



AVAILABLE ELECTRIC SCHOOL BUSES

**SAFE-T-LINER
C2 JOULEY**

eLionC

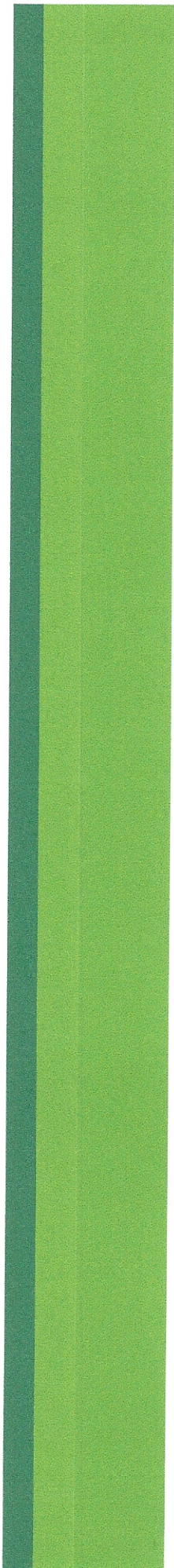
**STARCRAFT
QUEST XL**

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QUEST XL**

Type	Thomas Built Buses (Daimler)		Lion	Starcraft		Trans Tech	IC Bus (VW)
Chassis & Powertrain	Type C	Type A	Type A	Type C	Type A	Type A	Type A
Battery Type	700ev from EDI	TM4 Sumo MD	TM4 Sumo MD	Ford F-59	Ford F-59	Ford E-450	Ford E-450
Battery Capacity	Proterra	LG Chem - Lithium-ion (NMC)	LG Chem - Lithium-ion (NMC)	Sodium-Nickel-Chloride	Sodium-Nickel-Chloride	Lithium-ion	Lithium-ion
Passenger Capacity	100 and 160 kW	220 kW	220 kW	180 kW	180 kW	260 kW	260 kW
Range with Standard Battery	81	54-72	54-72	39-47	39-47	42	42
Top Speed	120 miles	65 / 100 /125 / 155 miles	65 / 100 /125 / 155 miles	85 miles	85 miles	120 miles	120 miles
Gradeability	65 mph	60 mph	60 mph	60 mph	60 mph	60 mph	60 mph
Cabin Heating System		20%	20%	20%	20%		
Charger		2 x 80,000 BTU	2 x 80,000 BTU				
Charging System		19.2 kW	19.2 kW	208v / 25kW	208v / 25kW		
Estimated Charging Time	J1772	J1772	J1772	208/240V 3-phase	208/240V 3-phase		
Approx Price	6-8 hours	4-6 hours	4-6 hours	8 hours	8 hours	6-10 hours	6-10 hours
Deployed in US							
GVWR	MA, CA	CA, NY, MN, MA	CA, NY, MN, MA				

up to 30,000 lbs
Other

Fast-charging,
wheelchair lift, AC

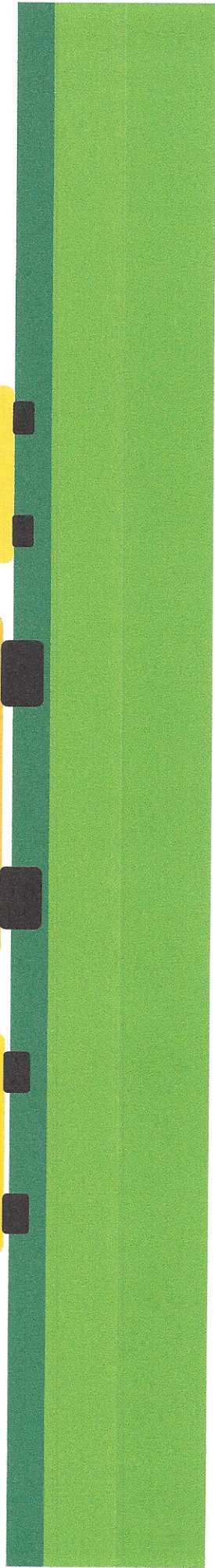
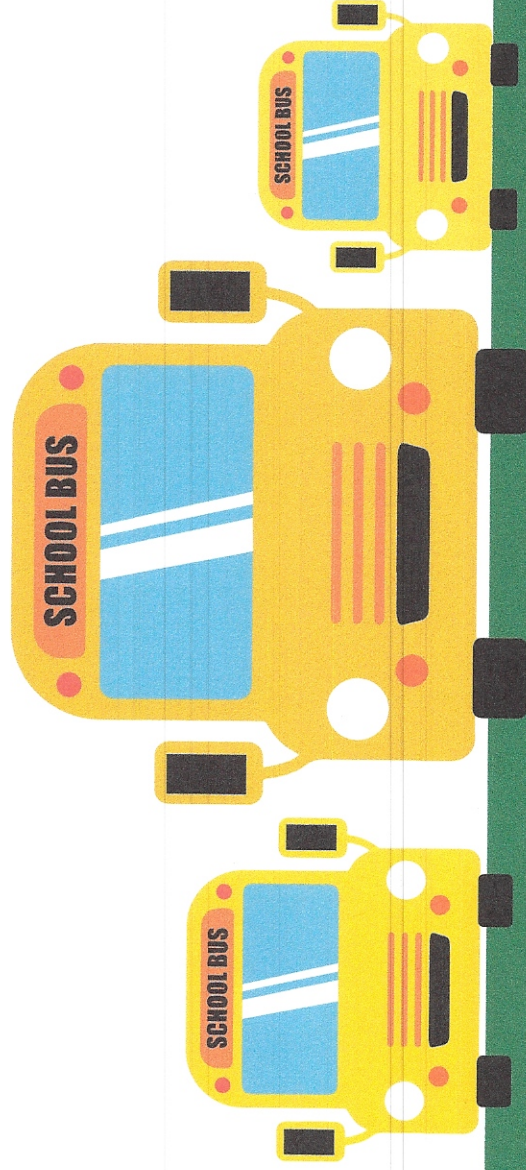




AVAILABLE ELECTRIC SCHOOL BUSES

ALL AMERICAN REAR ENGINE (RE) ELECTRIC MICRO BIRD G5 ELECTRIC VISION ELECTRIC

Type	Type D	Type C	Type A
Chassis & Powertrain	ADOMANI & Efficient Drivetrains, Inc. (EDI)	x	x
Battery Type	Lithium-ion	x	x
Battery Capacity	100 and 160 kW	100 and 160 kW	87 kW
Passenger Capacity	66-84	77	30
Range with Standard Battery	80-100 miles	120 miles	100 miles
Top Speed		65 mph	
Gradeability			
Cabin Heating System	Yes		
Charger	19.2 kW	x	
Charging System	SAE J117	SAE J117	SAE J117
Estimated Charging Time	6-8 hours	x	x
Approx Price			
Deployed in US	CA		Canada
GVWR	up to 36,200 lbs	up to 33,000 lbs	up to 14,500 lbs





HEALTH BENEFITS OF ELECTRIC SCHOOL BUSES

TRANSITION TO ELECTRIC

Electric school buses are the cleanest option available. They produce zero tailpipe emissions, and could help school children breathe cleaner air. In a 2019 California study, researchers found that a decrease in nitrogen dioxide was associated with a decrease in the number of asthma cases.

70% LOWER 

Electric buses have 70% lower greenhouse gas emissions than diesel and natural gas buses everywhere in the country.

FEWER TOXINS 

This means improved air quality, better health for children and our communities, and fewer toxins harming our environment and worsening climate change.

SIX MILLION 

6 million children across the United States have asthma
Asthma is the #1 chronic illness for children AND the #1 cause of school absences

TWO TIMES 

Children living in urban areas have twice as many cases linked to nitrogen dioxide pollutants

KIDS OF COLOR  

Children of color are more likely to ride diesel school buses
Children of color are more likely to live in neighborhoods with unhealthy air
Electric school buses are the **ONLY** clean, zero-emission model that will help improve air quality and improve children's health



NO MORE DIESEL

Diesel school buses -- the largest form of public transportation in the country -- emit harmful exhaust that hurt kids' developing lungs. In a 2005 landmark study, researchers found that kids riding diesel school buses were breathing in 5 to 15 times more toxins than they would have otherwise.

Diesel school buses also travel thousands of miles through neighborhoods each year, polluting our communities. Diesel exhaust is known to shorten life spans; increase rates for lung, bladder and other cancers; and has been linked to various heart and lung illnesses.



HEALTH BENEFITS OF ELECTRIC SCHOOL BUSES

DIESEL & ASTHMA

Diesel can also cause or exacerbate children's asthma. Asthma is the number one chronic illness for children and a top cause of school absences, leading kids to miss school and fall behind in class.

**\$82
BILLION**

In one year, asthma can cost the U.S. economy nearly \$82 billion dollars in missed work and school days, deaths, and medical costs. For uninsured and low-income individuals, average costs are even higher.

For the sake of our children and our futures, it's time to transition to a clean, all-electric fleet.



ASTHMA & COMMUNITIES OF COLOR

Asthma disproportionately hurts communities of color. Latino and Black children are more likely to ride school buses than their white peers. That means they are more likely to breathe in diesel toxins and suffer the corresponding health complications, like asthma.

2x

Latinos overall are twice as likely to visit the ER for complications with asthma, while Latino children twice as likely to die from asthma than their white peers.

3x

Non-Hispanic African-Americans are three times more likely to die from asthma, while Black children are four times more likely to be hospitalized because of asthma than their white peers.

Communities of color are already more likely to carry the burden of air pollution, living or working near pollution sources or in cities with dirtier air. For low-income communities of color, the inequities are even greater. Poverty is associated with a shortened lifespan due to poor air quality. When coupled with lower health insurance rates, the risks to our health increase.

Dirty air is hurting our communities.



ELECTRIC SCHOOL BUSES IN ACTION LAKEVILLE, MINNESOTA



In 2017, Minnesota launched the first electric school bus in the Midwest. Two electric co-ops partnered with a wholesale utility to split the cost of the bus. Running in one of the coldest climates in the country with pre-heating technology, Lakeville’s school bus proves that electric buses can operate in all kinds of weather.

The utilities say operating costs are \$12,000 lower per year compared with the school district’s traditional diesel school buses. The bus takes 3-5 hours to charge overnight and has a 100-mile range, and it’s also powered by clean, wind energy.

“We think it represents the future of school buses,” said David Ranallo, manager of marketing and member services at Great River Energy.

“It’s like what our partner Schmitt & Sons has said — this is everything we hoped for in the future of school buses and it’s here today.”

“There are so many innovations that are in this electric bus that aren’t part of a standard diesel bus — things as simple as a composite roof so there’s not sections and doesn’t leak and rust in the future.

There’s a built-in trash can, better ergonomics, improved safety.”



BUS SPECS

- Lion
- 100 mile range

BUS FINANCING

- The electric school bus cost \$325,000
- Funded entirely through 2 electric co-ops and a wholesale energy supplier



ELECTRIC SCHOOL BUSES IN ACTION MICHIGAN



In 2018, Michigan devoted \$3 million of its Volkswagen settlement funds to invest in electric school buses. In mid-2019, the state announced schools in Ann Arbor and Roseville would receive six electric school buses, using \$1.5 million granted through the Volkswagen settlement. The buses will be equipped with vehicle-to-grid technology so the state utility can use the buses as back-up batteries.

The state is also planning to implement educational initiatives around the electric school buses, so students can better learn about the technology powering their ride to school.

"Not only will [the electric buses] help us reduce our carbon footprint, but they will also serve as great educational opportunities for our students," Kment said.

"Our educators will use them to lead discussions on how we can all take steps to integrate cleaner energy into our daily lives."

"We're excited to help bring clean electric transportation to thousands of Michigan students," said Trevor F. Lauer, president and CEO of DTE Electric.

"This partnership and grant fits well with our commitment to advancing both STEM education and Michigan's clean energy future."



BUS SPECS

- 6 ThomasBuilt Jouley buses

BUS FINANCING

- Utility provided 70% of the cost for each electric school bus
- School district paid one-third of the cost
- Each electric school bus cost \$325,000



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THE MYTH OF “CLEAN DIESEL”

There is no such thing as “clean diesel.” That’s a lie perpetrated by the diesel industry, the very same industry that said diesel was cleaner than regular gas.

Their lies helped Volkswagen sell 11 million diesel cars that emitted up to 40 times more toxins than permissible, polluting the air we breathe and harming our health. It wasn’t until Volkswagen was caught cheating federal emission standards that they admitted diesel isn’t, in fact, better and is actually much worse for our health.

That’s why they were forced to pay a \$2.7 billion settlement and undertake various types of reparations. And it’s not just Volkswagen: other major automakers have been implicated in cheating federal emission tests, too. We can’t let them keep getting away with this.

Newer diesel technologies that claim to be cleaner still emit some level of toxins, just fewer. But even limited exposure to diesel toxins can be harmful. As U.S. PIRG points out, “some components of diesel exhaust, like ultrafine particles, pose health threats but remain unregulated.”

Diesel remains a dirty, polluting fossil fuel. Like researchers have been saying since 2002: there is NO safe level of diesel exhaust for children to breathe.





ELECTRIC SCHOOL BUSES IN ACTION TWIN RIVERS, CALIFORNIA



Twin Rivers Unified School District, right outside Sacramento, Calif., operates 25 electric school buses -- the largest electric school bus fleet in the nation. The school district reports they're saving 80% on maintenance costs and 80% on fuel. Overall, the school district estimates they're saving \$15,000 annually.

They are already planning to purchase an additional 10 school buses over the next year, bringing their total to 35 electric school buses, and hopes to reach 70 electric buses within five years.

At least some of the buses will be upgraded to include Vehicle-to-Grid technology, enabling them to send energy back to the grid and release it when demand is highest.

Twin Rivers USD uses 127 schools to transport 5,000 students to 52 different schools. The school buses are operating in the district's "most disadvantaged communities," since nearly 87% of its students qualify for free or reduced lunches.

The electric school buses are also being used for educational opportunities, teaching students about clean energy and partnering with a local college to provide career and technical education courses to future mechanics.



**80% SAVINGS
IN FUEL AND
MAINTENANCE**

**25 ELECTRIC
SCHOOL BUSES
CURRENTLY**

**TWIN RIVERS USD
TRANSPORTS 5K
STUDENTS SAFELY**



BUS SPECS

- 5 Blue Bird All-American Electric
- 12 Lion Type C buses
- 8 TransTech eSeries Type A Buses
- 16 chargers; 6 more expected soon
- 16 school bus drivers certified to drive the all-electric buses



ELECTRIC SCHOOL BUS

15-19 cents per mile

vs



DIESEL SCHOOL BUS

82-85 cents per mile

BUS FINANCING

- State grant provided \$7.5 million
- SMUD provided \$1 million to help fund charging infrastructure



ELECTRIC SCHOOL BUS
TYPE A

\$225,000



ELECTRIC SCHOOL BUS
TYPE D

\$400,000

**100 miles range per vehicle

Each electric school bus ranged from \$225,000 for Type A buses to \$400,000 for Type D buses



ELECTRIC SCHOOL BUSES IN ACTION WHITE PLAINS, NEW YORK



In White Plains, New York, a local utility helped the school district purchase 5 electric school buses by covering a third of the total cost of each bus. Under this partnership, the utility will pay the bus operator to use the buses during the summer as back-up batteries, storing energy and sending it back to the grid when demand is highest -- saving money for every ratepayer. The school district also received a state grant that covered half of the remaining cost, and paid the bus operator approximately \$130,000 per bus, what they typically pay for a diesel school bus.

Buses are charged overnight and mid-day, with a full charge taking 4-6 hours and providing a range of 66 miles. White Plains has praised the school buses and their ability to lead the way in sustainability efforts.

White Plains serves more than 7,000 students, 57% who are Latinx and 55% who are “economically disadvantaged,” transporting at least 5,000 students each day.



BUS SPECS

- **5 Lion Type C all-electric school buses**
 - Same body as the diesel Lion 360 with a TM4 SUMO MD electric motor
- **Operated by National Express, who pays the buses’ energy cost**
- **First Priority GreenFleet provides servicing, technicians and driver training**

BUS FINANCING

- **Each electric school bus cost \$365,000**
- **Utility provided \$100,000 per bus (total of \$500,000)**
- **State grant provided \$120,000 per bus (total of \$600,000)**
- **School district paid approximately \$130,000 per bus**

The New York Times, “The Wheels on These Buses Go Round and Round With Zero Emissions.” November 12, 2018. <https://www.nytimes.com/2018/11/12/climate/electric-school-buses.html>

Patch.com, “White Plains Students Get First Look at Electric School Bus.” June 20, 2018. <https://patch.com/new-york/whiteplains/white-plains-students-get-first-look-electric-school-bus>

Sustainable Bus Magazine, “Electric school bus fleet in NY State. Lion Electric will be used also as power storage unit.” December 4, 2018. <https://www.sustainable-bus.com/news/electric-school-bus-fleet-in-ny-state-lion-electric-buses-will-be-used-also-as-power-storage-unit/>



ELECTRIC SCHOOL BUSES ARE THE ONLY ZERO-EMISSION, CLEAN RIDE FOR HEALTHY KIDS.

SAVING MONEY WITH ELECTRIC SCHOOL BUSES

Electric school buses are ultimately cheaper than diesel, propane or CNG models. Because electric school buses cost significantly less to operate and maintain (60-80% less in some current examples), they can actually help school districts save thousands of dollars per year.

An electric school bus may have a high upfront cost, but has fewer maintenance and operation costs over its lifespan, while diesel school buses get more expensive to fuel and maintain over time. Additionally, electricity prices are more stable than diesel prices; it costs 2.5 times less to power a vehicle with electricity than with diesel.



As the price of batteries continues to fall each year and electric technology improves, so will the upfront costs of electric school buses. Electric school buses are projected to reach cost parity with diesel buses as soon as 2022.

Multiple studies have shown that electric school buses are more affordable than diesel school buses in the long-term, given fewer parts to maintain, no fuel costs and longer-lasting parts. U.S. PIRG found in 2018 that each electric school bus can save school districts up to \$2,000 a year in fuel and \$4,400 a year in reduced maintenance costs, saving tens of thousands of dollars over the lifetime of a bus.

TOTAL LIFECYCLE COSTS OF SCHOOL BUSES

