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Clean Transportation Program

Draft Solicitation Concept for Vehicle-Grid Innovation Lab (ViGIL)

Matt Alexander
Fuels and Transportation Division
May 13, 2020

Workshop Agenda

- Welcome and Introductions

- ViGIL Overview
  - ViGIL Solicitation Concept and Background
  - Proposed Funding
  - Proposed Eligibility
  - Proposed Project Requirements
  - Proposed Evaluation Criteria
  - Proposed Schedule

- Questions and Discussion

Housekeeping

- Chat and Q&A boxes are available for questions and comments throughout the presentation.
- Participants on the phone will have the chance to provide questions and comments at the end of the presentation.
- "Raise hand" feature to ask a question or provide comment at the end of the presentation.
- Diversity Survey:
  - More information will be provided in the "chat box" section and the next few slides.
  - Survey will be emailed to all participants after the workshop.

Commitment to Diversity

The CEC adopted a resolution on April 8, 2015 to firmly commit to:

- Increase participation of women, minority, disabled veteran and LGBT business enterprises in program funding opportunities.
- Increase outreach and participation by disadvantaged communities.
- Increase diversity in participation at CEC proceedings.
- Increase diversity in employment and promotional opportunities.

Commitment to Diversity (cont.)

- Fairness – Increase funding accessibility to all Californians.
- Inclusion – Small businesses make up a significant portion of the U.S. economy.
- Job Creation – Projects can create jobs for residents of the under-served communities.
- Diversity of Ideas – Great ideas occur in a variety of areas.
- Diversity in Communities' Needs – Needs vary widely from one area to the next (air quality, socioeconomic, etc.).

Diversity Survey

- The CEC is committed to ensuring that the Clean Transportation Program reflects the rich and diverse characteristics of California and its people.
- Please tell us the following:
    - Your name
    - Your company
    - How you heard about this workshop
    - Whether your company is in Northern, Central, or Southern CA
- Please email this information to Matt.Alexander@energy.ca.gov

Diversity Survey (cont.)

- Additionally, please let us know in your email if you are representing a business that is:
  - A small business,
  - A disabled veteran business,
  - A woman-owned business,
  - A Lesbian-, Gay-, Bisexual-, Transgender-owned business, or
  - A minority-owned business.
- Please list this workshop title in the subject or body of your email:

  Vehicle-Grid Innovation Lab (ViGIL)
- The information supplied will be used for public reporting purposes to display anonymous overall attendance of diverse groups.

Clean Transportation Program

- Formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program
- Established by Assembly Bill 118 (Nunez, 2007)
- Provides up to $100 million per year in funds
- Extended to January 1, 2024 by Assembly Bill 8 (Perea 2013)

Clean Transportation Program

"…*to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies.*"

- California Health and Safety Code 44272(a)

Complementary goals:

- Improve air quality
- Investments in low-income and disadvantaged communities
- Promote economic development
- Increase alternative fuel use
- Reduce petroleum dependence

Vehicle-Grid Innovation Lab (ViGIL)

Overview

- Provide local testing capacity and accelerated throughput for charging technologies
- One project will be funded
- Maximum of $3 million available

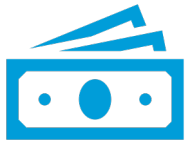
Electric Vehicle Charging Equipment Goals

Convenience

Ensure that technologies employed in plug-in hybrid and electric vehicles work in a harmonious manner and across service territories.

Public Utilities Code 740.2 (e)

Cost Control



EVs should assist in grid and renewables management, and reduce fuel costs for drivers who charge in a manner consistent with grid conditions.

Public Utilities Code 740.12(g)

Customer Choice

Standardized, open charging systems that ensure easy access by all in a competitive, and highly innovative market.

U.S. DOE EERE Public Plug-In Electric Vehicle Charging Infrastructure Guiding Principles

Interoperability "will provide standardized devices that are capable of functioning as intended with each other, without special effort by the user."

US DOE/EU JRC EV-Smart Grid Interoperability Center

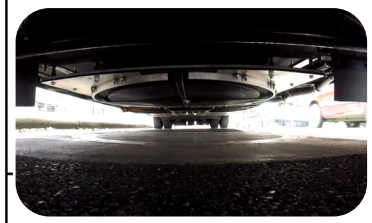
Origination of ViGIL

Discussion at and comments to the November 18, 2019 workshop on CALeVIP Future Equipment Requirements* highlighted the following needs:

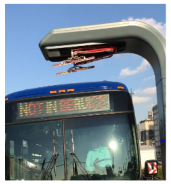
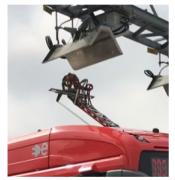
1) Validation that equipment is capable of advanced charging functions
2) For the CEC to convene between automakers, electric manufacturers, and service providers to encourage collaborative product development and testing
3) Additional laboratory capacity in order to reduce costs, expedite services, and increase providers for testing – proximally located within California
4) Support for small equipment manufacturers and service providers to ensure a diverse and competitive market for charging technologies
5) EVSE-specific support that helps clean energy startups prove performance and accelerate commercialization, akin to the vouchers in the CalTestBed Initiative.

*Refer to the CEC docket “17-EVI-01” for written comments

M&HDV Interoperability





Maximum Rated Power Capacity (kW)

10k
1k
100
10
1

22
200
19
166
400
400
400
4,500
350
1,200

Automatic wireless
Handheld conductive
Pantograph conductive
AC
DC

SAE J2954
SAE J2954/2
SAE J1772
SAE J3068
SAE J3068
CHAdeMO
SAE J1772
CharIN HPCCV
SAE J3105 L1
SAE J3105 L2

Source: EPRI, SAE, Chademo, Phoenix Contact, CharIN/Tesla/Daimler.

Proposed Funding

- Maximum of $3 million is available for one project
- $1 million of this funding must be used to test a minimum of 10 eligible product models
- The remaining funding may be used for capacity expansion in accordance with the project requirements and the eligible costs:
  - Added engineering staff
  - Number of test devices
  - Number of devices tested per quarter
  - Number of new types of form factors tested
  - Number and type of tests offered
  - Reduction in cost of testing

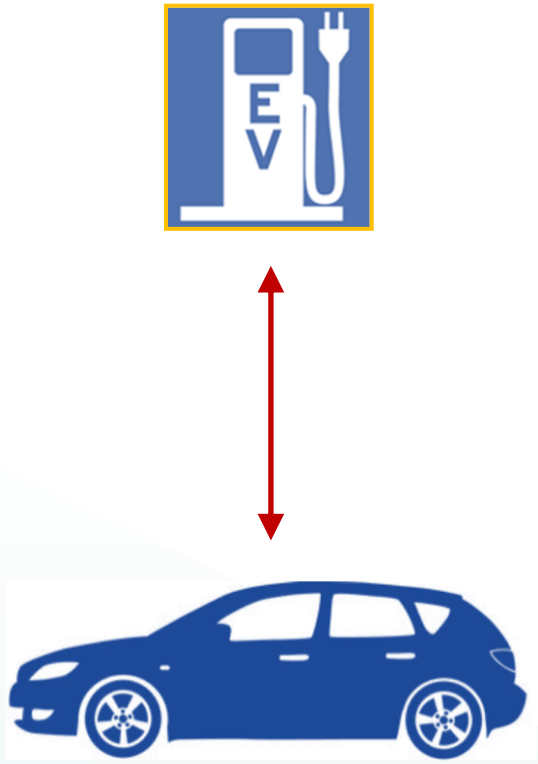
Proposed Eligibility

- Open to California private entities for capacity expansion and accelerated throughput of electric vehicle charging infrastructure testing at an existing facility located within California

- Applicants may only submit one application

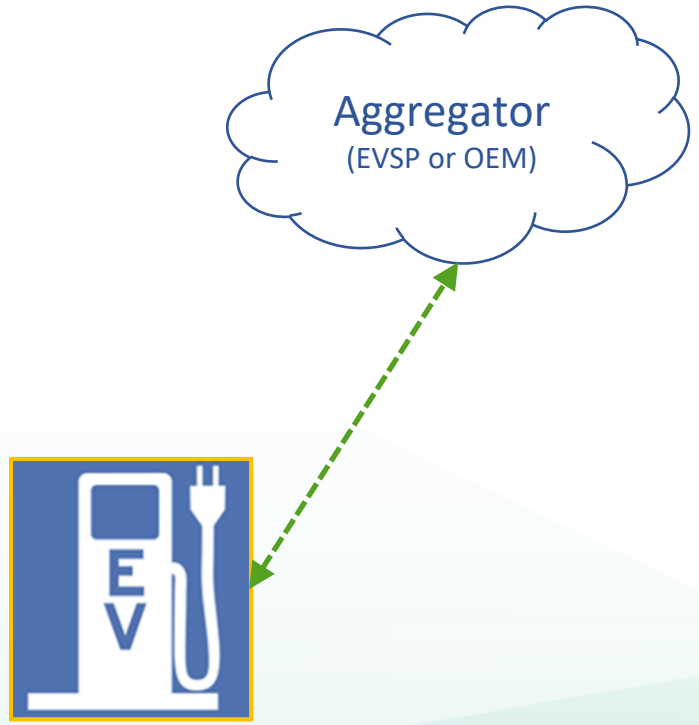
Proposed Project Requirements – Mandatory Standards (1)

- **ISO 15118**
  - Smart charging
  - Plug & Charge
  - AC and DC Charging
  - Bidirectional Charging
  - Wireless charging



Proposed Project Requirements – Mandatory Standards (2)

- **Open Charge Point Protocol (OCPP)[2] Version 1.6JSON and 2.0.1**
  - Core Functionality
  - Security Profile 2
  - ISO 15118 translation

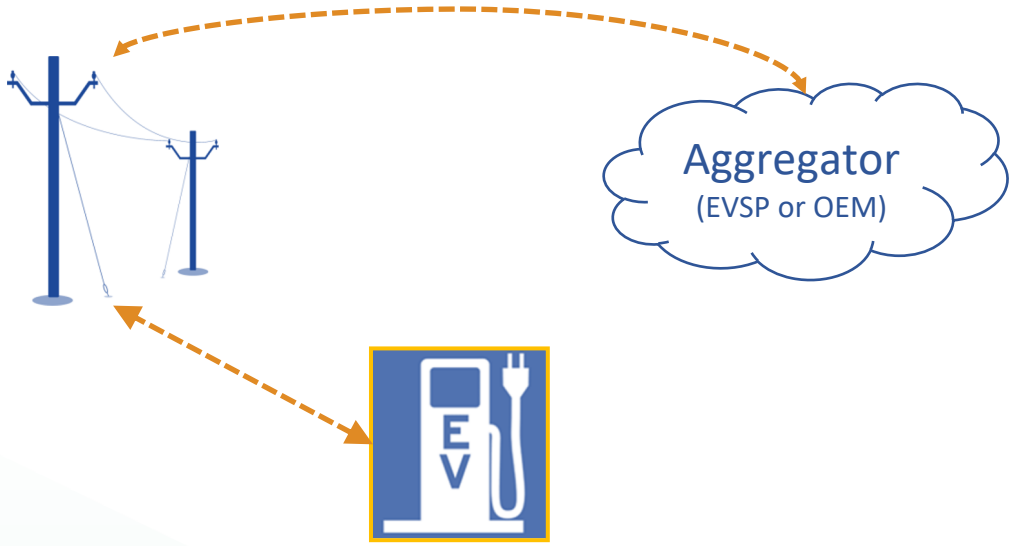


Proposed Project Requirements – Mandatory Standards (3)

- **Section 3.40 of the NIST 2020 Handbook 44 (Electric Vehicle Fueling Systems)[3]**
  - Selection of variable unit prices using equipment communicating with the EVSE system
  - Protection of metrological components
  - Directional controls to support the reversal of energy flow

Proposed Project Requirements – Optional Standards (4) and (5)

- **IEC 62746-10-1 (2019) (Open Automated Demand Response 2.0b)[4]**
  - Load control
  - Distributed energy resources control



- **ENERGY STAR® for Electric Vehicle Supply Equipment[5]**
  - Version 1.0 for alternating current (AC) and Version 1.1 for both AC and DC charging

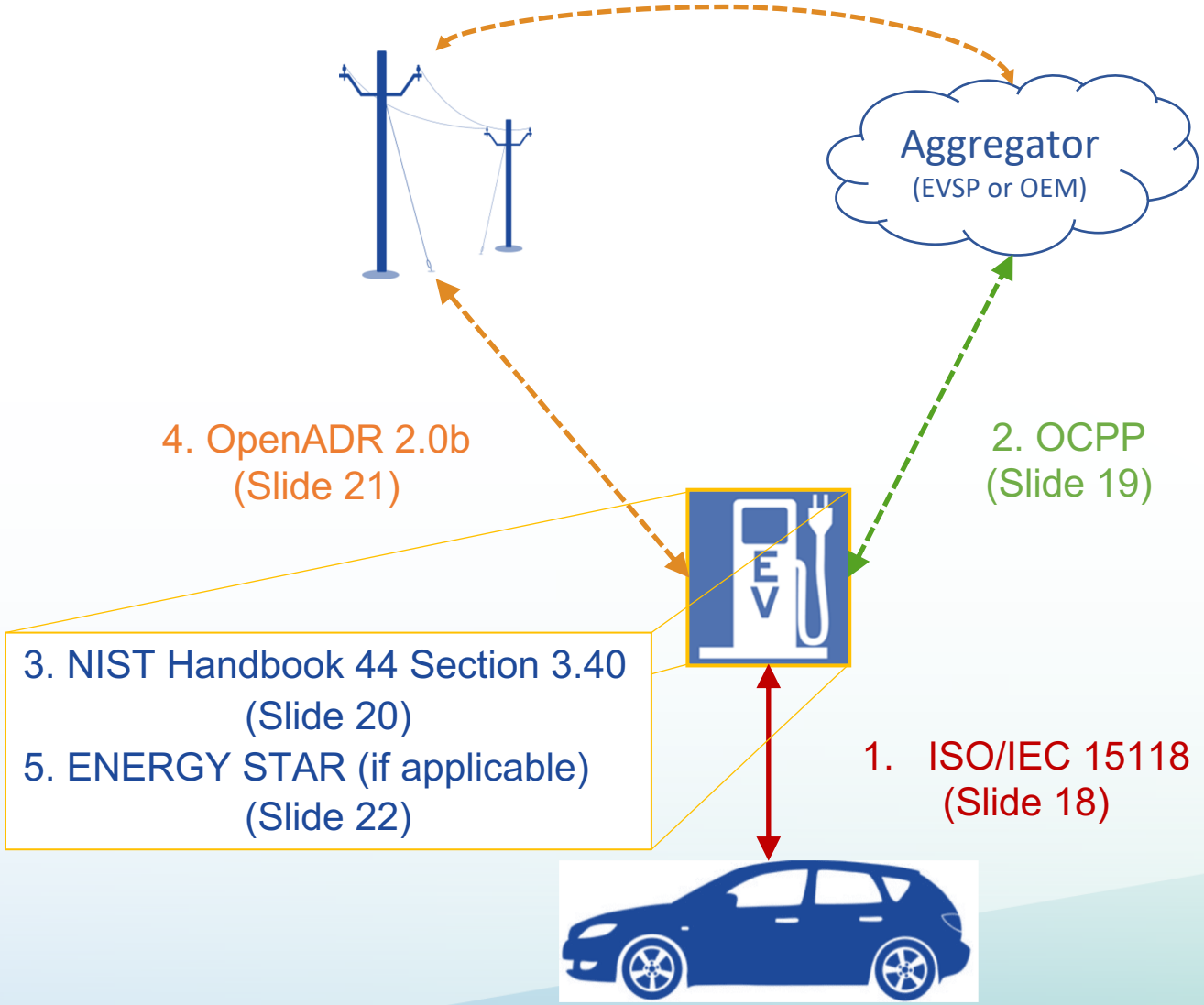
Proposed Project Requirements – Eligible Product Models

- **Level 2 Alternating Current**: Conductive and Wireless Charging
- **Direct Current**: Conductive Charging
- **High-Powered**: Conductive, Wireless, and Automated Connection Devices

Proposed Project Requirements – Eligible Interfaces

- **SAE J1772** – Electric Vehicle and Plug-In Hybrid Electric Vehicle Conductive Charge Coupler
- **Combined Charging System (CCS/Combo 1)** – Combines AC and DC charging into one interface
- **SAE J2954** – Wireless Power Transfer for Light-Duty Plug-In/Electric Vehicles
- **CharIN High Power Charging for Commercial Vehicles (HPCCV)** – Charging for class 6, 7, and 8 commercial vehicles, buses, aircraft and other battery electric vehicles
- **SAE J3105** – Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices
- **SAE J3072** – Interconnection Requirements for Onboard, Utility-Interactive Inverter Systems

Potential Combinations of Vehicles, Standards, Interfaces, & Use Cases



Interfaces for Light Duty Vehicles
SAE J1772 AC Conductive
CCS1 (SAE J1772 AC+DC)
SAE J2954 AC Wireless
SAE J3072 Onboard Inverters

Interfaces for Medium- & Heavy-Duty Vehicles
CCS1 (SAE J1772 AC+DC)
SAE J3105 Automated Connection Devices
SAE J2954 Wireless Power Transfer for HD PEV
High Power Charging for Commercial Vehicles

Ineligible Projects

- New construction of a test facility
- A university lab testing facility

Match Funds

- Applications must include at least 50 percent of total project costs as match share
- Of this match share, at least 50 percent should be cash match

Eligible Project Costs

- Examples of eligible costs include but are not limited to:
  - Facility design, engineering plans, and specifications
  - Building and facilities installations and/or modifications
  - Assets, materials and supplies, and equipment acquisition
  - Staff training

- The following <u>are not</u> eligible for CEC's reimbursement or as the applicant's match share:
  - New construction
  - EVSE
  - Vehicles
  - Utility service upgrade costs covered by the utility

Project Prompt

You have reached the stage where you are ready to begin testing products. What are your strategies to:

1) Attract original automotive and charging equipment manufacturers developing new products across all vehicle sectors (light-duty, medium-duty, heavy-duty) to your facility?
2) Select products to test in accordance with your proposed portfolio as well as the CEC eligibility requirements?
3) Ensure the protection and confidentiality of intellectual and technological property?
4) Provide pro-forma testing in terms of pricing, time required, and results delivered?
5) Balance the timelines of testing and products so that a steady stream of diverse technologies and products enter the market?
6) Coordinate with the conformance testing procedures developed by third-party certification bodies to facilitate the compliance of products with standards (e.g. ENERGY STAR®) in a timely manner?
7) Track and summarize the performance and impacts of the facility's activities on the improvement in electric vehicle charging innovations in California and the market more broadly?
8) Maintain pace with anticipated technological advancements and associated updates with standards development organizations?

Proposed Evaluation Process

- Applications will be ranked according to final overall score
- Final overall score for each application will be the average of the combined scores of all Evaluation Committee members
- A minimum of 70% is required to be eligible for funding

Proposed Evaluation Criteria (cont.)

Application Evaluation Criteria

Scoring Criteria	Points
Capacity and Throughput	65
Project Readiness and Implementation	45
Economic, Social, and Environmental Benefits	30
Team Experience and Qualifications	30
Budget	30
TOTAL POSSIBLE POINTS:	**200**

Project Selection and Award

- The CEC will recommend one award to the highest ranked project
- Ties, if any, will be broken in the following order:
  - The proposal with highest Capacity and Throughput score will be ranked higher
  - If still tied, the proposal with highest Project Readiness and Implementation score will be ranked higher
- If still tied, an objective tie-breaker will be utilized

Proposed Schedule

Activity	Action Date (Tentative)
Scoping Workshop	May 13, 2020
Pre-Application Workshop	August 12, 2020
Solicitation Release	End of July 2020
Deadline to Submit Applications	End of September 2020 (8 weeks after GFO posted)
Anticipated Notice of Proposed Award Posting	October 2020
Anticipated CEC Business Meeting Approval	December 2020
Agreement Execution	January 2021

Directed Questions

Overall Impact

- Will this proposal reduce the cost, time, and resources needed for testing of charging equipment and help create a robust, diverse market in California?
  - How would you enhance or improve this solicitation to better achieve our goals?

Funding

- Is $3 million sufficient for a project that expands testing capacity ($2M) and provides vouchers to test ten new charger models ($1M)?
  - How much does testing equipment cost?
  - How much do tests cost to perform?

Eligible Applicants

- How should we define the applicant eligibility requirements such that the final recipient is a trustworthy, independent laboratory that provides excellent, objective, and rigorous technical testing necessary to achieve interoperability in the market?

Project Requirements

- Are there other metrics you would use to define expansion differently from those listed on Slide 16?
  - Added engineering staff
  - Number of test devices
  - Number of devices tested per quarter
  - Number of new types of form factors tested
  - Number and type of tests offered
  - Reduction in cost of testing

Standards, Interfaces, and Use Cases

- Are the product model requirements (i.e., standards, interfaces, and use cases) representative of current and likely future needs of light, medium, and heavy-duty vehicles in the California market?

Project Requirements

What is the most appropriate way to publicly share the specifications of products that have been supported by this solicitation?

- Is there a standard format that should be used for specifications?
- Should a public repository of completed charging equipment be created?

- What data should be reported to the CEC confidentially for purposes of load research and determining performance capabilities?

Open Discussion

Public Comments

Docket #:19-TRAN-02

- Submit comments via the CEC E-Commenting System:

https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=19-TRAN-02

- Email Docket Unit: DOCKET@energy.ca.gov

Reference "*Vehicle-Grid Innovation Lab (ViGIL)"* in the subject line. If answering or providing comments to the specific questions included in this presentation, please reference the slide number or question.

All comments due by 5:00 p.m. on Wednesday, May 27, 2020.

Q&A / Public Comments

- Phone lines first
- Raise hand feature second (for those online)
- Q&A / chat box questions

Email or call the Public Advisor's Office @:

PublicAdvisor@energy.ca.gov

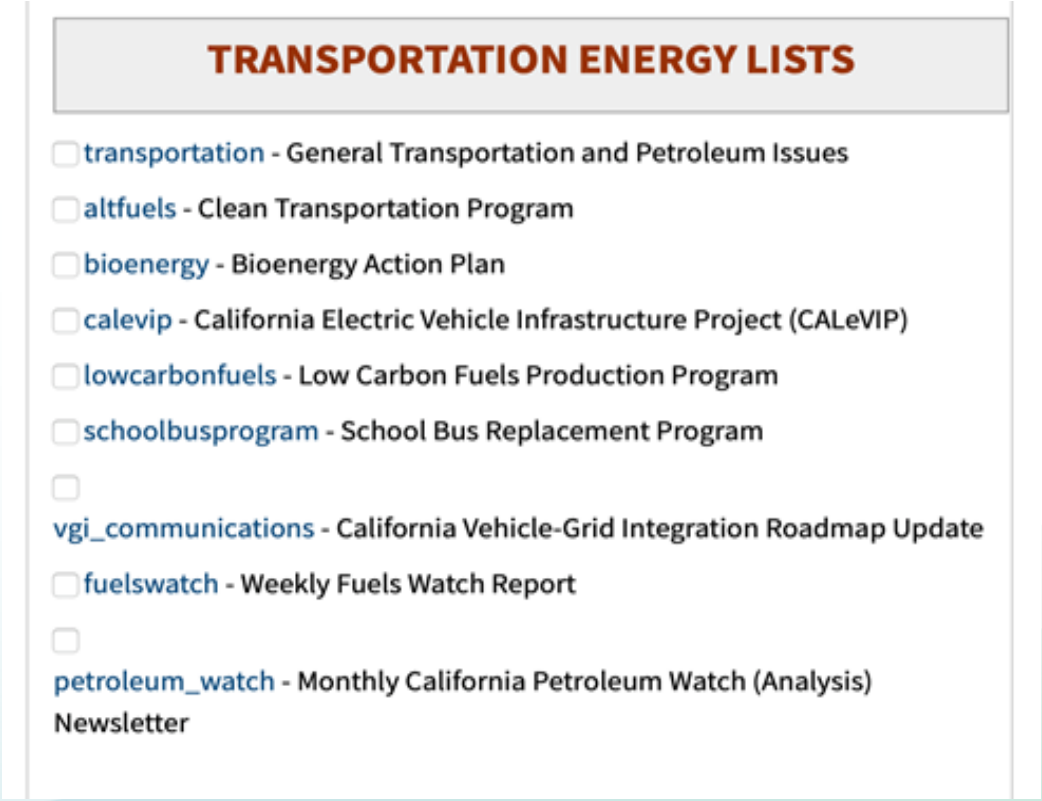
Or call (916) 654-4489

Toll free at (800) 822-6228.

List Serv Notifications

Subscribe to Transportation Energy List Servers to receive updates on the Clean Transportation Program and upcoming solicitations:

https://ww2.energy.ca.gov/listservers/index_cms.html



TRANSPORTATION ENERGY LISTS

- transportation - General Transportation and Petroleum Issues
- altfuels - Clean Transportation Program
- bioenergy - Bioenergy Action Plan
- calevip - California Electric Vehicle Infrastructure Project (CALeVIP)
- lowcarbonfuels - Low Carbon Fuels Production Program
- schoolbusprogram - School Bus Replacement Program
- vgi_communications - California Vehicle-Grid Integration Roadmap Update
- fuelswatch - Weekly Fuels Watch Report
- petroleum_watch - Monthly California Petroleum Watch (Analysis) Newsletter

Staff Contact Information

Matt Alexander

Matt.Alexander@energy.ca.gov

(916) 654-4466

Thank you for participating remotely!

Appendix

Light Duty Vehicles – Interfaces – Use Cases (Possible Combinations)

J1772 AC Conductive	J1772 DC Conductive (CCS1)	J2954 AC Wireless
ISO 15118 Smart Charging Plug & Charge Bidirectional Charging, J3072	ISO 15118/DIN 70121 Smart Charging Plug & Charge Bidirectional Charging	ISO 15118 Smart Charging Authentication Bidirectional Charging
OpenADR Load Control DER Control	OpenADR Load Control DER Control	OpenADR Load Control DER Control
OCPP Core Functionality Security Profile 2 ISO 15118 translation	OCPP Core Functionality Security Profile 2 ISO 15118 translation	OCPP Core Functionality Security Profile 2 ISO 15118 translation
NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow	NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow	NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow
ENERGYSTAR 1.0	ENERGYSTAR 1.1	N/A

Medium & Heavy Duty Vehicles – Interfaces – Use Cases (Possible Combinations)

J1772 DC Conductive (CCS1)	J3105 Automated Connection Devices	J2954-2 Wireless Power Transfer for HD PEV*	High Power Charging for Commercial Vehicles*
ISO 15118 Smart Charging Plug & Charge Bidirectional Charging	ISO 15118 Smart Charging Authentication	ISO 15118 Smart Charging Authentication Bidirectional Charging	ISO 15118 Smart Charging Plug & Charge Bidirectional Charging
OpenADR Load Control DER Control	OpenADR Load Control DER Control	OpenADR Load Control DER Control	OpenADR Load Control DER Control
OCPP Core Functionality Security Profile 2 ISO 15118 translation	OCPP Core Functionality Security Profile 2 ISO 15118 translation	OCPP Core Functionality Security Profile 2 ISO 15118 translation	OCPP Core Functionality Security Profile 2 ISO 15118 translation
NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow	NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow	NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow	NIST Handbook 44 Variable Unit Price Selection Meter Components Reverse Energy Flow
ENERGYSTAR v1.1	N/A	N/A	N/A