

- Technology advancement: BE appliance costs expected to decline and manufacturer engagement could accelerate reductions while demand grows
- New home builder interest: building community examples of all-electric developments
- Active advocacy from 3rd parties: NRDC, Sierra Club, NREL studies, Vox Media, and Greentech Media support electrification
- Policy momentum:
  - California Air Resources Board (CARB)
  - CEC Title 24 and Integrated Resource Plan
  - Local jurisdictions/reach codes
  - AB 3232 and SB 1477
- Public utilities pursing BE: City of Palo Alto, SMUD, LADWP

EPRI/SCE BE Project

- Fontana ZNE community
- SCE collaboration to build California's first ZNE neighborhood
- 20 homes on 2 transformers
- Early example of heating electrification in SCE territory





Upcoming: All-electric homes in Irvine, CA

- First Production Builder Multifamily ZNE community
- Worked with builder to eliminate gas runs to homes
- Tipping point for eliminating gas lines: Incentives for induction cooktops and heat pump dryers
- Will conduct customer surveys, and develop cost planning for builders

Questions?

Thank You!