

# Alternative Power or Compromised Power?

James de Havilland charges up and shops around for alternative power mowers.

As the smell of freshly mown grass mingles with exhaust fumes and the aroma of hot hydraulic oil, it is all too easy to forget that it need not be like this. Electric powered mowers have been around for almost as long as those with an internal combustion engine, but their use has typically been confined to tending suburban household lawns.

When Ransomes introduced its all-electric E-Plex greens mower back in 1997, the company suggested that this model could well herald a new approach to golf course mowing. Although many commentators focused upon the mowers quiet running and low emissions at the point of use as key environmental benefits, it was the fact that the mower dispensed with hydraulics and, with it hydraulic oil, many saw as a key benefit.

By removing the risk of oil leaks, the Ransomes E-Plex looked set fair to revolutionise ride-on greens mowing. Hot oil kills grass, whether it is a conventional mineral oil or a synthetic or vegetable based 'bio' oil. An E-Plex has no hydraulics to fill with oil, so a leak, even if they are increasingly rare on modern conventional alternatives, can never happen with an E-Plex.

Eight years on and the E-Plex has morphed into the Jacobsen E-Plex II. Increasingly popular, a battery powered E-Plex certainly does the job, but these mowers do not suit every course, battery capacity meaning that in some situations they are compromised.

Cold mornings and aging battery packs sometimes make a mockery of claimed battery endurance times, and the thought of a stranded E-Plex is something that has put off some potential buyers.

This is not to suggest the E-Plex is too compromised for serious consideration. Courses that want the E-Plex to work will make it work and no doubt there are readers who will either be converts themselves or know someone that is. But battery power will always have its detractors, which in turn means ride-on electric greens mowing has yet to win as many users as it deserves.

Jacobsen are not resting on its E-Plex laurels, however, and have added the battery powered E-Walk to its range. For some, this pedestrian greens mower will prove a more tempting proposition, not least because it allows



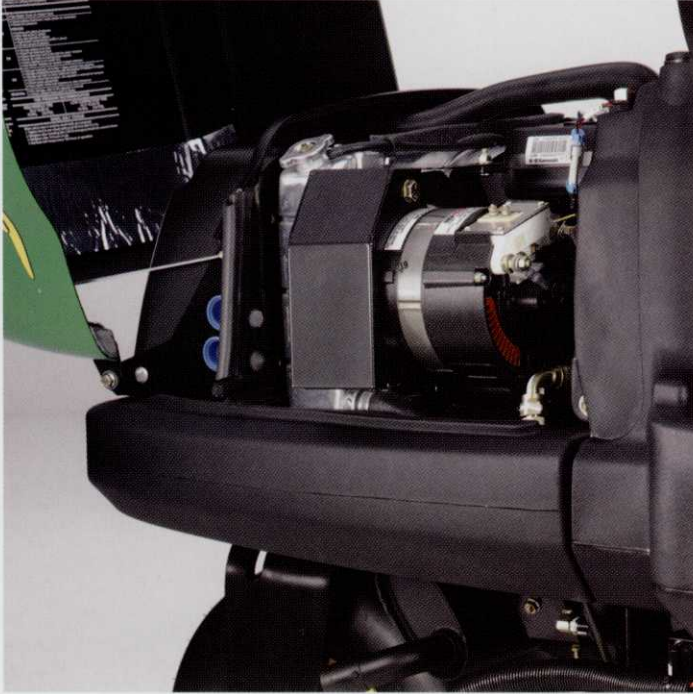
Originally introduced by Ransomes, the E-Plex was the world's first all-electric, battery powered ride-on triple greens mower. The latest variant has evolved into the Jacobsen E-Plex II, with some of the early models' wrinkles ironed out. A key feature of all variants is quality of cut; it is this that should see it considered above the fact that it does away with an engine and hydraulics. Up and running following an overnight mains charge, this mower has won many over to electric power. E-Plex II prices start at £20,949.

a toe to be dipped into electric mowing waters without committing too much capital. Of equal importance, this particular mower could win sales through its mowing ability alone, more of which later.

What could further help the 'electric' mowing case is the latest John Deere 2500E. Where the E-Plex has a pack of batteries, the John Deere Tri-Plex greens mower has a nominal 20hp three-cylinder diesel powering a 48 volt, 90 amp alternator. This provides enough juice to spin the three electric motors powering the cylinders, conventional hydrostatics providing drive to the two front wheels.

At first glance, this combination of diesel power, hydrostatics and electric motors may seem a bit baffling. Why go for electric motors to drive the cylinders but stick with hydrostatics for the wheels? The short answer





With its 20hp three-cylinder diesel powering a 48 volt, 90 amp alternator, the John Deere 2500E is a 'hybrid' alternative to the full battery powered Jacobsen E-Plex II. By sticking with hydrostatic drive to the traction motors, Deere has managed to keep much in common with the 'conventional' Tri-Plex 2500A, yet still offer many of the benefits of electric mowing. Deere had orders in the UK and Eire running into double figures for this new mower prior to its BTME launch in January. Will such early success see a hybrid fairway mower coming next?

is not the one provided by Deere, but pretty obvious to anyone who knows the existing 2500A Tri-Plex diesel; the two mowers share the same basic layout, enabling Deere to keep its 'electric' version well priced.

Sticking with hydrostatics to the wheel motors should not compromise the mower's ability to minimise leak related problems either. Deere suggest research in the USA has shown 90% of all hydrostatic greens mower oil leaks come from the circuit powering the cylinders, or reels if American terminology is your bag. From this it should follow that the Tri-Plex 2500E should be considerably less likely to drop hot oil than a more conventional design.

### QUALITY OF CUT

Maintaining a quality of cut on the greens is of course critical. Electrically powered cylinders arguably have an advantage in this respect, and for two reasons. First, it is easier to ensure an electric motor spins at a fixed speed than one powered by hydraulic flow. A consistent cylinder speed is critical as it delivers the required number of cuts per metre. Both the Jacobsen E-Plex II and the John Deere Tri-Plex 2500E benefit from advanced control of the cylinder speeds.

A second point, and one that some would consider pedantic, is cylinder acceleration. An electric motor has the ability to develop its maximum torque at a low speed, and reach its full operating speed almost as soon as it receives power. It will take a hydraulically powered motor a bit longer to get up to full speed.

Although it is tempting to add 'so what' to this, remember consistent mowing quality calls for a fixed number of blade strokes per metre. If the green is mown from the moment power is sent to the cylinders, an electric drive will have cut the green at the desired rate of cut just that much sooner. There are those that argue that using electronics and electric motors will give the precise control over cut quality that is just not possible with hydrostatics.



The new John Deere 2500E is the golf and turf industry's first hybrid greens mower, combining conventional diesel power with electric motors. One design aim was to eliminate 102 potential hydraulic leak points by removing all hydraulics from the cutting unit drive circuit. The 2500E is equipped with three 56cm (22in) seven- or 11-blade cylinders. All 2500A attachments are compatible with the 2500E to include greens tender conditioners, rear roller power brushes and vertical cutting units. Prices from £22,378 with 11-blade cylinders and grooved front rollers.



## Alternative Power or Compromised Power?

### THE FUTURE

Greens mowers are the ideal target for electrification. A critical issue is that the power needed to drive the cylinders is relatively modest and, where electric motors also power a ride-on mower's traction wheels, demands on the system remain relatively low when compared to a fairway mower.

It is spreading the acceptance of electric motors to other items of mowing equipment where the challenge lies, and it is here where John Deere's 'hybrid' approach could well be exploited further. If the Tri-Plex 2500E proves a success, then encouraging sales will almost certainly see other models follow. The trick is predicting when.

### WHAT ABOUT LPG?

Liquefied petroleum gas, typically as propane, is a well established alternative fuel to petrol. Golf carts converted to run on gas are now well established. With regard to mowers, there are a number of amenity users using gas powered machines, with Ransomes offering a gas powered Highway 2130 triple to meet their specific demands. But LPG is losing its edge in the UK. For a start, it is likely to become increasingly costly, as reserves prove harder to find.

Then there is the issue of its 'environmental' impact. It now appears that LPG burnt in an internal combustion engine produces more harmful emissions than originally suggested, albeit when measured from the tailpipe of a road vehicle as opposed to a mower or buggy.

LPG has its place, but it is currently unlikely to usurp either diesel or petrol as a primary fuel for internal combustion engines. Hybrid and electric power look like safer long term bets.



Powered by four 12V DC batteries, the Jacobsen E-Walk offers a fully adjustable forward speed, allowing total control over the clip rate. This, together with a choice of five bed knives, should enable the E-Walk to suit specific requirements. Anyone looking into electric mowing could do well to consider a mower like this as a first step. Getting everyone interested in a switch to alternative power is a key to enabling new technology to succeed. E-Walk prices from £5439.



Dramatic progress has been made in the production of diesel engines over the last few years with new models being quieter, smoother, more efficient, yet still complying with tough emissions legislation. One such engine - a 25hp water-cooled 3-cylinder Lombardini - is at the heart of Etesia's new ride-on rotary mower, the Hydro 124DN. This latest 124cm tractor has the powerful delivery necessary to achieve the high output and efficiency of a mower which, depending on conditions, is capable of working fast at speeds of up to 16km/h.

### ENVIRONMENTAL ISSUES

Year round play brings with it increased levels of soil compaction. Compacted ground means increased surface water run off. A modest spill of oil is now increasingly likely to be washed from turf into surface water and go on to form a disproportionately huge oil slick. Everyone then shouts 'pollution' and demands an instant fix. No wonder so many courses now specify new mowers with a factory fill of biodegradable oil.

It is tempting to now diverse into the merits of various types of biodegradable oils. As many a Course Manger will know, the rape based vegetable hydraulic oils used in some mowers have proven less able than conventional mineral based fluids to do the job reliably. There are, however, biodegradable synthetic oil alternatives to vegetable based oils, but these are costly and often overlooked as a result.

For those that have 'fallen out of love' with bio oils, any 'electric' or 'hybrid' mower has to be worth investigating. But for those looking for a cracking good greens mower should give these machines a chance as well. Electric power has a great future in golf course mowing, and not just because it is perceived as offering 'environmental' benefits.

There are those who will argue electric power's corner solely on environmental grounds. This is a bit tricky to square as electricity needs to be generated, so an electric powered mower is certainly not 'carbon neutral'. There are those who can also argue that a diesel mower can be run on biodiesel, and it is this approach that will have the greatest impact on reducing global warming. So perhaps the future could see more hybrid mowers being developed, with power generated by a diesel running on a 'green' fuel.