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Review of Cost of Gasoline versus Electric Walk-behind Mowers

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Review of Cost of Gasoline vs Electric Walk-behind Mowers

During the last decade, residential lawn and yard equipment has proliferated with a variety of battery-powered products. The latest generation of walk-behind electric, cordless lawn mowers offer simplicity of operation and near zero maintenance. These efficient mowers are lightweight, most in the 50–80-pound range or less, as they are made from molded composite deck, engineered polymers and aluminum parts. Because they use minimal steel parts, they can weigh much less than combustion engine residential mowers (60-100 lbs.). In April 2025, a recent article from a popular U.S. publisher reviewed some of the top battery-powered walk-behind mowers available today.[1] Table 1 shows selected self-propelled battery mower models from the article and specific data.

Table 1: Electric walk-behind mower specifics and data (2025)

E-Mower Brand	**Model**	**E-Mower Specs**	**Battery voltage, Amp-hr. (Ah) Capacity (watt-hr.)**	**Cut area per charge Square feet (Sq. ft.)**	**Sq. ft. per Amp-hr. (sq. ft./ Ah)**	**Whr/ sq. ft. (calculated)**
EGO	Power + 21 in.	22 in., 53 lb. 7.5 Ah batt.	56V, (7.5 Ah) 420 watt-hr.	11,019	1469	0.038
Toro	Recycler (3-ph motor) 22 in.*	22 in., 80.4 lb. w/6Ah batt.	60V (6 Ah) 360 watt-hr.	13,524	2254	0.026
Ryobi	HP 21-inch	21 in., 56 lb. with 6Ah x 2 batts.	40V (240 whr ea.)	7644	1274	0.033

*PM article states that Toro model with 3-phase electric motor is by far the most efficient of all walks –behind mowers under review.

In 2011, the Cristian Science Monitor (CSM) had published an article comparing the cost of mowing for gasoline powered against electric mowers available at the time. The 2011 CSM article quoted the following data on Table 2 based on fuel costs at the time.[2]

Table 2: Data from Christian Science Monitor Article (2011)

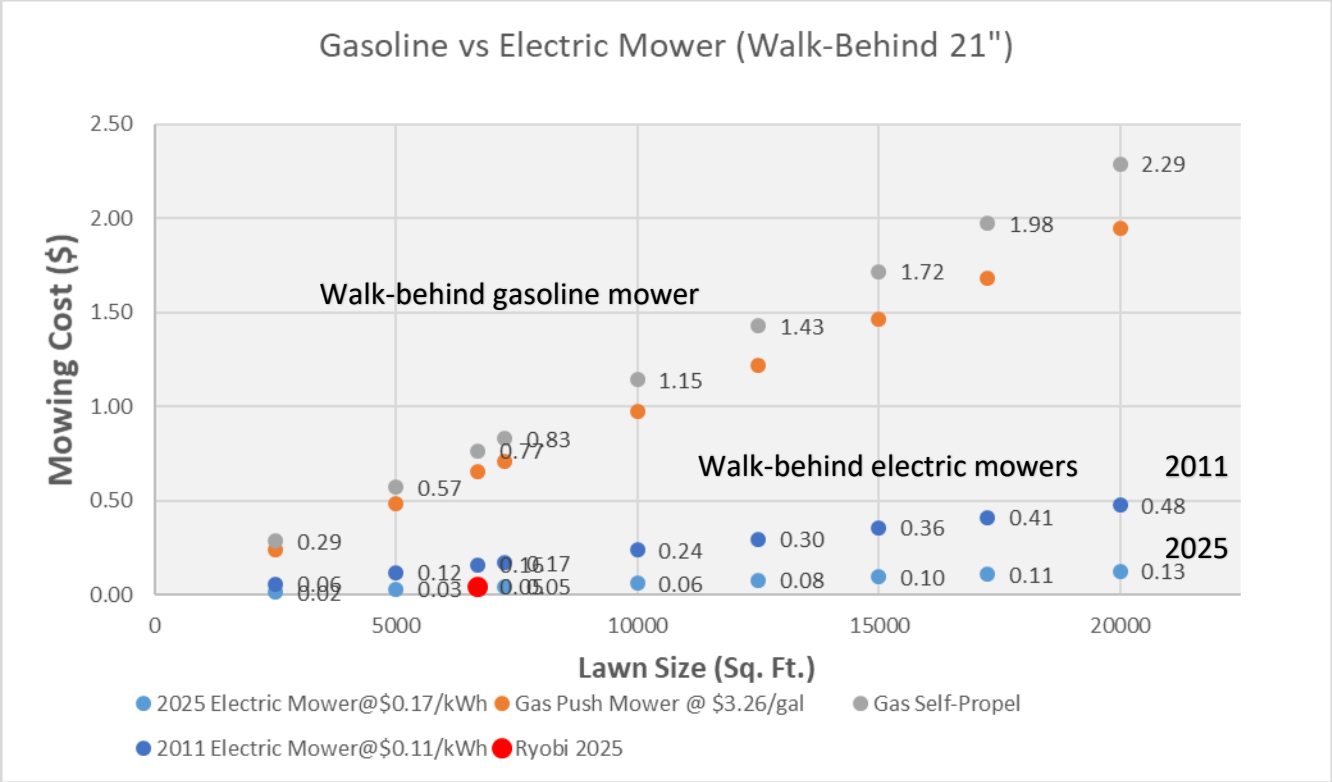
Mower type	2011 Energy Cost	Cost ($) to Mow 1 Acre (42,560 Sq. ft.)
Gasoline Mower	$3.50 / gal. (gasoline)	$4.70
Electric Battery Mower	$0.11 / kWh	$1.04

[1] https://www.popularmechanics.com/home/tools/g122/we-test-the-best-battery-powered-lawnmowers/?utm_source=google&utm_medium=cpc&utm_campaign=mgu_ga_pop_md_dsa_comm_org_us_g122&gad_source=1&gclid=Cj0KCQjw782_BhDjARIsABTv_JDs7QXfHzRoB_WIErAcyqtCoNJAO6V-fr7zPLTvYDnt81JZPpqWEE0aAg9zEALw_wcB

[2] https://www.csmonitor.com/Business/The-Simple-Dollar/2011/0929/Electric-vs.-gas-lawnmowers-Which-is-cheaper

In 2011, a typical electric mower required 3.5 kilowatt-hours (kWh) to recharge, or $0.38 at the electric rate of $0.11/kWh. We decided to investigate the cost of 2024-25 residential walk-behind electric mowers as new technology appears to provide higher efficiency.

The plot shown below compares the cost of mowing a grass area (x-axis, sq. ft.) based on the energy costs for a particular year (i.e., $3.26 /gal gas and $0.17/ kWh (2025 national average), $0.11/kWh (2011).



As observed on the plot, substantial operating cost savings can be obtained by using electric walk-behind mowers when compared to their gasoline engine counterpart. This is true regardless of mower technology from ten years ago or today. Furthermore, the design of today's walk-behind electric mowers appears to be more efficient according to data supplied by manufacturers in 2025.

We decided to put a Ryobi 40V mower with 6Ah battery to the test by mowing a flat plot area of St. Augustine grass. The experimental procedure was carried out by charging one 6Ah 40V battery to full capacity and then left sitting overnight. The following day, we cut grass until the battery power was depleted and power was automatically cut off. We measured the

Photo Credit: Carlos Colon

amount of grass-mowed area resulting in 6,700 square feet. Grass cutting was performed by using the self-propelled feature at mid-speed (walk pace) with grass catcher attachment. Mower height was set to "2" out of 6 slotted height settings available. The grass-mowing exercise was accomplished in 38 minutes excluding emptying bagged clippings. Grass cutting was interrupted two times (~ 2 minutes each) to discard grass clippings from the catcher. When full of grass clippings, the catcher weighed at 10 lb., 12 oz. (mesh frame included). The weight of the incremental collected grass clippings imposes further energy consumption on the self-propelled mechanism. Prior to mowing, the mower battery current was measured indicating an average energy consumption of 217 watts (5.3 Amps @ 41V). When self-propelled drive is engaged, battery currents spiked to higher levels momentarily, eventually settling between 7 and 8 amps (281-328W) when cutting short grass at walk pace. Grass cut length and slope of terrain has an effect of battery current consumption, as peaks of 20 to 40A were observed momentarily on a 45-degree bank grass terrain slope on an earlier test. This particular mower also increases blade speed (and power) when cutting thick grass.

The single data point shown in red on the plot (labeled Ryobi 2025), falls along with the expected linear prediction of energy cost per mow area. Data along the linear prediction was calculated using the average watt-hour (0.351 Whr/sq. ft.) data per cut grass area given in the review article — excluding the Toro 3-phase high efficiency model.

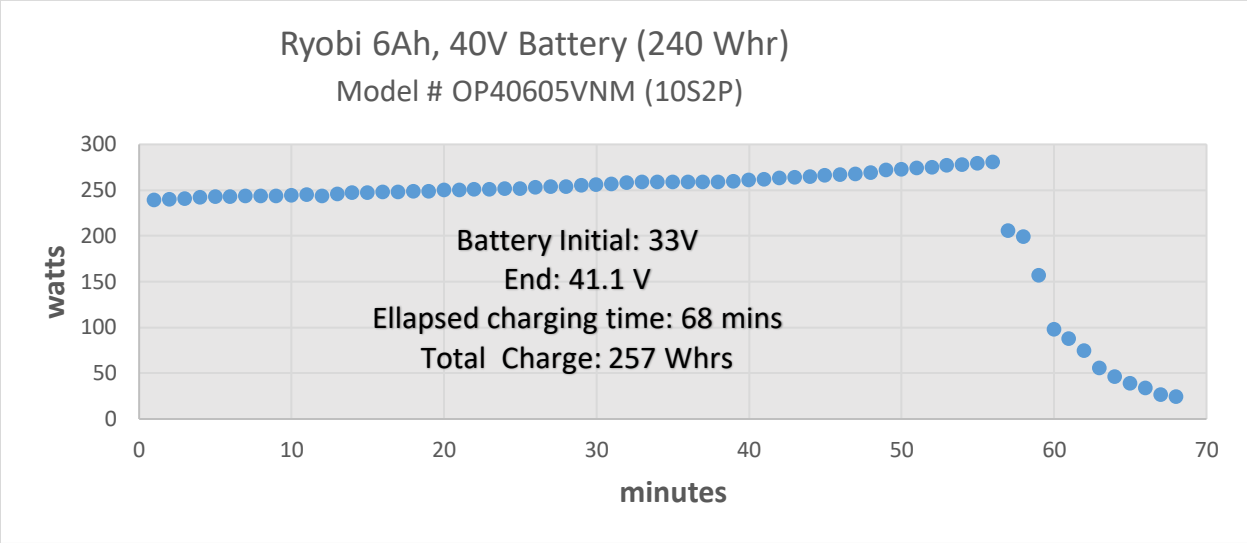
In our test, the Ryobi mower with fully charged battery was able to mow 6,700 sq. ft. (0.15 acre) of grass area using self-propelled and grass-catching features. This compares very favorably against gas mower energy consumption per cut grass area as shown in Table 3. We consider a gallon of gasoline equivalent to 125,000 Btu's (36.633 kWh).

Table 3: Grass Mowing Activity Comparison Summary

	Grass area Sq. ft (Acre)	Mow time (minutes)	Mowed sq.ft per minute (Sq.ft./min)	Fuel Energy used Electric or gasoline	Watt-hours per Sq. ft. (Whr/sq. ft)	Cost per mow (38 min) @ $0.17/kWh or gasoline @ $3.26/gl.	Annual cost ($) 25 hours[3]
Electric	6700 (0.15)	38	176.3	256 (Whrs)	0.038	$0.05	$1.97
Gas mower	same	same	same	7327 (whrs) 0.2 gals.	1.093	$0.77	$30.39

[3] Annual operating hours for residential lawn mowers used as example taken from EPA (Table3) reference. https://www3.epa.gov/ttnchie1/conference/ei21/session10/banks.pdf

The following day, we replenished energy to the battery, using the provided 40V battery charger. The full charge process took a little over 1 hour (1 hr., 8 min) and the power consumption rate of battery charging can be observed in the figure below.



The Ryobi 40V, 6Ah battery is rated as 240Whr capacity. We measured 257 watt-hours to fully charge the battery over a period of 1hr, 8 minutes. Efficiency of the battery charging/discharge cycle is about 93.5% efficient. This is evident in the plot, most likely by design of modern electronics design using pulse width modulation (PWM), which efficiently controls the amount of current (and power) delivered to the battery at the beginning and end of the charging cycle.

We conclude that today's electric battery mower equipment is as efficient as manufacturers claim – at least when the battery is new, providing the stated energy storage capacity. A battery pack capacity eventually begins to deteriorate with periodic charging cycles or a thru a deviation in its battery management system (BMS). A Google search indicates that a typical consumer battery pack is designed to last 1000 cycles. However, some users indicate that consumer LiFePo4 battery packs last 2-5 years. The battery pack (Ryobi 40V) mentioned in this write-up is built out of 10 series cells (string) with two parallel strings (10S2P). LiFePo4 cell chemistry nominal reference voltage is 3.65V per cell. However, the 40V battery pack is charged above the nominal voltage pushing this slightly above 41V during charging, where 42V is considered the absolute maximum charge voltage level. Currently, the retail cost of this particular 40V (6 Ah) battery is $142 ($0.59/Whr).

Although the electric mower is less expensive to operate than its gas counterpart, and offers benefits that the gas mower does not—such as noise reduction and no handling of gasoline—needing to replace one or two batteries every five years over a 10-yr lifetime of an electric mower would put a dent in savings compared to the gasoline mower. Needless to say, for a significant, overall savings, the retail cost of battery packs would have to come down in price, or technology improve so that they last longer.