MEETING NOTICE
AND AGENDA

REGIONAL ENERGY WORKING GROUP
The Regional Energy Working Group may take action on any item appearing on this agenda.

Thursday, July 26, 2018
11:30 a.m. to 1 p.m.
SANDAG, 7th Floor Conference Room
401 B Street, Suite 800
San Diego, CA 92101

Please take the elevator to the 8th floor to access the meeting room.

Staff Contacts: Anna Lowe
(619) 595-5603
anna.lowe@sandag.org
Jeff Hoyos
(619) 699-1932
jeff.hoyos@sandag.org

AGENDA HIGHLIGHTS

- A TRANSITION TO ZERO EMISSION BUSES
- METROPOLITAN TRANSIT SYSTEM ZERO EMISSION BUS PILOT
- PLUG-IN SAN DIEGO UPDATE AND REGIONAL NEEDS ASSESSMENT

PLEASE SILENCE ALL ELECTRONIC DEVICES DURING THE MEETING

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Both agenda and non-agenda comments should be sent to SANDAG via comment@sandag.org. Please include the Working Group name and meeting date, agenda item, your name, and your organization. Any comments, handouts, presentations, or other materials from the public intended for distribution at the Working Group meeting should be received by the Working Group coordinator no later than 12 noon, two working days prior to the meeting. All public comments and materials received by the deadline become part of the official project record, will be provided to the members for their review at the meeting, and will be posted to the agenda file as a part of the handouts following each meeting.

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# REGIONAL ENERGY WORKING GROUP

Thursday, July 26, 2018

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<tr>
<th>ITEM NO.</th>
<th>RECOMMENDATION</th>
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<tr>
<td>1.</td>
<td>WELCOME AND INTRODUCTIONS</td>
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<td>2.</td>
<td>APPROVAL OF MEETING MINUTES</td>
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<td>The Regional Energy Working Group (EWG) is asked to review and approve the minutes from its May 24, 2018, meeting.</td>
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<td>3.</td>
<td>PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS</td>
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<td></td>
<td>Members of the public shall have the opportunity to address the EWG on any issue within the jurisdiction of SANDAG that is not on this agenda. Anyone desiring to speak shall reserve time by completing a Request to Comment form and giving it to the meeting coordinator prior to speaking. Public speakers should notify the meeting coordinator if they have a handout for distribution to EWG members. Public speakers are limited to three minutes or less per person. EWG members also may provide information and announcements under this agenda item.</td>
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<tr>
<td>4.</td>
<td>CONSENT</td>
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<td>5.</td>
<td>SAN DIEGO REGIONAL ELECTRIC VEHICLE REBATE STATISTICS</td>
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<td>The electric vehicle market in the San Diego region is rapidly growing. SANDAG has committed to provide the EWG with monthly updates on regional Clean Vehicle Rebate Program statistics. Statewide rebate statistics also have been provided for comparison.</td>
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<tr>
<td>6.</td>
<td>REPORTS</td>
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<td>A TRANSITION TO ZERO EMISSION BUSES (Ray Pingle, Sierra Club)</td>
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<td>Ray Pingle, lead volunteer for the Sierra Club Clean Transportation Campaign, will present on why the Sierra Club supports the transition to zero emission buses (ZEBs), environmental benefits, performance issues, economics of ZEBs, and the ZEB Rule expected from the California Air Resource Board this fall.</td>
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<td>METROPOLITAN TRANSIT SYSTEM ZERO EMISSION BUS PILOT (Bill Spraul, MTS Chief Operating Officer)</td>
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<td>The San Diego Metropolitan Transit System (MTS) has initiated a zero emission bus pilot program. Bill Spraul, MTS Chief Operating Officer, will describe the pilot program and share information about its implementation and next steps.</td>
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<td>PLUG-IN SAN DIEGO UPDATE AND REGIONAL NEEDS ASSESSMENT (Kevin Wood, Center for Sustainable Energy; and Jeff Hoyos, SANDAG)</td>
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<td>The SANDAG Regional Energy Working Group last heard about Plug-in San Diego (PISD) in June 2017. Staff will present an update on PISD Phase II and share information about the San Diego Regional Electric Vehicle Charging Station Needs Assessment.</td>
</tr>
</tbody>
</table>
+8. STATE ACTIVITIES ON ENERGY AND CLIMATE CHANGE (Maggie Soffel, SANDAG)  
DISCUSSION  
Staff will provide an update on state activities as well as legislative bills that have been of interest to the EWG. Members are asked to review the bills and share legislation that would support implementation of the Regional Energy Strategy.

9. UPCOMING MEETINGS  
INFORMATION  
The next EWG meeting is scheduled for Thursday, August 23, 2018, at 11:30 a.m.

10. ADJOURNMENT

+ next to an item indicates an attachment
Chair Carrie Downey (City of Coronado) called the meeting of the Regional Energy Working Group (EWG) to order at 11:36 a.m.

1. WELCOME AND INTRODUCTIONS

Introductions were made.

3. PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS

John Wotzka, a member of the public, submitted written comments and spoke about energy and climate-related news.


Mo Lahasie (City of Oceanside) informed the EWG that the cities of Oceanside, Carlsbad, Encinitas, and Del Mar are developing a joint Community Choice Energy feasibility study.

4. SAN DIEGO REGIONAL ELECTRIC VEHICLE STATISTICS (INFORMATION)

Updates from the Clean Vehicle Rebate Program on regional electric vehicle growth were attached. Chair Downey mentioned the need for ongoing collaboration with regional tribal nations to increase renewable energy and electric vehicle charging station installations. Councilmember Colin Parent (La Mesa) requested a presentation on the topic.

Action: This item was presented for information.

2. APPROVAL OF MEETING MINUTES (APPROVE)

Action: Upon a motion by Councilmember Amanda Rigby (City of Vista) and a second by Councilmember Parent, the EWG approved the minutes from the March 22, 2018, and April 26, 2018, meetings.

Yes: Chair Downey, Scott Anders (Energy Policy Initiatives Center, University of San Diego), Renee Yarmy (Port of San Diego), Councilmember Catherine Blakespear (City of Encinitas), Hanna Greene (Center for Sustainable Energy), Fernando Valero (San Diego Gas & Electric), Mr. Evans, and Dave Grubb (Sierra Club).
No: None. Abstain: None. Absent: Public Transit Operators, Environmental Health Coalition, San Diego Regional Airport Authority, Cleantech San Diego, San Diego Regional Chamber of Commerce, San Diego Regional Clean Cities Coalition, Economic Development, City of San Diego Subregion, County of San Diego Subregion, San Diego County Regional Airport Authority, Universities.

5. REGIONAL MOBILITY HUB IMPLEMENTATION STRATEGY AND NEIGHBORHOOD ELECTRIC VEHICLE LEGISLATION (DISCUSSION)

Staff presented information about the Regional Mobility Hub Implementation Strategy and some of the key deliverables. Staff also discussed Neighborhood Electric Vehicle (NEV) legislation California Senate Bill 1151 (Bates) that would authorize local jurisdictions within the County of San Diego to develop and implement NEV transportation plans.

Action: This item was presented for discussion.

6. SAN DIEGO FORWARD: THE 2019-2050 REGIONAL PLAN (INFORMATION)

Staff outlined the process for developing the transportation network scenarios for San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan) and discussed the role of the 2019 Regional Plan in state- and local-level climate action planning.

Action: This item was presented for discussion.

7. SANDAG 2018 LEGISLATIVE PRIORITIES (INFORMATION)

This item was tabled until the next EWG meeting.

Action: This item was postponed.

8. UPCOMING MEETINGS (INFORMATION)

The next EWG meeting is scheduled for Thursday, June 28, 2018, at 11:30 a.m.

9. ADJOURNMENT

Chair Downey adjourned the meeting at 1 p.m.
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<th>REPRESENTATION</th>
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<th>NAME</th>
<th>MEMBER/ALTERNATE</th>
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<tr>
<td>South County Subregion</td>
<td>City of Coronado</td>
<td>Hon. Carrie Downey, Chair</td>
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<td>Hon. Catherine Blakespear</td>
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<td>City of Carlsbad</td>
<td>Jason Haber</td>
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<td>City of Oceanside</td>
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<td>East County Subregion</td>
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<td>Hon. Colin Parent</td>
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<td>City of Lemon Grove</td>
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<td>Hon. David Alvarez</td>
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<td>Jack Clark</td>
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<td>Charles Marchesano</td>
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<td>Metropolitan Transit System</td>
<td>Sharon Cooney</td>
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<td>Brendan Reed</td>
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<td>Unified Port District of San Diego</td>
<td>Renee Yarmy</td>
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<td>Dave Weil</td>
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<td>San Diego Gas &amp; Electric</td>
<td>Fernando Valero</td>
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<td>Center for Sustainable Energy</td>
<td>Larry Goldenhersh</td>
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<td>Hanna Grene</td>
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<td>Energy Policy Initiatives Center, University of San Diego School of Law</td>
<td>Scott Anders, Vice Chair</td>
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<td>Nilmini Silva-Send</td>
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<td>Transportation Fuels</td>
<td>San Diego Regional Clean Cities Coalition</td>
<td>Debra Kelley</td>
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<td>Jennifer Case</td>
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<td>Sierra Club</td>
<td>Paul Webb</td>
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<td>San Diego Regional Chamber of Commerce</td>
<td>Mike Evans</td>
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<td>Colleen Klaiber</td>
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<td>Paul O'Neal</td>
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<td>John Moot</td>
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<td>Cleantech San Diego</td>
<td>Jason Anderson</td>
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<td>Alyssa Gutner-Davis</td>
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<td>OTHER ATTENDEES:</td>
<td>SANDAG STAFF MEMBERS LISTED BELOW</td>
<td>Mike Grim – City of Carlsbad</td>
<td>Krystal Ayala</td>
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<td>Jennifer Mendoza - APTIM</td>
<td>Susan Freedman</td>
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<td>Chris Nanson – SDG&amp;E</td>
<td>Laurie Gartrell</td>
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<td>Cesar Rios – RioSolutions</td>
<td>Keith Greer</td>
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<td>Katie Wilson – TRC Solutions</td>
<td>Katie Hentrich</td>
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<td>John Wotzka – Member of the public</td>
<td>Jeff Hoyos</td>
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<td>Jeff Wyner – City of Escondido</td>
<td>Anna Lowe</td>
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<td>Andrew Martin</td>
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<td>Phil Trom</td>
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<td>Robin Wapner</td>
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SAN DIEGO REGIONAL ELECTRIC VEHICLE REBATE STATISTICS  

The electric vehicle market in the San Diego region is rapidly growing. SANDAG has committed to provide the Energy Working Group with monthly updates on regional Clean Vehicle Rebate Program statistics. Statewide rebate statistics also have been provided for comparison.

Attachments:  
2. July 2018 Rebate Statistics – California
CVRP Rebate Statistics

Data is updated monthly. Last updated: July 03, 2018

Click here to download the entire dataset in Excel format: CVRPStats.xlsx

* Please select the *Notes tab of this dashboard for additional details and links to related information.

Please cite use of these data and images. For example:
CVRP Rebate Statistics

Data is updated monthly. Last updated: July 03, 2018

Click here to download the entire dataset in Excel format: CVRPStats.xlsx

* Please select the *Notes tab of this dashboard for additional details and links to related information.

PLUG-IN SAN DIEGO UPDATE AND REGIONAL NEEDS ASSESSMENT

**Introduction**

The SANDAG Regional Energy Working Group (EWG) last heard about Plug-in San Diego (PISD) at the June 2017 EWG meeting. Since that time, Phase I of PISD has concluded and Phase II has commenced. PISD is a California Energy Commission- (CEC) funded program that provides technical assistance and resources to help ensure that the San Diego region can accommodate the growing demand for electric vehicles and to help the state achieve its aggressive greenhouse gas emissions reduction goals. This report summarizes the current PISD Program efforts and highlights the San Diego Regional Electric Vehicle Charging Station (EVCS) Needs Assessment (Needs Assessment), one of the primary program deliverables.

**Background**

On January 24, 2014, the Board of Directors accepted the San Diego Regional Plug-in Electric Vehicle Readiness Plan as a guide for use by local governments, public agencies, and others, to support plug-in electric vehicle adoption and EVCS deployment throughout the region. In July 2015, SANDAG and the Center for Sustainable Energy (CSE) launched PISD to implement recommendations from the San Diego Regional Plug-in Electric Vehicle Readiness Plan through a combination of resource development, training, technical assistance, and outreach. In July 2017, SANDAG and CSE kicked off Phase II of the PISD Program to continue and expand upon the PISD Program offerings through June 2019.

**Plug-in SD Phase II**

PISD II continues to provide outreach and support through the CSE-supported Electric Vehicle Expert. The Electric Vehicle Expert provides no-cost general and technical assistance for local governments, employers, multifamily property managers/owners, and other stakeholders interested in electric vehicles and EVCS (Attachment 1). Through June 2018, the Electric Vehicle Expert has provided direct support to over 65 inquiries, eight of which were public agencies. Electric Vehicle Expert inquiries vary widely and the Electric Vehicle Expert can help provide individualized assistance to all of them. In addition to the Electric Vehicle Expert, PISD provides electric vehicle resources and EVCS information through outreach and education in the community and to stakeholders. More information about PISD and the Electric Vehicle Expert is available on the program website: energycenter.org/pluginsd.

**Regional Needs Assessment**

In addition to the Electric Vehicle Expert, PISD is developing a Needs Assessment, which will be deployed as an interactive web-based mapping tool to help inform decision makers about current
and future EVCS needs in the San Diego region. The Needs Assessment will include regional mapping of current EVCS infrastructure and identify EVCS needs based on regional travel patterns and gaps in the existing network. Additional considerations for inclusion in the Needs Assessment are disadvantaged communities and equitable distribution of infrastructure. To forecast future EVCS needs throughout the San Diego region, estimated regional electric vehicle sale totals coinciding with state goals also will be included in the Needs Assessment. This will help inform future EVCS incentive programs and capital projects.

**Next Steps**

A final draft of the Needs Assessment mapping tool and associated methodology report will be provided to the CEC in September 2018 for review and comment. SANDAG staff will provide a demonstration of the mapping tool at the November 2018 EWG meeting.

**Attachment 1: Electric Vehicle Expert Fact Sheet**

Key Staff Contacts: Jeff Hoyos, (619) 699-1932, jeff.hoyos@sandag.org
Anna Lowe, (619) 595-5603, anna.lowe@sandag.org
Electric vehicles (EVs) continue to grow in popularity in the San Diego region and are expected to rise with California’s goal of 1.5 million zero-emission vehicles on the road by 2025. With an increase in EVs comes a greater demand for electric vehicle charging stations (EVCS).

Plug-in San Diego (Plug-in SD) was established through a partnership between the San Diego Association of Governments (SANDAG) and the Center for Sustainable Energy (CSE) to help support this growth. Plug-in SD provides no-cost support to local stakeholders interested in general and technical information on EVs and EVCS through the EV Expert. The EV Expert is here to help ensure the San Diego region is EV ready.

Services for Target Audiences

<table>
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<tr>
<th>Local Governments</th>
<th>Employers</th>
<th>Multifamily Property</th>
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<tr>
<td>• Permitting and Inspection Best Practices</td>
<td>• Workplace Charging Workshops: “PEV 101”</td>
<td>• EVCS Siting Assistance</td>
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<td>• Assistance with Regional EV Readiness Planning</td>
<td>• Incentives and Policies</td>
<td>• Connection Costs and Fee Information</td>
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<td>• Public-access Charging Solutions</td>
<td>• Cost-recovery Information and Usage Policies</td>
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No-Cost Technical Assistance

Contact the EV Expert for a no-cost EV and EVCS consultation via evexpert@energycenter.org or by calling (866) 967-5816. Learn more about Plug-in SD and EV/EVCS readiness at energycenter.org/pluginsd.

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<th>Status</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB 813</td>
<td>Holden D</td>
<td>Multistate regional transmission system organization: membership.</td>
<td>6/27/2018-From committee: Do pass and re-refer to Committee on Appropriations (Ayes 4. Noes 2.) (June 26)</td>
<td>Would prohibit a California electrical transmission facility owner, a retail seller of electricity, or a local publicly owned electric utility from joining a multistate regional transmission system organization, as defined, unless the bylaws or other organizational documents that govern the organization, and the organization’s operations, meet Federal Energy Regulatory Commission requirements and other specified requirements. The bill would require a California transmission owner, retail seller, or local publicly owned electric utility, before joining a multistate regional transmission system organization, to submit the bylaws and other organizational documents that govern the multistate regional transmission system organization to the State Energy Resources Conservation and Development Commission for review.</td>
</tr>
<tr>
<td>AB 2061</td>
<td>Frazier D</td>
<td>Near-zero-emission and zero-emission vehicles.</td>
<td>7/5/2018-Read second time and amended. Re-referred to Committee on Appropriations</td>
<td>Current law sets specified limits on the total gross weight imposed on the highway by a vehicle with any group of two or more consecutive axles. This bill would authorize a near-zero-emission vehicle or a zero-emission vehicle, as defined, to exceed axle, tandem, gross, or bridge formula weight limits, up to a 2,000 pound maximum, by an amount equal to the difference between the weight of the vehicle attributable to the fueling and propulsion system carried by that vehicle and the weight of a comparable diesel fueling and propulsion system.</td>
</tr>
<tr>
<td>AB 2127</td>
<td>Ting D</td>
<td>Electric vehicle infrastructure: assessment and roadmap.</td>
<td>6/21/2018- Re-referred to Committee on Appropriations</td>
<td>Would require the Energy Commission, in consultation with the State Air Resources Board and the Public Utilities Commission, to create a statewide assessment of electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption needed for the state to reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030. The bill would require the Energy Commission to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure.</td>
</tr>
<tr>
<td>AB 2885</td>
<td>Rodriguez D</td>
<td>Air Quality Improvement Program: Clean Vehicle Rebate Project.</td>
<td>6/27/2018- Re-referred to Committee on Appropriations</td>
<td>Beginning January 1, 2019, would require the State Air Resources Board, for purposes of the Clean Vehicle Rebate Project, to provide outreach to low-income households and low-income communities to increase consumer awareness of the rebate project and to prioritize rebate payments to both low-income applicants and applicants that have eligible vehicles registered in low-income communities.</td>
</tr>
<tr>
<td>SB 100</td>
<td>De León D</td>
<td>California Renewables Portfolio Standard Program: emissions of greenhouse gases.</td>
<td>7/5/2018-From committee: Do pass as amended. (Ayes 10. Noes 5.) (July 3)</td>
<td>The Legislature has found and declared that its intent in implementing the California Renewables Portfolio Standard Program requires the Public Utilities Commission is to attain, among other targets for sale of eligible renewable resources, the target of 50 percent of total retail sales of electricity by December 31, 2030. This bill would revise the above-described legislative findings and declarations to the state that the goal of the program is to achieve that 50 percent renewable resources target by December 31, 2026, and to achieve a 60 percent target by December 31, 2030.</td>
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<tr>
<td>Bill</td>
<td>Description</td>
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</table>
| SB 700 | (Wiener D) Energy Storage Initiative.  
Status: 6/26/2018-Read second time and amended. Re-referred to Committee on Appropriations  
Summary: In response to a requirement to adopt initiatives, on or before March 7, 2001, to reduce demand for electricity and reduce load during peak demand periods, including differential incentives for renewable or super clean distributed generation resources, the Public Utilities Commission adopted decisions establishing a Self-Generation Incentive Program. This bill would extend the collection for the Self-Generation Incentive Program to December 31, 2024, and the administration of the program to January 1, 2026. The bill would require the Public Utilities Commission, on or before July 1, 2020, to update the factor for avoided emissions of greenhouse gases. |
| SB 1000 | (Lara D) Transportation electrification: electric vehicle charging infrastructure.  
Status: 7/5/2018-From committee with author’s amendments. Read second time and amended. Re-referred to Committee on Appropriations  
Summary: Would require the Energy Commission, in consultation with the State Air Resources Board, to develop minimum labeling standards for publicly accessible electric vehicle charging stations, to develop a cost-per-vehicle-mile-driven price metric for charging stations, to be known as the e-gallon rating, to develop, and biennially reassess, minimum charging speed standards for direct current fast charging stations and for electric vehicle batteries, to assess whether charging station infrastructure is disproportionately deployed, as specified, and, upon finding disproportionate deployment, to use state moneys to more proportionately deploy new charging station infrastructure. |
| SB 1014 | (Skinner D) Zero-emission vehicles.  
Status: 7/5/2018-From committee with author’s amendments. Re-referred to Committee on Appropriations  
Summary: Would require, by January 1, 2020, that the State Air Resources Board establish a baseline for emissions of greenhouse gases for vehicles used on the online-enabled applications or platforms by transportation network companies on a per-passenger-mile basis. The bill would require, by January 1, 2021, that the state board establish, and the commission implement, annual targets and goals starting in 2023 for the reduction under that baseline for emissions of greenhouse gases per passenger mile driven on behalf of a transportation network company. The bill would require that the targets and goals meet specified requirements. This bill contains other related provisions. |
| SB 1072 | (Leyva D) Regional Climate Collaborative Program: technical assistance.  
Status: 7/2/2018-Read second time and amended. Re-referred to Committee on Appropriations  
Summary: Would, until October 1, 2029, establish a regional climate collaborative program, to be administered by the Strategic Growth Council, to assist under-resourced communities, as defined, in a region to access statewide public and other grant moneys, as specified, for climate mitigation and adaptation projects by establishing collaboratives, as specified. The bill would authorize the council to award specified grants to collaboratives for specified activities. |
| SB 1151 | (Bates R) Neighborhood electric vehicles: County of San Diego.  
Status: 6/26/2018-From committee: Do pass and re-refer to Committee on Appropriations (Ayes 12. Noes 0.) (June 25)  
Summary: Existing law authorizes, until January 1, 2022, the County of Orange to establish a specified neighborhood electric vehicle (NEV) transportation plan for the Ranch Plan Planned Community in that county the purpose of which is to further the community’s vision of creating a sustainable development that reduces gasoline demand and vehicle emissions by offering a cleaner, more economical means of local transportation within the plan area. This bill would, until January 1, 2029, authorize the County of San Diego or any city in the county to establish a similar NEV transportation plan, as specified. |
Electric Buses are Ready to Meet Today’s Needs

• Range
  • 56% of public transit agency routes in California are 150 miles or less.
  • Buses have nominal ranges of up to 350 miles / charge.
  • Do need to discount nominal to real range but even so, can meet the majority of bus routes today.

• Availability in many configurations – See CARB list of HVIP eligible vehicles in references.¹

• Gradeability
• Charging standards
Two key technical aspects of electric buses

• An electric bus drive train is five times more efficient than a diesel or CNG bus.
  • A key reason why emissions from electric buses on today’s grid are so low.

• Improvements in battery technology continues to lower costs and increase density; more range / dollar
  • Why this is important
    • Batteries are biggest reason for higher cost than combustion engine buses.
    • 77% reduction in cost from 2010 to 2016 and further reductions continuing
      • Proterra Example

A Plethora of Financial Support Programs

• Capital Costs for Buses and Charging Infrastructure
  • Hybrid and zero-emission truck and bus Voucher Incentive Project (HVIP)*
    • E.g. $150,000 per 40’ bus + additional $15,000 if operated in disadvantaged community (DAC).
    • $30,000 / charger
    • Has $188 million for awards this year.

• Transit and InterCity Rail Capital Program (TIRCP)(10% of GGRF)*
  • Recently awarded grants supporting 11 transit agencies to acquire 285 ZEBs
  • MTS was awarded $41 million for 11 60’ electric buses.
Financial Support Programs

- Low Carbon Transit Operations Program (LCTOP) (5% of GGRF)*
  - This month announced awards of $97 million to 130 projects
  - MTS was awarded $2.6 million towards purchase of 6 electric buses, two fuel cell buses and charging infrastructure.
- VW Mitigation Funds - $130 million for transit, school and airport shuttle buses
- Bus maker battery leases or full leases – e.g. BYD’s Generate Capital – initial commitment of $200 million

* Funded with Cap and Trade Greenhouse Gas Revenue Funds (GGRF). Current average rate of generated funds is $3 billion/yr.

Utility Financial Support to Build Charging Infrastructure

SDG&Es Proposal for Transportation Electrification of Heavy Duty Vehicles

- Request cost is $152 million and will cover
  - Electrical infrastructure upgrades to the depot meter
  - Installation of make-readies to the charger
  - Purchase, installation and maintenance of the chargers or option to be owned by customer.

Make-ready infrastructure

Utility T&D infrastructure  Utility meter, panel and conduit  Charger  Plug-in Electric Vehicle
Financial Support Programs

Operating expense support – Low Carbon Fuel Standard (LCFS)

- For a typical electric bus operating 40,000 miles/year in SD&E territory that is depot charged the cost of electricity will be about $15,120/year/bus. (About 50% higher than average in the state.)
- Under today’s LCFS program, a transit agency would receive a credit of about $10,000/year per bus assuming a market price of $100/credit.
- Under CARBs proposed update to this program, a transit agency would receive a credit increase of 30% for a total of $13,000 per year.
- Under CARBs proposed update, a transit agency using its own solar power could receive an increase of 30% for a total of $16,000 per year.
- At today’s actual market price of $133/credit (2018 YTD average) all the values above could be increased by 33%. There is no cap on the credit amount a Transit Agency may receive – i.e. it is not capped at the actual cost of the fuel.

Total Cost of Ownership (TCO) is Positive

- There are additional up front costs today,
  - Electric buses cost more than combustion engine buses (but the delta continues to decrease and could reach parity within 5 years.)
  - You have to install new charging electrical infrastructure.
- But maintenance costs are forecast to be 30% lower
  - Due to very few moving parts in the motor and decreased replacement of brakes.
  - With LCFS incentives and five times more drive train efficiency, fuel costs are lower.
- So total cost of ownership is positive.
- Cash flow needs are higher up front but is paid for with financial support programs.
Total Cost of Ownership is Positive

• California TCO Studies
  • “Exploring the Costs of Electrification for California’s Transit Agencies” UC Davis Institute of Transportation Studies (ITS) October, 2017\(^2\)
    • With HVIP and LCFS incentives, electric buses are equal to cost of operating conventional buses today. In the future, electric buses will be less expensive to acquire and operate.
    • Since this was published, the HVIP incentives were increased and other financial support programs have enhanced their level of support.
  • California Air Resources Board (CARB) study – 6/2017\(^3\)
    • With full transition of all transit buses to ZEBs by 2040, the combined cost to all transit agencies would save 2.6% or $580 million vs a business as usual case.
    • This study would show improved savings if updated to include HVIP incentives, reduce charging costs now paid for by utilities and considering other financial support programs.

Total Cost of Ownership is Positive

• National TCO studies
  • “Electric Buses in Cities” - Bloomberg New Energy Finance, March 29, 2018\(^4\)
  • “Electric Buses - Clean Transportation for Healthier Neighborhoods and Cleaner Air” – Frontier Group, CALPIRG Education Fund and Environment California, May 2018\(^5\)
    • If you add in California’s extraordinary incentives, it makes a strong case for moving forward here now.
  • Once established, California transit agencies can expect to save money which can be applied to increased service and/or reduced fares.
California ZEB Adoption is Large and Growing

Transit Agencies With 100% ZEB Commitments

California Transit Agencies with 100% ZEB Commitments

<table>
<thead>
<tr>
<th>Transit Agency</th>
<th>Total Buses</th>
<th>Year of 100% Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles Metropolitan County Transportation Authority (LA Metro)</td>
<td>2,452</td>
<td>2030</td>
</tr>
<tr>
<td>San Francisco Municipal Transportation Agency (SFMTA)</td>
<td>620</td>
<td>2035</td>
</tr>
<tr>
<td>Santa Clara Valley Transportation Authority (VTA)</td>
<td>485</td>
<td>2033</td>
</tr>
<tr>
<td>Foothill Transit</td>
<td>373</td>
<td>2030</td>
</tr>
<tr>
<td>San Mateo County Transit District (SamTrans)</td>
<td>369</td>
<td>2033</td>
</tr>
<tr>
<td>Los Angeles Department of Transportation (LA DOT)</td>
<td>357</td>
<td>2030</td>
</tr>
<tr>
<td>Santa Monica Big Blue Bus (BBB)</td>
<td>200</td>
<td>2030</td>
</tr>
<tr>
<td>San Joaquin Regional Transit District (RTD)</td>
<td>111</td>
<td>2025</td>
</tr>
<tr>
<td>Santa Cruz Metropolitan Transit Districts</td>
<td>98</td>
<td>2040</td>
</tr>
<tr>
<td>Anaheim Resort Transportation</td>
<td>82</td>
<td>2020</td>
</tr>
<tr>
<td>Antelope Valley Transit Authority (ATVA)</td>
<td>77</td>
<td>2018</td>
</tr>
<tr>
<td>Porterville Transit</td>
<td>20</td>
<td>2025</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,244</strong></td>
<td></td>
</tr>
</tbody>
</table>
CARB Innovative Clean Transit (ICT) Rule

- Would require all transit agencies to transition to 100% ZEBs by 2040.
- Beginning in 2023 an increasing percentage of buses that come up for replacement must be replaced with ZEBs.
- Expected to be on September CARB Board agenda for consideration.
- Will be in the best interest of transit agencies to begin replacing all buses with ZEBs as they come up for replacement to take maximum advantage of available financial incentives.

Benefits of ZEBS

- Reduce health harming pollutants
- Mitigate climate change
- Improve the California Economy
  - California is the electric bus making capital of North America.
  - Jobs produced in bus manufacturing, infrastructure manufacturing and installation, solar installation and electric bus “eco-system” products and services.
- Passengers and drivers love to ride / drive in them – quiet, pollution free and little vibration.
- Transit agency buses can pioneer electric transportation broadly in the heavy-duty sector.
Electric Bus Deployment is Ready For Prime Time Commercial Use in California Today

- Operationally ready to meet today’s needs
- A plethora of financial support programs are available
- Total cost of ownership is positive
- Adoption by CA transit agencies is large and growing
- The California Air Resources Board (CARB) will consider a rule this September
- Benefits of ZEBs are considerable
- Now is the time for 100% ZEBs!

Questions?

- Contact information
  Ray Pingle
  Sierra Club California
  Co-lead CARB ZEB Rulemaking Project
  Ray_Pingle@msn.com
  (530) 677-4513
References

1. Listing of CARB approved HVIP eligible clean vehicles https://www.californiahvip.org/eligible-technologies/#your-clean-vehicles

2. “Exploring the Costs of Electrification for California’s Transit Agencies” UC Davis Institute of Transportation Studies,[Hanjir Ambrose, et al. Reference Number: UCD-ITS-RR-17-16. (Go to https://its.ucdavis.edu/research/publications/ and enter the title above in the search area to find this publication.).

3. CARB ICT Workshop presentation including TCO study results 6/26/17 https://arb.ca.gov/msprog/ict/meeting/mt170626/170626_wg_pres.pdf


6. CARB California Map and Table of California Transit Agency ZEB Adoption https://arb.ca.gov/msprog/ict/faqs/zbusmap.pdf
Zero Emission Buses

SANDAG Energy Working Group Meeting
July 26th, 2018

MTS Overview

MTS provides transit for San Diego and surrounding cities, rural parts of the County, and to the international border – 3,240 total square miles

- Bus, Light Rail, Paratransit, Taxicab
- Bus: nearly 100 bus routes, 630 fixed route buses
- Light rail: the Trolley - over 130 cars, 50 + miles
- 300,000 passengers daily, 88 million annually
- Bus remains a transit workhorse in San Diego
  - More than half of transit trips are on the bus
  - Local bus system feeds the light rail network
  - Added three new Bus Rapid Transit routes in last three years, adding fourth in January, 2019
Emission Reduction Efforts

Near Zero Emissions: Bus
- One of first transit systems to commit to CNG (early 2000’s)
  - 100% RNG Fleet and a commitment to Low NOx engines
- Commitment to 100% propane for Mini-bus and Paratransit Fleets (200+ buses)
  - 26,500 lbs per bus annual GHG reductions

Zero Emissions: Trolley
- 40 - 45% of MTS ridership already on ZEV’s
- Increasing service on Blue Line
- Building an additional 11 miles to UCSD campus

CARB Proposed Innovative Clean Transit Rule

- Zero emissions buses
- 100% electric by 2040
- Transition path, benchmarks and how do we get there from here?
- Funding
- Implementation dates
ZEB Challenges for Transit and MTS: Bus Costs

• **Standard forty ft. bus (MTS equipped, not including tax):**
  - Gillig CNG $500,000 (current MTS contract)
  - New Flyer battery electric $830,000 (current MTs contract)
  - Proterra battery electric $840,000 (current Washington state contract)
  - BYD battery electric $850,000 (current Washington state contract)
  - Fuel Cell Electric $1,200,000

• **Articulated sixty ft. bus (MTS equipped, not including tax):**
  - New Flyer CNG $850,000 (current MTS contract)
  - BYD battery electric $1,240,000 (recent price quote)

**Total increased, incremental cost to replace the current MTS 600 bus fleet:**

- 1-to-1 replacement ratio $198 million ($106 million if 100% HVIP)
- 1.25-to-1 replacement ratio $330 million ($215 million if 100% HVIP)

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ZEB Challenges for Transit and MTS: Range

**Daily operating range capability:**

• CNG 300 Miles
• Battery Electric 150-200 Miles
• Fuel Cell 300 Miles

• 50% of MTS buses exceed 150 miles per day

• May require more buses to operate the same service level (+ 25%)
**ZEB Challenges for Transit and MTS: Fuel**

**Electricity is more expensive than CNG:**

- **Cost per mile (CTA’s E3 report)**
  - CNG $0.18 (MTS is actually lower than this state average)
  - Electricity $0.54

- **IF MTS was currently a 100% electric bus fleet:**
  - $8 - 10 million dollars annual additional operating costs
  - MTS daily electricity usage is equivalent to 6,000 households

**ZEB Challenges for Transit and MTS: Fuel**

- SDG&E’s electricity rates are much higher than rates found in other areas of California
  - Proposed rate increase of 28% over next four years

- Impact of peak charges, demand charges and time of use charges?

- Need change in utility pricing policies and rate setting, to move electricity costs closer to CNG costs
  - waiver from time of use charges, demand charge exclusion, development of demand management system

- Impact of state-wide FLEX Alerts?
ZEB Challenges for Transit and MTS: Infrastructure and Full Deployment

• Current depot charging will reduce bus parking capacity (bumper to bumper, side to side is used at all four MTS facilities)
  – Antelope Valley, first system all electric – 80 buses, 15 acres
  – MTS Imperial Avenue Division, CNG – 174 buses, 8 acres

• Cost/availability of additional land for charging facilities in dense urban areas

• Shorter daily operating range (150 miles vs. 300 miles for CNG bus) may result in more buses needed for same service level (plus 25%)

• ROM estimate, 100% Electric Bus Fleet = $34 million
  – Four facilities
  – depot charging

• Large urban facility with 100% depot charging capability has not been developed or implemented
MTS ZEB Pilot Program

- October 2017: Board approved recommendation for $10 million ZEB pilot program
- March 2018: Board approved Center for Transportation and the Environment (CTE) for on-going consulting services
- May 2018: Six New Flyer battery electric buses purchased
- June 2018 - June 2019: ZEB pilot program and infrastructure development
- Summer 2019: Battery electric buses begin delivery
- Fall 2019 - 2021: ZEB pilot program operation
- 2020 - 2021: Roadmap/Transition to full deployment plans developed

Key components to be evaluated:

- Costs
  - Life cycle
  - Initial capital and construction
  - Operating costs including fuel and maintenance
  - Major component replacement requirements (such as, batteries)

- Operational Characteristics, Range and Fuel Efficiency
  - Depot charging performance
  - Climate
  - Battery capacity and degradation over bus life
  - Passenger loads
  - Operator Performance
  - Route Profiles

- Training needs for employees
- Infrastructure for facilities and charging systems
- How to scale up an electric fleet, from pilot to 100% deployment
MTS ZEB Pilot Program

Pilot Program Phase 1 – Current Status, Buses and Infrastructure:

• Purchase of six New Flyer buses
• Buses available summer 2019
• Extended range, depot charge 150 - 200 miles (480kw on board)
• $830,000 per bus (price excludes tax and HVIP of $150,000 per bus)
• Commonwealth of Virginia - state contract for battery electric buses that allows other, non-Virginia transit agencies to purchase buses (fast track process for MTS)
• Option for up to nine depot chargers (equip all four facilities)
• Evaluate both fixed route assignments and rotation plan throughout the system

Pilot Program Phase 1 Continued:

• Develop roadmap to potential transition/full deployment
  – ICT compliance
  – Target dates, system implementation plan
  – Costs
• Analyze and report data, performance and operating characteristics

Pilot Program Phase 2 (2020 – 2021):

• Potentially purchase additional ZEB’s
  – 1 - 2 BEB’s – Gillig’s
  – 1 - 2 Fuel Cell Buses (infrastructure issues)
Questions/Comments?
Plug-in San Diego Phase II

Regional Energy Working Group | July 26, 2018

SANDAG EV Efforts

- Regional AFs, Vehicles, and Infrastructure Report
- The EV Project Launches
- PEV Readiness Planning
- AF Readiness Planning
- EV Charging Program Development
- PEV Readiness Plan with EV Expert
- AF Readiness Plan with EV Expert
- SANDAG RTP and SCS
- EV Charging Program Development

Timeline:

2009: Regional AFs, Vehicles, and Infrastructure Report
2010: The EV Project Launches
2011: PEV Readiness Planning
2012: AF Readiness Planning
2013: PEV Readiness Plan with EV Expert
2014: AF Readiness Plan with EV Expert
2015: SANDAG RTP and SCS
2016: EV Charging Program Development
2017: 2018: 2019+
PISD Resources

- **Phase I: AB 1236 Compliance Resources**
  - Best Practices Report
  - Permit and inspection correction sheets
  - Installation checklists
  - Workshops and training
- **Phase I & II**
  - EV Expert (continuation)
  - Fact Sheets (updated)
  - Outreach (continued)
  - Regional Needs Assessment

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**Services for Target Audiences**

<table>
<thead>
<tr>
<th>Local Governments</th>
<th>Employers</th>
<th>Multifamily Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Permitting and Inspection&lt;br&gt; • Best Practices&lt;br&gt; • Assistance with Regional EV Readiness Planning</td>
<td>• Workplace Charging&lt;br&gt; Workshops: “PEV 101”&lt;br&gt; • Incentives and Policies&lt;br&gt; • Public-access Charging Solutions</td>
<td>• EVCS Siting Assistance&lt;br&gt; • Connection Costs and Fee Information&lt;br&gt; • Cost-recovery Information and Usage Policies</td>
</tr>
</tbody>
</table>

**No-Cost Technical Assistance**

Contact the EV Expert for a no-cost EV and EVCS consultation via evexpert@energycenter.org or by calling (866) 967-5816. Learn more about Plug-in SD and EV/EVCS readiness at energycenter.org/pluginsd.
Examples of EV Expert Consultations

• Pricing structure for City Hall EV chargers
• EV chargers at gas stations
• Local bakery installing EV chargers for employees
• EV chargers at downtown high-rise condo with valet parking
• EV chargers at small North Park apartment building

EV Expert Statistics

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<td>Commercial</td>
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<tr>
<td>Single Family</td>
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<tr>
<td>Out Of Scope</td>
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<tr>
<td>Other</td>
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<th>Complexity of Inquiry</th>
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</table>

Need assistance or know someone who might? Call EV Expert at 866-967-5816 or email at evexpert@energycenter.org
EV Expert Inquiries

Education and Awareness

- Educate San Diego Region on the benefits of electric vehicles
- Promote EV Expert
- Presentations to/discussions with:
  - Community-based organizations
  - Community planning groups
  - Public agencies
  - HOA boards
  - Employers
PISD EVCS Regional Needs Assessment

- Existing EVCS
- Existing EV registrations
- EV owner characteristics
- Assign EV trip starts
- Assign EV trip ends
- ID EVCS near trip ends
- ID gaps in EVCS network

Assigning EV Home Locations
Assigning EV Trip Ends

Home TAZ

Work TAZ

EV Trip Ends & Charger Proximity

TAZ 2510
20 EV Trip Ends
22 Charger Spaces in 1/4 mi
Identifying Charger Opportunity Areas

Home TAZs above income threshold

Opportunity areas by Percentile

Disadvantaged Communities Assessment
Next Steps

- Continued methodology refinement
- Investment and Incentives Analysis
- Other considerations
  - Forecasting EV adoption rates and Governors Goals
- Deploy mapping tool as web application
- Inform SANDAG Regional Charging Incentive Program

Regional Charging Incentive Program

2015 Regional Plan Actions:

- Develop charger incentive program
- Bring program to Board prior to next Regional Plan
- Commit $30 million to program from 2020-2050

In doing so, SANDAG:

- Helps address regional infrastructure needs
- Helps achieve GHG reductions from passenger vehicles
Questions?

- Jeff Hoyos
  - jeff.hoyos@sandag.org
  - (619) 699-1932
- Anna Lowe
  - anna.lowe@sandag.org
  - (619) 595-5603
- Kevin Wood
  - Kevin.Wood@energycenter.org
  - (858) 244-7295
- EV Expert
  - evexpert@energycenter.org
  - (866) 967-5816
- Susan Freedman – Regional Charging Program
  - susan.freedman@sandag.org
  - (619) 699-7387