

# WARWICK VALLEY

CENTRAL SCHOOL DISTRICT

## Transportation - Electric Busing April 4, 2024





# Agenda

- Legislation
- Planning/Process
- Bus Fleet Analysis
- Electric Buses (Jeremy Johnston - NY Bus Sales)
- Electric bus replacement cost projection
- Route Analysis
- Infrastructure (Jack Eisenbach)
- Transportation Facility
- Grants
- Final Thoughts



# New York State Legislation

## Climate Leadership and Community Protection Act (July 2019)

New York State committed to reducing greenhouse gas emissions by 40% by 2030 and no less than 85% by 2050



# New York State Legislation

April 7, 2022 - NY passed the statewide Zero-Emission School Bus Mandate that all new bus purchase must be electric starting in 2027, and the entire fleet must be electric by 2035





# Process

1. Fleet Energy Study
2. Fleet Electrification Plan
3. Charging Concept and Layout
4. Safety Integration
5. Implementation



# Fleet Electrification Plan

A **Fleet Electrification Plan** is a comprehensive evaluation of existing fleet operations, analysis of current site electrical capabilities, and a plan for electrifying the Purchaser's entire fleet by 2035.

The plan will serve as a guide that identifies and prioritizes actions to help Purchasers make informed decisions about electrifying their fleets.





# Fleet Electrification Plan

Table 9. Fleet Electrification Plan Contents

Title	Description
Electrification Goals	An overview of the electric bus assessment and the approach to fleet electrification. This may include the proposed timeline and milestones for electrification.
Route Analysis	Analysis of the time and distance involved in each available bus route, which is necessary to understand the range requirements. The analysis will define the specification requirements (hilly, etc.) for each bus route to provide recommended minimum battery requirements and the total energy required to charge the batteries.
Utility Assessment	An assessment, performed by your Utility, that analyzes your existing grid connection and determines how much additional electrical capacity is required. This assessment will tell you what equipment needs, upgrades, and costs are needed to provide that additional power.
Charging Strategy	Development of a charging strategy that includes Charger power ratings and quantities and preferred times of day to charge. The charging strategy will include identification of demand during on-peak and off-peak times.
Phasing Plan	Development of a phasing plan identifying necessary capital works projects, vehicle replacement plan, and phased plan for Charger Installation aligned with vehicle replacement plan. This phasing plan should include a schedule and transition cost estimate for Utility upgrade/sitework, bus purchases, and Charger purchases, as well as a comparison of operating costs.



# Warwick Current Bus Fleet

65 Passenger	20-30 Passenger	20 - 30 Passenger	Wheelchair Bus	9 Passenger	Total
54	5	8	6	3	76

## Type of Fuel

Diesel 28 buses      37%  
 Gasoline 26 buses    34%  
 Propane 22 buses    29%





Current Cost of Fuel  
 Diesel, Gas and Propane  
 \$250,000 - \$275,000







# ESB Market by Bus Type

Bus Type	Type A	Type B	Type C	Type D
Example Image				
Passenger Capacity	16-20	20-30	60-72	72-90
# Models Available	7	N/A	4	4
Range (mi)	Low: 100 Medium: 120 High: 150	N/A	Low: 120 Medium: 131.5 High: 210	Low: 120 Medium: 135 High: 155
2019 U.S. Sales (all fuels)	8,242	0	28,787	3,685
NY Bus Market Share	24%	7%	66%	3%
Cost Share (electric)	\$265,000 - \$335,000	N/A	\$300,000 - \$400,000	\$345,000 - \$410,000
Participating Manufacturers	Legacy: Blue Bird (MicroBird), Collins Electric Only: BYD, GreenPower, Lion, Motiv, Lightning e- Motors, Phoenix Motor Cars	N/A	Legacy: Blue Bird, IC Bus, Thomas Built Electric Only: Lion Repowers: SEA Electric, Unique Electric Solutions	Legacy: Blue Bird Electric Only: BYD, GreenPower, Lion Repowers: SEA Electric, Unique Electric Solutions



# Electric Bus Replace

Year	Electric Bus Replacement	Average Cost	Total Costs	Projected Transportation Aid %	Transportation Aid	Net Cost
2026-27	5	\$400,000	\$2,000,000	64.9%	\$1,298,000	\$702,000
2027-28	8	\$400,000	\$3,200,000	64.9%	\$2,076,800	\$1,123,200
2028-29	9	\$400,000	\$3,600,000	64.9%	\$2,336,400	\$1,263,600
2029-30	9	\$400,000	\$3,600,000	64.9%	\$2,336,400	\$1,263,600
2030-31	9	\$400,000	\$3,600,000	64.9%	\$2,336,400	\$1,263,600
2031-32	9	\$400,000	\$3,600,000	64.9%	\$2,336,400	\$1,263,600
2032-33	9	\$350,000	\$3,150,000	64.9%	\$2,044,350	\$1,105,650
2033-34	9	\$350,000	\$3,150,000	64.9%	\$2,044,350	\$1,105,650
2034-35	9	\$350,000	\$3,150,000	64.9%	\$2,044,350	\$1,105,650
	<b>76</b>		<b>\$29,050,000</b>	<b>64.9%</b>	<b>\$18,853,450</b>	<b>\$10,196,550</b>

Does not include any incentives, rebates or grants



# Route Analysis

Route #	Miles	Bus Number	Route #	Miles	Bus Number	Route #	Miles	Bus Number
1	82.13	327	14	57.34	332	27	64.29	381
2	77.87	369	15	64.66	334	28	87.90	370
3	77.22	295	16	73.87	312	29	98.02	367
4	73.55	359	17	41.08	375	30	69.76	330
5	39.03	376	18	60.62	356	31	71.68	364
6	60.90	352	19	53.43	357	32	85.76	317
7	59.44	353	20	66.82	351	33	55.95	307
8	61.37	335	21	88.28	358	34	54.39	342
9	71.48	336	22	69.46	301	35	36.59	325
10	55.49	323	23	65.02	349	36	66.40	366
11	58.00	343	24	55.99	374	37	44.55	348
12	88.98	380	25	67.99	308	38	26.82	329
13	62.24	328	26	85.07	382	39	35.80	379



# Route Analysis

Route #	Miles	Bus Number	Route #	Miles	Bus Number
40	29.37	311	53	85.94	360
41	75.72	371	54	103.27	377
42	18.78	302	55	101.46	337
43	39.13	324	56	124.51	372
44	47.43	341	57	83.70	338
45	94.46	365	58	176.66	321
46	72.59	344	59	82.53	339
47	39.04	362			
48	118.42	368			
50	107.95	355			
51	61.86	373			
52	189.40	361 W/C			

Total Routes 58 100%

## Daily Charges Need

One charge (Green) 40 69%  
 Borderline (Orange) 11 19%  
 Additional Charge (Red) 7 12%



# Infrastructure





# Infrastructure

## Current Electrical Service

### Bus Garage

- 400 AMP 3 phase 208V Service



### Bus Barn/Wash

- 600 AMP 3 phase 208V Service





# Infrastructure

## Charging



	Level 2 Charger	DC Fast Charger
<b>Type of Current</b>	Alternate Current	Direct Current
<b>Power Level (kW)</b>	7-20	20-150
<b>ESB Recharge Time</b>	5.5-13 hours	1-4.5 hours
<b>Charger Equipment Cost</b>	\$400-\$6,500	\$10,000-\$40,000



# Infrastructure

## Equipment Required

Estimated Cost \$800,000-\$1,000,000\*

- Transformer (400 Amp 2 phase 480V Service)
- CT Box
- Electrical Panel (2)
- Chargers (up to 29 chargers)
- Other infrastructure (Wiring, Conduit, etc.)

\*Infrastructure is aided mainly through Transportation Aid



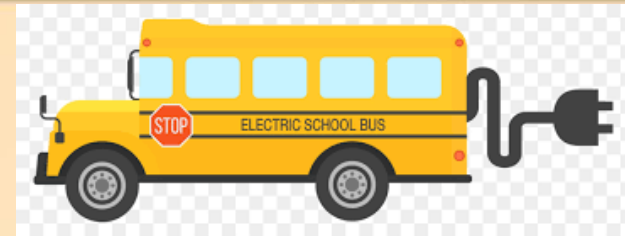


# Transportation Facility





# Grants



## NY School Bus Incentive Program - NYSERDA

### School Buses

November 29, 2023: NYSERDA is now accepting School Bus Voucher Applications on a first-come, first-serve basis - subject to per fleet caps.

School Bus Type	Percentage of Incremental Cost Covered	Base Voucher Dollar Amount
New Type A (NTA)	60%	\$114,000
New Type C (NTC)	60%	\$147,000
New Type D (NTD)	60%	\$156,000
Repowered Type A (RTA)	75%	\$105,000
Repowered Type C (RTC)	75%	\$135,000

- Estimated Electric bus cost see page 9



# Grants

## School Buses

### Scrappage Bonus:

**NTA (Type A)     \$47,500**

**NTC (Type C)     \$61,250**



Scrapping the vehicle being replaced

a. Scrapping is verifiably rendering inoperable an Internal Combustion Engine vehicle with an engine dated 7 years or older than the year of application by cutting a three-inch hole in the engine block and disabling the chassis by cutting the vehicle's frame rails completely in half.

### Wheelchair add on:

**NTA (Type A)     \$8,000**

**NTC (Type C)     \$8,000**





# Grants

## School Bus Voucher Caps

In line with the goal of NYSBIP to enable all school districts an opportunity to participate, the following caps will be placed on the number of ESB Vouchers each Purchaser may seek. The voucher caps listed below apply until December 1, 2025.

## School District-Owned Fleets

- Each school district may apply for the greater of six (6) ESBs or 6% of their fleet.
- Each Priority District may apply for the greater of ten (10) ESBs or 10% of their fleet.
- School districts can apply for the greater of an additional 4% or four (4) ESBs if they  
complete an approved Fleet Electrification Plan



# Grants

## NYSERDA

### Charging Voucher

### Charging Voucher Amounts



The base Charging Voucher amounts are intended to cover all or most of the cost of a low-voltage (e.g., Level 2) Charger, customer-side Make-Ready equipment, and installation costs. Charging Voucher amounts are determined by Priority District status, and whether the Purchaser has conducted a Fleet Electrification Plan. It is recommended that Purchasers of chargers complete a Fleet Electrification Plan to identify charging needs before applying to NYSBIP to ensure the fleet is purchasing and installing appropriate charger(s) for their needs and there is enough power for the chosen solution.

Table 8: Maximum Charging Voucher Amounts	Base Voucher Amount	With Fleet Electrification Plan
Non-priority District	\$25,000	\$55,000
Priority District	\$35,000	\$65,000



# Other Grants

## Utility Make-Ready Programs(Orange & Rockland)

Covers up to 100% of the charging station installation costs on the utility side of the electric meter

Federal Inflation Reduction Act of 2022 (Diesel to Electric) Offers direct payment of \$40,000 per bus.



# Final Thoughts/Questions

- 1) Conduct Electrification Plan.
- 2) Consider purchasing 2 electric buses & charger by 25-26 to pilot.
- 3) Consider new Capital Bus Reserves Plan
- 4) Monitor mandates regarding other vehicles (Buildings and Grounds)
- 5) Advocacy