Progression of Battery Capabilities and Costs

Year	Battery Type	Energy Density (Wh/kg)	Cell Weight for 300-Mile Range* (kg)	Cell Cost/kWh (2020 Dollars)	Cell Cost for 300-Mile Pack
1995	Sealed Lead-Acid	25	37,500	$200	$187,500
2000	Nickel Metal Hydride	50	18,750	$300	$281,250
2004	Nickel Sodium Chloride	94	9,973	$1,000	$937,500
2008	Lithium Iron Phosphate – Early	100	9,875	$1,700	$1,593,750
2015	Lithium Iron Phosphate – Midterm	100	9,875	$350	$328,125
2015	Nickel Manganese Cobalt – Leaf	160	6,172	$250	$234,375
2020	Lithium Iron Phosphate – Advanced	160	6,172	$200	$187,500
2020	Nickel Cobalt Aluminum – Tesla 3	248	3,982	$200	$187,500
2025(?)	NMC/NMA(?)	300(?)	3,292	$100(?)	$93,750

* 300-mile range is for a transit bus or Class 8 truck using an average of 2.5 kWh/mile, and assumes 80% battery discharge limit (battery weight and cost will be lower for more efficient vehicles or batteries capable of deeper discharge).

Note: Cell integration costs and total battery subsystem weight can vary, depending on cell size and integration complexity