



Manufacturer capacity regarding Advanced Clean Fleet Proposal

We appreciate the opportunity to share our feedback regarding the meaningful and necessary ACF proposed Rule by CARB. Below are comments from *GreenPower Motor Company (GP)*.

Clean Vehicle Credit – Section 30D

- 1. Establishes an \$80,000 price cap for van, SUV's and pick-up trucks.
- 2. Creates a Tax Credit for commercial vehicles up to \$7,500 weighing less than \$14,000 lbs.
- 3. Creates a Tax Credit for commercial vehicles up to \$40,000 weighing greater than \$14,000 lbs.
- 4. This credit is good through 2032.

Alternative Fuel Refueling Property Credit – Section 30C

- 1. Section 30 C offers a Tax Credit up to \$100,000 per item of property for electric charging stations or hydrogen fuel cell.
- 2. Includes Bi-directional charging equipment.
- 3. This credit is good through 2032.

Truck Sales in California's HVIP program:

These new Federal MHD incentives along with local funding like HVIP, VW, Carl Moyer, Goods Movement and Community Air Protection – all will support the adoption of MHD commercial ZEV's. It shall continue to support investments in EV procurement which provides substantially less operational cost than an ICE.

We have seen an additional 17 "new" ZEV OEM's enter the space over the last two years and selling the technology. We have just turned the corner as there is a clear uptick. Several ZEV Truck OEM's that are big brand names are offering product, such as: Ford, Volvo, General Motors, Freightliner, Peterbilt, Kenworth, Navistar, Mack, Zeus, and Xos. See HVIP ZEV sales stats at **Table 1**.

The HVIP program has inventory of 31 active OEM's selling vehicles with 21 being active Truck OEM's. Out of the 5,212 ZEV sales to date 60% of the sales are Trucks at 3,904 units. Deliveries will directly be impacted by these sales.

GP GreenPower MOTOR COMPANY Porterville, CA Rancho Cucamonga, CA Vancouver, Canada

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Table 1: HVIP Impact Sales thru 8-31-22.	(OEM with ZEV Truck inventory in BLUE text)		

Repo	ort Date: 9-13-22 (Impact data thru 8-31-22)		2022 OE	2021 OEM's = (3)New					
No	ZEV OEM VOUCHERS DELIVERED (Sorted by OEM Delivered Sales)	Vehicle Sales (vouchers)	Vehicle Sales %	Total Unpaid Vouchers	Total Unpaid %	Total Delivered Vouchers	Total Paid & Delivered %		
1	BYD	692	13.28%	381	55.06%	311	44.94%		
2	GreenPower	239	4.59 %	91	38.08%	148	61.92 %		
3	Proterra	177	3.40%	60	33.90%	117	66.10%		
4	Phoenix	145	2.78%	51	35.17%	94	64.83%		
5	Blue Bird	349	6.70%	261	74.79%	88	25.21%		
6	Motiv	324	6.22%	255	78.70%	69	21.30%		
7	New Flyer	215	4.13%	148	68.84%	67	31.16%		
8	Lion	278	5.33%	222	79.86%	56	20.14%		
9	Lightning	314	6.02%	259	82.48%	55	17.52%		
10	Ford (returned 2022)	143	2.74%	91	63.64%	52	36.36%		
11	Navistar (returned 2021)	201	3.86%	167	83.08%	34	16.92%		
12	Micro Bird	149	2.86%	142	95.30%	7	4.70%		
13	Thomas Built (new 2020)	39	0.75%	33	84.62%	6	15.38%		
14	Xos	355	6.81%	350	98.59%	5	1.41%		
15	Sea Electric (new 2020)	66	1.27%	62	93.94%	4	6.06%		
16	Volvo (new 2021)	508	9.75%	507	99.80%	1	0.20%		
17	Gillig	31	0.59%	30	96.77%	1	3.23%		
18	Freightliner (new 2020)	444	8.52%	444	100.00%	0	0.00%		
19	Peterbilt (new 2020)	149	2.86%	149	100.00%	0	0.00%		
20	Nikola (new 2022)	123	2.36%	123	100.00%	0	0.00%		
21	Kenworth (new 2020)	114	2.19%	114	100.00%	0	0.00%		
22	Freightliner Custom Chassis (new 2022)	50	0.96%	50	100.00%	0	0.00%		
23	Envirotech Drive Systems (new 2019)	36	0.69%	36	100.00%	0	0.00%		
24	Crain Carrier (new 2022)	20	0.38%	20	100.00%	0	0.00%		
25	Van Hool (new 2021)	20	0.38%	20	100.00%	0	0.00%		
26	Arboc (new 2022)	11	0.21%	11	100.00%	0	0.00%		
27	Optimal (new 2022)	8	0.15%	8	100.00%	0	0.00%		
28	Zeus (new 2022)	5	0.10%	5	100.00%	0	0.00%		
29	Motor Coach (new 2020)	4	0.08%	4	100.00%	0	0.00%		
30	Mack Trucks (new 2022)	3	0.06%	3	100.00%	0	0.00%		
31	Workhorse	0	0.00%	0	100.00%	0	0.00%		
31 TOTAL OEM'S 5,212 100.00% 4,097 78.61% 1,115									
8-31-22, HVIP Impact Data, Historical Overall Results:									
GreenPower has the #2 Ranking for Deliverables out of all "39" OEM's in history.									
Extinct OEM's removed from Data.									

See HVIP ZEV Truck sales states at *Table 2* and *Chart 1*.





The largest truck sales vocation is 1,460 units of truck tractors at 47% of all truck sales. Currently we can see that we have ramped up sales significantly largely due to the big brand OEM's that have recently entered the market. There are a total of 2,416 truck sales to be delivered. This is more than what we had seen over the entire decade of the HVIP program.

No	TRUCK SALES BY OEM	Vehicle Sales (vouchers)	Vehicle Sales %	No	TRUCK SALES BY VOCATION	Vehicle Sales (vouchers)	Vehicle Sales %	TRUCK SALES BY YEAR	Vehicle Sales (vouchers)	Vehicle Sales %
1	Volvo	508	16.42%	1	Truck Tractor	1,460	47.19%	2011	67	2.17%
2	Freightliner	444	14.35%	2	Cargo Van	928	29.99%	2012	106	3.43%
3	Xos	355	11.47%	3	Box Truck	619	20.01%	2013	171	5.53%
4	Lightning	172	5.56%	4	Refuse	55	1.78%	2014	20	0.65%
5	Smith Electric	168	5.43%	5	Utility Truck	31	1.00%	2015	6	0.19%
6	Peterbilt	149	4.82%	6	Strait Truck	1	0.03%	2016	5	0.16%
7	Ford	143	4.62%					2017	7	0.23%
8	Motiv	143	4.62%					2018	54	1.75%
9	Nikola	123	3.98%					2019	71	2.29%
10	Kenworth	114	3.68%					2020	87	2.81%
11	EVI	112	3.62%					2021	62	2.00%
12	BYD	95	3.07%					2022	22	0.71%
13	Orange	85	2.75%					unredeemed vouchers	2,416	78.09%
14	GreenPower	74	2.39%							
15	Sea Electric	66	2.13%							
16	Navistar	63	2.04%							
17	Freightliner Custom Chassis	50	1.62%							
18	Lion	45	1.45%							
19	Kalmar Ottawa	41	1.33%							
20	Envirotech Drive Systems	36	1.16%							
21	Phoenix	32	1.03%							
22	Chanje	25	0.81%							
23	Zenith	22	0.71%							
24	Crain Carrier	20	0.65%							
25	Zeus	5	0.16%							
26	Mack Trucks	3	0.10%							
27	AMP	1	0.03%							
28	Workhorse	0	0.00%							
	28 TOTAL OEM'S (7 Extinct)	3,094	100.00%	6 TRUCK VOCATIONS		3,094	100.00%	12 TOTAL YEARS	3,094	100.00%

Table 2: HVIP Impact Truck Sales thru 8-31-22.





Chart 1: HVIP Impact Delivered Truck Sales thru 8-31-22.



The HVIP program has spear headed the technology through its innovative and easy access to procurement by drawing down the investments with its Funding program. As CARB and CalStart strive to learn from the stakeholders and the data collected, I believe looking at the most recent launch on 8-30-22 of the newest funding program that was the first of its kind and specifically devoted to Trucks and small fleets will create a new wave of stakeholders. The Innovative Small Electric Fleet (ISEF) program is a program for small truck fleets adopting EV's. The fleet must have 20 vehicles or less and under \$15 million in annual gross revenue. The program closed within 2.5 weeks with a total amount of \$23.6 Million in funding and approximately 170 MHD Truck Sales (which are not accounted for in the current HVIP impact reports that are shown).





MHD ZEV OEM History and Progress:

As shown in the above **Table 1** with 12 years of HVIP data from ZEV MHD sales the entire program has been maintained by small, new OEM's. This has largely been a vertical market with sales contributed by (in order of highest deliverables to date):

- 1. BYD
- 2. GreenPower
- 3. Proterra
- 4. Phoenix
- 5. Blue Bird
- 6. Motiv
- 7. New Flyer
- 8. Lion
- 9. Lightning
- 10. Ford (returned 2022)
- 11. Navistar (returned 2021)

The technology is commercially viable and reliable and has real world proven data. California has been the biggest influencer in Transportation Technology. The vertical market has shaped our future and now the inventory includes big brand OEM's. This change marks the future of this technology. The proposed regulation will build on this progress and it is critical to accelerating the MHD ZEV's and supports existing policies and regulations through a very reasonable phased-in fleet transition of medium, heavy, and light-duty.

GreenPower Motor Company ZEV Delivery Status:

GreenPower is one of these small ZEV MHD OEM's and began delivering vehicles thru HVIP in 2018. We have maintained the 2nd highest deliverables year over year. This year (2022) GreenPower has the very highest deliverables in the HVIP program and GreenPower has repeated the same in both NY and NJ. We are 2nd behind BYD however, BYD has 5 years of additional history with sales thru HVIP. GreenPower sold 87 units of trucks thru it's providers in the ISEF program on August 30th making up approximately \$11.5 million of funding alone. We have seen strong interest by the truck market and it has been our top selling line. GreenPower only sells trucks in the MD classification and based on the population and the ACF and ACT we see a strong market in the short term.





ACF Timelines:

Per ACT, beginning 2040 MY, all medium- and heavy-duty vehicles sold in California must be ZEV. The Proposed ACF provides two pathways:

Model Year Schedule:

Beginning January 1, 2024, all additions to the fleet must be ZEVs, and all ICE vehicles must be removed from the California fleet at the end of their useful lives.

ZEV Milestones Option:

ZEV phase-in requirement where a portion of the fleet must be ZE-based. This option is separated into three distinct schedules as follows:

- **Group 1**: Box trucks, vans, two-axle buses, yard trucks, light-duty delivery vehicles: 10 percent by 2025, increasing to 100 percent by 2035.
- **Group 2**: Work trucks, day cab tractors, three-axle buses: 10 percent by 2027, increasing to 100 percent by 2039.
- Group 3: Sleeper cab tractors and specialty vehicles:

10 percent by 2030, increasing to 100 percent by 2042.

These options provide a very reasonable and long-time frame of adoption which does not force the fleet to scale. We believe the program supports the climates goal and a 2024 implementation that is optional is not aggressive enough however, it balances with those that need more time before making the leap.

Cost Savings:

The Board has determined the costs or savings incurred by public agencies and private persons and businesses overall are reasonable and in compliance with the proposed regulatory actions. Compared to gasoline, diesel, or natural gas vehicles, ZEVs generally have higher upfront capital costs today but lower operating costs, which results in an overall savings throughout the vehicle's useful life. The facts are the truck market and small to medium size fleets have a strong future to reduce operational cost with this technology.

We can look at one operational cost alone "fuel" to help determine the savings are at minimum 50% per mile as shown in the below two charts.









This illustration uses GP's advertised efficiency of 0.80 kWh/mi ; thereby this results in a more conservative savings than the actual real-world Demo days established.





Advancements Exceeding Range:

GreenPower motor has collected several thousand miles of EV data from real world use. We have been able to determine many positive findings with the technology. Driver experience alone can support exceeding the range due to the design with regenerative braking and pedal use. See below for some examples of GreenPower Motor's medium duty Class 4 EV Star. The capacity is 118 kWh and 153 miles of range.

In each scenario, this demonstrates long haul driving and we are exceeding our ranges.

Scenario 1:

Traveled 146 used 75% SOC from San Fran to Ukiah California (First chart is map, 2nd chart is data)



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Battery Storage

Miles Traveled

kWh Used

■ SOC % Used

DEMO DATE: JUN 1, 2022 ROUTE: 880 N, 580 W, 101 N. EV STAR FUEL STORAGE = 118 kWh DISTANCE = 146 MILES TRAVELED KWH USED = 89 SOC % USED = 75% ESTIMATED RANGE = 175 + MI





Scenario 2:

Traveled 226 used 90% SOC from Las Vegas to Ontario California (First chart is map, 2nd chart is data)







Recommendations & Support of Proposal:

We recommend and support the proposal and see it as a very reasonable approach to the necessary changes. We strongly believe as adoption occurs by the truck and smaller size fleets many positive findings will satisfy the stakeholders more than we realize. We look forward to supporting this proposal and GreenPower is available for any follow up or questions.

~Lisa McGhee, GreenPower Motor Company