CALIFORNIA ENERGY COMMISSION

Welcome

Scoping Workshop for a Vehicle-Grid Integration Solicitation under the Second EPIC Investment Plan

December 15, 2015

Kiel Pratt

Energy Research and Development Division

California Energy Commission

Housekeeping

- In Case of Emergency
- Facilities
- Sign-In Sheet
- Diversity Survey
- Q&A protocol

Commitment to Diversity

The Energy Commission adopted a resolution strengthening its commitment to diversity in our funding programs. We continue to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

To meet this commitment, Energy Commission staff conducts outreach efforts and activities to:

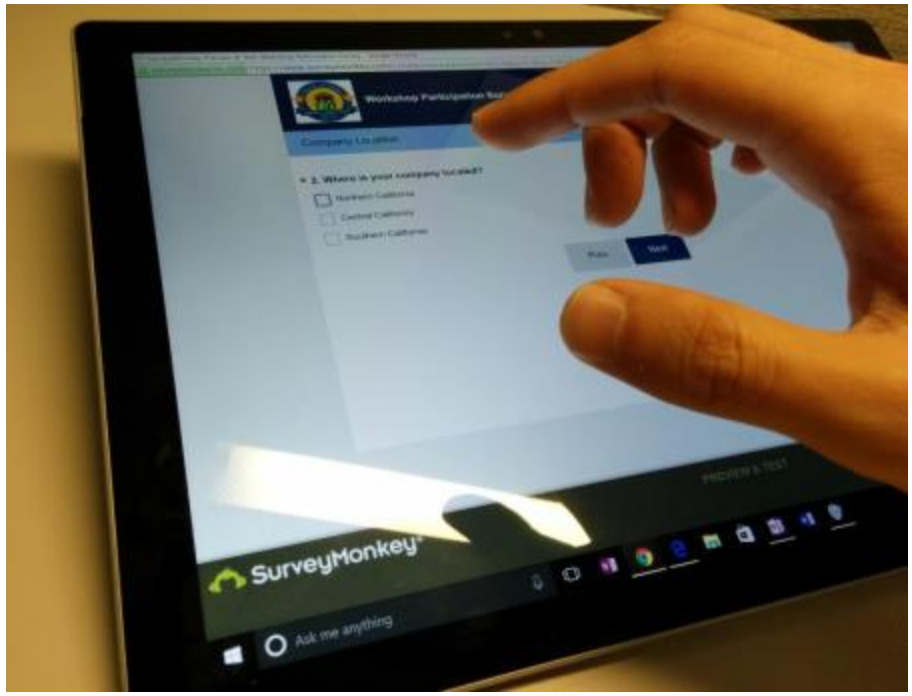
- Engage with disadvantaged and underrepresented groups throughout the state.
- Notify potential new applicants about the Energy Commission's funding opportunities.
- Assist applicants in understanding how to apply for funding from the Energy Commission's programs.
- Survey participants to measure progress in diversity outreach efforts.

We Want to Hear From You!

1 Minute Survey

- The information supplied will be used for public reporting purposes to display anonymous overall attendance of diverse groups.

- Does your company identify as an underrepresented group?
- Where is your company located?
- How did you hear about the workshop?
- **Online survey for WebEx Participants:**
  https://www.surveymonkey.com/r/CEC-12-14-2015



Vehicle-Grid Integration

"The term vehicle-grid integration or VGI, as used in this roadmap, encompasses the ways EVs can provide grid services."

- California Vehicle-Grid Integration Roadmap: Enabling vehicle-based grid services

Vehicle-Grid Integration

"Vehicle-Grid Integration (VGI) is the **process** of developing technology and policy frameworks for enabling EV-based grid services, including demand response and energy storage. The VGI activities include EV load tracking, load management, and deployment of enabling technologies."

CALIFORNIA ENERGY COMMISSION

Questions and Discussion Session

Scoping Workshop for a Vehicle-Grid Integration Solicitation under the Second EPIC Investment Plan

December 15, 2015

Scoping Workshop

Vehicle-Grid Integration Solicitation under the Second EPIC Investment Plan

Staff Workshop

California Energy Commission

December 15, 2015

Rey Gonzalez

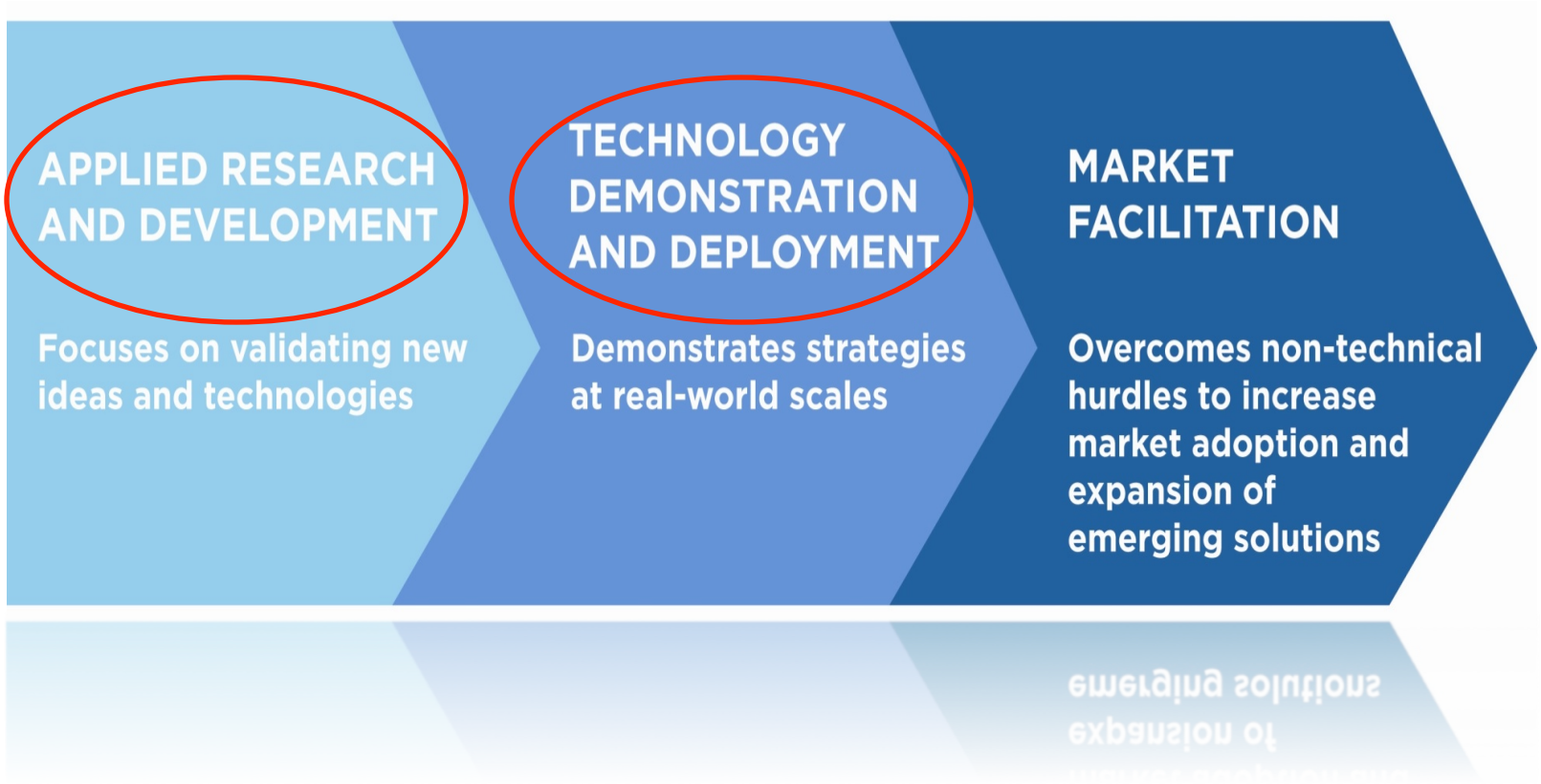
Kiel Pratt

Research and Development Division

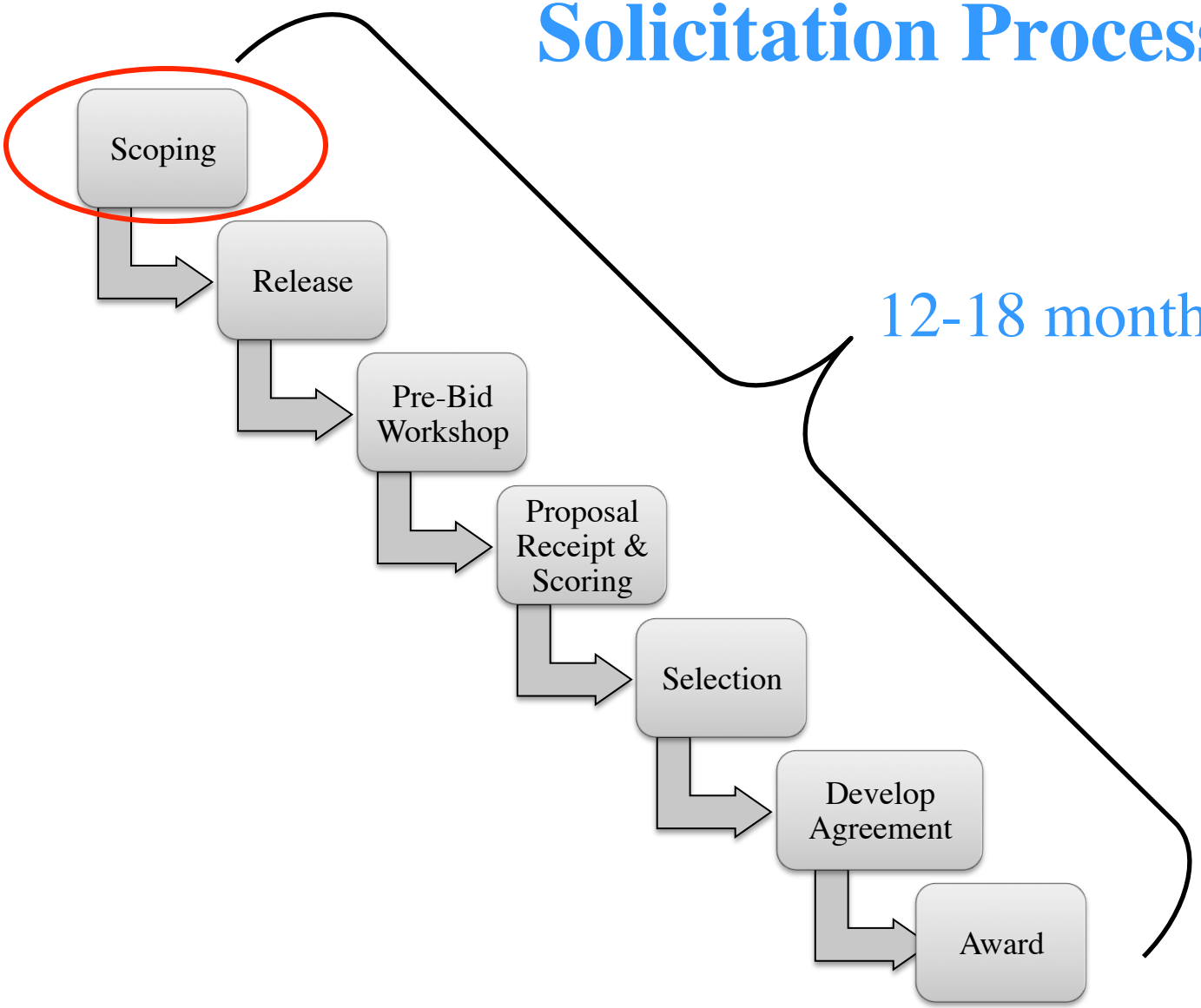
Workshop Overview

- Today's workshop purpose:
  - Receive public comment on draft solicitation material to address initiatives S9 "Advance Electric Vehicle Infrastructure to Provide Electricity System Benefits" and S16 "Expand Smart Charging and Vehicle-to-Grid Power Transfer for Electric Vehicles"
  - Solicitation Schedule: Anticipated release during Q4 FY 2015-2016

EPIC Structure: The Innovation Pipeline



Solicitation Process



First EPIC Investment Plan
2012-14 TRIENNIAL INVESTMENT PLAN

Strategic Objective S9

Advance Plug-In Electric Vehicle Infrastructure and Use EVs to Improve the Operation and Performance of California's Power Grid

S9.1 Investigate Smart and Efficient Charging Technologies and Approaches to Integrate Plug-in Electric Vehicles Into the Power Grid
S9.2 Develop Grid Communication Interfaces for Plug-in Electric Vehicle Charging to Support Vehicle-to-Grid Services
S9.3 Advance the Economics and Business Case of Distributed Storage Through the Development of Second-Use EV Battery Storage Applications
S9.4 Develop Advanced Technologies and Processes for Recycling Batteries Used in Distributed Storage and Plug-in Electric Vehicles

Strategic Objective S14

Demonstrate the Reliable Integration of Energy Efficient Demand-Side Resources, Distributed Clean Energy Generation, and Smart Grid Components to Enable Energy-Smart Community Development

S14.1 Demonstrate Zero-Net Energy Buildings and Communities.
S14.2 Demonstrate Renewable Energy-Based Microgrids Capable of Sharing Resources Across the Larger Power Grid.
S14.3 Demonstrate Advanced Vehicle-to-Grid Energy Storage Technologies and Second-Use Vehicle Battery Applications.

Solicitation: PON-14-310

Driving the Integration of Electric Vehicles to Maximize Benefits to the Grid

Awarded Projects	Description
EPC-14-077 Center for Sustainable Energy	Develop a Demand Clearing House able to translate common utility smart grid protocols such as Open ADR 2.0b into ISO/IEC 15118 Tariff Tables that compatible vehicles and charging stations can respond to.
EPC-14-078 ChargePoint, Inc.	Develop communication interfaces between PEV customers and utilities using cloud-to-cloud OpenADR 2.0b communication with a vehicle charging network and will leverage emerging means for retrieving vehicle information via 15118 standard for consideration in the PEV operator decision process.
EPC-14-086 Electric Power Research Institute	Develop and demonstrate a fully functional, grid-compatible and interoperable V2G system factoring in end-to-end information processing. The technology will focus on a V2G system that is safe, outage-immune and grid-aware through real-time transformer monitoring and access to distribution system information.

Solicitation: PON-14-301

Developing a Portfolio of Advanced Efficiency Solutions: Technologies and Approaches for More Affordable and Comfortable Buildings

Awarded Projects	Description
EPC-14-057 **Lawrence Berkeley National Laboratory**	Develop and demonstrate a smart charging control system for electric vehicle supply equipment (EVSE) that serves both fleet and non-fleet PEVs in multiple geographic locations.
EPC-14-056 **University of California, Los Angeles**	Develop and demonstrate technologies that specifically address integration of electric vehicles into the electrical grid, including the integration of energy storage and renewable energy.

Second EPIC Investment Plan
2015-17 TRIENNIAL INVESTMENT PLAN

Strategic Objective S9

Advance Electric Vehicle Infrastructure to Provide Electricity System Benefits.

S9.1 Advance Electric Vehicle Charging to Increase Renewable Energy Levels and Improve Grid Reliability.
S9.2 Advance Vehicle-Grid Integration Technologies and Methods for Broader Use and Benefit for Residential, Private, and Public Users.
S9.3 Advance Technologies and Methods to Enable Safe, Efficient, Smart Recycling of Electric Vehicle Batteries.

The intent of these targeted research categories is to fund applied research projects that effectively integrate plug-in electric vehicles (PEVs) into the electricity grid by enabling a higher mix of renewable resources, advancing the capabilities of PEVs, and improving the commercial viability of PEVs.

Strategic Objective S16

Expand Smart Charging and Vehicle-to-Grid Power Transfer for Electric Vehicles

S16.1 Demonstrate the Ability of Electric Vehicles To Provide Advanced Grid Services.

Projects within this targeted research category will advance the integration of plug-in electric vehicles (PEVs) with the electric grid and with customer sites, and must validate the economics and operating characteristics of any one or combination of the following technologies:

- actively managed "smart" one-way charging (SC)
- vehicle-to-building (V2B)
- vehicle-to-grid (V2G)

Public Comments (General Questions)

Written Comments

Due December 29, 2015

Submit Comments to:

Reynaldo.Gonzalez@energy.ca.gov

or

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Sacramento, CA 95814-5512