



A lush garden scene with a variety of plants, including tall grasses, yellow flowers, and green foliage. In the foreground, a green robotic mower is visible on the left side, partially cut off by the frame. The background shows a dense garden with a brick building and a chimney visible through the trees.

Green Alternatives

TO LANDSCAPING & TURF MANAGEMENT

by Joseph Conrad

Today, facility and maintenance managers have options for sturdy, electric, lithium-powered mowers that offer zero emissions, zero gas or fluids, and low noise.



The mowers and electric hand-held equipment include a wide variety of options from Push, Walk Behind, Stand On, and Zero Turn models. There are commercial cordless electric versions of trimmers, chain saws, pruners, and edging attachments, as well as battery backpack blowers. Universities can maintain their pristine campus landscaping with low noise and cleaner alternatives, even gaining LEED points in many cases.

Electric Alternative to Fossil Fuels

The electric advantage over petroleum-driven options for outdoor power equipment is substantial. The first advantage is less noise. Electric mowers can offer extreme power, with horsepower that exceeds many commercial gas mowers in their classes, combined with stealthy operation. Most gas mowers are 95-100 decibels, whereas electric ones run at less than 80 decibels. For every six decibels' difference in sound, the noise doubles, so the reduction is striking.

Secondly, electric mowers and outdoor maintenance tools can offer zero emissions, benefiting the environment and saving money.

Outdoor, or off-road, power equipment such as lawn mowers, leaf blowers, grass trimmers, farm tractors, ATVs, UTVs, and so on, are all part of a sparsely-regulated group of fossil-fuel-powered products. These products have a significant impact on our environment. Since they are not "on-road" vehicles, the EPA has put little effort into regulating emissions on these products. Due to this limited regulation, outdoor power vehicles are among the worst polluters and the least efficient products on the market today. Emissions are more than thirty times worse than on-road gas vehicles, and efficiency is near 20%. Gas-powered outdoor power equipment is so polluting that the EPA has concluded that just one 2-cycle string trimmer can produce as much emissions in one hour as one full size pick-up truck traveling over 3,000 miles.

Thirdly, electric mowers use zero gas. Electric replacements for gas engine products can run at close to 90% efficiency and only cost about 5% of the costs of operating and maintaining their gas engine rivals. This price difference means that operators can save anywhere from \$5.50-\$8.00 per hour while

mowing with an efficient zero-turn, battery-powered mower.

Finally, low maintenance is another benefit. Routine maintenance is one of the most important, time consuming, and most expensive tasks that every gas mower owner is plagued with throughout the service life of the mower. Electric alternatives require little routine maintenance. There is no internal combustion engine, so no spark plugs to clean or change, no carb/injectors to rebuild, no engine oil or filters to change, no hydraulics, no belts, no pulleys, no clutches, and no air filters. In fact, there are no oils or liquids to leak or spill. Because of these many benefits, as well as the sustainability factors, facility managers at private colleges and universities are turning more often to green alternatives.



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YALE REPLACING GROUNDS EQUIPMENT WITH ELECTRIC ALTERNATIVES

Yale Landscape and Grounds Management is taking the initiative to replace its gas-fueled and diesel-fueled equipment with electrically-powered alternatives. The effort will improve air quality, reduce noise pollution, and help Yale in achieving its greenhouse gas emissions reduction commitment.

The effort began when Dev Hawley, Director at University Planning & Facilities Operations, actively began researching electric alternatives to gas backpack blowers. He expressed that, while the gas equipment is effective, it is loud and emits fumes that are harmful to the environment. “Electric not only helps from an emissions point of view, but it also helps with noise because the electric equipment is generally a lot quieter,” says Hawley. “We’re in a learning environment

where we don’t really need a leaf blower or lawn mower creating lots of noise right outside of the classroom.”

By reducing localized emissions and cutting back on noise, the initiative will also benefit the health and well-being of the facilities grounds staff. Working with Paul Catalano, Director of Grounds Maintenance, he put together an inventory of current grounds equipment. Yale has over thirty backpack blowers, along with a large quantity of augers, handheld blowers, tractor lawn mowers, push lawn mowers, chainsaws, hedge trimmers, string trimmers, leaf vacuums, and sweepers. To help manage its property of over 1000 acres, Yale also hires contractors. Any equipment that Yale replaces for electric will also need to be replaced by the contractors.

Gas-powered outdoor power equipment is so polluting that the EPA has concluded that just one 2-cycle string trimmer can produce as much emissions in one hour as one full size pick-up truck traveling over 3,000 miles.

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When considering alternatives, they looked into the price and performance of the equipment. They asked questions such as: Does the land mower cut as fast and collect the grass as well? Does the electric blower blow the leaves when the leaves are wet? While the market for electric grounds equipment is currently in a state of development and transition, they found areas of opportunity. Without any major performance compromise, they found replacements for about half of their inventory, including handheld blowers, chainsaws, push mowers, hedge trimmers, and string trimmers.

When it came to backpack blowers, they were not convinced that the electric alternatives would have ample power to perform the job efficiently. They decided on replacing half of the backpack blower supply with electric alternatives to test their performance. Hawley expects the equipment will measure up so

that they can replace the remaining supply next year.

One of the challenges that comes with the switch to electric is batteries. For the equipment to last during a day's worth of work, the battery needs to be charged midway. To account for this limitation, Yale will install a battery station at the main Grounds Management office with enough batteries to act as replacements throughout the day. This initiative is a larger reflection of Yale Facilities' efforts to reduce its environmental impact and lower its carbon footprint, supporting Yale's commitment to reduce greenhouse gas emissions by 43% below 2005 levels by 2020 and achieve carbon neutrality by 2050.

As part of a Vehicle Replacement Program for 2017, Yale Facilities needed to replace twenty fleet vehicles. After researching alternatives, they were able to replace thirteen vehicles with hybrid models that would

take advantage of a propane fueling station installed nearby this past summer. "That again is sending the message that Yale Facilities is going to drive as a priority a much more sustainable solution to everything we do, and we're really taking it from trucks all the way down to the string trimmer," says Hawley.

The new electric grounds equipment will be up and running within the year. For the remaining equipment, Yale will continue to research alternatives and expects to make progress each consecutive year. Yale is committed to building a more sustainable world. By doing what we do best—integrating science, the humanities, and our community—Yale creates, tests, and adopts innovative solutions to the environmental and social challenges we all face.

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LAWN MOWER EMISSIONS FACTS

According to an EPA study, one 3 hp lawn mower emits the same air pollution as eleven cars driving at 55 mph. Each additional hp is calculated with a linear use equation. Each 1 hp from a lawn mower = 3.67 cars at 55 mph emissions

Commercial ZTR gas mower

24 hp commercial ZTR mower = 88 cars at 55 mph emissions, or 4,840 car miles each hour

24 hp ZTR mower at 3.5 hrs (national average/day) = 308 cars at 55 mph/day, or 16,940 miles car emissions/day

24 hp ZTR used 350 hours/year = 1,694,000 car miles of emissions/year

1,694,000/12,000 miles (average annual car miles) = 141 car emissions per year for each commercial ZTR mower

Residential gas riding tractor mower

18 hp riding mower = 66 cars at 55 mph emissions, or 3,633 car miles each hour

18 hp riding mower @ 1.5 hrs (national average/week) = 99 cars at 55 mph/week, or 5,445 miles car emissions/week

18 hp riding mower used 50 hours/year = 181,650 car miles of emissions/year



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