

**Comment 1 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Francesca  
Last Name: Wahl  
Email Address: fwahl@tesla.com  
Affiliation:

Subject: ZEP Cert Comments  
Comment:

Please find attached Tesla's comments on the draft regulatory language for ZEP Cert released on Dec. 31, 2018.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/1-zepcert2019-UiZUN1UnVWoDZFQL.pdf'

Original File Name: Tesla Comments ZEP Certification 02152019 .pdf

Date and Time Comment Was Submitted: 2019-02-15 18:09:32

No Duplicates.

**Comment 2 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Kent

Last Name: Leacock

Email Address: KLeacock@Proterra.com

Affiliation:

Subject: Proterra Comments on Zero-Emission Powertrain Certification Regulation  
Comment:

See attached letter.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/2-zepcert2019-UTdVOIQ7ADIEblAP.pdf'

Original File Name: Final Zero-Emission Powertrain Cert Letter.pdf

Date and Time Comment Was Submitted: 2019-02-19 10:01:52

No Duplicates.

**Comment 3 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Stephen

Last Name: Trichka

Email Address: stephen.trichka@baesystems.com

Affiliation:

Subject: Zero-Emission Powertrain Certification

Comment:

Please see attached file.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/3-zepcert2019-AmNQJAZlAg5QLAls.pdf'

Original File Name: ARB Zero Emission Drivetrain reg comment letter.pdf

Date and Time Comment Was Submitted: 2019-02-19 10:53:55

No Duplicates.

**Comment 4 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Timothy  
Last Name: Blubaugh  
Email Address: [tblubaugh@emamail.org](mailto:tblubaugh@emamail.org)  
Affiliation: Truck and Engine Manufacturers Associati

Subject: EMA Comments on ZEP Certification Rule (zepcert2019)  
Comment:

The Truck and Engine Manufacturers Association hereby submits its comments on the Proposed Zero-Emission Powertrain Certification Regulation and the Proposed Zero-Emission Airport Shuttle Regulation that the California Air Resources Board will consider for adoption at a public hearing scheduled for February 21, 2019

Attachment: '<https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/4-zepcert2019-Wz5VPgBgBwsDf1cy.pdf>'

Original File Name: EMA ZEP Certification Comments - Final.pdf

Date and Time Comment Was Submitted: 2019-02-19 15:05:32

No Duplicates.

**Comment 5 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Eddie

Last Name: Ahn

Email Address: eddie@brightlinedefense.org

Affiliation: Brightline Defense

Subject: Comments of Brightline Defense

Comment:

Hi, please see attached for our comments on this regulation.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/5-zepcert2019-VjRQJANrUmZRP1Im.pdf'

Original File Name: Brightline-comments-ProposedAltCertRequirements-AirportShuttleRegulation.pdf

Date and Time Comment Was Submitted: 2019-02-19 15:06:04

No Duplicates.

**Comment 6 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Hannah

Last Name: Goldsmith

Email Address: hannah@caletc.com

Affiliation: CalETC (on behalf of Coalition)

Subject: Coalition Comments on ZEP Cert. Proceeding

Comment:

Attached, please find comments on the proposed ZEP Cert. rulemaking from a coalition of organizations. Thank you.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/6-zepcert2019-UTJUPVExBzhXOFIm.pdf'

Original File Name: Coalition ZEP Cert Letter vF.pdf

Date and Time Comment Was Submitted: 2019-02-19 15:57:14

No Duplicates.

**Comment 7 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Hannah

Last Name: Goldsmith

Email Address: hannah@caletc.com

Affiliation: CalETC (on behalf of Joint Parties)

Subject: Joint Parties Feedback on ZEP Cert. Rulemaking  
Comment:

Please find our comments attached. Thank you.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/7-zepcert2019-B21WP1M7WWQBcwNc.pdf'

Original File Name: Joint Party ZEP Cert Comments vF.pdf

Date and Time Comment Was Submitted: 2019-02-19 16:48:51

No Duplicates.

**Comment 8 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 45 Day.**

First Name: Urvi

Last Name: Nagrani

Email Address: urvi@motivinc.com

Affiliation: Motiv Power Systems

Subject: Comments to ZEP Rule and ZEAS Rule

Comment:

Please see attached.

Attachment: 'https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/8-zepcert2019-UD1cNQB1V20Le1N9.pdf'

Original File Name: Motiv.pdf

Date and Time Comment Was Submitted: 2019-02-20 11:53:19

No Duplicates.



**Comment 1 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019). (At Hearing)**

First Name: Lisa

Last Name: McGhee

Email Address: Non-web submitted comment

Affiliation: San Diego Airport Authority

Subject: Comments of San Diego Airport Parking Company

Comment:

Please see attached.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/9-zepcert2019-WzYBZFE3Vm1RMgdi.pdf>

Original File Name: McGhee Zepcert.pdf

Date and Time Comment Was Submitted: 2019-02-22 11:36:02

No Duplicates.

**Comment 2 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019). (At Hearing)**

First Name: Douglas

Last Name: Kerste

Email Address: Non-web submitted comment

Affiliation: Commercial Fleet Industries

Subject: Comments on the Zero Emission Power Train Certification Regulation

Comment:

Please see attached.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/19-zepcert2019-Vj1VNl0uBSUGdANm.pdf>

Original File Name: Kerste.pdf

Date and Time Comment Was Submitted: 2019-06-28 08:28:13

No Duplicates.

### **Comment 3 for Zero-Emission Powertrain Certification Regulation (zepcert2019). (At Hearing)**

First Name: Lisa

Last Name: McGhee

Email Address: Non-web submitted comment

Affiliation: San Diego Airport Parking Company

Subject: Comments of SDAP on Proposed Regulation of Zero-Emission Powertrain Certification  
Comment:

Please see attached.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/20-zepcert2019-AG1TNIQyWGMFZgdi.pdf>

Original File Name: McGhee.pdf

Date and Time Comment Was Submitted: 2019-06-28 08:30:32

No Duplicates.

## **Comment 1 for Zero-Emission Powertrain Certification Regulation (zepcert2019) - 15-1.**

First Name: Abas

Last Name: Goodarzi

Email Address: abas@ushybrid.com

Affiliation: US Hybrid

Subject: US Hybrid Comments on Cal Standards and test procedure HD Zero Emission Powertrain

Comment:

US Hybrid is pleased to provide the following recommendation/comments on the proposed ZEV certification. The California standards and test procedures for new 2021 and subsequent model heavy-duty zero-emission powertrains requires better-quantified definitions in support of test procedures, so the consumer, powertrain technology provider, OEM, and the dealer have uniform understanding of the ratings.

Following is the recommendation to be included in the test procedures for the zero emission MD/HD vehicles:

Table 1. Fuel Cell Engine Energy Efficiency Determination.

Item Definition Requirements

1 FC Rated Power The FC engine must provide the manufacturer specified rated power and energy efficiency for at least 1 hour as continuous power at the vehicle or equivalent test configuration with an ambient temperature of  $>35^{\circ}\text{C}$  and specified rated cooling system ( $>60^{\circ}\text{C}$ ). Rated power is to be provided at rated voltage and the power rating at the end of 1 hour, and the test must meet the manufacturer specified name plate. This is the Beginning-Of-Life (BOL) test power rating.

2 FC Maximum Power The FC engine must provide the manufacturer specified max power for at least 5 minutes (after being subjected to 15 minutes of continuous rated power) at the vehicle, or equivalent test configuration with ambient temperature of  $>35^{\circ}\text{C}$  and specified rated cooling system ( $>60^{\circ}\text{C}$ ).

3 FC End-of-Life FC engine manufacturer must specify the End-of-Life (EOL) definition for the fuel cell engine as % of rated power and maximum power at the end of 1 hour of testing/operation for continuous power and 5 minutes for max power. Typically 70%.

4 FC Run Decay FC engine manufacturer must specify the End-of-Day (EOD) power rating decay based on 8 hours of operation.

5 FC Engine Rated Energy Efficiency FC engine manufacturer must specify the FC engine energy efficiency kWhr/kg-H<sub>2</sub>, NET after the FC engine with all BOP included and NET after the dc-dc converter output to the vehicle HV system, at the end of 1 hour of operation at rated power and end of the 5 minute operation at the maximum power.

6 FC Engine Energy Efficiency Map FC engine manufacturer must provide the FC engine energy efficiency over the FC engine operation from 10% to 100% of power rating at rated voltage (kWhr/kg-H<sub>2</sub> NET) after the FC engine with all BOP included and kWhr/kg-H<sub>2</sub> NET after the dc-dc converter output to the vehicle HV system. FC engine shall operate for  $>30$  minutes at rated power before reducing power at 10% step and taking energy efficiency

measurement at the end of this test to measure energy efficiency after 2 minutes of operation with the maximum power.

Table 2. Energy Storage System Rated and Peak Power Testing.

Item Definition Requirements

1 Battery Energy Storage Rated Power The battery energy storage system must provide the rated power for at least 1 hour as continuous power at the vehicle or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

2 Battery Energy Storage Max Power The battery energy storage system must provide the manufacturer specified max power for at least 5 minutes (after being subjected to 15 minutes of continuous rated power) at the vehicle or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

3 Battery Energy Storage End-of-Life Battery system manufacturer must specify the End-of-Life (EOL) definition for the battery as % of rated power and energy at the end of 1 hour of testing/operation for continuous power as well as after 5 minutes at maximum power at EOL.

4 Battery System Energy Efficiency Map Battery manufacturer must provide the battery system round trip energy efficiency over the FC engine operation from 10% to 100% of power rating.

Table 3. Powertrain System Rated and Peak Power Testing.

Item Definition Requirements

1 Powertrain Rated Power Powertrain system must provide the rated power for at least 1 hour as continuous power at the vehicle or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

2 Powertrain Max Power Powertrain system must provide the manufacturer specified max power for at least 5 minutes (after being subjected to 15 minutes of continuous rated power) at the vehicle, or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

3 Powertrain Energy-Eff Map Powertrain manufacturer must provide the powertrain system energy efficiency over the operation from 10% to 100% of power rating at 25%, 50%, 75% and max speed.

Table 4. Charger System Rated and Peak Power Testing.

Item Definition Requirements

1 Charger Rated Power Charger system must provide the rated power for at least 1 hour as continuous power at the vehicle or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

2 Charger Max Power Charger system must provide the manufacturer specified max power for at least 30 minutes (after being subjected to 15 minutes of continuous rated power) at the vehicle, or equivalent test configuration with ambient temperature of >35C and specified rated cooling system (>60C).

3 Charger Energy Efficiency Map Charger manufacturer must provide the charger system energy efficiency (AC-in/DC-out to battery) over the operation at 10%, 25%, 50%, 75% and 100% of max power rating at base voltage +/-20%.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/10-zepcert2019-USQGcwFfUWoEewBi.pdf>

Original File Name: US Hybrid comments on ARB ZEV certification.pdf

Date and Time Comment Was Submitted: 2019-05-28 14:45:15

No Duplicates.

**Comment 2 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

First Name: Lisa

Last Name: McGhee

Email Address: lisamcghee@aol.com

Affiliation: San Diego Airport Parking Company

Subject: Appendix H Econcomic Anaylsis (document added to record)

Comment:

See Attached.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/11-zepcert2019-Wz5TOFc3BT9WPFcI.zip>

Original File Name: Email San Diego Airport Parking Company 5-27-19.zip

Date and Time Comment Was Submitted: 2019-05-28 14:52:54

No Duplicates.

**Comment 3 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

First Name: Hannah  
Last Name: Goldsmith  
Email Address: hannah@caletc.com  
Affiliation: CalETC

Subject: CalETC Comments ZEP Cert. 15-Day Proposed Reg. Amends.  
Comment:

Please find CalETC's comments attached. Thank you.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/12-zepcert2019-VTZXMABtWW9WJAJh.pdf>

Original File Name: CalETC Comments Re ZEP Cert. Proposed Regs 15-Day vF 5-28-19.pdf

Date and Time Comment Was Submitted: 2019-05-28 15:10:31

No Duplicates.



**Comment 4 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

First Name: Jason

Last Name: Dake

Email Address: JasonD@OrangeEV.com

Affiliation:

Subject: Comments to Proposed Alternative Certification Requirements and Test Procedures for Heavy

Comment:

Enclosed, please find Orange EV's comments to the proposed rules for Alternative Certification Requirements and Test Procedures for Heavy-Duty Electric and Fuel-Cell Vehicles and Proposed Standards and Test Procedures for Zero-Emission Powertrains (Zero-Emission Powertrain Certification Regulation).

Thank you

Jason Dake

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/13-zepcert2019-WzgHYFQnWGIVDAR2.docx>

Original File Name: Carb Rule Comment Final .docx

Date and Time Comment Was Submitted: 2019-05-28 15:22:00

No Duplicates.

**Comment 5 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

First Name: Dan  
Last Name: Chia  
Email Address: dchia@tesla.com  
Affiliation:

Subject: Tesla Comments ZepCERT  
Comment:

Please find Tesla's comments attached.

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/14-zepcert2019-Wy9SMQNxVmlRNIUK.pdf>

Original File Name: Tesla Comments ZEP Certification\_Final 05282019.pdf

Date and Time Comment Was Submitted: 2019-05-28 15:39:54

No Duplicates.

**Comment 6 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

This comment was posted then deleted because it was unrelated to the Board item or it was a duplicate.

## **Comment 7 for Zero-Emission Powertrain Certification Regulation (zepcert2019) - 15-1.**

First Name: Al

Last Name: Cioffi

Email Address: acioffi@plugpower.com

Affiliation:

Subject: Zero Emission Power Trains

Comment:

I would like to express my support for the revisions made to the proposed Standard and Test procedures. In particular I would like to point to the distinction of requirements applied to motive batteries of BEV's but are excluded from the power assist battery equipped in FCEV, except where that FCEV also has off-board charging capability. These are very astute observations and perfectly applicable to this Standard.

As a matter of language editing, I would point out that several sentences and sub-sections still start off by stating "for Battery Electric Vehicles" even though the words that follow are equally applicable to both BEV and FCEV.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2019-05-28 20:38:00

No Duplicates.

**Comment 8 for Zero-Emission Powertrain Certification Regulation  
(zepcert2019) - 15-1.**

First Name: lisa

Last Name: mcghee

Email Address: lisamcghee@aol.com

Affiliation: San Diego Airport Parking Company

Subject: 15 Day Comment on ZEV Certification

Comment:

See attached

Attachment: <https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/17-zepcert2019-W2lRelNgWDoDKFdm.pdf>

Original File Name: 2-21-19, 15-day comments by SDAP.pdf

Date and Time Comment Was Submitted: 2019-05-28 23:52:45

No Duplicates.