



Coalition For A Safe Environment

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July 30, 2024

Governing Board
South Coast AQMD
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Re: PR 2306
PR 316.2
Su: Public Comment Submittal - Agenda # 26

Dear Governing Board:

The Coalition For A Safe Environment (CFASE) submits our public comments in support of PR 2306 and PR 316.2 with supporting Zero Emissions Rail Yard Technologies Information and with some requested changes.

I have attached the following documents in support of PR2306:

1. ZET Electric Locomotive - Train Descriptions
2. Electric Battery Locomotives
3. Electric Catenary Locomotives
4. Electric Fuel Cell Locomotives
5. Electric Maglev Freight Transportation Vehicle
6. Zero Emission Electric Freight Locomotive Manufacturers
7. ZET Electric Locomotive - Train Descriptions
8. CFASE Zero Emissions Technology Survey
9. CFASE NOX Physical and Mental Public Health Impacts
10. CFASE Railroad Industry Public Health Impact Bibliography Abstract (25 Citations)
11. CFASE Railroad Industry Public Health Impact Bibliography (114 Citations)

A. CFASE conducted a survey of available Zero Emission Locomotives and Switchers

CFASE conducted a survey of available Zero Emission Locomotives and Switchers and discovered that there are currently 14 manufacturers of Zero Emission Locomotives, Switchers and Freight Carrier Vehicles. These are divided into four Zero Emission Technology categories: Electric Battery, Overhead Wire Catenary, Hydrogen Fuel Cell Power and Magnetic Levitation (Maglev).

A. CFASE does not support the proposed 2050 end date

The new rule establishes NOX Emission Reduction Targets which will begin in 2027 and end in 2050. The Coalition For A Safe Environment (CFASE) is against the proposed 23 year-long implementation schedule and against any fossil fuel locomotive or switcher is requesting a compliance end date of 2040, because Zero Emissions Technology (ZET) exists today to replace over 95% of all locomotives, switchers, cargo handling equipment, drayage freight trucks, transportation refrigeration units and power.

B. CFASE opposes two proposed exemptions

CFASE opposes two exemptions included in the rule because they can be high air pollution sources close to Wilmington, San Pedro and West Long Beach:

- a. An Intermodal Rail Yard located on dock at a Marine Terminal within the Long Beach Harbor District or the Los Angeles Harbor District (Harbor Districts); or
- b. A Freight Rail Yard that is not an Intermodal Rail Yard and where the Freight Rail Yard Operations are solely for the purpose of moving Railcars to and/or from Marine Terminal(s) located within the Harbor Districts.

C. CFASE requests that all railyards be required to have fenceline air quality monitoring

Environmental Justice Communities have suffered for decades exposure to toxic air pollution and now is the time to require fenceline air quality monitoring like what is required for all Oil Refineries in the U.S.

The Coalition For A Safe Environment requests that you vote and approve PR2306 and PR 316.2

Respectfully,



Jesse N. Marquez
Executive Director

Coalition For A Safe Environment

Zero Emission Electric Freight Locomotive Manufacturers

7-30-2024

1. Alstom Transport

53 Rue Albert Dhalenne
93400 Saint-Ouen
France
+ 33 1 57 06 90 00

<https://www.alstom.com/>

Alstom Electric Freight Locomotives

- Traxx Hauler
- Traxx Universal
- Traxx Shunter

2. American Maglev Technology Inc.

8030 First Coast Hwy.
Amelia Island, FL 32034
404-386-4036

<https://american-maglev.com/>

AMTI Maglev Electric Freight Locomotive

- EMMI Freight Vehicle

3. Clayton Equipment Ltd.

Second Avenue, Centrum 100
Burton upon Trent
Staffordshire, DE14 2WF
England
+44 (0) 1283 524470

www.claytonequipment.co.uk

Clayton Electric Freight Locomotives

- Clayton Battery Shunter Switcher
- Clayton CB40 Battery Shunter
- Clayton CB80 Battery Shunter
- Clayton CBD90 Battery Shunter

4. Canadian Pacific Kansas City

7550 Ogden Dale Rd SE
Calgary, AB T2C 4X9
888-333-6370

www.cpkcr.com

CPKC Hydrogen Fuel Cell Electric Freight Locomotive

- CPKC Hydrogen Fuel Cell Locomotive

5. CRRG Zhuzhou Locomotive Co. LTD

No.16 West 4th—Ring Mid Road,
Haidian District, Beijing
100036
+86-10-51862188

https://www.crrgc.cc/en/73_5129/73_6628/73_6629/index.html

CRRG Electric Freight Locomotives

- CRRG - HXD1 Electric Locomotive
- CRRG - HXD1B Electric Locomotive
- CRRG - HXD1C Electric Locomotive
- CRRG - HXD1F Electric Locomotive
- CRRG - HXD2 Electric Locomotive
- CRRG - HXD2B Electric Locomotive
- CRRG - HXD2F Electric Locomotive
- CRRG - HXD2C Electric Locomotive
- CRRG - HXD3 Electric Locomotive
- CRRG - HXD3B Electric Locomotive

6. CSX Transportation

500 Water Street
Jacksonville, FL 32202
904-359-3100

<https://www.csx.com/>

CSX Hydrogen Electric Freight Locomotive

- CSX GP38H2 No. 2100 Hydrogen Fuel Cell Locomotive

7. GEN H2

5200 S. Washington Ave.
Titusville, FL 32780
530-309-1759

<https://genh2hydrogen.com/industries/locomotive-fuel-genh2-hydrogen-technology>

GEN Hydrogen Electric Freight Locomotive

- GEN H2 Electric Hydrogen Fuel Cell Locomotive

8. Innovative Rail Technologies

773-550-0559

<https://innovativerailtech.com/>

Electric Battery Freight Locomotives

- IRT ET-5e Switcher

9. Kawasaki Rail Car Inc.

29 Wells Avenue, Building 4

Yonkers, New York 10701

914-376-4700

<https://global.kawasaki.com/en/mobility/rail/index.html?id=locomotives>

Kawasaki Electric Freight Locomotives

- JR Cargo EF 210 Electric Locomotive
- JR Cargo EF 510 Electric Locomotive
- JR Freight M 250 Super Rail Cargo Electric Locomotive
- 6K Freight Electric Locomotive

10. PESA Bydgoszcz SA

85-082 Bydgoszcz,

ul. Zygmunta Augusta 11

52-58-68-004

<https://pesa.pl/en/railway>

PESA Hydrogen Electric Freight Locomotive

- PESA SM42-6Dn Hydrogen Fuel Cell Switcher

11. Progress Rail

1600 Progress Drive

Albertville, AL 35950

800-476-8769

<https://www.progressrail.com/en/Segments/RollingStock/Locomotives.html>

Progress Rail Electric Freight Locomotives

- EMD Joule - SD40JR Switcher
- EMD Joule - SD50 Switcher
- EMD Joule - SD60 Switcher
- EMD Joule - SD70J Switcher
- EMD Joule - SD70J-BB Switcher
- EMD Joule - GT38JB Switcher
- EMD Joule - GT38JC Switcher

12. Siemens Rail Systems Division

Infrastructure & Cities Sector
 2 Queen Anne's Gate Buildings
 Dartmouth Street
 London SW1H 9BP
 +44 (0)207 222 0722

<https://www.mobility.siemens.com/global/en/portfolio/rail.html>

Siemens Electric Freight Locomotives

- Vectron MS
- Vectron AC
- Vectron DC

13. Stadler Bussnang AG

Ernst-Stadler-Strasse 4
 9565 Bussnang
 Switzerland
 +41 (0) 71 626 21 20

<https://stadlerrail.com/en/products/>

Stadler Electric Freight Locomotives

- EURO9000 Heavy Haul

14. Wabtec Corporation

30 Isabella Street
 Pittsburgh, PA 15212
 412-825-1000

<https://www.wabteccorp.com/locomotive/alternative-fuel-locomotives/FLXdrive>

Wabtec Electric Battery Freight Locomotives

- FLXdrive Heavy Haul
- FLXdrive Switcher

Zero Emissions Technology

Electric Locomotive - Train Descriptions

There Are 4 Types of Zero Emissions Electric Locomotives

- **Battery Powered Locomotives**
- **Catenary Overhead Wire Cable Powered Locomotives**
- **Hydrogen Fuel Cell Powered Locomotives**
- **Electric Power Maglev Freight Transportation Vehicle**

Electric Battery Powered Locomotives

A Zero Emissions Battery-Powered Locomotive is a Locomotive that has been built or retrofitted with on-board lithium, lead-acid or lead-carbon rechargeable batteries to provide electric power to an electric drive engine. A Locomotive is designed to pull or push a train of multiple connected railroad cars. A Locomotive is a self-propelled rail vehicle with an electric engine, steel metal wheels that runs on steel metal rail tracks and is used for hauling various types of cargo railroad cars. The Locomotive batteries are recharged two ways: 1. When Regenerative Braking is employed, the current in the electric motors is reversed which slows down the train and at the same time, the electric motors generate electricity which is sent to and stored in the batteries. 2. When the Locomotive arrives at a destination, railyard or other in-route electrical charging way station. The benefits of Zero Emissions Battery-Powered Locomotives are that they generate no air pollution, no greenhouse gases, are quieter and require less maintenance because the electric engines have fewer moving parts.

Electric Catenary Locomotives

A Zero Emissions Catenary Locomotive is a Locomotive that is powered by a network of overhead stationary electrical wires. A Locomotive is designed to pull or push a train of multiple connected railroad cars. A Locomotive is a self-propelled rail vehicle with an electric engine, steel metal wheels that runs on steel metal rail tracks and is used for hauling various types of cargo railroad cars. The Catenary Locomotive is built with a pantograph apparatus mounted on the roof of the Locomotive which is a z-shaped, with a lower and an upper metal arm which is spring-loaded to push a flat electrical contact shoe up on the upper arm against the underside of the electric contact wire to allow power to transfer down to the locomotive and electric drive engine. The benefits of Zero Emission Catenary Locomotives are that they generate no air pollution, no greenhouse gases, are quieter, requires no charging time, and require less maintenance because the electric engines have fewer moving parts.

Electric Hydrogen Fuel Cell Locomotives

A Zero Emissions Hydrogen Fuel Cell Locomotive is a Locomotive that has been built or retrofitted to be powered by on-board Hydrogen Fuel Cells. A Locomotive is designed to pull or push a train of multiple connected railroad cars. A Locomotive is a self-propelled rail vehicle with an electric engine, steel metal wheels that runs on steel metal rail tracks and is used for hauling various types of cargo railroad cars. A fuel cell is like a regular car battery that requires water to be refilled regularly to generate electricity. The Hydrogen Fuel Cells are refilled with hydrogen gas when the Locomotive arrives at a railyard or other location refueling station. Hydrogen Fuel Cell power is stored in on-board lithium batteries to provide electrical power to the electric drive engine. The benefits of Zero Emission Hydrogen Fuel Cell Locomotives are that they generate no air pollution, no greenhouse gases, are quieter, can travel longer distances than other Zero Emission Locomotives, and require less maintenance because the electric engines have fewer moving parts.

Electric Maglev Freight Transportation Vehicle

A Zero Emissions Magnetic Levitation (Maglev) Freight Transportation Vehicle can be a Locomotive if it is the lead Locomotive designed to pull or push a train of multiple connected railcars. Maglev Freight Transportation Vehicles are however designed for maximum logistics efficiency by their ability to be individually programmed to travel individually without other connected freight railcars. Electrical power from the power grid, solar cells and other green renewable power sources can be provided to the track and Maglev Vehicle batteries. Maglev Technology uses flat magnets on the track and under the Maglev freight railcar vehicle to repel and lift the Maglev freight railcar vehicle about .5" above the track. A Maglev railcar vehicle has no metal wheels. The Linear Induction Motors (LIMs) are built under the Maglev railcar and generate electromagnetic waves that propel the Maglev Vehicle Railcar on the track. The benefits of Zero Emission Magnetic Levitation (Maglev) Freight Transportation Vehicle are that they generate no air pollution, no greenhouse gases, significantly quieter, can travel longer distances than other Zero Emission Locomotives, and require less maintenance because there is no engine, and it has only few moving parts.

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Nitrogen Oxides (NOX) Physical and Mental Public Health Impacts

1. Acute Blood Poisoning
2. Acute Chronic Obstructive Pulmonary Disease
3. Acute Completed Suicides
4. Acute Depressive Disorder Symptoms
5. Acute Depressive Symptoms
6. Acute Nose Irritation
7. Acute Psychosis Mortality
8. Acute Respiratory Disease
9. Acute Respiratory Infections
10. Acute Throat Irritation
11. Chronic Aggravation of Pre-Existing Heart Disease
12. Chronic Allergic Reactions
13. Chronic Alzheimer's Disease
14. Chronic Anxiety Disorder
15. Chronic Asthma
16. Chronic Augmentation of Pulmonary Permeability
17. Chronic Breast Cancer
18. Chronic Bronchitis Symptoms
19. Chronic Bronchitis Symptoms
20. Chronic Cardiovascular Disease (CVD)
21. Chronic Cardiovascular-Circulatory System Disease
22. Chronic Cardiovascular-Myocardial Infraction
23. Chronic Cell Damage
24. Chronic Cervical Cancer
25. Chronic Childhood Asthma
26. Chronic Cough
27. Chronic Cytotoxic Activities in the Immune System
28. Chronic Damage of Surfactant Properties
29. Chronic Damage to DNA
30. Chronic Damage to Fatty Bronchial Epithelium
31. Chronic Depression
32. Chronic Diabetes
33. Chronic Disabilities
34. Chronic Dyspnea
35. Chronic Eye Irritation
36. Chronic Exacerbation of Asthma Symptoms
37. Chronic Formation of Nitrosamines
38. Chronic Headaches
39. Chronic High Blood Pressure
40. Chronic Increased Mucus Secretion
41. Chronic Increased Risk of Cerebral Palsy in Children
42. Chronic Inflammation of the Airways

43. Chronic Inflammation of Tracheal Mucosa
44. Chronic Inflammatory Responses
45. Chronic Irritation of the Conjunctiva
46. Chronic Ischemic Heart Disease
47. Chronic Kidney Cancer
48. Chronic Lung Cancer
49. Chronic Nausea
50. Chronic Nose Irritation
51. Chronic Parkinson's Disease
52. Chronic Pneumonia
53. Chronic Poor Birth Outcomes such as Underweight Babies
54. Chronic Prostate Cancer
55. Chronic Psychological Distress
56. Chronic Reduced Lung Function
57. Chronic Reduction of Oxygenation of Body Tissues
58. Chronic Reproductive Impacts
59. Chronic Respiratory Ailments
60. Chronic Respiratory Disease
61. Chronic Respiratory Infections
62. Chronic Shortness of Breath
63. Chronic Sleep Disorder
64. Chronic Spasms
65. Chronic Stroke
66. Chronic Symptoms Progress to Bronchoconstriction
67. Chronic Swelling of Tissues in the Throat
68. Chronic Swelling of Upper Respiratory Tract
69. Chronic Throat Irritation
70. Chronic Tiredness
71. Chronic Ulceration of the Nasal Cavity
72. Chronic Vasodilator of Cerebral Blood Vessels
73. Acute and Chronic Asthma
74. Acute and Chronic Chest Colds
75. Acute and Chronic Chest Cough
76. Acute and Chronic Wheezing
77. Premature Death

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Railroad Industry Public Health Impact

Bibliography Abstract

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Coalition For A Safe Environment

Rail Road Industry

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Coalition For A Safe Environment

Zero Emission Technology Survey Transportation Vehicles, Cargo Handling Equipment, Construction Equipment, Ship and Boats Commercial Availability

7.5.2024

New Additions Are Highlighted - 200+ Company Listings

Electric Trucks Class 8

1. BYD Motors - 8TT Battery-Electric Truck
2. EMOSS - 16 Series Electric Truck
3. EMOSS - 18 Series Electric Truck
4. E-Force One AG - EF18 SZM Electric Truck
5. ETrucks - E700 6x4 Hydrogen FCEV Tractor
6. ETrucks - E700 6x4 Battery Swap Tractor
7. ETrucks - E700 8x4 Truck
8. Freightliner - eCascadia
9. Freightliner - eM2
10. Hyundai - XCIENT Hydrogen Fuel Cell Electric Truck
11. Hyzon Motors - FCET8 Fuel Cell Electric Truck
12. Hyzon Motors - HyHD8 Fuel Cell Electric Truck
13. Kenworth - ZECT-Zero Emissions Cargo Transit T680 FCEV Hydrogen Fuel Cell
14. Lion Electric Co.- LION8T All-Electric Class 8 Truck
15. Nikola – TRE Battery Electric Truck
16. Nikola – TRE FCEV Fuel Cell Electric Truck
17. Peterbilt - Model 579EV Battery Electric Truck
18. XOS Thor Trucks Inc. - ET-1 Electric Day Cab Truck
19. XOS Trucks – Heavy Duty XOS Truck HDXT
20. Tesla - Semi Electric Truck
21. Toyota - Electric Class 8 Truck - Hydrogen Fuel Cell
22. TransPower - ElecTruck
23. US Hybrid - Electric Class 8 Truck - eTruck
24. US Hybrid - Electric Class 8 Truck - H2Truck
25. Volta - Ambient 18T Electric Truck
26. Volta - Ambient 18T Refrigerated Electric Truck
27. Volvo Group - VNRe 4x2 Electric Straight Truck
28. Volvo Group - VNRe 6x4 Electric Straight Truck
29. Volvo Group - FH Electric Drayage Truck
30. Volvo Group - FM Electric Drayage Truck
31. Volvo Group - FMX Electric Multipurpose Truck
32. Volvo Group - FE Electric Multipurpose Truck
33. Volvo Group - FL Electric Multipurpose Truck

Electric Yard Tractors Class 8

1. Battle Motors - LNT Battery Electric Tractor

2. BYD Motors - 8Y Terminal Tractor
3. BYD Motors - T9 Battery-Electric Tractor
4. BYD Motors - Q1M Battery Electric Tractor
5. Einride - Tractor Trailer 4x2
6. Hoist Liftruck - TE Series Electric-Powered Terminal Tractor
7. Kalmar Ottawa - T2E Electric Terminal Tractor
8. Lion Electric Co.- LION8 All-Electric Class 8 Tractor
9. Lonestar - S22 4x2 Electric Terminal Tractor
10. Lonestar - T22 4x2 Electric Terminal Tractor
11. Orange EV - T-Series 4x2 Terminal Truck
12. Orange EV - T-Series 4x2 Terminal Truck Conversion of Kalmar Ottawa Truck
13. Orange EV - T-Series Reman (Conversion/Repower)
14. Orange EV - e-Triever Terminal Truck
15. Terberg - YT203EV 4x2
16. Transpower - Elec Truck Yard Tractor
17. Volvo-Penta - Electric Terminal Tractor
18. Volvo Group - VNR 4x2 Electric Tractor
19. Volvo Group - VNR 6x2 Electric Tractor
20. Volvo Group - VNR 6x4 Electric Tractor

Electric Class 7 Truck

1. Battle Motors - LNT Battery Electric Vehicle
2. BYD Motors - 8TT Battery-Electric Truck
3. BYD Motors - 6F Long Range Battery Electric Truck
4. Cenntro Electric Group - LM864 Hydrogen Fuel Cell HD Truck
5. EMOSS - 12 Series
6. Freightliner - eCascadia
7. Freightliner - eM2
8. Hexagon Purus Systems - eM2 Battery Electric Truck
9. International - eMV Series MV60E 107.9" BBC 4x2
10. International - eMV Series MV60E 40" BA 4x2
11. Kenworth - Class 7 K370E
12. Mack Trucks - MD Electric Medium Duty Truck
13. Navistar International - eMV Battery Electric Truck
14. Peterbilt - Model 220 Battery Electric Straight Truck
15. XOS Trucks - Medium Duty XOS Truck MDXT
16. XOS Trucks - CC Battery Electric Straight Truck
17. Volta - Ambient 16T Electric Truck
18. Volta - Ambient 16T Refrigerated Electric Truck
19. Volvo - VNRe Battery Electric Straight Truck
20. Zeus Electric Chassis – Z22 Battery Electric Straight Truck

Electric Trucks Class 6

1. Alkane/evLabs - Electric Class 6 Truck
2. Bolinger - Class 6 B2 Commercial Truck
3. BYD Motors - 6F Long Range Battery Electric Truck
4. BYD Motors - 6F Plus Long Range Battery Electric Truck
5. BYD Motors - T7 Battery Electric Truck
6. DAF Trucks - LF Electric Tractor
7. DAF Trucks - CF Electric Tractor
8. EMOSS - 10 Series

9. Evolectric - CEV 45
10. Freightliner - eM2
11. Hexagon Purus Systems - eM2 Battery Electric Truck
12. Kenworth - Class 6 K270E
13. Lightning Systems - LEV100 All Electric Low Cab
14. Lion Electric - Lion6 All-Electric Class 6 Truck
15. Lightning eMptors - Lightning Electric Isuzu FTR12 Low Cab Forward Truck
16. Lightning eMptors - Lightning Electric Chevrolet 6500XD Low Cab Forward Truck
17. Mack Trucks - MD Electric Medium Duty Truck
18. Navistar International - eMV Battery Electric Truck
19. Peterbilt - Model 220 Battery Electric Straight Truck
20. XOS Trucks - Medium Duty XOS Truck MDXT
21. XOS Trucks - Last-Mile Delivery SV05 Stepvan
22. XOS Trucks - CC Battery Electric Straight Truck
23. Zeus Electric Chassis - Z22 Battery Electric Straight Truck

Electric Trucks Class 5

1. ADOMANI - Class 5 Truck Cab & Chassis
2. Bolinger - Class 5 B2 Commercial Truck
3. BYD Motors - 5F/T5 Battery-Electric Box Truck
4. Evolectric Inc. - CEV 45
5. Phoenix Motorcars - E450 Battery Electric Truck
6. Rizon - e16L Battery Electric Straight Truck
7. Rizon - e16M Battery Electric Straight Truck
8. Rizon - e18L Battery Electric Straight Truck
9. SEA - 5e Battery Electric Straight Truck
10. Via Motors - Cab Chassis Class 5
11. XOS Trucks - Last-Mile Delivery SV05 Stepvan
12. Volta Trucks - Ambient Volta Zero 16T
13. Volta Trucks - Ambient Volta Zero 18T
14. Zeus Electric Chassis - Z19 Battery Electric Straight Truck

Electric Trucks Class 4

1. ADOMANI - Class 4 Truck
2. Bollinger Motors - B4 Chassis Cab
3. Endera - B Series Battery Electric Vehicle
4. Evolectric - CEV 45
5. Green Power - EV Star CC Cargo Transportation
6. Green Power - EV Star Cargo Truck
7. Motiv - EPIC4 Battery Electric Box Truck
8. Optima Electric Vehicles - E1 Battery Electric Truck
9. Rizon - e16L Battery Electric Straight Truck
10. Rizon - e16M Battery Electric Straight Truck
11. Rizon - e18L Battery Electric Straight Truck
12. SEA - 5e Battery Electric Straight Truck
13. Workhorse Group Inc. - W4CC Battery Electric Straight Truck
14. Via Motors - Cab Chassis Class 4
15. Zeus Electric Chassis - Z19 Battery Electric Straight Truck

Electric Trucks Class 3

1. ADOMANI - Class 3 Truck

2. Bollinger Motors - B2 Commercial Truck
3. ePower - XT320E 3.5t
4. Ford - Pro E-Transit
5. EVT - Urban Electric Class 3 Truck
6. TEVVA Motors - Electrify E-Truck Series
7. Via Motors - Cab Chassis Class 3
8. ZERONOX - Class 3 EV Truck

Electric Trucks Class 2

1. Ford - Pro E-Transit
2. Via Motors - Cab Chassis Class 2

Electric Trucks Class 1

1. Ford - Pro E-Transit

Solar-Electric TRU

1. AEM.GREEN - SolarTech TRU Full-Electric Reefer Power System

Electric Pickup Trucks

1. Atlis Motor Vehicles - XT Electric Pickup Truck
2. Bollinger Motors - All-Electric B2 Pickup Truck
3. Chevrolet - Silverado EV Pickup Truck RST
4. Chevrolet - Silverado EV Pickup Truck WT
5. Ford - F-150 Lightning Pro
6. Ford - F-150 Lightning Platinum
7. Ford - F-150 Lightning XLT Standard Range
8. Ford - F-150 Lightning XLT Extended Range
9. Ford - F-150 Lightning Lariat Standard Range
10. Ford - F-150 Lightning Lariat Extended Range
11. GMC - Sierra EV
12. GMC - Hummer EV2 Pickup
13. GMC - Hummer EV2x Pickup
14. GMC - Hummer EV3x Pickup
15. GMC - Hummer EV Edition 1 Pickup
16. Havelaar Canada - Bison Electric Pickup Truck
17. Lordstown - Endurance Pickup Truck
18. Nicola - Badger FCEV-Hydrogen Fuel Cell Electric Vehicle Battery Truck
19. Nissan/Dongfeng Motor Corporation - Rich 6 EV
20. Rivian - Electric Pickup Truck R1T
21. Workhorse Group - W15 All Wheel Drive Electric Truck
22. Zero Automotive - ZED70 Wagon E-Truck
23. Zero Automotive - ZED70Single Cab E-Truck
24. Zero Automotive - ZED70Dual Cab E-Truck

Electric Jeep

1. Bollinger Motors - All-Electric B1 Jeep Work Truck
2. Jeep - Wrangler 4xe

Electric Troop Carrier

1. Zero Automotive - ZED70 Troup Carrier E-Truck

Electric SUV Full Size

1. Bolinger Motors - Bollinger B1 SUV
2. GMC - Hummer EV2 SUV
3. GMC - Hummer EV2x SUV
4. GMC - Hummer EV3x SUV
5. GMC - Hummer EV Edition 1 SUV
6. Rivian - Electric SUV R1S

Electric Ship-to-Shore (STS) Rail-Mounted Gantry Cranes

1. Konecranes - Electric Ship-to-Shore (STS) Gantry Cranes
2. Liebherr - Rail Mounted Electric Gantry Crane
3. MacGregor - Electric Gantry Crane
4. Shanghai Zhenhua Heavy Industries Co. - Electric Ship-to-Shore Cranes

Electric Rubber-Tired Gantry (RTG) Cranes

1. ANUPAM-MHI - E-RTG Electric Rubber Tired Gantry Crane
2. Konecranes - Electric Cable Reel Rubber-Tired Gantry (RTG) Cranes
3. Konecranes - Electric Busbar Rubber-Tired Gantry (RTG) Cranes
4. Kalmar - E-One2 Zero Emission RTG
5. Liebherr Container Cranes - e-RTG
6. MI-JACK - Electric Rubber Tired Gantry Crane JL1400P
7. Terex Port Solutions - E-RTGs

Electric Rail-Mounted Gantry Cranes

1. HY Crane Co. - Electric RMG Rail Mounted Container Gantry Crane

Electric Bulk Handling Crane

1. Liebherr - LPS 420 E Electric Port Crane

Carry Deck Crane

1. JMG America - MC 100RE Articulated Telescopic Boom 10 T - 22,000 LBS
2. JMG America - MC 50000RE Articulated Telescopic Boom 50 T:M - 110,000 LBS
3. Zero Emissions Equipment - ZEECRANE 4500 4.5 Ton Carry Deck Crane
4. Zero Emissions Equipment - ZEECRANE 9000 9-Ton Carry Deck Crane

Cabin Cruiser Crane

1. JMG America - MC 85 Full Electric
2. JMG America - MC 100HY Full Electric
3. JMG America - MC 120 Full Electric
4. JMG America - MC 160 Full Electric
5. JMG America - MC 250 Full Electric
6. JMG America - MC 350 Full Electric
7. JMG America - MC 580 Full Electric
8. JMG America - MC 700MT Full Electric

Lige Cabin Cruise Crane

1. JMG America - LIGE 40 - CAPACITY 4 T - 8,800 LBS

2. JMG America - LIGE 60 - CAPACITY 6 T - 13,200 LBS
3. JMG America - LIGE 90 - CAPACITY 9 T - 19,800 LBS
4. JMG America - LIGE 120 - CAPACITY 12 T - 26,500 LBS

Telescopic Forklift Crane

1. JMG America - MC80.06 - CAPACITY 12 T - 26,400 LBS

Lifter Forklift Crane

1. JMG America - MC 250.09FL - MAX CAPACITY - 25T - 2.500Kg

Radio Remote Controlled Cranes

1. JMG America - MC25S Full Electric Pick & Carry Crane
2. JMG America - MC32S Full Electric Pick & Carry Crane
3. JMG America - MC45S Full Electric Pick & Carry Crane
4. JMG America - MC60S Full Electric Pick & Carry Crane
5. JMG America - MC100S Full Electric Pick & Carry Crane
6. JMG America - MC130S Full Electric Pick & Carry Crane
7. JMG America - MC180S Full Electric Pick & Carry Crane
8. JMG America - MC180S Full Electric Pick & Carry Crane
9. JMG America - MC250S Full Electric Pick & Carry Crane
10. JMG America - MC300S Full Electric Pick & Carry Crane
11. JMG America - MC350S Full Electric Pick & Carry Crane
12. JMG America - MC450S Full Electric Pick & Carry Crane
13. JMG America - MC580S Full Electric Pick & Carry Crane

Reach Stackers

1. ETrucks - Electric Reach Stacker
2. Hyster Company - Hydrogen Fuel Cell (HFC) Top Pick Container Handler
3. Kalmar - ERG420-450 Electrically Powered Reach Stacker
4. N.C. Nielson - NCN 85 T
5. N.C. Nielson - NCN 100 T
6. N.C. Nielson - NCN 110 T
7. N.C. Nielson - NCN 130 T
8. N.C. Nielson - NCN 152 T
9. Konecranes Hybrid Reach Stacker
10. Taylor Machine Works - XEC 150LE - Unloaded Container Top Handler
11. Taylor Machine Works - XEC 155/6 - Unloaded Container Top Handler
12. Taylor Machine Works - XEC 205/6 - Unloaded Container Top Handler
13. Taylor Machine Works - XEC 206/7 - Unloaded Container Top Handler
14. Taylor Machine Works - XEC 207/8 - Unloaded Container Top Handler
15. Taylor Machine Works - ZLC-975 Loaded Container Top Handler
16. Taylor Machine Works - ZLC-976 Loaded Container Top Handler
17. Taylor Machine Works - ZLC-996 Loaded Container Top Handler
18. Transpower - Electric Forklift Reach Stacker

Shuttle Carrier

1. Kalmar - Electric Shuttle Carrier

Straddle Carrier

1. Apollolift A3022 Full Electric Straddle Stacker
2. Apollolift A3020 Full Electric Straddle Stacker
3. Apollolift A3017 Full Electric Straddle Stacker
4. Apollolift A3021 Full Electric Straddle Stacker
5. Apollolift A3023 Full Electric Straddle Stacker
6. Apollolift A3019 Full Electric Straddle Stacker
7. Apollolift A3028 Fully Powered Straddle Walkie Stacker
8. Apollolift A3029 Fully Powered Straddle Walkie Stacker
9. EKKO EB13E-119LI Full Lithium Powered Straddle
10. EKKO EB12E-138 Full Powered Straddle Stacker
11. EKKO EB13E-119 Full Powered Straddle Stacker
12. EKKO EB13E-138 Full Powered Straddle Stacker
13. EKKO EB16EAS-189Li Lithium Straddle Stacker
14. EKKO EB12E-98Li Full Lithium Powered Straddle Stacker
15. Huadelift - Industrial Straddle Carrier - 150 Ton
16. Huadelift - 90t Straddle Carrier - Span 13m
17. Huadelift - 60t Straddle Carrier - Span 12.1m
18. Huadelift - 60t Straddle Carrier - Span 9m
19. KALMAR - FastCharge Straddle Carrier
20. Konecranes Electric Straddle Carrier DE53
21. Konecranes Electric Straddle
22. Carrier DE54
23. Konecranes Electric Boxrunner
24. Kalmar ESC440 Electric Straddle Carrier
25. Noblelift Full-Electric Straddle Leg Stacker
26. Noblelift Full-Electric Straddle Leg Stacker

Trailer Spreader

1. TEC - Electric Trailer Spreader BA-030

Electric Forklifts

1. Bendi - Electric Narrow Aisle B-30
2. Bendi - Electric Narrow Aisle B-40
3. BYD Motors - ECB 16 Electric Forklift
4. BYD Motors - ECB 16S Electric Forklift
5. BYD Motors - ECB 18 Electric Forklift
6. BYD Motors - ECB 18S Electric Forklift
7. BYD Motors - ECB 20 Electric Forklift
8. BYD Motors - ECB 25 Electric Forklift
9. BYD Motors - ECB 27 Electric Forklift
10. BYD Motors - ECC 27 Electric Forklift
11. BYD Motors - ECB 30 Electric Forklift
12. BYD Motors - ECB 35 Electric Forklift
13. BYD Motors - ECB 40 Electric Forklift
14. BYD Motors - ECB 45 Electric Forklift
15. BYD Motors - ECB 50 Electric Forklift
16. CAT - EP16-20(C)N Electric Forklifts
17. CAT - EP10-15KRT PASC Electric Forklifts
18. CAT - EP10-16-20(C)PNT Electric Forklifts
19. Clark - GEX 40/45/50 Series Electric Forklifts

20. Clark - GEX ECX 20/25/30/32 Series Electric Forklifts
21. Clark - GEX 20/25/30 Series Electric Forklifts
22. Clark - GEX 16/18/20S Series Electric Forklifts
23. Clark - GTX 16/18/20S Series Electric Forklifts
24. Clark - TMX 12/15S/15/17/20/25 Series Electric Forklifts
25. Clark - ESX 12/15S/15/17/20/25 Series Electric Forklifts
26. Crown - RC 5500 Series Stand Up 3-Wheeled Electric Forklift
27. Crown - SC 5200 Series 3-Wheeled Electric Forklift
28. Crown - FC 4500 Series Four Wheeled Electric Forklift
29. Danner - Danner 4.00 Electric Work Vehicle Forklift
30. Doosan - B40/45/50X-5 Series Electric 4-Wheel Forklift
31. Doosan - B45X-7 Electric 4-Wheel Forklift
32. Doosan - B22/25/30/35X-5 Series Electric 4-Wheel Forklift
33. Doosan - B20/25/25SE-7/30/32S-7 Series Electric 4-Wheel Cushion Forklift
34. Doosan - B15/18S/20SC-5 Series Electric 4-Wheel Cushion Forklift
35. Doosan - B15T/18TL/20T/20TL Electric 7 Series 3-Wheel Forklift
36. Doosan - B16/18/20X-7 Electric 7 Series 4-Wheel Forklift
37. Doosan - B13/15/16R-5 Series Rear Drive 3-Wheeled Forklift
38. Drexel - Electric Narrow Aisle SLT 30
39. Drexel - Electric Narrow Aisle SL-40
40. Hangcha - A Series 3 Wheeled Forklift
41. Hangcha - J Series 3 Wheeled Forklift
42. Hangcha - A Series 4 Wheeled Forklift
43. Hangcha - J Series 4 Wheeled Forklift
44. Hoist Liftruck - PE Series Heavy-Duty Pneumatic Lift Trucks
45. Hoist Liftruck - Lazer Series Cushion Tire Lift Truck
46. Hoist Liftruck - Neptune Electric Series Lift Truck
47. Hyster - E30-40XN Series Electric Lift 4 Wheel Truck
48. Hyster - J45-70XN Series Electric Pneumatic Tire
49. Hyster - J80-100XN Series Electric Pneumatic Tire
50. Hyster - Class 1 With Nuvera Hydrogen Fuel Cell
51. Hyster - Class 2 With Nuvera Hydrogen Fuel Cell
52. Hyster - Class 3 With Nuvera Hydrogen Fuel Cell
53. Hyundai Construction - Series 9 40B-9 Four Wheeled Forklift
54. Hyundai Construction - Series 9 45B-9 Four Wheeled Forklift
55. Hyundai Construction - Series 9 50B-9 Four Wheeled Forklift
56. Kalmar - EC50-90
57. Komatsu - FB10-FB18 Series Electric Forklifts
58. Komatsu - FB20 A Electric Forklift
59. Komatsu - FB15M-FB20M Series Electric Forklifts
60. Komatsu - FB25-FB30 Series Electric Forklifts
61. Komatsu - FB13RL-FB18RL Series Electric Forklifts
62. Konecranes - TX AC Electric Rider Lift Trucks
63. Konecranes - SRX AC Electric Reach Trucks
64. Linde - E12-E20 EO Series 386-02
65. Linde - E Series 4-Wheel Drive
66. Linde - E Series
67. Linde - E R series
68. Linde - E35-E50 Series 388
69. Linde - E Series Heavy Loads
70. Mariotti - Electric AC

71. Raymond Corp. - 4150 Stand Up Forklift
72. Raymond Corp. - 4250 Stand Up Forklift
73. Raymond Corp. - 4460 Sit Down Forklift
74. Raymond Corp. - 4750 Stand Up Forklift
75. Raymond Corp. - 7200 Reach-Fork Truck
76. Raymond Corp. - 7300 Reach-Fork Truck
77. Raymond Corp. - 7500 Universal Stance Reach Truck
78. Raymond Corp. - 7500 Dockstance reach Forklift
79. Raymond Corp. - 7000 Series Deep-Reach Forklift Truck
80. Raymond Corp. - 7700 Reach-Fork Truck
81. Raymond Corp. - 7310 4-Directional Reach Truck
82. Raymond Corp. - 9600 Sw8ing Reach Turret Truck
83. Raymond Corp. - 9700 Sing Reach Truck
84. Raymond Corp. - 9800 Swing Reach Truck
85. Raymond Corp. - TRT Transtacker Truck
86. Raymond Corp. - 9300 Sideloader Long Load Forklift
87. Raymond Corp. - 9400 Sideloader Forklift
88. Still - RX 50 1.0-1.6T Three-Wheeled Electric Forklift
89. Still - RX 20 1.4-2.0T Three-Wheeled Electric Forklift
90. Still - RX 20 1.4-2.0T Li-Ion Three-Wheeled Electric Forklift
91. Still - RX 60 1.6-2.0T Four Wheeled Electric Forklift
92. Still - RX 60 2.5-3.5T Four Wheeled Electric Forklift
93. Still - RX 60 3.5-5.0T Four Wheeled Electric Forklift
94. Still - RX 60 6.0-8.0T Four Wheeled Electric Forklift
95. Mitsubishi Forklift Trucks - FB16PNT-FB20PNT Series Three-Wheeled Electric
96. Mitsubishi Forklift Trucks - FBC15N-FBC18N Series Small Electric Cushion
97. Mitsubishi Forklift Trucks - FBC22N2-FBC30LN3 Series Mid-Size Electric Cushion
98. Mitsubishi Forklift Trucks - FBC15NS-FBC20NS Series Stand-Up End Control
99. Toyota - Core Electric Forklift
100. Toyota - Large Electric Forklift
101. Toyota - 3-Wheel Electric Forklift
102. Toyota - Stand-Up Rider Forklift
103. Toyota - Electric Pneumatic Forklift
104. Toyota - High-Capacity Electric Cushion Forklift
105. Wiggins Lift. Co. - Wiggins Yard eBull
106. Wiggins Lift. Co. - Wiggins Marina eBull
107. Yale - ESC 30 Three-Wheeled Forklift
108. Yale - ERC Four Wheeled Forklift
109. Yale - ERP30 Four Wheeled Forklift

Narrow Aisle Electric Forklifts

1. Linde - A Series 5022
2. Linde - K Series 5231

Autonomous Electric Forklifts

1. Linde - K-Matic Series

Electric Carriers

1. BrightDrop - EP1 Rapid Load Vehicle Electric Propulsion Carrier

Electric Pallet Truck

1. Big Joe - P33 Pallet Truck
2. Big Joe - E30 Pallet Truck
3. Big Joe - D40 Pallet Truck
4. Big Joe - WPT45 Pallet Truck
5. Big Joe - WPT60 Pallet Truck
6. Big Joe - LPT26 Pallet Truck
7. Big Joe - LPT33 Pallet Truck
8. Big Joe - LPT44 Pallet Truck
9. BYD - P20JW All-Electric Walkie Pallet Truck
10. BYD - PMW20 Pallet Truck
11. Cat Lift Trucks - NPP16-20N2 Pallet Truck
12. Cat Lift Trucks - NPV/NPF20-25N3 Pallet Truck
13. Cat Lift Trucks - NPV20PD Pallet Truck
14. Cat Lift Trucks - NPR20N Pallet Truck
15. Cat Lift Trucks - NPS20N Pallet Truck
16. Crown - WP3025 Walkie Pallet Truck
17. Crown - WP3030 Walkie Pallet Truck
18. Crown - WP3035 Walkie Pallet Truck
19. Crown - WP3040 Walkie Pallet Truck
20. Crown - WP3045 Walkie Pallet Truck
21. Hyster - W40ZA Walkie Pallet Stacker
22. Hyster - W30ZA2 Walkie Pallet Stacker
23. Hyster - W25ZA2 Walkie Pallet Stacker
24. Jungheinrich - EJE 112i Pedestrian Pallet Truck
25. Jungheinrich - EJE 114i Pedestrian Pallet Truck
26. Jungheinrich - EJE 114 Pedestrian Pallet Truck
27. Jungheinrich - EJE 116 Pedestrian Pallet Truck
28. Jungheinrich - EJE 118 Pedestrian Pallet Truck
29. Jungheinrich - EJE 120 Pedestrian Pallet Truck
30. Jungheinrich - EJE 222 Pedestrian Pallet Truck
31. Jungheinrich - EJE 225 Pedestrian Pallet Truck
32. Jungheinrich - EJE 230 Pedestrian Pallet Truck
33. Jungheinrich - EJE 235 Pedestrian Pallet Truck
34. Jungheinrich - EJE 220r Pedestrian Pallet Truck
35. Jungheinrich - EJE 225r Pedestrian Pallet Truck
36. Jungheinrich - EJE C20 Pedestrian Pallet Truck
37. Jungheinrich - ERE 120 Stand-On
38. Jungheinrich - ERE 125 Stand-On
39. Jungheinrich - ERE 225 Stand-On
40. Jungheinrich - ESE 120 Stand-On/Sideways Seated
41. Jungheinrich - ESE 220 Stand-On/Sideways Seated
42. Jungheinrich - ESE 320 Stand-On/Sideways Seated
43. Jungheinrich - ESE 420 Sideways Seated
44. Jungheinrich - ESE 430 Sideways Seated
45. Jungheinrich - ESE 533 Sideways Seated
46. Linde - Citi One Series 1130
47. Linde - T16-T20 Series 1152
48. Linde - T16-T20 P Series
49. Linde - T16-T20 FP Series
50. Linde - T20-T25 AP/SP Series

51. Linde - T14-T25 S Series
52. Linde - T20-T25 R Series
53. Linde - T25-T30 Series
54. Linde - T33 RHP Series
55. Linde - T16L
56. Linde - T20SR
57. Linde - T20AP
58. Linde - MT15
59. Toyota - 8HBW23 - Walkie Pallet Jack

Autonomous Electric Pallet Truck

1. Linde - T-Matic

Pallet Stacker Truck

1. Linde - MM10
2. Linde - L10-L12 Series
3. Linde - L14-L20 Series
4. Linde - L14C
5. Linde - L14P
6. Linde - D12-D14 AP/SP
7. Linde - L14-L16 R Series
8. Linde - L10-L12 AS Series 1172
9. Linde - L14-L16 AS AP/AS Series 131
10. Linde - D06-D08 Series
11. Linde - D12-D14 Series
12. Linde - D12 S series
13. Linde - D12R
14. Linde - D10
15. Linde - L14-L20 AP Series
16. Linde - D10AP
17. Linde - D10FP

Autonomous Electric Stacker Truck

1. Linde - L-Matic
2. Linde - L-Matic AC Series

Electric Tow Tractor

1. Clark - CTX 40/70 Series Electric Tow Tractor
2. Hedin USA - PTT3 Power Tugger
3. Hedin USA - PTT6 Power Tugger
4. Hedin USA - GP Tugger
5. Hedin USA - Ride-On Tugger
6. Hedin USA - Cable Reel Transporter
7. Hedin USA - Coil Car
8. Hedin USA - Coil Car Cradle
9. Hedin USA - Coil Tipper
10. Holloway - MasterMover Electric Tugger
11. Konecranes - TGX AC Electric Tow Tractor
12. Linde - P20
13. Linde - P30 Series 132

14. Linde - P40
15. Linde - P50 Series 131
16. Linde - P250 Series 127-03
17. Linde - W20 Series 127-04
18. Linde - P60-P80 W08 Series
19. Linde - P30-P50 C
20. Raymond - 8610 Tow Tractor
21. Zallys - M3 Electric Tow Tractor
22. Zallys - M4 Electric Tugger
23. Zallys - M5 Industrial Electric Power Pusher
24. Zallys - M10 tow Tug For Heavy Load
25. Zallys - M12 Vertical Electric Tug

Autonomous Electric Tow Tractor

1. Linde - P-Matic

Electric Dredger

1. Custom Dredge Works, Inc.
2. Damen - Cutter Suction Dredger 650
3. DSC Dredge
4. IMS Dredges
5. Ellicott Dredges. LLC
6. Mud Cat - MC 20E
7. Mud Cat - MC 40E
8. Mud Cat - MC 40 E 30' DD
9. Mud Cat - MC 50E
10. Mud Cat - MC 100E
11. TV Dredging

Tracked Crawler Crane

1. JMG Cranes - Electric Crawler Cranes MC50000TE
2. Liebherr - LR 1250.1 Crawler Crane
3. Liebherr - LR 1200.1 Crawler Crane
4. Movex Innovation - Mini Crawler Crane
5. Sany - SCE800TB-EV - 80t Electric Telescopic Crawler Crane

Tracked Dozer (Tractor)

1. Caterpillar - D6 XE Dozer
2. Caterpillar - D7E Hybrid Bulldozer

Excavators

1. Bobcat - E10e Electric Micro-Excavator
2. Case - Mini Excavators CX15EV
3. Caterpillar – Z Line All-Electric 26-Ton Excavator
4. Doosan - DX17Z-5 Electric Mini Excavator
5. Doosan - DX140
6. Doosan - DX220/225
7. Doosan - DX300
8. Doosan - DX340
9. Doosan - DX380/420

10. Doosan - DX480/520
11. Green Machine - Mini Excavator E210
12. Hitachi - EX1900E-6
13. Hitachi - EX2600E-6
14. Hitachi - EX3600E-6
15. Hitachi - EX5600E-6
16. Hitachi - EX8000E-6
17. Hyundai - R18e Mini Excavator
18. JCB - 19C-IE Electric Mini-Excavator
19. Kato - 9VXE- 3 Electric Mini Excavator
20. Kato - 17VXE Electric Mini Excavator
21. Suncar - TB216E Electric Excavator
22. Suncar - TB260E Electric Excavator
23. Suncar - TB1140E
24. ViridiParente - e20 Compact Mini Excavator
25. Volvo - EC18 Electric Compact Excavator
26. Volvo - ECR18 Electric Compact Excavator
27. Volvo - ECR25 Electric Compact Excavator
28. Wacker Neuson Group - Zero Tail EZ17e Mini Excavator
29. Wacker Neuson - 803 Dual Power Electric Excavator

Top Front End Payloader

1. BYD Motors - Zero Emission Top Front Payloader
2. MultiOne - EZ 8 Electric General Bucket
3. MultiOne - EZ 8 Electric Dumper
4. MultiOne - EZ 8 Electric Grapple Bucket
5. XIAMEN LITENG ENGINEERING MACHINERY CO. - **LT958EV Electric Loader**

Skid Steer

1. Giant - E-Skid Steer Remote Control Skid-Steer Loader
2. Kovaco - eLise 900 Electric Skid Steer Loader
3. Schibeci - 32PE Electric Mini Skid Steer Loader
4. Sherpa - 100 ECO Electric Mini Skid-Steer

Wheeled Loader

1. Caterpillar - 988K XE Electric Drive Wheel Loader
2. Hitachi - ZW220HYB-5 Hybrid Wheel Loader
3. John Deer - 944K Hybrid Wheel Loader
4. Kramer - KL25.5e Electric Wheeled Loader
5. Kramer - 5055e Electric Wheel Loader
6. MultiOne - EZ7 Mini Articulated Loader
7. MultiOne - EZ8 Mini Articulated Loader
8. Schaffer - 24E Electric Wheel Loader
9. Tobroco-Giant - G2500 HD Electric Wheel Loader
10. Tobroco-Giant - G2500 HDX-TRA00E Electric Wheel Loader
11. Volvo - L20 Electric Compact Wheel Loader
12. Volvo - L25H Electric Wheel Loader
13. Wacker Neuson Group - WL20e Wheel Loader

Rope Shovels

1. Caterpillar - Model 7295 50 Ton Electric Rope Shovel
2. Caterpillar - Model 7395 70 Ton Electric Rope Shovel
3. Caterpillar - Model 7495 HD 90 Ton Electric Rope Shovel
4. Caterpillar - Model 7495 HF 120 Ton Electric Rope Shovel
5. Caterpillar - Model 7495 120 Ton Electric Rope Shovel
6. Komatsu - P&H 1900XPC
7. Komatsu - P&H 2300XPC
8. Komatsu - P&H 2800XPC
9. Komatsu - P&H 4100C
10. Komatsu - P&H 4100C Boss
11. Komatsu - P&H 4100XPC
12. Komatsu - P&H 4100XPC AC-90
13. Komatsu - P&H 4800XPC

Wheel Dumper/Loader

1. Kuhn Schweitz - Elektro Dumper/eDumper
2. Wacker Neuman Group - DW15e Electric Wheel Dumper
3. Wacker Neuman Group - DT10e Compact Electric Wheel Dumper
4. Volvo - L20 Electric Compact Wheel Loader
5. Volvo - L25 Electric Compact Wheel Loader

Electric Truck Concrete Mixers

1. BYD - J9C Concrete Mixer
2. CIFA - E8 Concrete Mixer
3. CIFA - E9 Concrete Mixer
4. ETrucks - XCMG/Schwing V7 Electric Concrete Mixer Truck
5. Futuricum - Concrete 40E e-Truck Mixer
6. Liebherr - ETM 705 Truck Mixer
7. Liebherr - ETM 805 Truck Mixer
8. Liebherr - ETM 905 Truck Mixer
9. Liebherr - ETM 1005 Truck Mixer
10. Liebherr - ETM 1205 Truck Mixer
11. Liebherr - ETM 1004 T Truck Mixer
12. Sany - Electric Truck Mixer

Auger

1. MultiOne - EZ 8 Electric Auger

Backhoe

1. Case - 580 EV Electric Backhoe Loader
2. John Deere - 310X Electric Backhoe
3. MultiOne - EZ 8 Electric Backhoe
4. Solectrac - e25G Electric Tractor Gear Backhoe

Ground Compactor

1. Wacker Neuson - AS30e Electric Vibratory Rammer
2. Wacker Neuson - AS50e Electric Vibratory Rammer
3. Wacker Neuson - AS60e Electric Vibratory Rammer
4. Wacker Neuson - APS Series
5. Wacker Neuson - AP1840e Electric Vibratory Plate
6. Wacker Neuson - AP1850e Electric Vibratory Plate

7. Wacker Neuson - AP1860e Electric Vibratory Plate
8. Wacker Neuson - ACBe Electric Internal Vibrator

Trencher

1. MultiOne - EZ 8 Electric Trencher

Hydraulic Breaker

1. MultiOne - EZ 8 Electric Hydraulic Breaker

Dump Trucks

1. BYD - T5 Dump Truck
2. California Truck Equipment Co. - All-Electric Powertrain With Ford E450 Dump Truck
3. California Truck Equipment Co. - All-Electric Powertrain With Ford F59 Dump Truck
4. ETruck - TFT125 Mining Dump Truck
5. Komatsu - e-Dumper
6. Kuhn Schweiz AG - e-Dumper
7. Mack Trucks - LR Electric Refuse Truck

Wheel Barrow

1. Power Pusher - E-750 Electric Wheelbarrow

Delivery Truck

1. AMP - E-100 V.2 All-Electric Step Van With Workhorse Chassis
2. Arrival – Generation 2 Electric Delivery Van
3. Boulder Electric Vehicle - DV-500 Delivery Truck
4. BrightDrop - EV410 Electric Van
5. BrightDrop - EV600 Electric Van
6. BYD Motors - T7 Battery Electric Delivery Truck - Class 7
7. BYD Motors - T5 Battery Electric Delivery Truck - Class 5
8. Lightning eMotors - ZEV4 Box Truck (Ford E-450)
9. Lightning eMotors - ZEV4 Box Truck (GM 4500)
10. Mitsubishi Fuso Truck & Bus Corp. - Fuso eCanter Light Class 4 Delivery Truck
11. Mitsubishi Fuso Truck & Bus Corp./E-Fuso Vision One Heavy Duty Class 5 Delivery Truck
12. Motive Power Systems - All-Electric Powertrain For Ford E450 Box Truck/Flat Bed
13. Motive Power Systems - All-Electric Powertrain For Ford F59 Walk In Van
14. Oshkosh Defense - EV Next Generation Delivery Vehicle (NGDV)
15. UPS - Hydrogen Fuel Cell Class 6 Delivery Truck

Cab Chassis Delivery Truck

1. ADOMANI - Class 3 All-Electric Cutaway
2. ADOMANI - Class 5 Truck Cab & Chassis
3. Daimler - Freightliner eM2 106
4. ETruck - E300 4x2 Cab Truck
5. Lightning eMotors - ZEV5 Cargo Truck
6. Lightning eMotors - ZEV6 Cargo Truck
7. Motiv Power Systems - EPIC 4 Series
8. Motiv Power Systems - EPIC 5 Series
9. Motiv Power Systems - EPIC 6 Series
10. Peterbilt - 220EV

11. Via Motors - Cab Chassis Class 2
12. Via Motors - Cab Chassis Class 3
13. Via Motors - Cab Chassis Class 4
14. Via Motors - Cab Chassis Class 4
15. Zenith Motors - Electric Chassis Cab
16. Zenith Motors - Electric Cutaway Cab

Flat Bed Truck

1. Boulder Electric Vehicles - FB-500 Flat Bed Work Truck
2. Motive Power Systems - All-Electric Powertrain For Ford E450 Box Truck/Flat Bed
3. Phoenix Motorcars - ZEUS 500 Electric Flatbed Ford E350
4. Phoenix Motorcars - ZEUS 500 Electric Flatbed Ford E450

Cargo Panel Van

1. ADOMANI - All-Electric Logistic Van
2. Chanje Energy Inc. - Class 5 - V8070 Electric Panel Van
3. Chanje Energy Inc. - V8100 Electric Panel Van
4. Citroën - Jumpy/Relay BEV Electric Van
5. Citroën - Jumper BEV Electric Van
6. EMOSS – EMS 508 Electric Delivery Van
7. General Motors - BrightDrop EV600
8. Lightning eMotors - ZEV3 Transit Cargo Van
9. Mercedes-Benz - EQV 6 Panel Van
10. Mercedes-Benz - EQV 7 Panel Van
11. Mercedes-Benz - EQV 8 Panel Van
12. Morgan Olson Route Star - Motiv All-Electric Powertrain Ford F59 Walk-In-Van
13. Renault - SL31 i ZE Business Panel Van
14. Renault - SM31 i ZE Business Panel Van
15. Renault - MM31 i ZE Business Panel Van
16. Renault - LM31 i ZE Business Panel Van
17. Rockport Commercial Vehicles Cargoport - Motiv All-Electric Powertrain
18. Workhorse - C650 Step Van
19. Workhorse - C1000 Step Van
20. Zenith Motors - ZEUS 500 Electric Walk-In Van

Cargo Van

1. Electric Last MileServices - ELMS Urban Delivery Van Class 1
2. EVT - Electric Logistics Van
3. Ford - E-Transit Cargo Van T-350
4. Green4U Technologies - Cargo Van
5. GreenPower - EV Star 22' Heavy Duty Class 4
6. GreenPower - EV Star 25' Heavy Duty Class 4
7. GreenPower - EV Star+ Heavy Duty Class 4
8. Lighting Systems - Electric Transit Cargo Van
9. Lightning eMotors - Lightning Electric E-450 Box Van
10. Mercedes-Benz - eSprinter
11. Nissan - Electric E-NV200 Van
12. Sea Electric - SEA FORD Transit EV Cargo Van
13. VIA - Cargo Van
14. Volkswagen - I.D. Buzz Cargo Van

15. Workhorse - NGen Electric Delivery Van
16. Zenith Motors - Electric Cargo Van

Step Van

1. Lightning eMotors - E-450 Step Van
2. Workhorse - W750 All-Electric Class 4 Step Van
3. XOS Trucks - Last-Mile Delivery SV05 Stepvan

Utility/Electric Trucks

1. Boulder Electric Vehicles - SB-500 Utility/Maintenance Truck
2. California Truck Equipment Co. - Motiv All-Electric Powertrain With Ford E450 Utility Truck
3. California Truck Equipment Co. - Motiv All-Electric Powertrain With Ford F59 Utility Truck
4. Lion Electric Co.- Utility Truck
5. Phoenix Motorcars - ZEUS 500 Electric Utility Service Vehicle Ford E350/E450
6. ZeroNox Inc. - Tuatara UTV

Aerial Boom Truck

1. Altec - Aerial Boom Vehicle with JEMS: 16-20 kWh Lithium-Ion Battery *
2. Hyster - Ascender AWP
3. JLG - Aerial Lift
4. Lion Electric Co.- LION8 All-Electric Class 8 Bucket Truck
5. Yale - AEREO AWP

Refrigerated Truck

1. Lion Electric Co.- Refrigerated Truck
2. Volta Trucks - Refrigerated Volta Zero 16T
3. Volta Trucks - Refrigerated Volta Zero 18T

Stake Bed Truck

1. Lion Electric Co.- Stake Bed Truck

Electric Refuse Trucks

1. Battle Motors - Battle 480 Full Electric Refuse Truck
2. BYD - Class 8R Long Range Battery Electric Refuse Truck
3. BYD - Class 6R Long Range Battery Electric Refuse Truck
4. Dennis Eagle - eCollect Electric Refuse Collection Truck
5. Lion Electric Co.- LION8P ASL Class 8 Refuse Battery Electric Truck
6. Lion Electric Co.- LION8P REL Class 8 Refuse Battery Electric Truck
7. Mack - LR Electric Refuse Truck
8. Motiv Power - ERV Battery-Electric Class 8 Refuse Truck
9. Petebuilt - Model 520EV Battery-Electric Class 8 Refuse Truck
10. Sea Drive - Sea Refuse EV Rear Compactor Sea-Drive 120a
11. Sea Drive - Sea Refuse EV Rear Compactor Sea-Drive 120b
12. Sea Drive - Sea Refuse EV Rear Compactor Sea-Drive 120c
13. Sea Drive - Sea Refuse EV Rear Compactor Sea-Drive 180a
14. Sea Drive - Sea Refuse EV Rear Compactor Sea-Drive 180b
15. Sea Drive - Sea Refuse EV Side Loader Sea-Drive 120a
16. Sea Drive - Sea Refuse EV Side Loader Sea-Drive 120b
17. Sea Drive - Sea Refuse EV Side Loader Sea-Drive 120c
18. Sea Drive - Sea Refuse EV Side Loader Sea-Drive 180a
19. Sea Drive - Sea Refuse EV Side Loader Sea-Drive 180b

20. Volvo - FE Electric Refuse Truck
21. Wrightspeed - Electric Powertrain Refuse Truck

Street/Lot Sweeper

1. Dannar - Dannar 3.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
2. Dulevo International - Zero Electric Street Sweeper
3. Tenex International - Electra 1.0 Compact Street Sweeper
4. Tennant - Green Machines 500ze Electric Street Sweeper
5. Tropos - ABLE Sweep eCUV
6. U.S. Hybrid - Hydrogen Fuel Cell Street Sweeper

Fire Trucks

1. Bintelli Electric Vehicles - Fire Buddy Deluxe
2. Rosenbaur - Electric Fire Engine
3. Suzhou Eagle Electric Vehicle Manufacturing Co.

Agricultural Tractors

1. Dannar - Dannar 3.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
2. Dannar - Dannar 4.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
3. Fendt - e100 Vario Electric Tractor
4. John Deere – GridCON
5. Kubota - Electric Kubota Bx2350
6. Monarch - Electric Compact Tractor
7. Solectrac - e25G Electric Tractor Gear Front Loader
8. Solectrac - e70N Narrow Electric Tractor
9. Solectrac - eUtility Tractor
10. Solectrac - Compact eUtility Tractor (CET)
11. Wiggins Lift. Co. - Wiggins AG eBull

Autonomous Agricultural Tractors

1. Dannar - Dannar 3.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
2. Dannar - Dannar 4.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
3. Monarch - Electric Compact Tractor

Livestock/Equestrian Tractors

1. Solectrac - eUtility Tractor

Compact Utility Vehicles

1. Alke - ATX310E Small Electric Pick-Up
2. Alke - Double Cab ATX ED Electric Vehicle
3. Alke - ATEX Explosion Proof Vehicle
4. Alke - ATX320E Electric Vehicle
5. Alke - ATX340E Electric Utility Vehicle
6. Alke - Waste Collection Electric Vehicle
7. Alke - Electric Ambulance
8. Bintelli - Enclosed Electric Shuttle 15p
9. Bintelli - Pressure Washing Buddy
10. Bintelli - Industrial Truck Deluxe 1.5T
11. Bintelli - Transport Buddy Electric Shuttle
12. Bintelli - Transport Buddy Electric Shuttle SE

13. Bintelli - Transport Buddy gp
14. Bintelli - Utility Buddy
15. Bintelli - Utility Buddy Deluxe
16. Bintelli - Utility Buddy Enclosed
17. Bintelli - Utility Cargo Truck
18. Columbia ParCar Corp. - Payloader/Welding
19. Columbia ParCar Corp. - Payloader/Van Body
20. Columbia ParCar Corp. - Payloader/Metal Cage
21. Columbia ParCar Corp. - Payloader/Folding Side Rails
22. Columbia ParCar Corp. - Payloader/Steel Cab
23. Columbia ParCar Corp. - Payloader/Refuse Unit
24. Columbia ParCar Corp. - Utility MVP
25. Columbia ParCar Corp. - Utilitruck
26. Cushman - Hauler 800 X Electric
27. Danner - Danner 3.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
28. Danner - Danner 4.00 Electric Work Vehicle CAT/Bobcat/John Deer Attachments
29. GEM - GEM e2
30. GEM - GEM e4
31. GEM - GEM e6
32. GEM - GEM eL XD
33. GEM - GEM eM 1400 LSV
34. John Deere - TE 4x2 Electric Utility Vehicle
35. Kick - Kick Electric Mini Pickup LSV
36. Mars Cars - EZ Go Express L6 Passenger Vehicle
37. Mars Cars - EZ Go Express S2 Passenger Vehicle
38. Mars Cars - EZ Go Express S4 Passenger Vehicle
39. Mars Cars - EZ Go M2+2 Passenger Vehicle
40. Mars Cars - EZ Go M4 Passenger Vehicle
41. Mars Cars - EZ Go M6 Passenger Vehicle
42. Mars Cars - EZ Go Liberty Passenger Vehicle
43. Mars Cars - EZ GO 4X4 MARS M-WAGON
44. Mars Cars - EZ GO Valor Passenger Vehicle
45. Mars Cars - EZ GO TXT Islander Passenger Vehicle
46. Mars Cars - EZ GO TXT Islander Work Edition Passenger Vehicle
47. Mars Cars - EZ GO Freedom RXV Passenger Vehicle
48. Moto Electric Vehicles - 2 Passenger LSV Enclosed Utility Standard Hard Door
49. Moto Electric Vehicles - 2 Passenger Utility Deluxe
50. Moto Electric Vehicles - 2 Passenger Utility Deluxe Hard Door
51. Moto Electric Vehicles - 2 Passenger Enclosed Utility Deluxe
52. Moto Electric Vehicles - 2 Passenger Enclosed Utility Deluxe Hard Door
53. Moto Electric Vehicles - 4 Passenger Utility Hard Door
54. Moto Electric Vehicles - Industrial Buddy 2 Passenger Truck Deluxe Hard Door
55. Moto Electric Vehicles - Industrial Buddy 2 Passenger Delivery
56. Moto Electric Vehicles - Industrial Buddy 2 Passenger Delivery Hard Door
57. New Vac - KeyLo Electric Mini Pickup LSV
58. Tropos Motors - ABLE FRV - Electric Fire Response Vehicle
59. Tropos Motors - ABLE EMSO - Electric Medical Service Vehicle, Open Platform
60. Tropos Motors - ABLE EMSc - Electric Medical Service Vehicle, Closed Platform
61. Tropos Motors - ABLE Trades
62. Tropos Motors - ABLE Pickup
63. Tropos Motors - ABLE Cargo

64. Westward Industries - MAX EV 3 Delivery Flat Deck
65. Westward Industries - MAX EV 4 Wheel LSV
66. Westward Industries – GO-4 Parking Enforcement
67. Westward Industries – GO-4 ALPR Parking Enforcement
68. Westward Industries – GO-4 XTR Refuse Hauler
69. Westward Industries – GO-4 Extended Flat Deck

Compact Off-Road Vehicles

1. Alke ATX 330E Off Road Electric Vehicle

Autonomous Mobile Power Supply Platform

1. Dannar - Dannar Mobile Power Station 3.00
2. Dannar - Dannar Mobile Power Station 4.00

Mobile Power Supply Platform

1. Dannar - Dannar Mobile Power Station 3.00
2. Dannar - Dannar Mobile Power Station 4.00

Autonomous Emergency Response Vehicle

1. Dannar - Dannar Mobile Power Station 3.00
2. Dannar - Dannar Mobile Power Station 4.00

Passenger Trains

1. ALWEG Rapid Transit Company – Monorail Passenger Train
2. Altrom - Prima M4 - AZ4A Passenger Locomotives
3. Altrom - Citadis Dualis Tram-Train
4. Altrom - Citadis Spirit Light Rail Vehicle
5. Altrom - Fuel Cell Coradia iLint
6. Altrom - Metropolis Metro
7. Altrom - Translohr Tramway On Tyres
8. Altrom - X'Trapolis Suburban Train
9. American Maglev Technology, Inc. - Electric Passenger Train
10. Bombardier Transportation
11. Bombardier - Innovia APM 100
12. Bombardier - Innovia APM 200 Automated People Mover System
13. Bombardier - Innovia APM 256
14. Bombardier - Innovia APM 300 Automated People Mover System
15. Bombardier - Innovia Monorail
16. Bombardier - Flexibility Trams
17. Bombardier - Flexibility 2 Trams
18. Bombardier - Flexibility Freedom
19. Bombardier - Flexibility Light Rail Vehicles
20. Bombardier - Single Deck Electric Multiple Units
21. Bombardier - Double-Deck Electric Multiple Units
22. BYD - SkyRail Monorail System
23. CAF - Electric Locomotive BB A 3000V
24. CAF - Electric Locomotive BBB A 3000V
25. CAF - Electric Locomotive C'C' 3.000V
26. CRRC Zhuzhou Locomotive Co. LTD - HX1D AC Rapid Electric Passenger Locomotive
27. CRRC Zhuzhou Locomotive Co. LTD - ERP Passenger

28. CRRC Zhuzhou Locomotive Co. LTD - Maglev Passenger Train
29. Hitachi - AT 100 Metro Dual Voltage
30. Hitachi - AT 200 Commuter Dual Voltage
31. Hitachi - AT 300 Intercity High Speed
32. Hitachi - Monorail Passenger Train
33. Hyundai Rotem - Manned Electric Passenger Trains
34. Hyundai Rotem - Unmanned Electric Passenger Trains
35. Inekon - Trio Low Floor Tram
36. Inekon - 04 Superior Low Floor Tram
37. Inekon - 11 Pento Low Floor Tram
38. JSC Kolomensky Zavoc - EP2K Passenger Electric Locomotive
39. Kawasaki - SWIMO Ultra Low Floor Tramway
40. Kawasaki - JR East 200 Electric Passenger Extreme Cold Weather Train
41. Kawasaki - 05 Series Electric Subway Train
42. Kawasaki - 22 Series Electric Subway Train
43. Kawasaki - 66 Series Electric Subway Train
44. Kawasaki - 70-000 High Speed Electric Rail Train
45. Kawasaki - 2000 Series High Speed Electric Rail Train
46. Kawasaki - 1000 Series Electric Subway Train
47. Kawasaki - 3000 Series Electric Subway Train
48. Kawasaki - 5000 Series Electric Subway Train
49. Kawasaki - 6300 Series Electric Subway Train
50. Kawasaki - 8000 Series Electric Subway Train
51. Kawasaki - 16000 Series Electric Subway Train
52. Kawasaki - R143 Series Electric Subway Train
53. Kawasaki - PA-5 Commuter Electric Train
54. Kawasaki - 30000 Series Electric Railway Train
55. Kawasaki - 1000 Series Monorail Vehicle
56. Kawasaki - efSET Electric High Speed Railway Vehicle
57. Nippon Sharyo - Light Rail Electric Vehicles (LACMTA)
58. Nippon Sharyo - Model 800 Low Floor Light Rail Electric Vehicles
59. Nippon Sharyo - Gallery Type Bi-Level EMU
60. Nippon Sharyo - Highliner Gallery Type Bi-Level EMU
61. Nippon Sharyo - Commuter EMU
62. Nippon Sharyo - AE100 Express EMU
63. Nippon Sharyo - Series 215 EMU
64. Nippon Sharyo - Series 371 Express EMU
65. Nippon Sharyo - Series 683 Express EMU
66. Nippon Sharyo - Series 1700 Express EMU
67. Nippon Sharyo - Series 2000 Electric EMU
68. Nippon Sharyo - Series 2200 Electric EMU
69. Nippon Sharyo - Series 50000 Express EMU
70. Nippon Sharyo - Series 60000 Express EMU
71. Nippon Sharyo - Series 7000 Driverless Tram With Rubber tires
72. Nippon Sharyo - Model HSST-100 Linimo Maglev Train Fully Automated
73. Nippon Sharyo - Model 40 Suspended Monorail
74. Nippon Sharyo - Light Rail Vehicle
75. Patentes Taolgo SI - Electric Locomotive
76. Scoda Electric - Emil Zatopek Electric Passenger Locomotive
77. Scoda Electric - Single Deck Electric Unit Passenger Train
78. Scoda Electric - Double Single Deck Electric Unit Passenger Train

79. Scoda Electric - Monorail Passenger Train
80. Siemens - Avenio Single Articulated Tram Low Floor
81. Siemens - Avenio Single Articulated Tram Low Floor
82. **Stadler Rail (Switzerland) FLIRT H2 Hydrogen Fuel Cell**
83. Siemens - Streetcar S70 Light Rail Passenger Train
84. Swiss Stadler Rail Group - FLIRT High Speed Low Floor Multi Unit Passenger Rail
85. Swiss Stadler Rail Group - FLIRT 160 High Speed Low Floor Single Decker Passenger Train
86. Swiss Stadler Rail Group - KISS200 long Distance Double Decker Passenger Train
87. Swiss Stadler Rail Group - TANGO City Train High or Low Floor
88. Swiss Stadler Rail Group - TRAMLINK Multi Link Low Floor Train
89. Titagarh - TSR Lenord Double Deck EMU
90. Titagarh - TAF Double Deck EMU
91. Titagarh - ETR500 High Speed Trainset
92. Titagarh - E403 Electric Loco
93. Titagarh - E404.600 High Speed Electric Loco
94. Titagarh - EMUCVS Articulated Single Deck EMU Metrostar
95. Toshiba - 15E Electric Locomotives
96. Toshiba - 19E Electric Locomotives Dual-Voltage
97. Toshiba - SciB Battery Light Rail Transit
98. Toshiba - HSR High Speed Rail
99. Tulomsas - E68000 Electric Outline Engine Passenger Train
100. WINDHOFF Bahn - und Anlagentechnik GmbH

Note: All electric trains in the Netherlands are now 100% Wind Powered

Freight Train

1. Alstrom Transport - Prima T8 AZBA Heavy Freight Locomotive
2. **Alstrom Transport - Traxx Hauler**
3. **Alstrom Transport - Traxx Universal**
4. **Alstrom Transport - Traxx Shunter**
5. American Maglev Technology, Inc. - Electric Freight Locomotive
6. **Clayton Equipment Ltd. - Clayton Battery Shunter Switcher**
7. **CRRC Zhuzhou Locomotive Co. LTD - HXD1 Electric Locomotive**
8. **CRRC Zhuzhou Locomotive Co. LTD - HXD1B Electric Locomotive**
9. **CRRC Zhuzhou Locomotive Co. LTD - HXD1C Electric Locomotive**
10. **CRRC Zhuzhou Locomotive Co. LTD - HXD1F Electric Locomotive**
11. **CRRC Zhuzhou Locomotive Co. LTD - HXD2 Electric Locomotive**
12. **CRRC Zhuzhou Locomotive Co. LTD - HXD2B Electric Locomotive**
13. **CRRC Zhuzhou Locomotive Co. LTD - HXD2F Electric Locomotive**
14. **CRRC Zhuzhou Locomotive Co. LTD - HXD2C Electric Locomotive**
15. **CRRC Zhuzhou Locomotive Co. LTD - HXD3 Electric Locomotive**
16. **CRRC Zhuzhou Locomotive Co. LTD - HXD3B Electric Locomotive**
17. **Innovative Rail Tech - IRT ET-5e Locomotive**
18. Kawasaki - JR Cargo EF 210 Electric Locomotive
19. Kawasaki - JR Cargo EF 510 Electric Locomotive
20. Kawasaki - JR Freight M 250 Super Rail Cargo Electric Locomotive
21. Kawasaki - 6K Freight Electric Locomotive
22. Schoma Lokomotiven - Electric Tunnel Locomotives
23. Siemens - eHighway Freight System
24. Swiss Stadler Rail Group - NG Shunting Locomotive

25. Swiss Stadler Rail Group - Tailor Made Locomotives
26. Tulomsas - E43000 Electric Locomotive
27. Tulomsas - E1000 Electric Maneuvering Engine
28. Tulomsas - E68000 Electric Outline Engine Freight Train
29. Wabtec Corp. - FLXdrive Battery-Electric Heavy-Haul Freight Locomotive

Passenger Van

1. Green4U Technologies - Passenger Cargo Van
2. GreenPower Motor Co. - EV Star 25' 17 Passenger Van
3. Lightning eMotors – ZEV3 Transit Passenger Van
4. Lightning eMotors - Transit Passenger Van 170 Mile
5. Lightning eMotors - Transit Passenger Van Hydrogen Fuel Cell 250 Mile
6. Mercedes-Benz - eVito Passenger Van
7. Mercedes-Benz - EQV 6 Passenger Van
8. Mercedes-Benz - EQV 7 Passenger Van
9. Mercedes-Benz - EQV 8 Passenger Van
10. VIA - Passenger Van
11. Zenith Motors - Electric Passenger Van

Passenger/Shuttle Buses

1. Altrom - Aptis Electric Bus
2. Ameritrans Bus - All-Electric Motiv ePCS On Ford E450 Chassis 25 Passenger Shuttle Bus
3. Advanced Vehicle Manufacturing (AVM) - All Electric Mid-Size Shuttle Bus EV21
4. Advanced Vehicle Manufacturing (AVM) - All Electric Mid-Size Shuttle Bus EV27
5. Advanced Vehicle Manufacturing (AVM) - All Electric Mid-Size Shuttle Bus EV33
6. BYD Motors - C6 23-Ft Zero-Emission Electric Motor Coach
7. BYD Motors - K7M 30-Ft All Electric Zero-Emission Transit Bus
8. BYD Motors - K9s 35-Ft Zero-Emission Transit Bus
9. BYD Motors - K9M 40-Ft All Electric Zero-Emission Transit Bus
10. BYD Motors - K9S 40-Ft All Electric Zero-Emission Transit Bus
11. BYD Motors - C9 40-Foot Zero-Emission Electric Motor Coach
12. BYD Motors - C10M 45-Ft Articulated All Electric Coach
13. BYD Motors - K11M 60-Ft Articulated All Electric Zero-Emission Transit Bus
14. BYD ADL Enviro400EV Electric Double Decker Bus
15. Endera - B Series Battery Electric Vehicle Shuttle Bus
16. Gillig - Battery Electric Bus
17. Green4U Technologies - Shuttle Bus
18. Green4U Technologies - Touring Bus
19. GreenPower - AV Star Passenger Shuttle
20. GreenPower - EV250 30-Foot All Electric Bus
21. GreenPower - EV350 40-Foot All Electric Bus
22. GreenPower - EV500 40-Foot All Electric Double Decker Bus
23. GreenPower - EV550 40-Foot All Electric Double Decker Bus
24. GreenPower - SYNAPSE 72 All Electric Shuttle Bus
25. International IC Bus - IC charge All-Electric Bus
26. Irizar Group - e-Mobility ie Bus 10.8
27. Irizar Group - e-Mobility ie Bus 12
28. Irizar Group - e-Mobility ie Bus 15
29. Irizar Group - e-Mobility ie Bus 18
30. Irizar Group - e-Mobility ie Tram Bus 12m
31. Irizar Group - e-Mobility ie Tram Bus 18m
32. Lightning eMotors - ZEV4 Shuttle Bus (Ford F-450)
33. Lightning eMotors - ZEV4 Shuttle Bus (GM 4500)

34. Lightning eMotors - ZEV5 Shuttle Bus
35. Lightning eMotors – Lightning Repower City Transit Bus
36. Lion- Class 6 Electric LIONM Shuttle Bus
37. Kamaz - 6282 Electric Articulated Bus
38. Mercedes-Benz - eCitaro City Bus
39. Motiv Power Systems - EPIC 4 Passenger Bus
40. Motiv Power Systems - EPIC 6 Passenger Bus
41. Motor Coach Industries - D45 CRT LE Charge
42. Motor Coach Industries - J4500 Charge
43. New Flyer - Xcelior XE 35 Bus With Lithion-Ion Battery Pack
44. New Flyer - Xcelior XE 40 Bus With Lithion-Ion Battery Pack
45. New Flyer - Xcelior XE 60 Bus With Lithion-Ion Battery Pack
46. Novabus - LFSe Electric Bus 40'
47. Novabus - LFSe+ Electric Bus 40'
48. Optimal EV - S1LF Shuttle Bus
49. Optima Electric Vehicles - E1 Battery Electric Shuttle Bus
50. Phoenix Motorcars - ZEUS 400 Zero Emissions Shuttle Bus
51. Phoenix Motorcars - E450 Battery Electric Shuttle Bus
52. Proterra - Catalyst FC 35-Foot Urban Transit Bus
53. Proterra - Catalyst XR 35-Foot Urban Transit Bus
54. Proterra - Catalyst E2 35-Foot Urban Transit Bus
55. Proterra - Catalyst FC 40-Foot Urban Transit Bus
56. Proterra - Catalyst XR 40-Foot Urban Transit Bus
57. Proterra - Catalyst E2 40-Foot Urban Transit Bus
58. Proterra - ZX5 35' Electric Bus
59. Proterra - ZX5 40' Electric Bus
60. Sea Electric - SEA E4B Commuter Bus
61. Solaris - Urbino 8 LE Electric Bus
62. Solaris - Urbino 9 LE Electric Bus
63. Solaris - Urbino 12 LE Electric Bus
64. Solaris - Urbino 18 LE Electric Bus
65. Toshiba - Sora FC EV Bus
66. Van Hool - CX45E Electric Coach
67. VDL Bus & Coach - Citea SLF-120 Electric Bus
68. VDL Bus & Coach - Citea SLF-121 Electric Bus
69. VDL Bus & Coach - Citea SLFA-180 Electric Bus
70. VDL Bus & Coach - Citea SLFA-181 Electric Bus
71. VDL Bus & Coach - Citea SLFA-187 Electric Bus
72. VDL Bus & Coach - Citea LLE - 99 Electric Bus
73. Volvo - 7900 Electric Articulated Bus
74. Zenith Motors - Electric Mini Bus
75. Zenith Motors - Electric Shuttle 9 Passenger Van
76. Zenith Motors - Electric Shuttle 16 Passenger Van

Paratransit

1. Optima Electric Vehicles - E1 Battery Electric Paratransit Bus

Automated Passenger Bus

1. New Flyer - Xcelior AV 40'

Compact Shuttle/MiniBus

1. Columbia - 6 Passenger Shuttle
2. Columbia - MVP 14 Passenger Shuttle

3. EMOSS - MB4 - 7 Passenger Electric Minibus
4. EMOSS - MB14 - 15 Passenger Electric Minibus
5. EMOSS - MB15 - 15 Passenger Electric Minibus
6. EMOSS - MB16 - 16 Passenger Electric Minibus
7. Hyundai - County Electric Minibus
8. Lightning eMotors - E-450 Shuttle Bus 80 Mile
9. Lightning eMotors - E-450 Shuttle Bus 120 Mile
10. Motiv - Epic E-450 Shuttle
11. Moto Electric Vehicles - MotoEV Electro Transit Buddy 9 Passenger
12. Moto Electric Vehicles - MotoEV Electro Transit Buddy 9 Passenger Hard Door
13. Moto Electric Vehicles - MotoEV Electro Transit Buddy 11 Passenger ADA
14. Moto Electric Vehicles - MotoEV Electro Transit Buddy 12 Passenger
15. Moto Electric Vehicles - MotoEV Electro Transit Buddy 12 Passenger Hard Door
16. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger
17. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger Hard Door
18. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger XE Hard Door
19. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger LE Hard Door
20. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger ADA
21. Moto Electric Vehicles - MotoEV Electro Transit Buddy 15 Passenger Wheelchair
22. Moto Electric Vehicles - MotoEV Electro Transit Buddy 23 Passenger
23. Moto Electric Vehicles - MotoEV Electro Transit Buddy 27 Passenger ADA
24. Moto Electric Vehicles - MotoEV Electro Transit Buddy 28 Passenger Tram
25. Moto Electric Vehicles - MotoEV Electro Transit Buddy 28 Passenger Hard Door Tram
26. Phoenix Motors - ZEUS 400 Shuttle Bus

Autonomous Shuttle/Bus

1. Sensible4 - Gacha Autonomous Shuttle Bus
2. Toyota - e-Palette Autonomous Mobile as a Service (Autono-MaaS) Shuttle Bus

School Buses

1. ADOMANI - Electric School Bus
2. Blue Bird - Type D RE Electric School Bus
3. Blue Bird - Type A Micro Bird G5 Electric School Bus
4. BYD 35' School Bus
5. BYD 38" School Bus
6. BYD 40' School Bus
7. Creative Bus Sales Inc. - Type C Motiv All-Electric Powertrain With Ford F59 Starcraft School Bus
8. GreenPower – BEAST (Battery Electric Automotive School Transportation) 40'
9. GreenPower - SYNAPSE 72 All Electric School Bus
10. Lightning eMotors - ZEV4 Type A School Bus (Ford E-450)
11. Lightning eMotors - ZEV4 Type A School Bus(GM 4500)
12. LION Electric - eLion Type C School Bus
13. Motiv Power Systems - eQuest XL All-Electric Powertrain With Ford F59 Starcraft School Bus
14. Motiv Power Systems - EPIC 4 Type A School Bus
15. Motiv Power Systems - EPIC 5
16. Motiv Power Systems - EPIC 6 Type C School Bus
17. Motiv - Epic E-450 School Bus
18. Navistar - IC School Bus CE Series
19. Phoenix Motorcars - E450 Battery Electric School Bus
20. Thomas Built Buses/Daimler - Saf-T-Liner C2 Jouley Electric School Bus
21. Transpower - Type C Transit School Bus

22. Trans Tech Bus - SStE - Motiv ePCS On Ford E450 Chassis School Bus
23. Phoenix Motors - ZEUS 600 School Bus

Ambulance

1. Lightning eMotors - ZEV3 Transit Ambulance Type II 140-Mile
2. Lightning eMotors - ZEV3 Transit Ambulance Type II 200-Mile

Taxi

1. BYD - E6 Electric Taxi
2. Electric Cab North America - Micro Transit Shuttles
3. Nissan LEAF Electric Taxi

Underground Mining Equipment

1. Epiroc - Scooptram ST7 Battery Electric Loader
2. Epiroc - Scooptram EST1030 Electric Loader
3. Epiroc - Scooptram EST2D Electric Loader
4. Epiroc - Scooptram EST3.5 Electric Loader
5. Epiroc - Minetruck MT2010
6. Epiroc - Minetruck MT42
7. Epiroc - Boomer E2 Battery Face Drill Rig

Cargo Ship

1. Compagnie Fluvial de Transport - Zulu Hydrogen Fuel Cell Inland Cargo Vessel
2. COSCO Shipping Development - Electric Container Ship - N997 700 TEU Vessel
3. Guangzhou Shipyard International Company Ltd. - All Electric 2,200 Ton Cargo Ship
4. Kawasaki Heavy Industries - Hydrogen Fuel Cell 8,000 Ton Ship
5. PortLiner - EC52-1 Inland Waterway Bulk 400/1,000 Ton Ship
6. PortLiner - EC52-1 Inland Waterway 24/36 TEU Container Ship
7. PortLiner - EC110 Inland Waterway Bulk 7,000 Ton Ship
8. PortLiner - EC110 Inland Waterway 280 TEU Container Ship
9. Zero Emissions Services - Inland Container Vessel ZES Pack Exchangeable Battery Containers

Cargo/Container Barge

1. Future Proof Shipping - H2 Barge Hydrogen Fuel Cell Inland Container Ship
2. Heineken - Alphenaar Electric Inland Barge
3. Port Liner - All-Electric Container Barge Tesla Ships
4. Wartsila - Electric Cargo Barge
5. Yinson GreenTech - Electric Cargo Vessel - Hydromover

Cruise Barge

1. The Electric Barge - Cruise/Floating Classroom Barge

Autonomous Container/Cargo Ship

1. ASKO Maritime - Autonomous Electric Vessel Sea Drones
2. Vard Braila - All-Electric Container Ship
3. Yara International/Kongsberg - ZE Autonomous Electric Cargo Ship - Yara Birkland

Cruise Ship

1. AIDAperla - German Cruise Line

2. China Yangtze Power - Yangtze River Three Gorges 1
3. Fincantieri Ancona/Viking Cruise Lines - Hydrogen Fuel Cell Cruise Ship

Fishing Boats

1. Siemens Energy - Karoline Electric Fishing Boat
2. Siemens Energy - Elfrida Electric Fish Farming Boat

Car Ferry

1. E-Ferry - Ellen Electric Car Ferry
2. ForSea Ferries - M/F Tycho Brahe Electric Car Ferry Fjellstrand - MV Ampere Electric Car Ferry
3. NavAlt Solar & Electric Boats - Aditya Solar-Powered Passenger Ferry

Autonomous Car Ferry

1. Mitsubishi Heavy Industries - SOLEIL Car Ferry

Passenger Ferry

1. All American Marine/SWITCH Marine - Hydrogen Fuel Cell Electric Passenger Ferry
2. Austral - Volt Series Passenger Express 46V Ferry
3. Damen - Electric 80 Passenger Ferry 2306
4. Danfoss - Passenger Ferry
5. E-Ferry - Ellen Electric Passenger Ferry
6. Energy Absolute - Passenger Ferry
7. Fjellstrand - Electric Passenger Ferry
8. Incat Crowther - Battery Electric Passenger Ferry
9. Incat Crowther - Hydrogen Fuel Cell Passenger Ferry
10. Sterling PlanB Energy Solutions - Electric Passenger Ferry

Passenger/Car Ferry

1. Ampere - Electric Passenger & Car Ferry
2. Fjellstrand/Siemens Energy - Ampere - Electric Car & Passenger Ferry

Pilot Boat

1. Artemis Technologies - EF-12 Pilot - Artemis eFoiler Pilot Boat
2. MGH Group - e-Maguelonne Pilot Boat
3. Robert Allan Ltd. – 52' Rally 1600-E All-Electric Pilot Boat

RORO Passenger/Vehicle Ferry

1. Terson Shipyard - RORO Passenger/vehicle Ferry

Autonomous RORO

1. Cochin Shipyard/Asko Maritime - Electric RORO

Sight Seeing Boat

1. The Fjords/Broddrene Aa - Vision of the Fjords Passenger Sightseeing Boat

Tanker Ship

1. Asahi Tanker/Corvus Energy - e5 All-Electric Lithium-Ion Battery Tanker

Tug Boat

1. Crowley - 82' Ship Assist Electric Tug THS-08240, 70 Short Ton Bollard Pull
2. Damen Shipyards - Damen RSD Tug 2513 Electric, 70 Ton Bollard Pull
3. Damen Shipyards - Damen ASD-E Tug 2111 Electric, 50 Ton Bollard Pull
4. HaiSea Marine - Electric Tugboat - ElectRA 2800 - HaiSea Wamis
5. Lianyungang Port Holding Group - Yungang Electric Tug No. 1
6. Navtek Naval Technologies – ZEETUG30, NV712-Gisas Power 32 Ton Bollard Pull
7. Sanmar Shipyards - HAISEA WAMIS Battery ElectRA 70 Ton Bollard Tug

Workboat

1. Artemis Technologies - EF-12 Workboat
2. Damen - Multi Cat 1908 Electric Workboat
3. Hukkelberg Boats - Electric Aluminum Workboat

Electric Boats Note

There are several consumer recreational electric boat manufacturers.

Survey Notes:

1. CFASE conducts monthly searches for all vehicles and equipment that are zero emissions. Our survey is the most comprehensive document of zero emission technologies.
2. CFASE contacted the manufacturer directly to obtain information or information was available on the manufacturer website.
3. Commercially Available means that the manufacturer is accepting orders for delivery to customer in less than one year. Time of delivery can vary due to the type and number of vehicles ordered.
4. Vehicles, CHE, Locomotives and Equipment can be new or used and be retrofitted to be zero emission.

Electric Battery Locomotives



Progress Rail (USA) - EMD Joule - SD40JR Switcher



Progress Rail (USA) - EMD Joule - SD50 Switcher



Progress Rail (USA) - EMD Joule - SD60 Switcher



Progress Rail (USA) - EMD Joule SD70J Switcher



Progress Rail (USA) - EMD Joule SD70J-BB Switcher



Progress Rail (USA) - EMD Joule GT38JB Switcher

Electric Battery Locomotives



Progress Rail (USA) - GT38JC Switcher Locomotive



Innovative Rail Tech (USA) - IRT ET-5e Locomotive



Clayton Equipment (UK) - Battery Shunter



Clayton Equipment (UK) - CBD90 Battery Shunter



Clayton Equipment (UK) - CB40 Battery Shunter



Clayton Equipment (UK) - CB80 Battery Shunter

Electric Battery Locomotives



Wabtec Corporation (USA) - FLXdrive Switcher



Wabtec Corporation (USA) - FLXdrive Heavy Haul

Electric Catenary Locomotives



Siemens (England) - Vectron MS Locomotive



Siemens (England) - Vectron AC Locomotive



Siemens (England) - Vectron DC Locomotive



Alstom Transport (France) - Traxx Universal Locomotive



Alstom Transport (France) - Traxx Hauler Locomotive



Alstom Transport (France) - Traxx Shunting Locomotive

Electric Catenary Locomotives



Kawasaki Rail Car (Japan) - JR Cargo EF210 Locomotive



Kawasaki Rail Car (Japan) - JR Cargo EF510 Locomotive



Kawasaki Rail Car (Japan) - JR Freight M250 Locomotive



Kawasaki Rail Car (Japan) - 6K Freight Locomotive



Stadler (Switzerland) - EURO9000 Heavy Haul Locomotive



CRRC (China) - HXD1 Electric Locomotive

Electric Catenary Locomotives



CRRC (China) - HXD1B Electric Locomotive



CRRC (China) - HXD1C Electric Locomotive



CRRC (China) - HXD1F Electric Locomotive



CRRC (China) – HXD2 Electric Locomotive



CRRC (China) – HXD2B Electric Locomotive



CRRC (China) – HXD2F Electric Locomotive

Electric Catenary Locomotives



CRRC (China) – HXD2C Electric Locomotive



CRRC (China) – HXD3 Electric Locomotive



CRRC (China) - HXD1B Electric Locomotive

Electric Hydrogen Fuel Cell Locomotives



CPKC (Canada) - Hydrogen Fuel Cell Locomotive



CSX Transportation (USA) - Hydrogen Fuel Cell Locomotive



GEN H2 (USA) - Hydrogen Fuel Cell Locomotive



PESA (Poland) - SM42-6Dn Hydrogen Fuel Cell Switcher

Electric Maglev Freight Transportation Vehicle



American Maglev Tech. (USA) - EMMI Freight Vehicle



Max Bögl Group (Germany) - TSB Cargo System Maglev