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Updating the California Vehicle-Grid Integration Roadmap

2017 IEPR Joint Agency Workshop on the Integration of
Distributed Energy Resources in the California Grid

June 29, 2017

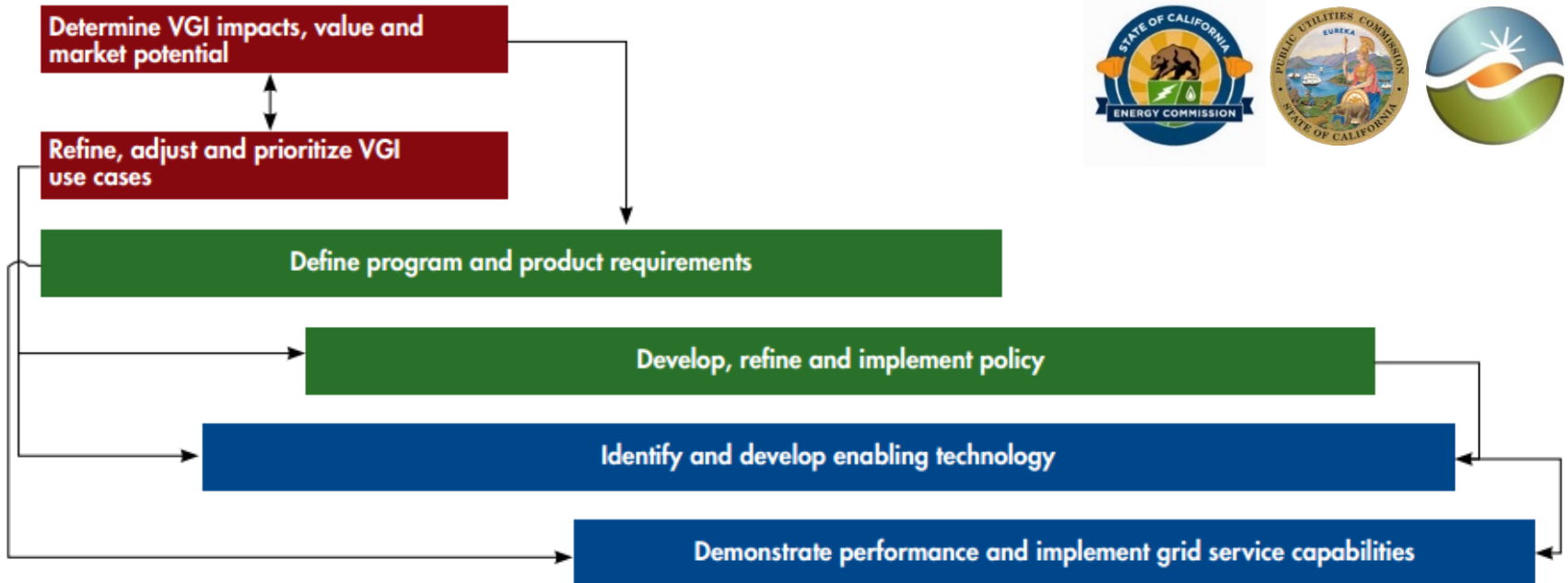
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Three Interrelated Tracks

1. **Determine VGI Value and Potential**
2. **Develop Enabling Policies, Regulations and Business Processes**
3. **Support Enabling Technology Development**





Next Steps

Party Feedback (6/13)

- Accelerate adoption to meet goals.
- Ensure customer simplicity, understand user reactions to increasingly complex rates, and potential roles for 3rd parties to simplify and deliver services.
- Use data to inform infrastructure design and deployment
- Examine and inform VGI value
- Modify Rule 21 to interconnect mobile storage devices (V2G).
- Protect EVs from IP-based attacks with cybersecurity standards.

Future Updates to Roadmap

- Reflect new ZEV Action Plan and Transportation Electrification (SB 350), market designs, procurements, incentives
- Synthesize prior research
- Align with updated charging infrastructure demand modeling (EVI-Pro) & deployment strategy
- Consider interagency VGI Communications Protocol Working Group output
- Coordinate with CEC Transportation Technology Roadmap

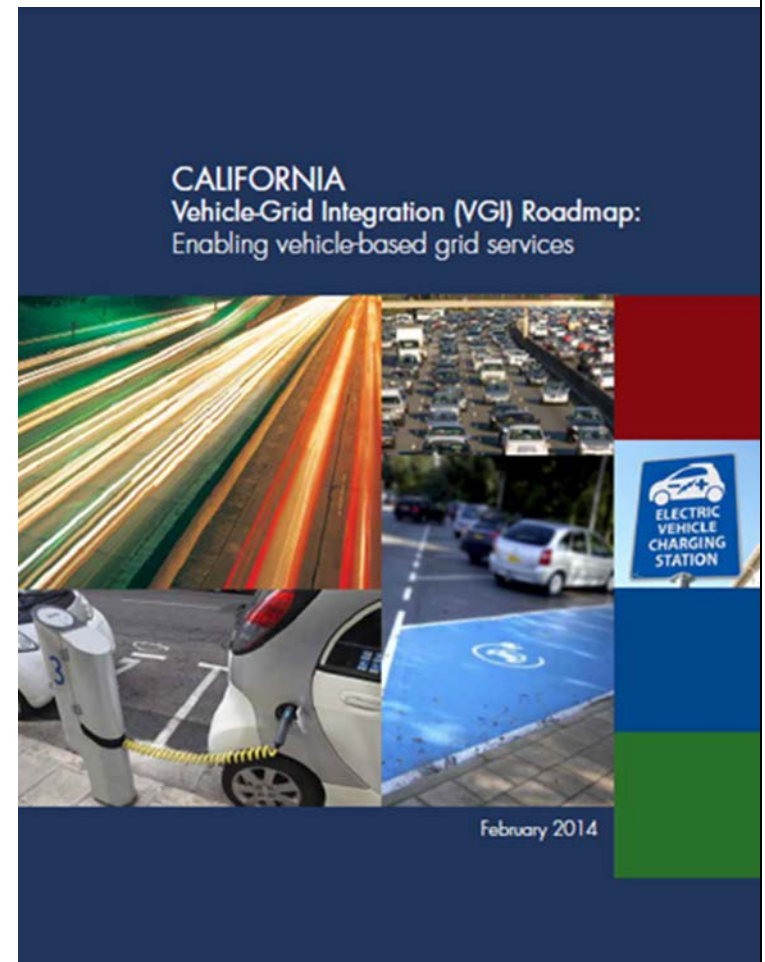


Thank You

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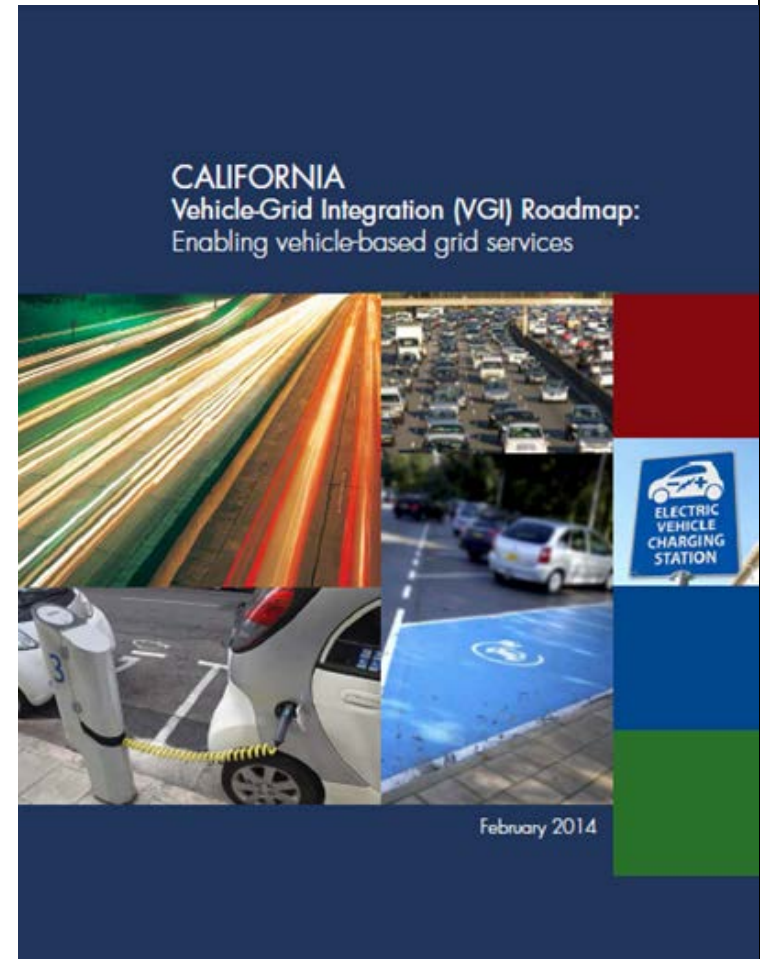
Appendix

**SPECIFIC VGI ROADMAP ACTIVITIES
EXCERPTED FROM CEC PRESENTATION
FOR 6/13/17 IEPR WORKSHOP**



Outline

- Tracks **1, 2, 3**
 - **Goals**
 - Activities
 - Shared-Agency Responsibilities
 - Cross-Functional
- Current status of goals
 - Activity Ongoing/Result Pending





Track 1: Value and Potential

Confirm VGI electrical system impacts

- SCE Smart Charging, PG&E BMW iChargeForward 1 & 2, SDG&E Power Your Drive, EPIC (ChargePoint, CSE, EPRI), LA Air Force Base, NRG Settlement R&D

Determine VGI value

- E3/LBNL DR Potential Study, NREL National Economic Value Assessment of PEVs, LBNL VGI-Soft, CPUC DRP/IDER/IRP, CEC IEPR/IRP

Confirm VGI market potential

- LBNL VGI-Soft, CPUC DRP/IDER/IRP, CEC IEPR/IRP, CEC EVI-Pro Model

Formulate VGI business models

- Various OEMs, PowerTree, NSI V2G Bus, EMW, ChargePoint, Greenlots, BMW iChargeForward 2, Proterra, BYD, Oxygen Initiative, Nuuve, EVgo DCFC Rate Design, **Research, development and demonstration (RD&D)**
- EPIC, Submetering Protocol, EV Pilot Survey Database, DOE Grid Modernization Lab Consortium Projects



Track 2: Enabling Policies, Regulations and Business Processes

Ensure coherence between state policies, programs and national standards

- Alignment within VGI Communications Protocol Working Group

Define VGI-related products and programs

Define VGI program or product eligibility

Clarify VGI-related product and program requirements

Clarify settlement

- *ESDER/DERP/MRE, Submetering Protocol, DMS EV Fueling Systems, LCFS

Define verification and conflict resolution protocols

- CEC Title 20, Submetering Protocol, CAISO/CPUC Multi-Use Applications

Define signals and messaging

- Industry Standards → VGI Communications Protocol Working Group

Research, development and demonstration

- All pilots informing above activities

} → IOU/POU Rate & Charging Programs
→ CEC Investments
→ ISO Initiatives*



Track 3: Enabling Technology Development

Develop enabling technology requirements

- VGI Communications Protocol Working Group, Specifications for State Fleet

Improve performance

- Scaled manufacturing of battery and microcontrollers, software development, and pilot results

Identify and inform about performance

- Analyze accuracy, measurement, and latency of load management (CAISO AGC, IOU DR & Smart Meters, 3rd Party Submeters)

Research, development and demonstration

- Alternative & Renewable Fuel Vehicle Technology Program, Electric Program Investment Charge Program (12 Investment Plans), IOU ratepayer-funded DR and infrastructure programs, POU ratepayer-funded programs, NRG Settlement, DOE/EPA-funded technology demonstrations