

BATTERY POWER

PERFORMANCE, AND PUBLIC SPACES



THE CASE FOR BATTERY-POWERED EQUIPMENT
REDEFINED FOR PROFESSIONALS.

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In a recent survey of people using grounds maintenance equipment, 84% said that everyone should do their bit to reduce pollution, with 60% saying that a switch to electric power tools would be helpful. We also asked professionals what qualities they most looked for in equipment. The top three were performance (44%), power (43%) and value for money (36%).

Yet even though battery-powered equipment delivers exceptional performance, power, and value (as we'll demonstrate), and also eradicates pollution at the source, petrol remains the 'go-to' fuel of choice for professionals. This is despite some staggering statistics, including the fact that a petrol brush cutter emits 11x more CO2 than a Ford Fiesta [1].

A switch from petrol to battery power can enable users to have the same, and in some cases improved performance, power and value for money. From what we know working closely with the professional sector, however, making that switch isn't quite as easy as it sounds. It's clear that for commercial users, some doubts about battery power remain.

[1] The Report, Attitude and usage of battery vs petrol, a compilation of analysis and data, Challenge 2025 & EGO, 2020.

BATTERY-POWERED EQUIPMENT FOR PROFESSIONAL USERS THE NEXT GENERATION.

Rapid advances in battery technology

The fact is, battery technology has come a long way, and changed dramatically even in recent years. This change has been led by major automotive manufacturers who know the days of petrol are over and are investing heavily in battery technology. Gone are the days of overheated, underperforming batteries with poor run-times. All of EGO's research and development efforts have gone into producing a battery platform that delivers the optimum amount of power over the widest range of equipment, with a focus on controlling heat mechanically, chemically, and electronically for the best run-times.

All of this means that market-leading equipment such as the EGO Power Plus's Pro X range is not only able to rival the performance of petrol alternatives. In many situations, it actually exceeds it. Estimates indicate that handheld tools are majority battery-powered with most product categories at 50% or over with chainsaws being the only likely exception. So, while petrol is still dominant in the professional market, the picture is changing rapidly and battery-powered equipment is gaining ground very quickly. Several factors are driving this shift.

The public sector wants grounds maintenance to go green

In Europe alone, public authorities spend €1 trillion annually on procuring goods and

services from external suppliers. A significant part of these services includes the maintenance of grounds, parks, and open spaces, as well as schools and leisure facilities.

Unsurprisingly, therefore, public sector contracts are one of the main sources of revenue for professional ground maintenance operators.

As upholders of citizen well-being, public bodies are increasingly aware of their need to minimise their impact on the environment and address the health and safety risks associated with petrol, including noise and vibration levels.

We see this happening already, and over the coming years the public sector will leverage its immense buying power to formally write these demands into contracts. In fact, the EU has already established guidelines on Green Public Procurement (GPP) – or what's known as 'green purchasing' [2].

GPP is defined as 'public procurement for a better environment... whereby public bodies seek to procure goods, services and works with a reduced environmental impact throughout their life cycle.' Although this is currently an EU protocol, the UK is also expected to fully embrace its objectives, and so it's clear that for the professional grounds maintenance sector, big change is imminent.

The end of petrol?

GPP guidance requires adopting stringent regulations about engine exhaust and air pollutant emissions. As such, it actively promotes the use of low noise, low emissions technology. Moreover, as part of its 2014 Procurement Directive, the European Commission encourages public authorities to consider this whole lifecycle cost of the technology they use, rather than just the initial cost of purchase [2].

It's clear therefore that policymakers are pushing hard for the end of petrol and the start of something greener, and battery power offers the only viable alternative. Petrol is still tolerated – just – but the question is for how long?

While many grounds maintenance professionals have embraced the inevitable and begun the migration to battery power, many remain hesitant. One of the main reasons they give for this is the perceived cost of investment. This argument collapses under closer examination which we will explore later on.

[2] EU Green Public Procurement Criteria for Public Space Maintenance, European Commission, 2019.

**A PETROL
BRUSH CUTTER
EMITS 11X MORE
CO2 THAN A FORD FIESTA**

IT'S ALL ABOUT POWER

BATTERY TECH

For professionals who need equipment to keep running over extended periods, the assumption is that petrol has the edge.

However, that's no longer the case. Today's battery-powered equipment can match petrol equivalents, and in some cases exceed it – whether you're working miles from base, all day long, or with heavy-duty tasks such as cutting logs, brush cutting wasteland or mowing expansive parks and playing fields.

The fact is, while petrol is the fuel of yesterday, battery is the technology of tomorrow. It's advancing rapidly, even in the last two years. With so much at stake for vehicle manufacturers, they're piling huge amounts into research and development, including partnerships with major research institutions. The Massachusetts Institute of Technology (MIT) for example is developing a new battery electrode which can deliver thousands of cycles without a loss in performance.

These advances are transferred rapidly to other applications, and as one of the world's leading suppliers of battery-powered cordless outdoor equipment, EGO is at the forefront. One of the few equipment manufacturers with an extensive R&D programme focused exclusively on battery-powered equipment, they've revolutionised the technology to deliver optimum power and performance for the professional market. The majority of components are built in-house. Others are sourced from major brands such as Sanyo and Samsung. The result is arguably the world's most advanced battery dedicated purely to professional grounds maintenance: the EGO™ ARC Lithium battery.

When looking at power and torque, the ARC Lithium™ battery has the industry's highest energy capacity at 420 watt-hours (Wh), delivering more usable power than any other portable battery. This means it can match petrol in terms of power.

Working hours and run time.

Professionals need long working hours and reliable performance. To deliver the necessary voltage and amp hours, ARC Lithium™ combines several lithium-ion cells in a single pack. Each cell is continually monitored by an intelligent power management system to optimise power, performance and run time.

EGO has introduced a new sequential charging system which allows up to 96 EGO batteries to be charged sequentially from a single 13A power supply, without the need to swap out multiple batteries and chargers.

The range also includes a DC to DC in-day charging unit which features a large format 40 Ah lithium phosphate battery which can also connect to the charging peripheral.

This battery can be utilised in a mobile environment such as a works van, providing onsite recharging capabilities even in the most remote areas, eliminating any concerns around runtime anxiety and so provide all-day battery power. This technology also reduces the number of batteries that users need to carry.

Safety.

Some lithium batteries have been known to overheat, leading to shut-down. ARC Lithium™ eliminates this issue. Advanced design features include an increased surface area to reduce overheating and unique KeepCool™ technology which insulates every individual cell. Robust casing protects all electronics from dust, moisture, and vibration to ensure safe and reliable operation in all environments, even during prolonged use.

PROFESSIONAL USE

3 YEAR
BATTERY WARRANTY



THE HEALTH AND SAFETY FACTOR

NOISE

After air quality, the World Health Organization considers noise to be the largest environmental cause of health problems [4]. As everyone knows, professional petrol-powered equipment can be very noisy.

In the case of some line trimmers for example, sound levels of 100dB(A) have been recorded – equivalent to standing 305 metres from a jet taking off. Most professional users will have experienced such noise first-hand and understand that regular exposure can lead to hearing damage including tinnitus and even hearing loss. In some cases, it can be an underlying cause of bigger problems including cardiovascular and metabolic issues.

Just as with vibration, recommended limits have been set for noise and the EU's Physical Agents (Noise) Directive 2003, which sets a maximum exposure limit of 87dB in working environments.

The onus is on the employer to ensure these are observed and to eliminate or reduce

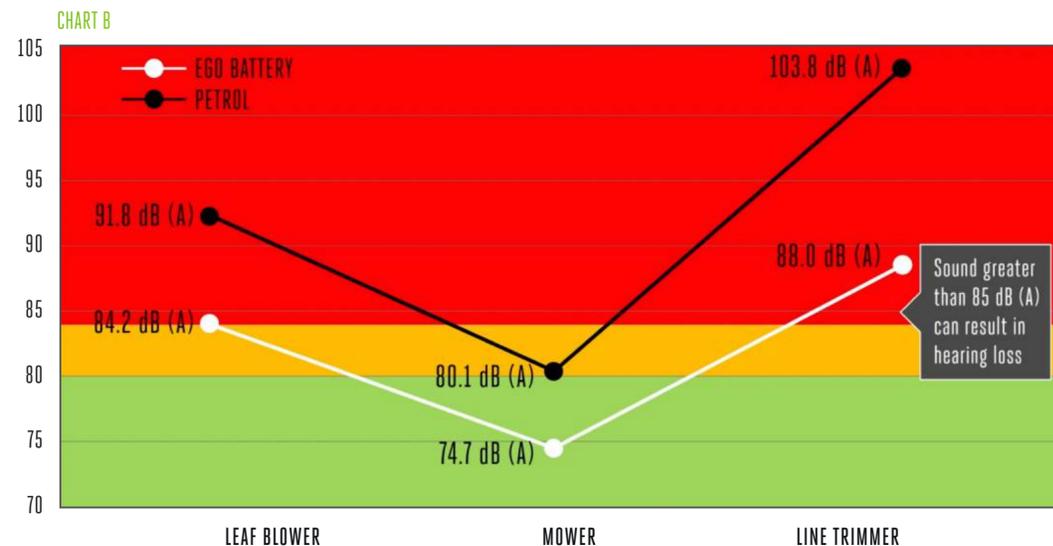
risks including providing employees with training and/or personal hearing protection. Other associated responsibilities include maintaining equipment and monitoring workers' hearing ability, so there's a whole bundle of activities involved.

In tests carried out by the UK's leading on-site vibration and noise testing company Earlsmere (CHART B), EGO's tools produced less noise than their petrol-powered counterparts. At the quieter end of things, EGO's mower measured at 74.7dB(A) – some 10.3dB(A) below the exposure limit level. The petrol equivalent was 30% louder, meaning that by switching to battery, a user would significantly lower their risk of harmful noise exposure.

At the noisier end of the scale, both battery and petrol-powered line trimmers exceeded HSE's exposure limit of 87dB(A). However, while this was by just 1dB(A) for EGO's equipment, the petrol equivalent was up to 3 times louder – representing a huge difference to the human

ear, and a significant difference in terms of work. At levels of 85dB(A), users can work approximately 3 hours longer than at 100dB(A) before a risk assessment is required. Statistics such as these explain why there's a steady increase in the uptake of battery-powered tools – quite simply, they're driving the industry towards a quieter and safer future. And then, of course, there's the question of emissions.

**PETROL POWERED TOOLS
CAN BE UP TO
3X LOUDER
THAN BATTERY ALTERNATIVES**



THE HEALTH AND SAFETY FACTOR

VIBRATION

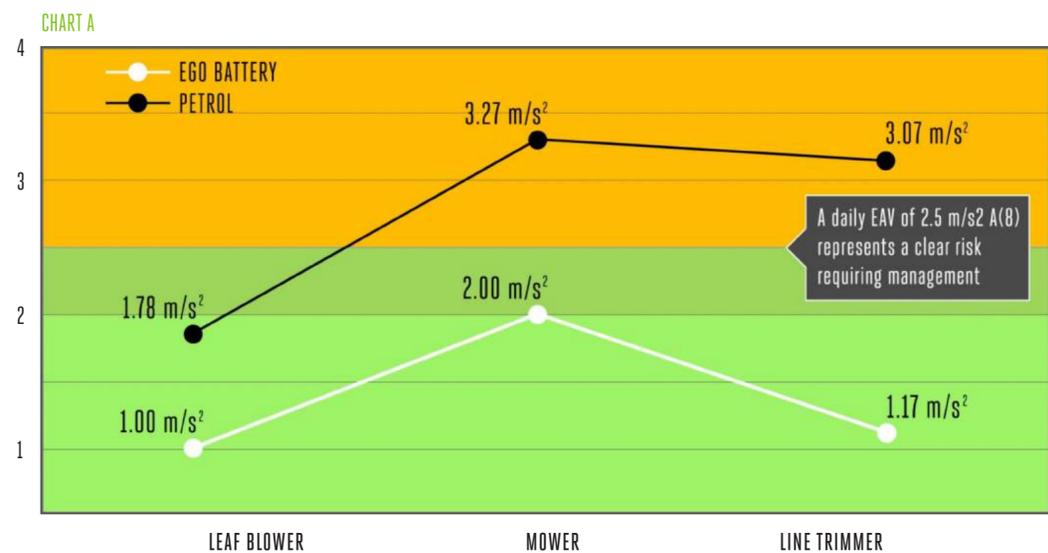
Because they're designed for tough jobs, all professional grounds maintenance tools vibrate, whether they're powered by petrol or battery.

The degree of vibration is critical because it can cause serious health issues including Carpal Tunnel Syndrome and Hand Arm Vibration (HAV) which over time can cause numbness and muscle weakness and injuries – popularly known as 'Vibration White Finger'. These will be all too familiar to professional users and can mean time off work, with all the associated costs. A 2021 study by the British Medical Journal found that the median duration of sick leave absence for Carpal Tunnel Syndrome stands at 20 days while the HSE estimates that up to 300,000 working days are lost each year in the UK due to hand-arm disability-related absences.

By law, an employer must identify potential exposure to hand arm vibration and introduce measures to eliminate or reduce the risk. Powerful directives are in place to ensure this happens, including The Control of Vibration at Work Regulations (2005). Failure to comply with the guidance can have serious consequences including personal injury claims, typically ranging from £2,600 to £34,000. In July 2023, Plymouth City Council was fined £200,000 for failing to address "prolonged and uncontrolled exposure" to hand-arm vibration in the workplace [3].

While figures vary by manufacturer, battery-powered equipment vibrates much less than petrol equivalents, meaning a significantly reduced risk. For example, tools in the EGO Power Plus Pro X range have fewer moving

parts, which ensures a lower level of vibration – often under the 2.5m/s² Exposure Action Value limit (EAV) specified by the regulations and well below the Exposure Limit Value (ELV). This has been verified by Earlsmere, the independent vibration and noise testing company. They measured the 'real-life' levels of noise and vibration in five different pieces of equipment – rotary mowers, hedge trimmers, line trimmers, leaf blowers and chainsaws. For each category, one petrol and one EGO battery tool were tested, each equivalent in terms of power, performance, and cost.



As the results in chart A above show, the results were telling. Three EGO battery-powered tools came in under the daily vibration exposure limit set by the UK's Health & Safety Executive. With petrol equipment, four out of the five exceeded this limit meaning they cannot be used for a full working day (8 hours)

without presenting a significant health risk. Such restrictions don't apply to the majority of battery-powered tools, which can be used without fear of injury or consequence. This has important implications for both worker safety, and for their workloads. For example, EGO's mower can be used for 12.5 hours before it hits

the lower action level for vibration. A petrol mower reaches this threshold in 5 hours, limiting the working day.

[4] Environmental Noise, European Environment Agency, 2019.

[3] Plymouth City County Council fined £200,000 after failing.

THE HEALTH AND SAFETY FACTOR

EMISSIONS

The last, and possibly most lethal of hazards relating to petrol-powered equipment, are emissions caused by burning fossil fuel. The major culprits here are CO₂ and Nitrogen oxides (NO_x).

Both are harmful to the environment, affecting soil chemistry as well as impacting on climate change, and both are harmful to health, causing inflammation of the airways and a range of respiratory infections. While the use of professional power tools contributes relatively little, that small amount is still damaging.

Traditionally, cars have been big contributors of these gases, but automotive manufacturers have dramatically reduced the risk. For example, one of the most popular vehicles currently on the roads generates less than 0.5g/km of carbon monoxide – an amount considered low under current regulations. Unfortunately, petrol-powered outdoor equipment hasn't

followed suit. Millbrook, one of the UK's leading emissions testing specialists, measured three petrol-powered tools – and each exceeded this figure.

The poorest performing of the tools – a leaf blower, generated the equivalent of 21.73g/km. Even the best performing tool – the petrol-powered hedge trimmer – produces 1.56g/km, over 3X the car! It's the same story with NO_x, with the car producing 0.08g NO_x/km, and the brush cutter emitting the equivalent of 0.33g/km. These findings aren't an anomaly. In 2017, The Deutsche Umwelthilfe e.V. – one of Germany's leading environmental organisations – measured emissions from European petrol-powered outdoor equipment, including motor saws and brush cutters. Of the 21 items investigated, nine failed to comply with EU limit values for HC+NO_x (hydrocarbons and carbon monoxide), while three also exceeded the limit value for CO(X). Berlin, Germany's capital, alongside Los Angeles have both introduced

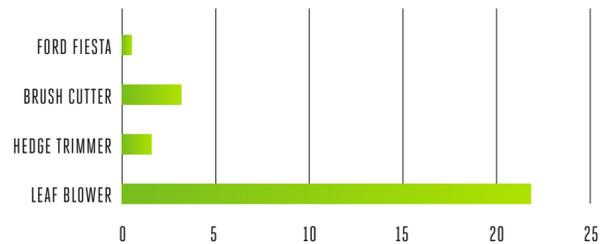
a ban on petrol-powered leaf blowers, while California is set to ban petrol-powered lawnmowers by 2024.

Battery-powered equipment such as EGO's Pro X range has no emissions during use, and so by switching from petrol, it's possible to make an immediate and positive impact on the environment and people's health. Most of Europe's electricity is also now largely generated by renewables too, meaning that 'unclean' electricity that would've once powered our batteries is, on the whole, disappearing rapidly. For grounds maintenance professionals, just one question remains to be answered: can batteries really do the same job as petrol?

Battery power then, can deliver substantial human and business benefits. Through digital connectivity, it can deliver even more.

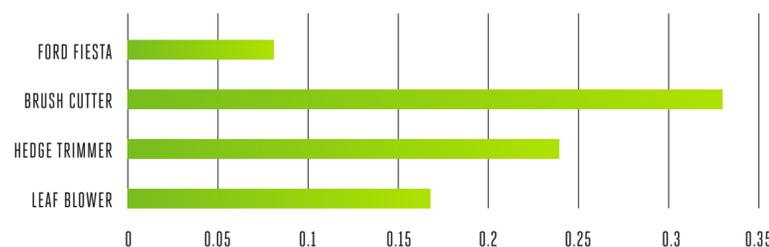
CO MASS CONVERTED TO G/KM

	CO MASS MG/S	CONVERTED TO G/KM
LEAF BLOWER	301.8	21.73
BRUSH CUTTER	42.6	3.07
HEDGE TRIMMER	21.6	1.56
2018 FORD FIESTA		<0.5



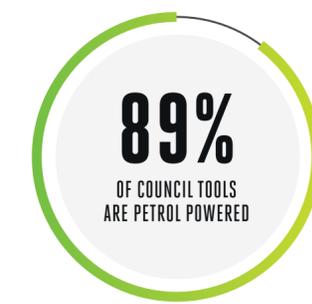
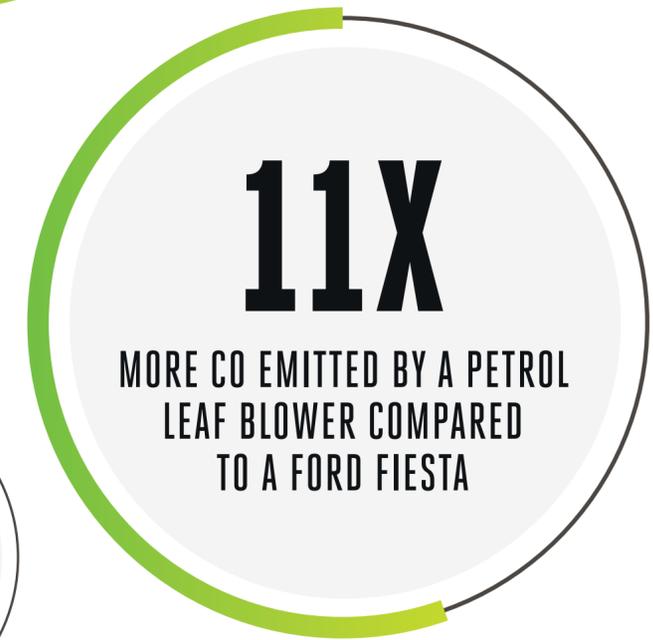
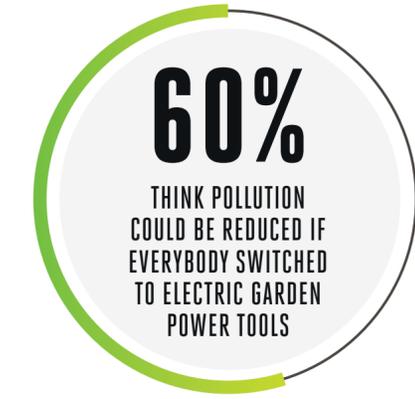
NO_x MASS CONVERTED TO G/KM

	NO _x MASS MG/S	CONVERTED TO G/KM
LEAF BLOWER	2.3	0.17
BRUSH CUTTER	4.6	0.33
HEDGE TRIMMER	3.3	0.24
2018 FORD FIESTA		<0.08



THE HEALTH AND SAFETY FACTOR

EMISSIONS



THE KEY TO COMMERCIAL SUCCESS

CONNECTIVITY

The concept of the Internet of Things – IoT – is well-known, where devices as diverse as cars, kettles and fridges can be connected via the internet, delivering information and control directly into the hands of end users via an app. Battery technology is perfectly suited to this approach, and to give professional users a real commercial edge, EGO is embedding IoT solutions within its Pro X range. Able to connect every piece of equipment, the EGO Connect App offers a wide range of functionality. It shows charge times – and remaining charge – for every battery, meaning you can customise the charging cycle to ensure you have the right power, for the right tool, at the right time, and reduce downtime as much as possible.

It allows you to schedule charging times precisely to take advantage of discounted rates – for example, overnight. This gives commercial users the confidence that tools are ready when needed the following day.

It also gives you visibility of both trigger times and run times, to help you understand usage and capacity, and to make sure that nobody is being exposed to vibration for too long. The health and safety benefits here are obvious, but with the data at your fingertips, could also reduce paperwork and admin time.

The app also monitors fault status and 'overheats' to protect equipment and improve productivity. And by using GPS, the app can even tell you exactly where your tools are at any given time, giving you a real-time inventory audit.

This is just the beginning of an expanding programme of connectivity which will help drive operational improvement and commercial success.

These benefits – cost, safety, connectivity, and sustainability – all strengthen the case for battery, but one objection remains to be overcome. In the end, it all comes down to the quality of the power.



THE FINANCIAL CASE FOR BATTERY-POWER

Grounds maintenance professionals operate in competitive and challenging markets, especially now. Overheads are high, margins are tight. They have to deal with cash-flow issues, and shortages of labour and supplies. Material costs are rising and the price of energy has hit troubling new heights.

Now more than ever, every penny counts. So the thought of investing in battery-powered equipment isn't necessarily at the forefront of their minds – especially as the upfront cost of the equipment is often higher than petrol.

False economy

When we look just a short way into the future and the rise of 'green purchasing', which is essentially a blueprint for battery power, investing in petrol really is a false economy. Equally, while the cost of petrol is currently steady, there's little doubt about its direction of travel over the coming years. Conversely, while electricity is currently at an all-time high, it's certain to return to re-establish itself as a cost-effective source of power.

Immediate cost benefit

The main argument for investing in battery-powered equipment lies in the immediate cost benefits it delivers. These are significant. For while battery-powered equipment may be a little more expensive as an upfront cost – mainly because of the cost of lithium batteries themselves – this is quickly offset by the far cheaper running costs – maintenance, servicing, and repairs as well as the price of fuel.

Tool maintenance

The fact is, grounds maintenance professionals work long hours and demand reliable, robust equipment. EGO's Pro X is both designed and

renowned for this, but the real advantage lies in the battery itself. Compared with a petrol combustion engine a battery has far fewer moving parts, minimising the risk of failure. It needs little servicing in comparison, virtually eliminating maintenance costs and the concept of downtime. There's less need for expensive repairs or spares from dealers. Nor do batteries require costly lubricants. Each of these factors delivers cost savings which add up quickly over a short period.

Beyond the hard cash benefits...

These represent just the hard direct costs of savings. There are other hidden financial benefits too.

Battery-powered equipment is lighter, meaning less stress for users, so they can work longer improving their productivity per hour. And because it's quieter and pollution-free, it can be used in places where petrol is prohibited – for example, schools and hospitals where restrictions concerning the use of equipment might apply. This offers the potential to extend the working day and even to take on contracts that might not be available to petrol-powered equipment.

Last but not least, there's a weight of evidence to demonstrate that EGO's tools deliver all the power of petrol-powered tools without the associated health & safety issues including noise, vibration, and toxicity (REF). This means it's less harmful to operators, resulting in fewer days off work, fewer expensive injury claims, and a reduced administrative burden for the employer. The result being, you have a healthier and happier team all round.



LOWER RUNNING COSTS



SAVE TIME

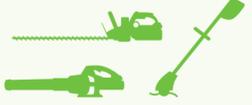


EASY SET-UP



PETROL VS. EGO POWER+ A COST COMPARISON

Cost estimates are based on a customer purchasing three tools from the Pro X range – the HTX7500 hedge trimmer, STX3800 line trimmer and LBX6000 leaf blower, plus the backpack harness and rapid charger to run all three tools, and petrol-powered equivalent tools and fuel.

PETROL		PRO X RANGE	
INITIAL OUTLAY YEAR 1			
 TOOLS £1,657.00		 TOOLS £1,027.00	
 SERVICING £310.00		 BATTERIES & CHARGERS £1,052.98	
 FUEL £1,129.18		 ELECTRICITY £98.60	
COST YEAR 1	£2,786.18 <small>Inc purchase of tools</small>	£2,178.58 <small>Inc purchase of tools</small>	£607.60 <small>Year 1 saving</small>
COST YEAR 2	£1,516.37 <small>Fuel and servicing</small>	£108.80 <small>Recharge cost only</small>	£1,407.57 <small>Year 2 saving</small>
COST YEAR 3	£1,598.92 <small>Fuel and servicing</small>	£147.90 <small>Recharge cost only</small>	£1,451.02 <small>Year 3 saving</small>
COST YEAR 4	£1,710.89 <small>Fuel and servicing</small>	£168.30 <small>Recharge cost only</small>	£1,542.59 <small>Year 4 saving</small>
COST YEAR 5	£1,850.13 <small>Fuel and servicing</small>	£190.40 <small>Recharge cost only</small>	£1,659.73 <small>Year 5 saving</small>
TOTAL COST OF OWNERSHIP	£9,462.49	£2,793.98	SAVING AT YEAR 5 BY INVESTING IN CORDLESS £6,668.51

* Fuel consumption - running these machines for 6 hours a day for 170 days a year.

THE TIME TO INVEST IS NOW

In summary then, while petrol-powered equipment has traditionally been the fuel and tool of choice for grounds maintenance professionals, the picture has and continues to change fast.

Governments, legislation, and procurement practices are pushing heavily for low-impact technology. Equally, professionals want more bang for their buck along with healthier and more productive employees. These factors are

bringing battery power to the fore, and the continued investment in technology and the charging infrastructure will only accelerate this further. Add to this a growing awareness that battery power delivers the same performance as petrol, while also delivering long-term cost savings to businesses, and everything's in place for the battery revolution.

The technology is truly future-proofed, so even if there's resistance to a complete migration

from petrol to battery at this moment in time, it makes sense to start the journey in small steps now. And as one of the world's biggest manufacturers for the outdoor equipment industry, it makes sense to take those steps with EGO.

PERCEIVED BARRIERS TO ADOPTION	HOW EGO'S PRO X RANGE OVERCOMES IT
High up-front cost of equipment.	Fast return on investment, and lower total cost of ownership.
Petrol is the fuel of choice - it's available and easy.	EGO's industry-leading 56V ARC Lithium batteries can match and often exceed petrol power.
Battery can't match the power of petrol and won't get the job done.	A breakthrough in all-day-long power. EGO's new Pro X charging system keeps Pro X tools working on-site all day long.
Charging batteries is time consuming and tricky to get right.	Connectivity - control tool charging, usage, maintenance and firmware upgrades with the EGO Connect APP.
Workers prefer petrol	Battery-powered equipment reduces noise and harmful emissions, as well as vibration making it safer and more comfortable to use.

OUR **CONSTANTLY
CONNECTED**
PORTABLE POWER SYSTEM



THE CASE FOR BATTERY-POWERED EQUIPMENT REDEFINED FOR PROFESSIONALS.

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