



Eco-Equipment Supply



Comparison of Life-cycle Costs and Annual CO2 Emissions and Fuel Costs of Gas/Diesel Lawn Mowers vs. Electric Mowers



Prepared April 17, 2018

245 Ten Stones Circle
Charlotte, VT 05445
(802) 363-3930

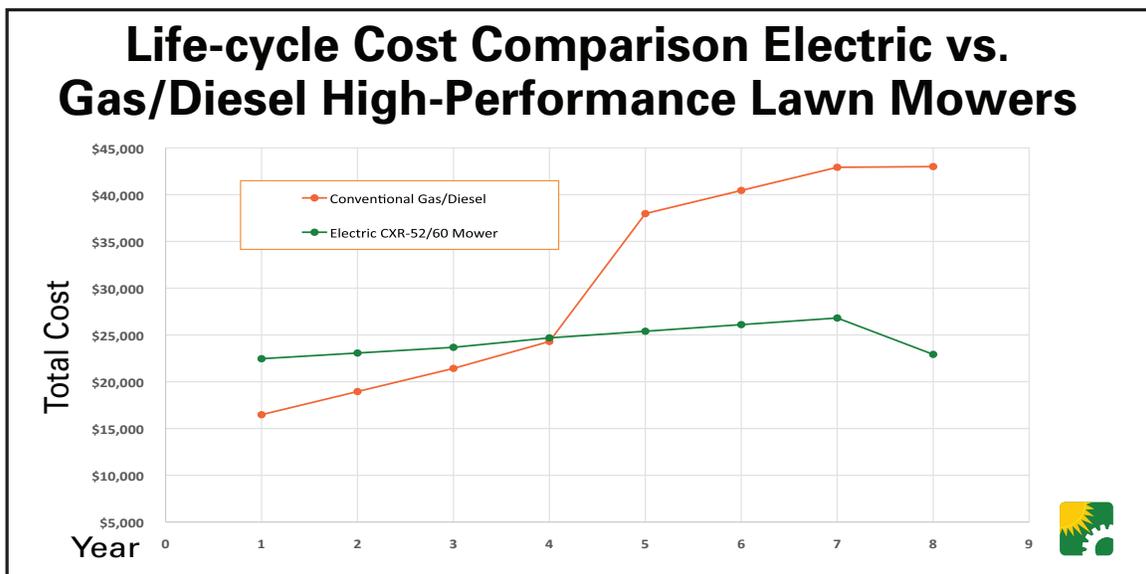
www.ecoequipmentsupply.com

Sample Life-cycle Cost Comparison

Gas/Diesel Mower vs. Electric High Performance Mower

Gas/Diesel Mower		Electric CXR-60 Mower	
Purchase Cost	\$14,000	Purchase Cost	\$23,000
Utility incentive/rebate	0	Utility incentive/rebate	\$500
Operating hours per year	690	Operating hours per year	690
Annual average maintenance	\$750	Average annual maintenance	\$300
Annual repair costs	\$100	Annual repair costs	\$100
Fuel use gallons per hour	1	Electricity consumption kWh per hour	2.8
Fuel costs (gallon)	\$2.50	Electricity Costs (kWh)	\$0.16
Annual fuel use (gallons)	690	Annual electricity use (kWh)	1,932
Annual fuel costs	\$1,725	Annual electricity costs	\$309.12
Residual value (year 4 & 8)	\$2,800	Residual value (year 8)	\$4,600
Annual operations cost	\$2,575	Annual operations cost	\$709.12
8-year life-cycle cost	\$43,000	8-year life-cycle cost	\$23,573

8-YEAR SAVINGS USING CXR-60 ELECTRIC MOWER \$19,427



Notes/Assumptions. Life-cycle Cost Analysis For GAS/DIESEL Lawn Mowers vs. ELECTRIC High Performance Lawn Mowers

General: To generate a life-cycle cost comparison for a specific application/mower, the data can either be inputted into the Excel spreadsheet at <https://www.ecoequipmentsupply.com/why-electric/>, or e-mailed to EES and we'll input the data and send you the completed spreadsheet and graph.

High-performance" lawn mowers are defined as those with engines having power ratings between 10 and 36 horsepower (hp). These mowers typically have mowing decks between 30 inches and 60 inches wide, and include zero-turn, walk-behind, and stand-on models.

Utility Incentive Payment: It's hoped that an incentive from VT's electric utilities will be available for high-performance electric mowers in 2018. For this analysis, we assumed an incentive amount of \$500.

Annual Operating Hours: 6 hours/day for 5 days per week, for 23 weeks per year.

Average Annual Maintenance Costs

Gas/Diesel Mowers:

1. Blade Sharpening and Replacement: This analysis assumes the blade sharpening is done "in-house" every 50 hours at an average cost of \$25 per sharpening – including blade replacement every 300 hours.
2. Oil Changes and Lubrication: This analysis also assumes oil changes and lubrication are done "in-house", but at 100-hour intervals at a cost of \$75 per oil change/lubrication.

Electric Mowers:

1. Blade Sharpening and Replacement: Same as gas/diesel mower.
2. Oil Changes and Lubrication: Electric mowers do not require oil changes and require minimal lubrication.

Average Annual Repair Costs:

Gas/Diesel Mowers:

Analysis assumes a new gas/diesel mower will have a 3-year warranty and this analysis assumes that the gas/diesel mower will be kept for one year beyond a 3-year warranty period and repair costs will be \$400 during the fourth year. Since this analysis covers an 8-year period, two mowers will be purchased with total repair costs of \$800. However, if a gas/diesel mower is kept for the full 8 years, these repair costs could be at least \$2,400 to \$4,000.

Electric Mowers:

Analysis assumes the electric mower will also have a 3-year warranty. But, Mean Green electric mowers can easily be kept for 8 years because the wheel and blade motors and batteries are designed for thousands of hours of use and cost very little to repair or replace if they are damaged or prematurely fail. Therefore, this analysis assumes that during the 5 years beyond the 3-year warranty period, a total of \$800 will be spent on repairs.

Fuel and Electricity Consumption and Costs: Analysis assumes an average consumption level of 1 gal/hr at an average cost of \$2.50/gal. The Mean Green CXR-52/60 electric mower consumes an average of 2.8 kW/hr of electricity at an average cost \$0.16/kWh (Vermont rates 2017).

Residual Value:

Gas/Diesel Mowers:

As described above, because gas/diesel mowers have so many moving parts and become relatively expensive to repair, they also depreciate relatively quickly. Therefore, this analysis assumes two gas/diesel mowers will be purchased over 8 years and they'll depreciate 20% per year. The residual value each of the 2 mowers after 8 years of depreciation is subtracted from their total operating costs to obtain the 8-year life-cycle costs.

Electric Mowers:

This analysis assumes the electric mower will be kept for eight years and will depreciate an average of 10% per year, or 80% over eight years. Again, the residual value of the one electric mower after 8 years of depreciation is subtracted from its total operating costs to obtain the life-cycle cost over the full 8 years.

Comparison of Annual CO2 Emissions and Fuel Savings

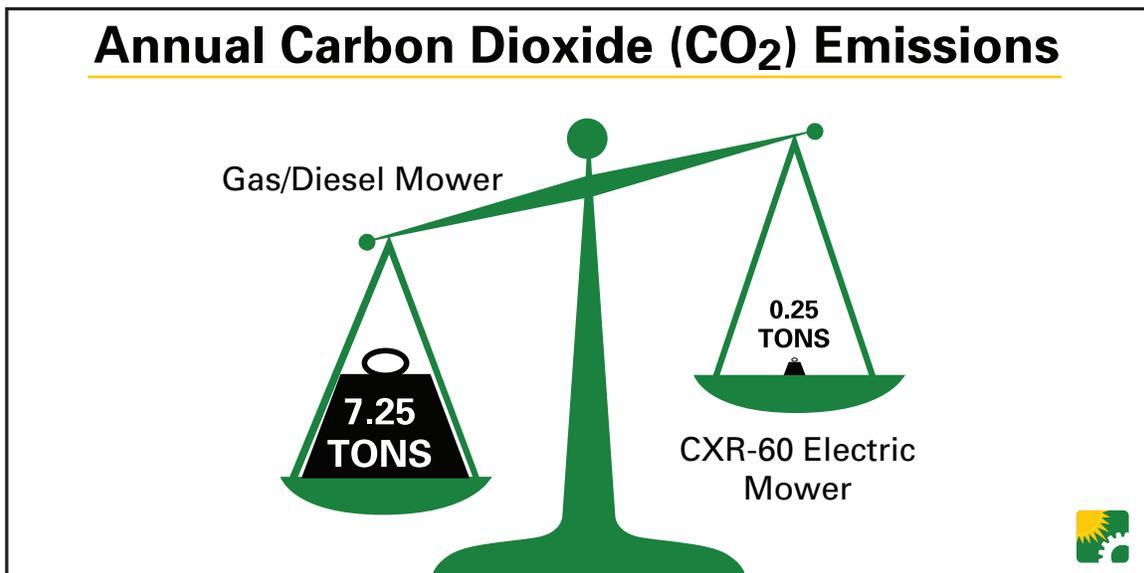
Gas/Diesel Mower vs. Electric High Performance Mower Sample Case

Operating hours per day	6
Operating days per week	5
Operating weeks per year	23
Fuel cost (per gallon)	\$2.50
Deck width (inches)	60
Average mowing speed (mph)	3.75
Number of mows per season	15

Annual Savings Using CXR-60 Electric Mower

Fuel cost savings	\$1,465
CO2 savings	7 Tons

To generate fuel and CO2 savings comparison for a specific application/mower, input your data into the Excel spreadsheet available at <https://www.ecoequipmentsupply.com/why-electric/>



Notes/Assumptions: CO2 Emissions Comparison between High-Performance GAS/DIESEL Lawn Mowers vs. Mean Green ELECTRIC Mowers:

General: To generate a CO2 emissions comparison for a specific application/mower, the data can either be inputted into the Excel spreadsheet at <https://www.ecoequipmentsupply.com/why-electric/>, or e-mailed to EES and we'll input the data and send you the completed spreadsheet and graph.

"High-performance" lawn mowers are defined as those with engines having power ratings between 10 and 36 horsepower (hp). These mowers typically have mowing decks between 30 inches and 60 inches wide, and include zero-turn, walk-behind, and stand-on mowers models.

Mower Use: This analysis assumes mowers are used 6 hours per day, 5 days per week for 23 weeks.

Fuel Consumption: Fuel consumption rates are NOT published by lawn mower manufacturers and will vary depending on operating conditions. However, anecdotal accounts indicate that conventional mowers with power ratings between 24 and 36 hp consume an average of 1 to 1.5 gal/hr.

Mowing Speed and Area: $19,800 \text{ ft/hr} \times 5 \text{ ft (deck width)} = 99,000 \text{ sq ft} \times 1 \text{ acre}/43,560 \text{ sq ft} = 2.27 \text{ acre/hr}$.

CO2 Emissions Associated with Gas/Diesel Fuel: According to EPA data, approximately 20 lb CO2 is emitted per gallon of gasoline burned and 22.4 lb CO2 is emitted per gallon of diesel fuel burned, or an average of 21 lb when gas and diesel mowers are considered together.

Electricity Consumption: A high-performance zero-turn lawn mower manufactured by Mean Green Products (CXR-52/60) consumes approximately 2.8 kW/hour when mowing at an average of 3.75 mph.

CO2 Emissions Associated with Electricity: VT Agency of Natural Resources (ANR) estimates an average of 0.26 lb CO2/kWh associated with VT electric sources, excluding the emissions related to electricity generated from burning sustainable harvested wood.

Calculations

Gas/Diesel Mower		Electric CXR-60 Mower	
Operating hours per year	690	Operating hours per year	690
Annual fuel use (gallons)	690	Equivalent electricity use kWh	1,932
Annual fuel cost	\$1,725	Annual electricity cost	\$309
Mowing speed - acres per hour	2.27	Mowing speed - acres per hour	2.27
Annual fuel consumption per acre	6.6	Annual kWhs per acre	18.48
Annual CO2 emissions per acre	138.6 lbs	Annual CO2 emissions per acre	4.8 lbs
Your CO2 emissions each year	7.25 Tons	Electric CO2 emissions each year	0.25 Tons

To generate a CO2 savings comparison for a specific application/mower, input your data into the Excel spreadsheet available at <https://www.ecoequipmentsupply.com/why-electric/notes/>

