

## Pay Dirt: Capitalizing on the Electrification of Landscaping

The clock is winding down on gas-powered lawn machines. The early rulers of battery-powered outdoor equipment aim to build an edge that isn't so easily trimmed.

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### Key Takeaways

- In the fight against climate change, gas-powered outdoor power equipment (OPE) is some of the lowest-hanging fruit. Already, 100 US municipalities restrict it, with the entire state of California set to follow in 2024.
- Two of the market leaders in the new cordless electric OPE segment are Techtronic (maker of Milwaukee and Ryobi) and Makita, established players whose lithium-ion powered hand tools had been on top for years.
- It's not easy building a battery-powered machine light enough to push or carry and powerful enough to tackle the great outdoors. While the power gap with gas is closing, run time remains an issue.
- Chervon's Ego brand leads a pack of dedicated battery OPE producers from China also vying for global market share.
- Intra-brand battery compatibility means that the established tool makers have a secret weapon for pressing their scale advantages already sitting in their existing customers' basements and garages.

Which of the following causes more smog-forming pollution?

(a) Gas-powered leaf blower



(b) 2017 Toyota Camry



If you picked (a), you're right. In fact, an hour of leaf blowing with the best-selling gas-powered leaf blower emits 20 times more pollution than an hour of highway driving, according to a [fact sheet](#) by the California Air Resources Board.

Simply put, lawn care is an environmental disaster. Most consumer-grade leaf blowers, lawn mowers, and other OPE are powered by two-stroke engines—monumental polluters that burn gasoline and oil together. Gardening crews and homeowners using this equipment inhale noxious fumes containing benzene, formaldehyde, and particulates, all of which are linked to cancer, heart disease, and asthma. In California, blowers and other gas-powered equipment together produce more air pollution than the state's 18 million automobiles. There, as elsewhere, lawn mowers contribute majorly to the damage: cutting the US's 40 million acres of lawn consumes 600 million gallons of gasoline and emits 16 billion pounds of carbon dioxide each year; 17 million gallons of gas are thought to be *spilled* by refilling mowers.

Governments are starting to restrict the use of gas-powered OPE. California recently banned its sale starting in 2024. More than a hundred US cities and towns, such as Washington, DC, already prohibit gas-powered leaf blowers or restrict their use to a few months of the year, not only for their impact on the environment, but also for the noise they make: some blowers produce more than 100 decibels, loud enough to cause hearing loss after just 15 minutes. Additional cities, including Boston and New York, are mulling restrictions.



Watch as Harding Loevner analyst Sergei Pluitsinski guides us through a key testing ground—otherwise known as his yard—for researching the burgeoning battery-powered outdoor power-equipment market.

There is an alternative to these noisome devices: battery-powered OPE. Over the last few years, the performance of cordless electric tools running on lithium-ion cells has advanced dramatically, largely closing the gap to their CO<sub>2</sub>-spewing cousins. The most powerful electric leaf blower on the market today, the Ryobi HP Brushless Cordless 404100VNM, blows 730 cubic feet of air per minute at a maximum air speed of 190 miles per hour, compared to 1,110 cubic feet per minute and 220 mph for the most powerful gas model, the Echo PB-9010T. "A few years ago, there would have been a chasm between the specs on the two models," says Harding Loevner Consumer Analyst Sergei Pluitsinski. "As batteries and battery-related technology keep getting better, the performance is now looking much closer." There are other advantages to the electric model. The Ryobi operates at 72 decibels, about the same as a passing car, compared to the helicopter-level din of the Echo.<sup>1</sup> The Ryobi is emissions-free and far easier to maintain than the Echo since there's no carburetor to get gummed up. The Echo retails for US\$799 on Amazon. The Ryobi sells for US\$299, including a spare battery and a high-speed charging adapter.

Cordless electric OPE has other advantages. It is easier and safer to use and therefore preferable in the many countries where labor shortages are leading to less-experienced lawn crews, says Harding Loevner Director of Research Yoko Sakai, CFA. It eliminates the need for portable gasoline cans, which top State Farm's fire-safety list of items to avoid storing in your garage. Cordless electric equipment is also more convenient than corded electric.

Challenges to OPE's imminent supremacy remain, however. In addition to the remaining gap in performance compared with gas-powered equipment, cordless electric OPE generally runs for less than 30 minutes on a charge from the out-of-the-box battery, or as little as 10–15 minutes for the most powerful models, although tools often come with a spare battery, and longer-lasting batteries can be purchased for a few hundred dollars more. For the moment, gasoline-powered models still dominate the US\$25 billion OPE market, accounting for 80% of sales in 2020. But

revenues from cordless electric models are growing almost twice as fast—10% a year vs. 5% a year according to a 2021 analysis,<sup>2</sup> with corded electric the slowest-growing OPE segment at only 4%.

A small number of companies are capturing a large portion of the growth in the cordless electric OPE market. Two of the market leaders are Ryobi parent Techtronic Industries and Makita, long-established power tool companies that recognized the opportunity to expand their reach to the outdoors. They are seeking to leverage their scale in manufacturing and distribution and investment in proprietary battery-management software, along with the customer stickiness that comes from offering a full line of tools that share the same battery system, to build a competitive advantage that will leave competitors in the dust if not sucking their exhaust. But as is often the case in today's consumer technology segments, they also face competition from an upstart in China with its own ideas about how you will keep your grass looking its best.

## Battery Bets

Battery-powered tools are not new. The first cordless power tool, a 3.6-volt screwdriver from Black & Decker, appeared in 1961, leading to the company being chosen by Martin Marietta to make power tools for astronauts to use in space. The nickel cadmium battery technology that prevailed through the end of the twentieth century achieved a certain level of acceptance among DIYers drawn to the sense of freedom that cordless tools provided. But there is a vast difference between the amount of power needed to turn a screw, or even drill a hole, and what it takes to cut a lawn or blow it clear of leaves. For 40 or so years, the possibility that battery-powered tools could do the latter seemed remote. The old-style batteries were bulky for the amount of power stored and had the unfortunate propensity to peter out in the middle of a job.<sup>3</sup>

**Like Elon Musk at Tesla (at least until recently), Techtronic founder Horst Pudwill realized it made little sense to make his own lithium-ion battery cells. Rather, his company's edge would be in battery management software.**

Lithium-ion batteries, which first appeared in laptop computers and cell phones in the 1990s, offered the potential to store more power with less weight, although they did present their own challenges around overheating and power management. One of the first power-tool companies to recognize the potential for lithium-ion batteries was Techtronic. The company was founded in Hong Kong in 1985 by German engineer Horst Pudwill to produce high-quality power tools cheaply in China for US and European customers. Like Elon Musk at Tesla (at least until recently<sup>4</sup>), Pudwill realized it made little sense to make his own lithium-ion battery cells, which were already on their way to being commoditized by companies like Panasonic and Samsung. Rather, Techtronic's competitive edge would be in developing

more frictionless motors and the software required to control charging and discharging the battery cells and to adjust the flow of power to those motors for optimal safety and efficiency.

Techtronic purchased the non-Japanese rights to Ryobi in 2000 and acquired Milwaukee, America's most iconic professional power-tool brand, in 2005. Three years later Techtronic installed an iconoclastic consumer tech CEO to take its lithium-ion-centric plan to the next level. Joseph Galli, whose prominent eyebrows and excitable manner bring to mind Martin Scorsese, had joined Black & Decker straight out of college in 1980 and risen to become president of its power tools division before leaving in 1999 to join Amazon as COO. With a style described by the book *The Everything Store* as constructive but "abrasive," he lasted but a year. Galli spent much of his first decade at Techtronic digging it out from the near-ruinous impact of the 2008 housing crisis on DIY tool sales—leaning into transitioning its tool line from majority corded equipment to majority battery powered and insulating the company against future cyclicity by diversifying into new commercial segments like tools for utilities and green power companies. By 2018 he had restored Techtronic to solid profitability and growth, when ongoing advances in lithium-ion technology and the company's power management and motor designs took another little leap forward.

Years of development of lithium-ion batteries had resulted in more-powerful cells that would be able to power not only drills, but leaf blowers and other outdoor tools as well. "The first time I heard Galli and the rest of the team talk about the OPE opportunity was in an earnings call in 2018," says Pliutinski. "They were very excited about it, although they acknowledged the technology was a work in progress. At the time, they figured outdoor might be a US\$2 billion-a-year addressable opportunity."

Techtronic's first high-profile battery-powered model, the Milwaukee M18 FUEL Blower launched in 2018, was still deficient in the air flow department—falling somewhere between a capable blower and a very high-powered hair dryer. The company positioned it as a kind of demonstration project, aimed primarily at professional crews doing light cleanup when finishing a lawn or leaf job.

**With the average Ryobi customer already in possession of eleven different Ryobi hand tools, many operating on the same battery system used to power the new OPE, the cost of starting over with a new brand and building up a new set of spare batteries was a non-starter.**

Before long, improvements in power management software and cell density supported the production of ever more capable outdoor cordless electric tools. The availability of these better products, plus the backlash against gas-powered versions, led more homeowners to decide to buy one. At that point, the choice for existing owners of Techtronic's various brands of tools was simple: With the average Ryobi customer already in possession

of eleven different Ryobi hand tools (and the average Milwaukee customer probably even more<sup>5</sup>), many of those devices operating on the same battery system used to power the new OPE, the cost of starting over with a new brand and building up a new set of spare batteries was a non-starter.

Makita was another early adopter of lithium-ion technology, launching its first product in 2005, the same year as Techtronic. At one time in the 1970s Makita enjoyed 20% of the US power tool market, before trade frictions between the US and Japan in the 1980s led Makita's US market share to decline. Today, while Techtronic is dominant in North America and has the closest distribution relationship with Home Depot of any power tool company, Makita is bigger in Europe, where the DIY market is smaller but the company's large physical presence (locations in 25 European countries, including multiple locations in some countries) allows it to vie with Germany's Bosch for leadership of the service-intensive professional market. The smaller DIY base makes the OPE opportunity for Makita somewhat smaller overall than it is for Techtronic. At the same time, the stronger regulatory and popular support for the energy transition in Europe have made for rapid growth of cordless electric OPE because even the performance-minded pro market in Europe tends to lean green. From the fiscal year starting in March 2017 through March 2022, Makita's OPE segment averaged a compounded annual growth rate of 23%, ultimately accounting for annual revenues of US\$789 million or 12% of Makita's overall business, up from 7% five years ago.

## The Competition Gets Chippy

Although there are many companies making outdoor power equipment, 10 account for roughly 90% of the global electric OPE market, including both battery and corded equipment, with Techtronic commanding the largest (20%) market share and Makita a notch or two behind with around 15%. Some major manufacturers, such as Stanley Black & Decker (Galli's former employer merged with Stanley in 2009) and Sweden-based Husqvarna, have been slow to adopt lithium-ion and their OPE market share has suffered as a result. In December 2021, Stanley Black & Decker announced it was acquiring MTD,<sup>6</sup> owner of the largely gasoline-powered Cub Cadet, Troy-Bilt, Rover, and WOLF-Garten lines. Stanley Black & Decker described the move as its entrée to a new pool of potential battery converts, but Galli has been withering in his criticism, derisive of how its acquisitions fly in the face of brand strategy. "Gas lawn mower companies?" he exclaimed in a March interview on CNBC's *Squawk Box*. "That's like Steve Jobs buying a pay phone company when he's rolling out iPhones."

"Gas lawn mower companies?" Techtronic CEO Joe Galli exclaimed in a March *Squawk Box* interview, referring to rival Stanley Black & Decker's acquisition of gas-heavy OPE manufacturer MTD. "That's like Steve Jobs buying a pay phone company when he's rolling out iPhones."

Galli's competition in the US doesn't only come from established players. There are scores of new dedicated OPE manufacturers in China. Most are still small and domestically focused, but a few are starting to matter outside of their home country. For instance, the Ego brand is quickly winning market share and building a reputation for quality. Ego belongs to Chervon, which listed on the Hong Kong exchange in December 2021. According to its IPO prospectus, the brand's revenues increased 42% in 2020, raising its OPE global market share from seventh in 2018 to second just behind Techtronic, though it may have since been overtaken by Makita.

In November 2021, Wirecutter, the influential *New York Times*-owned product review site, chose an Ego leaf blower as its top battery-powered pick, noting that it was more powerful (but louder) than the Ryobi 40470VNM model, which it also recommended. The site also gave its highest ratings to two Ego lawn mowers.

Of course, reviews in consumer tech are a fast-moving target, and only one of many factors that analysts like Pliutinski and Sakai consider in evaluating a company's prospects. More important factors, they say, are distribution and scale. It turns out Techtronic isn't the only brand that has worked closely with Home Depot. The big-box retailer was also instrumental in helping Ego/Chervon develop its OPE line. Shortly before its 2021 IPO, though, Ego/Chervon started rapidly expanding its presence with other retailers—including with Home Depot's low-cost arch-nemesis Amazon. "We were, like, I know, can you believe that? You guys should kick them out," Techtronic Deputy CFO Sean Dougherty told Pliutinski on a recent call, relating his own company's conversation with Home Depot about the rift. Home Depot has never publicly elaborated on what it simply termed an OPE "reset," but while Ego/Chervon now has a preferential relationship with Lowe's, it is no longer found at Home Depot.

Techtronic has announced that it will launch 103 new cordless outdoor products by 2025, compared to 10 for Ego/Chervon. Techtronic and Makita will also seek to expand their competitive edge by leveraging their higher revenues to invest more in improving battery performance. Techtronic invests 3.2% of its total sales in R&D, the highest proportion in the power tool industry. Makita invests a more standard 2.4%, only slightly higher than Chervon's 2.2%. But given Makita's US\$6.5 billion in total sales, in dollar terms its R&D commitment is almost five times that of Ego, while Techtronic's is ten times. Since 2020, Techtronic has nearly tripled the number of engineers working on batteries to 944 employees. The company is also investing heavily in automation to concentrate headcount where it has the most impact. That, too, has worked.<sup>7</sup> Gross margins have expanded every year since 2008, going from 31% to 39% in 2021.

## A Pandemic Bump

When Techtronic's competitors cut production due to fears of a decrease in demand amid pandemic restrictions, Galli foresaw that being stuck at home might lead to a boom in home improvement

and maintenance projects. After stockpiling chips and parts, Techtronic kept production at full throttle, enabling it to earn record revenues and win significant market share when competitors couldn't meet increased demand. In 2021, Techtronic's gross revenue grew 35% percent to US\$13.2 billion, while gross profit margin rose 50 basis points to 39%. Net profits rose 58%, to US\$524 million. OPE revenues rocketed up 71%.

In 2021, both Techtronic's and Makita's share price rose substantially. 2022 has been less kind so far. Rising interest rates have taken the shine off many expensive high-quality growth stocks, and gathering recessionary signs have afflicted Consumer Discretionary stocks in particular. Another headwind reflected in the stock price has been higher input costs arising from supply chain issues. Of Makita, Sakai says "a lot of its tools are made in China and other Asian countries. Shipping costs to Europe, America, and Japan are up, as are material prices." Additionally, pandemic-related component shortages delayed manufacturing, forcing Makita to use air freight to fulfill one Home Depot order, temporarily killing margins.

Other factors causing higher costs are deliberate and strategic. Makita, for instance, is investing in larger warehouses for its growing OPE line: landscaping equipment takes up more space compared to drills, saws, and fasteners. Makita also tends to be asset-heavy because it invests in countries for the long term and maintains ample local inventory worldwide to serve its customers. Techtronic is following a similar strategy. It has entered a product development partnership with Home Depot and is expanding a factory and warehouse in South Carolina to create the largest battery-operated lawn mower facility in the world. The expanded plant is set to start production of new OPE products by the end of 2022, including the Ryobi battery-powered ride-on mower, running on its largest (80-volt) battery.

**A California-based startup has begun shipping the first 450 watt/kilogram lithium-ion cells, almost twice the density of current batteries. In their recent earnings calls, Techtronic and Makita have reframed the addressable market as now being ten times their estimates from a few years ago.**

Meanwhile, in February, California-based startup Amprius began shipping its first lithium-ion cells, which at 450 watts/kilogram offer almost twice the density of the standard batteries found in most blowers and mowers. In their recent earnings calls, both Galli and his Japanese counterparts reframed the addressable opportunity set, widening the target from lighter-weight lawn and garden care to include heavier-grade equipment like lawn tractors, backpack blowers, tillers, sprayers, power washers, and portable power supplies, which together comprise a US\$25-billion-a-year market.

Early entrants in cordless electric OPE, Techtronic and Makita will need to work hard to maintain leadership in smaller OPE even as they venture into bigger stuff rife with competition from the likes of John Deere and still-other battery-native Chinese producers. With the public outcry over two-stroke gas engines and their coming ban in California, as well as concerns about climate change, the OPE industry's direction is now clear. The outcome of the battle for OPE supremacy will depend on who can build more powerful gear while continuing to extend battery life without adding weight. But Techtronic and Makita continue to have an edge, starting with knowing what it takes to defend their turf.

## Contributors

Analyst [Sergei Pliutsinski](#) and Director of Research and Analyst [Yoko Sakai](#), CFA contributed research and insights to this piece.

## Endnotes

- 1 The Echo blower is officially rated by the American National Standards Institute (ANSI) at 80 decibels, about the noise level of a passing truck. But the ANSI's is really more of a noise pollution than safety standard, measuring its decibel levels at a distance of 50 feet, not at the source. By the ANSI standard, the Ryobi registers a barely audible 57 decibels.
- 2 Frost & Sullivan analysis in the prospectus for the public offering of China-based battery operated OPE manufacturer Chervon., page 106 (December 17, 2021).
- 3 The nickel cadmium batteries of the era were beset by an unusual chemical quirk known as the "memory effect" or "lazy battery effect" in which the battery would start to "remember" when during previous discharge cycles it had been charged. Regardless of where in the subsequent cycle this occurred, it would cause the battery to lose voltage and conk out until a new charge was applied. Customers were advised they could prevent the problem by running their batteries all the way down before charging. Unfortunately, many customers' memories weren't as good as that of their batteries.
- 4 In late 2020, after years of relying on external suppliers like Panasonic and CATL, Musk announced that Tesla planned to halve the costs of the most expensive part of an EV by making its own batteries. Production has fallen well short of initial targets, however, amounting to enough cells for just about 30,000 of the 1.4 million vehicles Tesla will produce this year.
- 5 The company has never done a formal study of Milwaukee's customers as it has of Ryobi's, but on a recent call deputy CFO Sean Dougherty told Pliutsinski they suspect the average-tools-per-customer figure is even larger for Milwaukee, given its professional focus and the tendency for the same pro customer to have tools both at home and on the job site.
- 6 It should be noted MTD also has Robomow, an Israeli-based producer of battery-powered robot lawnmowers. Running between US\$800-US\$2,000 for a quality residential model (at least US\$300 more than comparable push mowers) and limited to flat terrain, robot battery OPE is still considered a niche within a niche.
- 7 According to Pliutsinski's conversations with management, another source of Techtronic's healthy gross margins and R&D spend is its aggressive use of tax holidays. For example, the company is currently building a plant in Vietnam. Though Vietnam has a 25% standard tax rate, in practice its tax rate is 0% for the first four-and-a-half years that a local subsidiary is profitable, then bumps up to 10.5% for the next four-and-a-half, and only then resets at the standard rate. By periodically shifting production to newer facilities benefitting from such preferential tax treatment, the company has lowered its effective tax rate to about 8%. In October 2021, the Organization for Economic and Cooperative Development (OECD) agreed on a minimum global tax rate of 15% affecting 130 countries. Techtronic's own tax team is skeptical that the OECD blueprint, once implemented, will eliminate tax holidays, but from Pliutsinski's perspective the risk to the effective tax rate going forward "is certainly to the upside."

## Disclosures

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