

## Rebecca Buck

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**From:** Steven Wisbaum <steven@ecoequipmentsupply.com>  
**Sent:** Monday, February 25, 2019 12:24 AM  
**To:** Rebecca Buck  
**Subject:** VT Senate Committee on Appropriations - Opportunities to reduce GHG emissions by increasing the use of electric lawn care equipment in VT  
**Attachments:** EES\_Kick-The-Can\_Feb11.jpg; Comparison of the Environmental and Economic Impacts of Electric vs Conventional Lawn Care Equipment.docx

Dear Senator Buck,

In a few months, Vermonters will begin reveling in the sights, sounds and smells of Spring. But for many of us, the all-too-familiar sound of gas-powered lawn equipment echoing across the landscape will be a stark reminder of yet another way we are recklessly burning fossil fuels and spewing CO2 into the atmosphere. But fortunately, with the increased availability of electric lawn care equipment, the Vermont legislature has some opportunities to help encourage more environmentally-friendly lawn care practices. In-fact, there's already been some noteworthy developments related to the use of electric lawn care equipment in Vermont, including:

- To help meet their commitment to reduce greenhouse gas emissions as required under Vermont's Tier 3 Renewable Energy Standard, some Vermont electric utilities including Green Mountain Power, Burlington Electric Department, and the Vermont Public Power Supply Authority have, have or are planning to launch incentives for commercial and residential electric lawn mowers.
- Increasing numbers of Vermont residents are switching from low-horsepower gas "push" mowers to battery-powered electric lawn mowers and other electric lawn care equipment (e.g. string trimmers, leaf blowers, hedge trimmers, chain saws, etc.) from a variety of manufacturers and available at a wide range of retail outlets.
- The Vermont Department of Forestry and Parks Northwest Region just purchased a Mean Green CXR-60 zero-turn 36 hp electric lawn mower, which will be the first commercial electric mower purchased by a VT state agency.
- As of the start of 2019 there are four lawn care contractors in Vermont using commercial electric lawn mowers and electric lawn care tools. Three of these companies are based in the Champlain Valley and one is based in the NE Kingdom.
- In 2018, the Greenworks company joined industry-leader Mean Green Products in offering a line of commercial, 24 to 36 hp electric lawn mowers.
- In 2018, the Ryobi company introduced a small, relatively inexpensive "steer-type" (ie. not zero-turn) electric riding mower suitable for residential lawns up to around 2 acres in size.
- Nationally, there are thousands of Mean Green commercial electric lawn mowers operated by contractors, universities, and about ten states including Oregon and California, and about sixty cities including Cambridge, MA, South Hampton, NY and Fairfax County, VA.

While these are encouraging developments, considering the significant environmental impacts of conventional lawn care equipment (as summarized in the attached "Comparison of the Environmental and Economic Impacts of Electric vs. Conventional Lawn Care Equipment") and the heightened urgency to reduce greenhouse gas emissions, the current pace of this transition in Vermont is much slower than what it could, and should be.

So, as the Vermont House and Senate Committees on Appropriations seek public input on the Governor's Recommended FY2020 State Budget, here's some actions our state government could take to help stimulate the adoption of electric lawn care equipment in Vermont:

**Create a Temporary Tax Holiday for Residential and Commercial Electric Lawn Mowers:**

Battery-powered lawn mowers, and especially commercial electric lawn mowers are currently 20 to 40% more expensive than their gas-powered counterparts. This higher cost is primarily related to the high cost of the lithium ion batteries which are key to providing the 6 to 9-hour run-time required in high-use applications. And even though electric lawn mowers can save their owners between \$2,000 and \$4,000 in annual operating costs (due to the lower cost of electricity versus gas and their lower maintenance and repair costs), this higher purchase price is a significant barrier to wider adoption. And while the incentives being offered by VT's electric utilities are helpful, most of these incentives will only cover 25 to 50% of the sales tax. For example, a Mean Green CXR-60 (60-inch mowing deck) zero-turn electric mower with up to a 7 hr run-time costs around \$23,000, which means that Green Mountain Power's incentive of \$700 will cover just over 1/2 of the \$1,380 (6%) sales tax. So, creating a temporary (e.g. 5 to 7-year) tax holiday for electric mowers and other electric equipment would make it easier for lawn mowing contractors to spend the extra money for an electric mower, and in-turn help initiate the wider adoption of this technology. And for those who worry about the loss of tax revenue associated with this tax holiday, it's noteworthy that since each commercial electric mower purchased in the state will divert \$2,000 to \$4,000 annually away from the purchase of imported fossil fuel, a significant amount of these savings will likely be kept circulating within our state economy, some of which will in-turn be collected as sales tax.

**Include Lawn Care Equipment in Climate Change Discussions and Actions:**

It's a little-known fact that the fuel used by conventional lawn mowers and other lawn care equipment is included in the "Transportation Sector" of Vermont's GHG emissions inventory. In-deed, the average commercial gas-powered lawn mower consumes 10 to 15 gallons of fuel per day, or 1,000 to 1,500 gallons per growing season, and there are many hundreds of these mowers being operated in the State. Yet, even though lawn mowers are seen (and heard) throughout Vermont from the statehouse lawn to our most isolated hollows, these gas-powered machines have to-date been conspicuously absent from all of Vermont's climate action discussions and policy actions. For this reason, it's critical that we start including gas-powered off-road vehicles and lawn care equipment in discussions related to the GHG emissions associated with the Transportation Sector, as well as policy actions designed to reduce those emissions. For example:

**Adopt Purchasing Procedures to Encourage the Purchase of Low-Emission and Zero-Emission Equipment and Services by State Agencies and Departments:**

There are a number of existing laws that demonstrate Vermont's commitment to lead by example and encourage best practices that are consistent with our efforts to reduce GHG emissions, and move to a clean energy economy. To further those objectives, there are some tangible actions that the legislature and the governor can take to encourage the purchase of low-emission and zero-emission equipment and services by State agencies and departments, including:

1. **Decrease the Action-Threshold to \$500 in Executive Order 05-16:** Executive Order 05-16 "Climate Change Considerations in State Procurements" <https://legislature.vermont.gov/statutes/section/03APPENDIX/003/00075> only applies for bid amounts exceeding \$25,000, which means that it does NOT apply to commercial electric lawn mowers which can cost as little as \$9,000, or for battery-powered hand-held

lawn care tools such as string-trimmers (aka “weed wackers”), leaf blowers (aka “debris blowers”), edgers, hedge trimmers, chain saws, etc. which can cost even less at \$500 to \$1,000 (excluding chargers and batteries). For this reason, the bid threshold for Executive Order 05-16 should be reduced to \$500.

2. **Expand Favorable Consideration of Executive Order 05-16 to the ITEMS Being Purchased:** As currently written, Executive Order 05-16 requires that favorable consideration only be given to the vendor’s “**business practices**” that promote clean energy and take action to address climate change. Therefore, it appears that favorable consideration does NOT apply to the actual items being purchased to have lower GHG emissions. So, if, for example a state agency or department needs to purchase a lawn mower, Executive Order 05-16 apparently does not require that agency or department to specify both electric AND conventional mowers in the Request for Quotes (RFQ). Nor is it clear if this Order requires that the electric lawn mower be given “favorable consideration” when bids are received for both electric and conventional mowers. To remedy this apparent oversight, a new or amended executive order should be enacted that specifies that RFQ’s for equipment, machines, and/or services purchased by state agencies and departments should include both conventional and Low-, or Zero-GHG emitting options (whenever those non-conventional versions are available), and that favorable consideration be given to the equipment, machines, services, etc. that reduce GHG emissions compared to conventional (e.g. gas-powered) options.
3. **Account For and Prioritize Lower Operating and Life-cycle Costs in Budget Development:** Annual budget development by state agencies and departments typically focuses on the **purchase price** of capital expenditures (e.g. equipment purchases) versus the **operating and life-cycle costs** of those capital expenditures. So, for example, even if an electric lawn mower will save \$2,000 to \$4,000 annually in operating costs (ie. \$20,000 to \$40,000 over ten years) compared to a gas-powered mower, the higher purchase price of an electric mower creates a disincentive for it being included in an annual budget request. For this reason, appropriate actions should be taken to modify state purchasing procedures to account for and prioritize lower operating and life-cycle costs in the development of annual budgets.

**Ensure that future Vermont Comprehensive Energy Plans (CEP) and Electric Plans Address the Electrification of Off-road Vehicles Including Lawn Care Equipment in the Three End-use Sector Goals for Renewable Transportation for 2025:**

In 2016 the Department of Public Service Department (DPS) updated the Vermont Comprehensive Energy Plan (CEP) and Electric Plan as required by 30 V.S.A. § 202b and 30 V.S.A. § 202

[https://publicservice.vermont.gov/sites/dps/files/documents/Pubs\\_Plans\\_Reports/State\\_Plans/Comp\\_Energy\\_Plan/2015/2016CEP\\_ES\\_Final.pdf](https://publicservice.vermont.gov/sites/dps/files/documents/Pubs_Plans_Reports/State_Plans/Comp_Energy_Plan/2015/2016CEP_ES_Final.pdf). With updates required every six years, the next update will be due in 2022. The CEP includes detailed recommendations to obtain 90% of Vermont’s energy needs from renewable sources by mid-century while virtually eliminating reliance on oil, including that used in the transportation sector. Considering it’s a little-known fact that the fuel used by off-road vehicles and lawn care equipment is included in the transportation sector, the end-use sector goals for renewable transportation for 2025 should specifically address the electrification of off-road vehicles and lawn care equipment.

**Ensure the Guidance for Regional Enhanced Energy Planning Standards Address the Electrification of Off-road Vehicles Including Lawn Care Equipment:**

Act 174 of 2016 “Recommendations and Determination Standards”

<https://publicservice.vermont.gov/content/act-174-recommendations-and-determination-standards>

establishes a new set of municipal and regional energy planning standards, which if met allow those plans to carry greater weight - substantial deference - in the Section 248 siting process for energy generation. An analysis of this law and its implementation reveals some missed opportunities to address the use of fossil fuel by off-road vehicles and lawn care equipment:

1. For example, the “Pathways Standard 7 Transportation”, question 7C in the “Guidance for Regional Enhanced Energy Planning Standards”  
[https://publicservice.vermont.gov/sites/dps/files/documents/Pubs\\_Plans\\_Reports/Act\\_174/Regional%20Guidance\\_Final.pdf](https://publicservice.vermont.gov/sites/dps/files/documents/Pubs_Plans_Reports/Act_174/Regional%20Guidance_Final.pdf) asks if the regional “plan promote(s) a shift away from gas/diesel vehicles to electric or other non-fossil fuel transportation options?”. Since the fuel used by off-road vehicles and lawn care equipment is included in the transportation sector, this guidance document should also encourage a “shift away from gas/diesel **off-road vehicles including lawn care equipment**”. Without this specific language, this fossil-fuel energy use category will continue to be ignored in the regional energy planning process.
2. Similarly, Section 4D in the Guidance document addresses transportation system changes and land use strategies needed to achieve a target of 10% renewable transportation end use sector goals for 2025. To satisfy this standard, the planning standards direct regional plans to set targets for energy use for passenger transportation and address the role that increased use of public transportation, rail ridership compact land use strategies, and fuel switching could play in helping regions reach transportation targets. Again, since the fuel used by off-road vehicles and lawn care equipment is included in the transportation sector, this guidance document should also **set targets for energy use by off-road vehicles including lawn care equipment** to ensure that this fossil-fuel energy use category is included in the regional energy planning process.

I’d be happy to answer any questions about the information presented above, either by e-mail, by phone, or in person in a Committee meeting/hearing.

And thank you for your public service!

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# **FUEL & ELECTRICITY CONSUMPTION, CO2 AND SMOG EMISSIONS, COSTS, AND NOISE LEVELS OF GAS/DIESEL COMMERCIAL LAWN MOWERS VERSUS ELECTRIC LAWN MOWERS**

## **HOURLY Fuel/Electricity Consumption:**

A conventional **commercial** lawn mower consumes about **1 to 1.75 gallons of gas or diesel fuel per hour**, while a commercial **electric** lawn mower consumes about **2.8 kW per hour**.

## **HOURLY CO2 Emissions:**

Assuming an average of 20 lbs of CO2 is generated per gallon of gas or diesel fuel burned, a **conventional** commercial mower generates **20 to 35 lbs of CO2 per hour**. For comparison, a commercial **electric** mower would generate approximately **.73 lbs of CO2 per hour** (based on VT ANR estimate of .26 lbs of CO2 per kWh of electricity consumed in Vermont).

## **ANNUAL Fuel Consumption and CO2 Emissions:**

**Conventional** lawn mowers used by contractors, institutions, municipalities, etc. often are run for **600 to 1,000 hours per year**, consuming **600 to 1,500 gallons of gas or diesel per year**, generating **6 to 15 tons of CO2 per year**. For comparison, a commercial **electric** mower operated for that same amount of time would use **1,680 to 2,800 kWh of electricity**, and emitting only **½ ton or less of CO2 per year**. Therefore, every commercial **electric** mower that replaces a gas/diesel mower **can reduce Vermont's CO2 emissions by 5 to 14 tons per year**.

## **ANNUAL Fuel, Maintenance and Repair Costs:**

At \$2.75/gallon, 600 to 1,500 gallons of gas/diesel would **cost between \$1,650 and \$4,125 per year**, while **the electricity consumed by an electric mower would cost between \$269 and \$448 per year** (assuming \$.16/kWh), resulting in **savings of between \$1,381 and \$3,677 per year** in fuel costs. And because electric mowers have so few moving parts compared to conventional mowers, they also save their owners hundreds of dollars per year in reduced service and repair costs.

## **30% Federal Solar Tax Credit:**

When the CXR and NXR zero-turn mowers are purchased with the optional Solar Assist Mower (SAM) solar canopy, the cost of the batteries (\$4,500 each) and the SAM (\$1,600) are eligible for the 30% Federal Solar Tax Credit.

## **Utility Incentives for Electric Mowers:**

Information about the new \$700 GMP commercial electric lawn mower incentive can be seen here [https://www.ecoequipmentsupply.com/news/new\\_discount\\_from\\_eco-equipment\\_supply/](https://www.ecoequipmentsupply.com/news/new_discount_from_eco-equipment_supply/). The Mean Green factory is also providing an additional \$300 discount with the incentive. The Burlington Electric Department has proposed a **\$3,000** incentive for Mean Green commercial mowers that's scheduled to go into effect this spring, and other utilities will also likely be introducing their own incentives.

## **Smog-Forming Air Emissions:**

Since gas/diesel engines on lawn mowers have minimal pollution controls, this equipment is a major source of smog-forming air pollution.

## **Noise:**

It's well known that gas/diesel-powered lawn equipment (e.g. mowers, debris blowers, string-trimmers, etc.) make excessive amounts of noise. Conversely, because they don't have internal combustion engines, electric lawn care equipment is 50 to 65% quieter. A video comparing the sound of a conventional Kubota zero-turn mower and the Mean Green CXR-52 can be seen (and heard) here [https://www.youtube.com/watch?v=QDx7w8upE\\_M](https://www.youtube.com/watch?v=QDx7w8upE_M)