

Life Cycle Cost Overview for Different Transit Technologies



Fuel Costs

Fuel Type	Efficiency	Fuel Cost	Annual Fuel Costs
Diesel	4.0 mi/gal	\$2.60 /gal	\$29,250
CNG ²	3.2 mi/dge	\$1.10 /gal	\$15,470
Hybrid Diesel Electric	5.5 mi/gal	\$2.60 /gal	\$21,270
Battery Electric (Off-Peak/No Demand) ¹	2.4 kWh/mi	\$0.10 /kWh	\$10,800
Battery Electric (Peak w/Demand) ¹	2.4 kWh/mi	\$0.20 /kWh	\$21,600
Hydrogen Fuel Cell	6.5 mi/kg	\$8.60 /kg	\$59,540

1. Electricity costs vary by time of use, season, and region
2. Approximate cost, which may vary with the Alternative Fuel Tax Credit



Life Cycle Costs

Fuel Type	Base Bus Cost	12-Year Fuel Costs	Lifecycle costs
Diesel	\$425,000	\$351,000	\$776,000
CNG	\$475,000	\$185,630	\$660,630
Hybrid Diesel Electric	\$600,000	\$255,270	\$855,270
Battery Electric (Off-Peak/No Demand)	\$750,000	\$129,600	\$879,600
Battery Electric (Peak w/Demand)	\$750,000	\$259,200	\$1,009,200
Hydrogen Fuel Cell	\$1,200,000	\$714,460	\$1,914,460

1. Excludes Maintenance Costs in all categories
2. Excludes Infrastructure costs: Costs of Charging infrastructure varies significantly depending on charge rate and location
3. Base battery electric bus prices have decreased by 25% over the last five years.



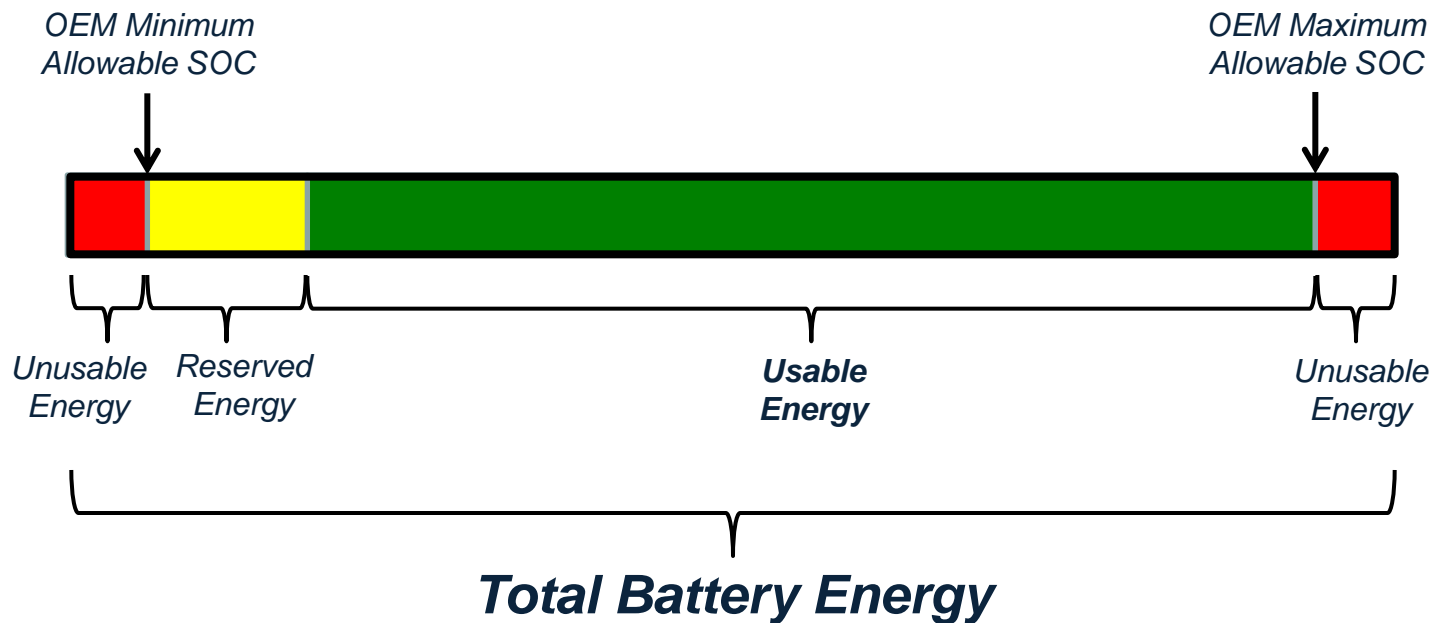
Battery Electric Bus Range

Battery Capacity (kWh)	Bus Range (mi.)	
	80% Usable	70% usable
100	33	29
200	67	58
300	100	88
400	133	117
500	167	146
600	200	175

1. Based on 2.4 kWh/mile
2. Recommended Operating range is typically 70% - 80% of the stated battery capacity

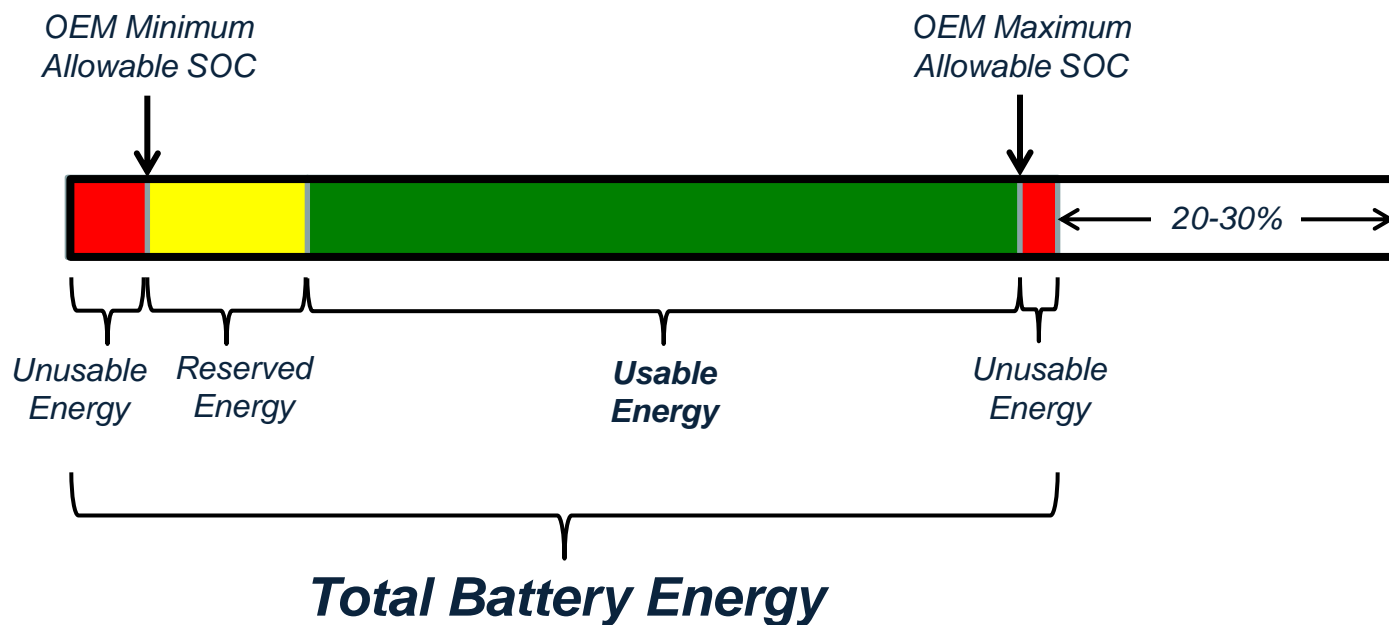


Usable Energy: Beginning-of-Life Batteries



- **Reserved Energy** can be defined by the transit agency.

Usable Energy: End-of-Life Batteries



- **End-of-Life** is determined by SOC warranty level, typically 70-80% of original capacity.
- **Reserve Energy** and **Unusable Energy** at the low end does not change as batteries degrade.