

TITLE 24 BUILDING STANDARDS AND PLUG IN ELECTRIC VEHICLES

Ed Pike, PE
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Overview

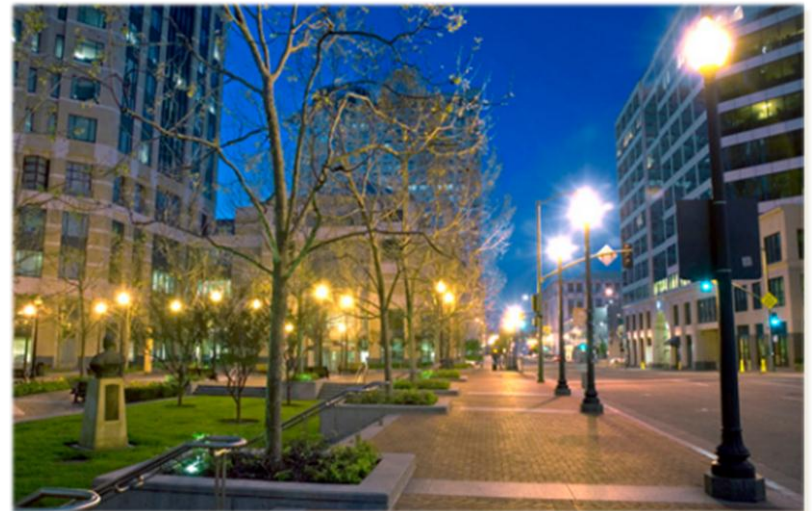
- Introduction to Energy Solutions
- PEV-readiness Building Codes Current Status
- PEV-readiness Building Codes Potential Revisions

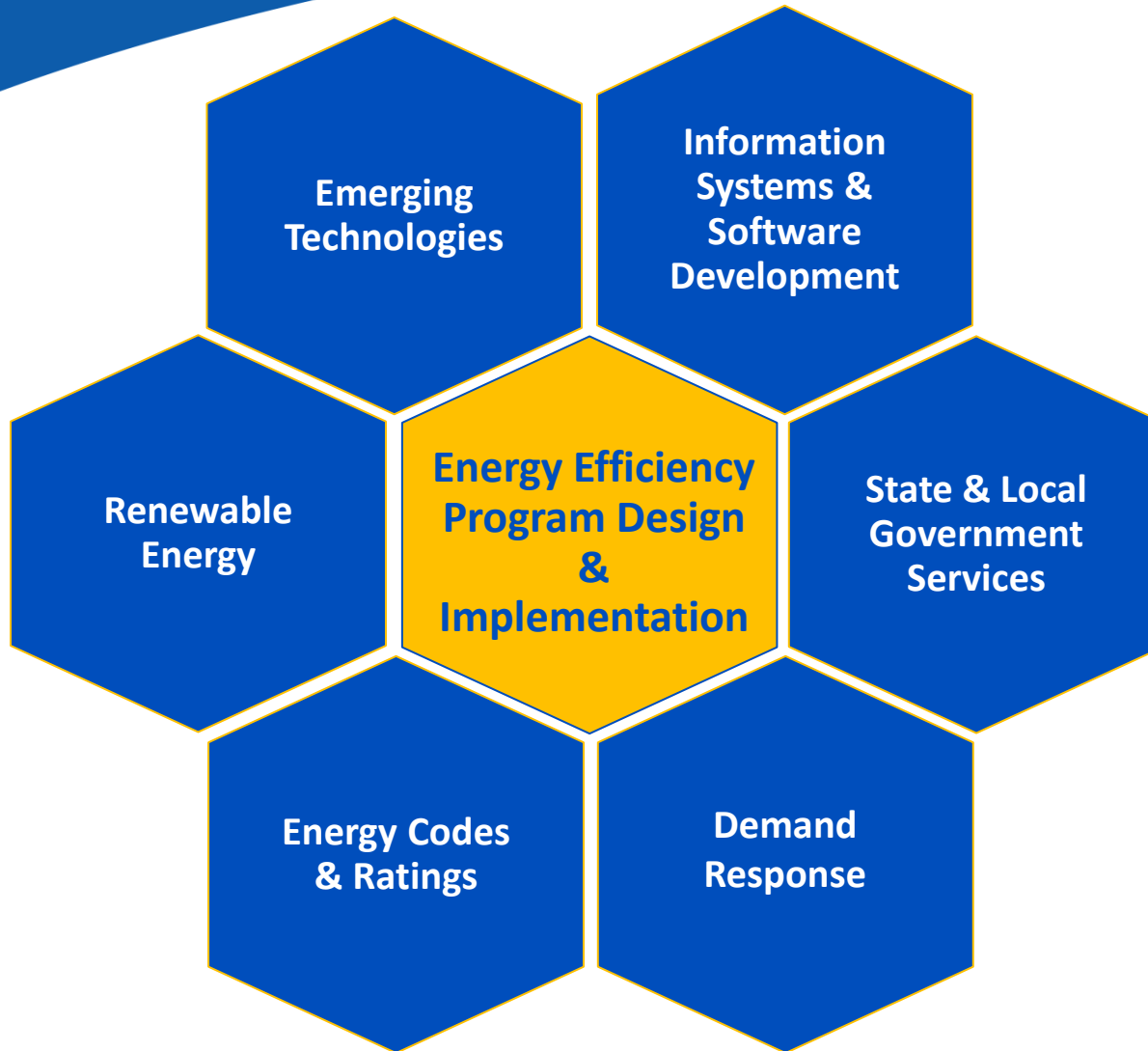


Mission:

Energy Solutions' mission is to create large-scale environmental benefits for our clients by implementing market-based solutions and developing policies that contribute to these goals.

- Founded in 1995
- Offices in Oakland and Long Beach, CA
- 75 employees
- Clients and customers served:
 - Energy utilities
 - Water utilities
 - State and local government agencies
 - Federal and international government agencies
 - Universities
 - Private sector





Title 24 Process Overview

	Part 6 Energy Code	Part 3 Electrical Code, Part 11 CalGreen
Agency	<ul style="list-style-type: none"> California Energy Commission 	<ul style="list-style-type: none"> Housing and Community Development (residential), Building Standards Commission (workplace, retail), others
Timing	<ul style="list-style-type: none"> Last adoption 2012, effective Jan 2014 Next adoption ~May 2015, effective Jan 2017 	<ul style="list-style-type: none"> Adoption July 2014, effective July 2015 Adoption Jan 2016, effective Jan 2017
Voluntary vs. mandatory	<ul style="list-style-type: none"> Mandatory 	<ul style="list-style-type: none"> Part 3 mandatory; Part 11 mandatory and voluntary sections



Title 24 Codes and Standards Progress to Date

- Energy Solutions participated in Title 24 building codes development on behalf of PG&E and California IOUs
- Energy Solutions/PG&E white paper: *Reducing Barriers to Electric Vehicle Adoption through Building Codes*
 - J. Shackelford, A. Chase, and M. McGaraghan, Energy Solutions; S. Tartaglia, Pacific Gas and Electric Company
<http://www.aceee.org/files/proceedings/2012/delta/papers/0193-000012.pdf>

Reducing Barriers to Electric Vehicle Adoption through Building Codes

Jordan Shackelford, Alex Chase, and Michael McGaraghan, Energy Solutions
Stuart Tartaglia, Pacific Gas and Electric Company

ABSTRACT

Plug-in hybrid electric vehicles and fully electric vehicles (collectively EVs for this paper) are increasingly available and are beginning to present a compelling opportunity to shift towards a lower-carbon transportation future. However, relatively high up-front consumer costs can reduce the potential adoption rate of EVs. Along with vehicle costs, retrofitting residences with EV charging infrastructure can add significant expense for homeowners - sometimes several thousand dollars. Including basic charging infrastructure (240 volt, AC Level 2 ready) during new construction can reduce future costs and thus remove a potential barrier to EV adoption.

In 2010 and 2011, on behalf of California's investor-owned utilities (IOUs), including Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), the authors developed an EV charging readiness building code proposal for residential new construction in California. On July 20, 2011, the California Building Standards Commission approved voluntary EV charging amendments to California's Green Building Standard, or CALGreen, that are expected to become effective in July of 2012. These voluntary requirements in CALGreen can then be easily adopted by local jurisdictions as mandatory local requirements.

We discuss the development of the California investor-owned utilities' EV charging readiness proposal, a collaborative process with utility EV experts and a variety of public stakeholders in California. Technical EV charging requirements and challenges are discussed, including residential issues such as branch circuit and electric service panel sizing and utility issues such as managing increased load on distribution transformers. Interactions with electric codes and other relevant standards are explored. We also highlight key differences between the adopted CALGreen language and the authors' code proposal and present our vision for future EV readiness in building codes in the State and beyond.

Introduction

Plug-in hybrid electric vehicles with gasoline range extension, and fully electric vehicles with no gasoline engine, may become an increasingly important part of the transportation sector. Recent auto manufacturer data shows that U.S. sales of the mass-produced Nissan Leaf and Chevrolet Volt exceeded 17,000 in 2011 (RMI 2012). In 2012, approximately one dozen new models are expected to be released and another dozen are expected to follow in 2013.

Forecasts for EV growth vary widely. For the state of California, a review of various projections by the Ready, Set, Charge initiative found projected penetration rates of around 5% of new car sales in 2020 by the California Air Resources Board (ARB) and a projection of almost 15% of new car sales by the International Energy Agency in that same time period (ABAG 2011, 12). The overall California auto market, at 1.1 million new cars sold per year, represents over 10% of U.S. sales. Registered vehicles total 22 million in California in 2010. Estimates range from 500,000 to 1.5 million or more registered EVs in California by 2020.



Title 24 (Part 11 CalGreen) Codes and Standards Progress to Date – Residential

- Currently in effect
- Voluntary: optional for jurisdictions to adopt
- Multi-family homes
 - 3% of parking spaces
 - Capacity and designs for PEV charging installation
 - Install any underground conduit that would be needed
 - Major cost savings proportional to implementation
- Single/dual-family
 - Conduit (i.e. pathway to add wire later) to the attic
 - Moderate cost-savings



Title 24 Codes and Standards Progress to Date – Non Residential

- Voluntary: optional for jurisdictions to adopt
- Final revised Building Standards Commission standards expected to be published June 2013 and effective January 2014
 - Similar requirements to multi-family plus installation of conduit (for multi-family, only if underground)
 - Plus a “Tier 2” option to make 5% of spaces PEV-ready



Local Codes

- Local jurisdictions have authority to make CalGreen mandatory
- Local jurisdictions also have authority to make findings and adopt their own PEV-readiness building codes

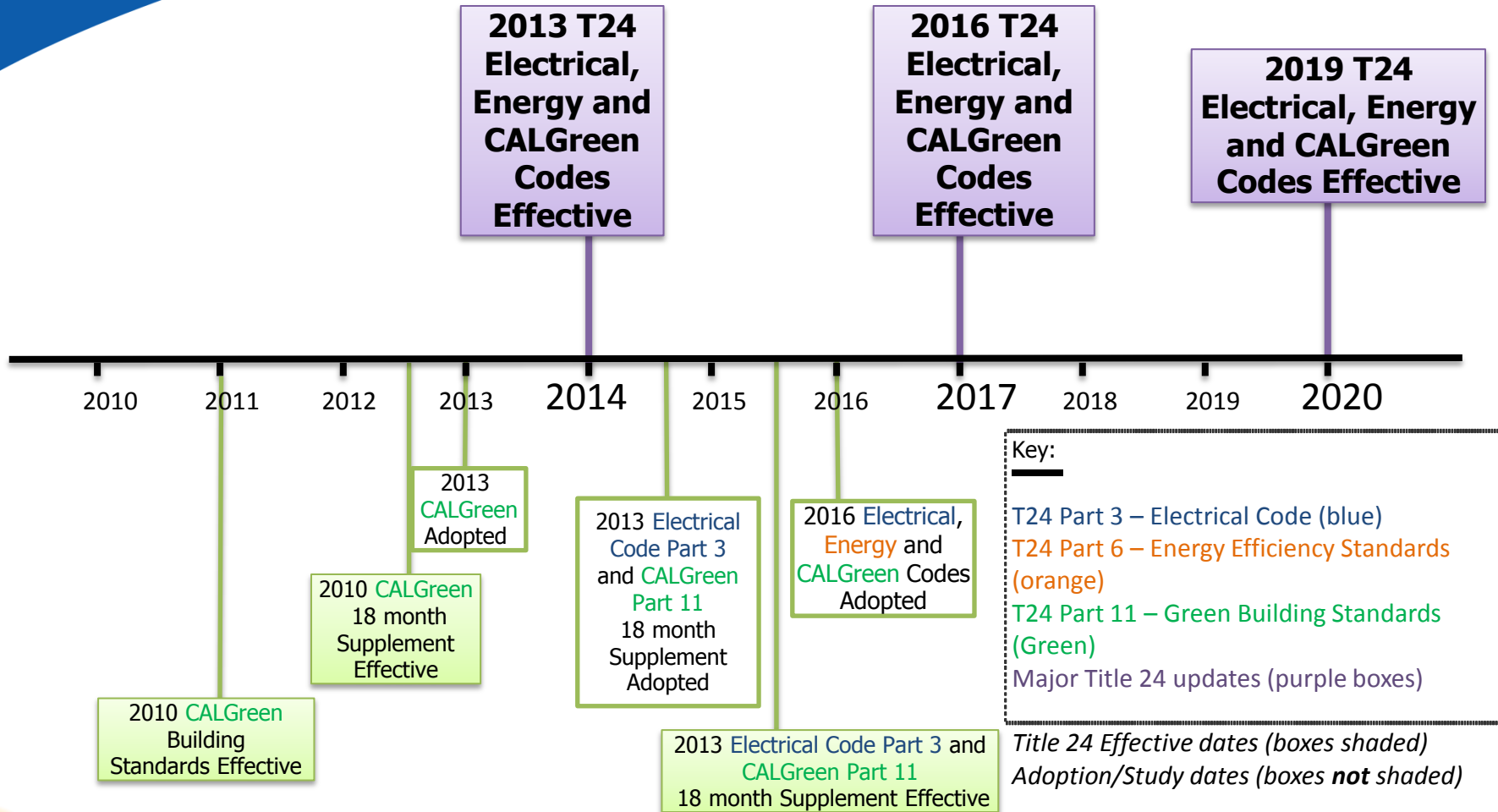


City of Los Angeles Mandatory PEV-Readiness Codes

- New single family and low rise multi-family housing
 - Include EV charging circuit or capacity and conduit
 - Single family: one circuit per dwelling unit
 - Low-rise multi-family: 5% of parking spaces
- New non-residential or high-rise multi-family
 - Include EV charging circuit or capacity and conduit for 5% of parking spaces



Regulatory Timelines



Current Activities

- Housing and Community Development managing technical study for residential sector
- Community recommendations under development in Governor's Office's PEV Guidebook
- Proposed AB1092
 - Would mandate PEV ready standards for multi-family residential and non-residential new buildings for January 2017 implementation
 - Would set current Calgreen as presumptive mandatory state standards; state agencies could change for cause



Examples of Potential Revisions to Existing Code

- Recommendations from “Reducing Barriers to Electric Vehicle Adoption through Building Codes”
 - 10% of multi-family parking spaces PEV ready
 - Complete circuit for single-family



Thank you!

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