

THE TRUTH ABOUT ELECTRIC BIKES

The future is almost
here – but is it shockingly
positive or negative?

- Hot tech
- New bikes
- Myths busted
- Owners speak out



WELCOME



Electric bikes?
They're just milk-floats with two wheels missing aren't they? I'll burn

It's a view I hear almost daily. Sometimes it's said with the casual confidence of the biker who simply knows that the internal combustion engine is at the heart of their affair with two wheels. But more often it's said with a puffed-out chest and sneering derision that, to me, simply smacks of pure ignorance. Fear even. I'm an engine-lover, make no mistake, but having spent a lot of time on electric bikes

over the last two years, I'm also a convert to the allure of electric propulsion. Proof that you can enjoy both options without lopping your testicles off or burning your bra.

Could I replace a petrol bike with electric? No, not completely - not yet. But for my daily commute - 34 miles on country lanes, fast B-roads and the A1 - an electric bike is close to perfect. It's only when I need to cover more than 100 miles in any one direction that electric is still nonviable. Savvy bikers I talk to know that electric bikes might not quite be there yet, but they're fascinated by the possibilities.

RICHARD NEWLAND EDITOR



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24-PAGES OF TECH, OWNERS AND ADVICE



YOUR QUESTIONS ANSWERED



WHAT THE HELL IS A kWh?

...and 15 other questions about electric bikes you were too afraid to ask

Q Go on then, what is a kWh?

A Found under the 'battery' section of electric bike spec sheets, the kilowatt-hour is simply a unit of energy. It's used to describe how 'big' the battery is – think of it as how many litres of fuel the tank holds.

Small, light electric commuters (like Super Soco's TC-Max) have batteries starting at around 3kWh, while larger, faster ones hold several times as much – Zero's SR/F has a 12.6kWh battery.

More kWh allows for a greater range, though a bigger battery also increases weight and price. It's essential to read claims carefully, though: most makers claim a 'maximum capacity' for their battery as it lets them promote the largest number but this isn't an accurate reflection of how much energy is available. Expert tip: check instead for a 'nominal capacity' (typically 85-90% of max capacity), which is a more relevant figure.

kWh signifies the capacity of the battery



Q How far does an

electric bike go?

A That depends on three things: how many kWh the battery can store; how efficiently the bike turns that energy into motion (its weight, aerodynamics, drivetrain losses, etc); and how you ride.

In the same way that a petrol bike can vary from 35mpg on a track to 70mpg on a motorway, an electric bike's range can change dramatically. Take the Zero SR/F as an example. Ridden sportily on country roads it lasts around 70 miles. Stick to the city and Zero reckon you could reach 160 miles. Flog it flat-out and you'll be finished shortly after 40 miles. This huge variance illustrates why it's so crucial to take any manufacturers' claimed range figure with not just a pinch of salt, but a whole grilling lorry of the stuff.



Q What are the perks of going electric?

A As well as rock-bottom costs per mile, road tax is free and in London they're congestion charge and ULEZ exempt, too. There are no costly valve clearance checks to pay for; no heat off engine or exhaust in summer and a grant is available on most new electric bikes where the government pays up to £1500.

There's no need to think of electric bikes as the enemy of dinosaur juice



Q But what happens if it runs flat?

A Well, the bike stops. Most models cut power and performance as the charge level drops, to help squeak a few extra miles to get you to a charging point. This means it's unlikely you'll be doing 70mph when the bike spontaneously runs out – you'll have had plenty of warning that it needs a charge.

But if you do run out, you can't just ask a mate to bring you a green plastic can of electricity. If you're stranded at the roadside, you'll need to be recovered – ideally to somewhere where you're happy to wait while it recharges. Which brings us to...



Q Can I use any public charger?



A Definitely not. Public charging is currently infuriatingly fragmented with masses of types of chargers. Some have leads in a variety of plug shapes, others sockets that need a cable. Some are AC, some DC. Some are single-phase, some three-phase. They're also operated by dozens of firms (regional and national) who want you to pay their way. Most require you to register, some are via phone apps or websites etc etc. Standardisation is desperately needed.



Q How much does a charge cost?

A It's all down to the pricing set by each company (though a few do remain completely free). At home, it depends on your own electricity contract. The average UK price per kWh is 14.4p, so a Zero SR/F costs less than £2 for a full charge. That works out to around 2.5 pence per mile, or the equivalent of almost 250mpg.



Q How long do they take to charge?



A At one extreme, an Energica Ego can recharge from 0 to 80% in just 20 minutes with the right kind of public charging point. At the other, a Zero with the optional Power Tank (larger battery) needs 12

hours on a household socket. Charge time depends on how big the battery is, how flat it is when plugged in, how much you want to top it up, how powerful the charger you're using is, and what charging rate the bike is capable of.

QUICK EV FACTS



Zero SR/F costs less than £2 for a full charge. That works out to around 2.5 pence per mile



An Energica Ego can recharge from 0 to 80% in just 20 minutes with the right kind of public charging point



Zap Map list over 15,000 charging devices in the UK (www.zap-map.com)

Q Why does charging take so long?

A Because of the physical and chemical limitations of battery cell design. When you charge a lithium-ion battery, ions flow from the metal cathode to the carbon anode through a conductive electrolyte. But these ions can only move so fast. Power supply is another limit. If charging at home, a regular, three-pin socket has a maximum supply of about 3kW meaning a 12kWh battery needs four hours to charge. It's possible to install a 7kW point at home, but more usually requires a public charging point.



Q I live in a tower block. How am I supposed to charge it?

A Some smaller electric bikes have removable batteries. The Super Soco TC-Max has a battery you can pull out, lug upstairs into your flat and charge indoors – though it weighs over 20kg. If that doesn't suit, then you've three other options: stick to public chargers; don't buy an electric bike; move house.



Q What if the charger's being used?

A You'll have to wait your turn. That, or head off to find an alternative charging point within whatever range you've got left. Websites such as Zap Map (www.zap-map.com) list over 15,000 charging devices in the UK, but not all are open to the public, and not all charging points work with all electric bikes. Always have a backup plan...

Q How fast are they?

A The top-end models are genuinely impressive – full-throttle acceleration will take your breath away. The Zero SR/F makes a claimed 110bhp, does 0-60mph in under four seconds and has a top speed of almost 120mph. Broadly, it's not far off a Yamaha MT-09 or KTM 790 Duke. At the other end of the market, the more affordable electric models are, let's say, considerably steadier.



The Zero SR/F's power is close to a Yamaha MT-09

STATS

Charging points as of October 21, 2019*

27,228 Connectors

15,734 Devices

9880 Locations

Regions with most charging points



Insurance quote

Zero SR/F
£308.36
MCN compare

Quotes for a 45-year-old IT consultant in West Sussex. Comprehensive policy for a Zero SR/F (£308.36) was less than a BMW R1250GS Adventure TE (£313.23).

Q Are they bad to insure?

A We used MCN Compare (www.moncompare.com) to generate quotes for a 45-year-old IT consultant in West Sussex. Our results showed the cheapest comp policy for a Zero SR/F (£308.36) was less than a BMW R1250GS Adventure TE (£313.23). However, fewer providers quote for electric bikes as the brands are more niche, so the pool of quotes is smaller.

Q Do they all weigh a ton?

A Battery cells add weight. Energica's road bikes are around 280kg, BMW's C Evolution scooter is 275kg and Harley-Davidson's LiveWire is 250kg. But there are exceptions, the Zero SR/F is just 228kg, or lighter than a Kawasaki Z800 while the Zero FXS superbike is a featherweight, 133kg. And if you want something for town use, a Super Soco TC-Max is 100kg.



No need to fear an electric future

Q So, are they the future?

A Depends what you mean. Truth be told, it's unlikely an electric motorcycle will come along in the next five to ten years that'll miraculously meet every demand of every rider conditioned to the speed, range, price and refuelling time of petrol power. But electric motorcycles don't need to be the right choice for everyone, they just need to make sense to some people's circumstances and wallets. Rather than seeing electric bikes as

some evil disease threatening to wipe out petrol bikes, it's fairer to see them as a complementary option. Imagine both co-existing side-by-side, every electric mile reducing demand at the pumps for those who stick with petrol. For now, at least. The UK target is to end the sale of new fossil-fuel vehicles by 2040. That's just 20 years away – the blink of an eye that Valentino Rossi has been riding in MotoGP. The future may be sooner than you think.

Q Do they need servicing?

A Generally batteries and motors need no maintenance. Some models use oil and/or coolant to cool their motors, batteries or converters, but plenty (like Zero bikes) don't. Otherwise, the usual chassis parts need the same care as a petrol bike. Generally, servicing is much cheaper (and quicker) than it is for a petrol bike.



Q Will it catch fire?

A Probably not. There have been high-profile (and alarming) fires from Tesla road cars to MotoE race bikes, so concerns are normal. Lithium battery fires are often the result of 'thermal runaway', where one cell overheats, causing neighbouring cells to overheat, flaming gases to be vented, while chemical reactions generate oxygen which feeds the fire. This is why it's vital for firms to keep battery voltage and temperatures within safe ranges as they're charging. It's important to keep the risks in perspective too – after all, petrol is fairly flammable. A report published in October 2017 by the US National Highway Traffic Safety Administration concluded that: 'the propensity and severity of fires and explosions from ... Li-ion battery systems are anticipated to be somewhat comparable to or perhaps slightly less than those for gasoline or diesel vehicular fuels.'

LIVING WITH AN

CASE STUDY #1 SPORTSBIKE FAN

'Even a mundane ride is an event'

● Life-long sportsbike fan Alec Short traded in a S1000RR for all-electric thrills

"I love biking and I can't imagine life without a bike," says sportsbike lover Alec Short. As bikers, it's a feeling we all totally understand, however not many of us will be able to get our heads around how a die-hard petrolhead could trade in a BMW S1000RR for an electric equivalent and not only ride it every day but also be completely satisfied.

Allow Alec to explain: "I'd been looking at electric bikes for a few years and thought it was about time that I test rode one – so I arranged a demo on an Energica and was blown away. The acceleration and the overall experience was phenomenal – 0-60mph in three seconds puts it on a par with a traditional litre bike, but it was smoothness of the Energica's acceleration that got me hooked – it's like nothing else.

"When I bought it, I realised that I only needed the one bike so I sold my BMW and the Energica became my weekday commuter and weekend fun bike. I commute around 25 miles a day and initially had my reservations about how good it'd be as a commuter, not least of which because it's so quiet, but it's actually really good. Even a normally mundane motorway ride becomes an event when you open the throttle and hear the whine from the motor as that rush of acceleration comes in.

"One charge sees me through a working week of commuting (100 miles), so I'll just plug it at home and let it charge overnight on a reasonably low rate of charge.

I've seen a slight increase to my home electricity bill – I worked it out once and I think it uses around £2 worth of electricity for a full charge, but obviously I'm saving money on fuel and servicing too – because maintenance costs are a lot cheaper than my old BMW simply because there are fewer moving parts to look at. It just has an annual service where it's checked over and the fluids are replaced.

"At the weekends I'll take it out for a bit of B-road fun up on the coastal roads and it gives me all the things that I first got into bikes for – brilliant performance, cornering agility and feelgood factor. Surprisingly,



THE SWITCH

2015 BMW S1000RR for 2018 Energica Ego
● 145hp ● 258kg ● 810mm seat height
Bought in July 2019 for £17,000
Current mileage 1612 miles



even when ridden hard the range only drops to 90 miles, and thanks to the Energica's ability to plug in to DC fast chargers in service stations you can charge it up in around 20 minutes.

"It's new technology so there's still a question mark over the reliability of the electronics but so far I've had no problems other than a blown headlamp bulb. The bike is guaranteed for two years and the battery for three – and Energica say the battery should last for 1200 charge cycles before its storage capacity drops off to 80%, so that's 120,000 miles of potential use before the battery starts to decline.

"Getting insurance was a bit of a challenge simply because, being so new and relatively rare, not many insurers have enough metrics on the Ego to include it on their databases, so getting a policy took a bit of shopping around. But once I'd found an insurer, the policy's actually cheaper than it was for my S1000RR."



THE OWNER

Alec Short
43, Southampton
Got into bikes at 17. A sportsbike lover at heart, he's previously owned a 749i R1 and a multitude of Minis, as well as a BMW R1200GS.



You can plug into a DC fast charger at service stations



The Ego's dash is suitably green

ELECTRIC BIKE

Alex went from
\$1000R to Ego
and loves it



BATTERY SPECS	
13.4kWh 14-16	Charging time
Range 100 miles	25 miles
Battery warranty/lifespan 3yrs/1200 cycles	
Average cost of full charge £1.92	

THE OWNER

Gary Cambridge
55, East London

Gary's shares this road-legal electric KTM with his son, and also has a 2007 Suzuki Bandit 1200 with a 2020 Yamaha YZF-R1M on the way...



CASE STUDY #2 OFF-ROAD RIDER

'I'm no tree-hugger. It's just fun'

● KTM's Freeride E-XC gives Gary Cambridge the freedom to roam

Noise complaints are ruining the fun of many MX, enduro and green lane riders, so silent running electric off-riders could be a real solution to the problem. Although Freeride E-XC owner Gary Cambridge says he's not too concerned about environmental issues and instead bought his electric dirt bike simply through curiosity... and because it was a bit of a bargain. "I used to do motocross years ago so I'd been looking at the electric KTM for a while," he says. "I'm not a tree hugger – in fact I own a car dealership – but I do own a couple of electric cars, a Nissan Leaf and a Tesla. However I saw that Fowlers had reduced the 2017 E-XC down from about £9000 to £5995 just to encourage a few sales, so I jumped at the chance to buy one. "I'll admit, I haven't used it as much as I'd have liked to, but it is road registered meaning that I can put it on the back of my motorhome and take it with me when we go camping so I can explore the area. I've done an enduro on it as well as a day at an MX track and it works really well. If you were racing it then you'd need a bit more power, but as a dirt bike it works well. Obviously, when I'm at an MX track I have to charge the battery in between sessions using a petrol generator,



THE SWITCH

2006 Suzuki RM125 for 2017 KTM Freeride E-XC

● 25bhp ● 111kg ● 910mm seat height
bought in September 2018 for £5995
Current mileage 550



so you do come in for a bit of stick from people for that! But the battery charges up in about 80 minutes, and because the batteries just slot in and out, you can have one on charge while you're using the other. Just undo four

bolts and slide it out. Simple.

"I've bought the upgraded 2018 3.9kWh battery (£2600) for it now which will mean it'll do about 30 miles – it's supposed to give 50% more range than the original 2.6kWh battery but in reality it's not quite. I had an issue with the charger at first which got replaced under warranty. Fowlers sorted it out but it was just a pain because they're so far away. I find the battery gives the best performance if you run them right down and charge them up fully but it's best not to leave them fully charged if you don't plan to use the bike straight away. It's all been a learning curve.

"In an ideal world, I'd love it to charge in seconds using a solar panel and have a 300-mile range, but it's all still early days... Electric is definitely the way forward and technology is evolving all the time, so until we figure out a way have a 30kWh battery that's small and lightweight we're always going to be limited by range. I think having a short range of 100 or so miles is OK for commuter bikes, but for fun bikes – like sportsbikes or off-riders – you need more. Thirty miles simply isn't enough for going green laning, and the batteries weigh 8kg so you can't exactly take a spare with you."



Gary would prefer the range to be greater



No engine noise to upset countryside types

BATTERY SPECS

3.9kWh
14kWh-16kWh

Charging
time

Range
30
miles

80
miles

Battery warranty/lifespan
3yrs/700 cycles

Average cost of full charge
56p



Batteries can be swapped
out in a matter of seconds

CASE STUDY #3 HIGH-MILEAGE

'It cost just £16 to cross Britain'

● John Chivers has ridden from Land's End to Shetland on his Zero DSR

If anyone thinks that you can't go touring on an e-bike, Zero DSR owner John Chivers begs to differ. In 2017 he took his battery-power dual-sport machine on a four-day, 1023-mile journey from Land's End to Skaw beach in Shetland. The trip contributed to the 14,500 miles that John's completed on the bike since buying it new in the summer of 2016, meaning that he knows a thing or two about what life's like with an electric bike.

"Obviously doing such a trip required a lot of planning," admits John. "The Zero has an average 100-mile range so I split the journey up into ten 85-mile legs. After plotting a route on Garmin Basecamp, I set about looking for potential charge stops along the way. This involved finding the nearest pub or fast charger, and B&Bs for four nights where I could charge. I went through this process, contacted potential places and explained what I was doing. Without exception, the places I found were all very accommodating and were perfectly happy to allow me to charge. I didn't get caught short at any point, breakdown or make any unscheduled stops, although one planned section of the route from Kendal to Crawford required a 100-mile stint and because of the higher road speeds and uphill climb, I topped up for an hour at Carlisle just to be on the safe side.

"But I'm more into the technology rather than the green aspect," says John. "I was looking for a bike to use when doing observed rides with the IAM, and as we've got an electric car I was already sold on the drive train as a concept, which led me to the Zero DSR. I took it out for a test ride and just fell in love with it, so signed myself up on a PCP deal to purchase my own. When I bought the bike I made the decision not to fit the extra Charge Tank – which is a dealer-fit upgrade to the bike's standard charger and allows faster charging when out and about – because back then the rate of charge was only 3kW and it didn't think it was worth the £2500 extra cost. It also couldn't be retrofitted.

"But last year, Zero announced they had a new 6kW Charge Tank which could be retrofitted to older bikes. So when it came to the end of my PCP deal, I decided to invest in the new



THE SWITCH

2007 Honda CBF1000 for 2016 Zero DSR

● 67bhp ● 180kg ● 843mm seat height
Bought in June 2016 for £14,395
Current mileage 14,456 miles



Charge Tank rather than get a brand new bike. The 6kW unit now charges my 13kW battery in about two hours.

"At home we've got a dedicated 220-volt Type 2 charge plug in the garage because we've got the car too, but when I'm at home I tend to use the slower, standard charger rather than the 6kW charger on the Charge Tank just because it uses less energy.

"We've got a few solar panels which will generate 1.7kW on a sunny day which is more than enough to charge the bike from a domestic socket. A lot of electricity suppliers charge as little as 5p per 1kWh off peak on special EV tariffs, so that's about 65p to do 100 miles. Back when I did my LEJOG trip, it cost me the equivalent of £16.12 in electricity to go from one end of the country to the other. There's simply no way a petrol bike could compete on cost-savings. Servicing is every 4000 miles and less than £100, consumables like brakes and tyres last longer, and I've got no concerns about the battery life because it's guaranteed for 350,000 miles before it starts to experience drop off. I know people who commute 100 miles per day by bike who've bought a Zero and financed the purchase of the bike by the money they've saved on petrol."



THE OWNER

John Chivers
48, Warwickshire
A rider since 2002, John helps others through his role as an IAM observer. He also owns a Honda CBF1000. He rides purely for pleasure.

John admits the trip did take a bit of extra planning



BATTERY SPECS

13kWb
Hitham 40m

Charging time

Range 100 miles

2 hours

Battery warranty/lifespan 5 yrs / 350,000m

Average cost of full charge

£1.86



B&Bs were happy to let John plug in and charge

COULD YOU MARK

CASE STUDY #1

The urban commuter

ANNUAL MILEAGE: 10,000

With 30 miles each way to work, the urban commuter needs sufficient luggage capacity for the office while also being able to deal with dual carriageways and urban riding whatever the weather.



Max power

Max torque

What he'd ride now

Yamaha TMAX

Reasons Europe's best-selling maxi scooter combines sporty performance with good weather protection. You get keyless ignition, traction control and ABS while the underseat storage space is big enough for two open-face lids.

55MPG Range 99 miles Capacity 15l

Price £10,120. Cost to fill £18.75
Cost after 3 years PCP finance
£6522; fuel £1035; road tax £198
Total cost £17755 (exc servicing)



THE SWITCH

The best electric option: BMW C evolution



SPECS



Max power

Max torque

Recharge time, domestic supply: 4.5hrs
Range 99 miles Capacity 9kWh

Price £13,855. Cost to fill £1.35
Cost after 3 years PCP finance
£10,296; fuel £136; road tax £0
Total cost £10,434 (exc servicing)

(*£1500 GOVERNMENT GRANT INCLUDED).

Is it worth swapping to electric?

At £2679 more it might seem not but cheaper servicing will help even the stakes while employers increasingly have free charging days as well.

CASE STUDY #2

The naked lover

ANNUAL MILEAGE: 4000

Generally riding for weekend enjoyment, the naked bike lover is more interested in the sheer pleasure of the ride rather than practicalities.

What he'd ride now

Triumph Street Triple RS

Reasons The RS is Triumph's best-selling Street Triple and comes with all the necessary bling to appease those who appreciate such things. Align such items as an Ohlins shock and Brembo brakes with a full-electronics package and that's a hard act to beat.



Max power

Max torque

54MPG Range 205 miles Capacity 17.4l

Price £10,300. Cost to fill £21.75
Cost after 3 years PCP finance
£6295; fuel £425; road tax £273
Total cost £6993 (exc servicing)



THE SWITCH

The best electric option: Zero SR/F



SPECS



Max power

Max torque

Recharge time, domestic supply: 4.5hrs
Range 80 miles Capacity 9kWh

Price £16,499. Cost to fill £1.35
Cost after 3 years PCP finance
£12,812; fuel £88; road tax £0
Total cost £12,899 (exc servicing)

(*£1500 GOVERNMENT GRANT INCLUDED).

Is it worth swapping to electric?

Costing nearly twice as much, it's hard to justify a switch to electric for those who uses a naked for short hops and fun rides.

CASE STUDY #3

The corner carver

ANNUAL MILEAGE: 3000

In race leathers and dark visor when the sun's shining, the sportsbike lover wants to be seen on the latest and greatest. Rides are generally fairly short and on roads he knows as well as trips to local bike meets.

What he'd ride now

Ducati Panigale V4 S

Reasons As well as achingly beautiful to look at, the V4 is home to a monster of an engine while its chassis has genuine WSB race-winning credentials. The name on the tank as well as the sound of that V4 turns heads in equal measure.



Max power

Max torque

40MPG Range 140 miles Capacity 16l

Price £24,411. Cost to fill £20.00
Cost after 3 years PCP finance
£15,019; fuel £429; road tax £273
Total cost £15,721 (exc servicing)



THE SWITCH

The best electric option: Energica Ego



SPECS



Max power

Max torque

Recharge time, domestic supply: 3.5hrs
Range 120 miles Capacity 11.7kWh

Price £23,499. Cost to fill £1.76
Cost after 3 years PCP finance
£16,741; fuel £44; road tax £0
Total cost £15,205 (exc servicing)

(*£1500 GOVERNMENT GRANT INCLUDED).

Is it worth swapping to electric?

Remarkably, if you want to roll up at a bike meet and make an impression, you can do so on an Energica Ego for less than a Ducati Panigale V4 S.

IS THE SWITCH?

CASE STUDY #4

The adventurer

ANNUAL MILEAGE: 15,000

The Adventurer likes to head out into the unknown. He'll hit Europe in search of some beautiful bends and if there's the odd gravel trail in the midit, even better...

What he'd ride now BMW R1250GS Adventure

Reasons The ultimate adventure bike, the GS Adventure comes with an enormous 30-litre fuel tank while traction control and ABS are standard, as is a full-colour TFT dash, but hard panniers add an extra £1,295 and a top box is £550.

SPECS



Max power **Max torque**

59 mpg **Range 389 miles**
Capacity 30l

Price £14,575. **Cost to fill** £37.50
Cost after 3 years PCP finance
£8993; **fuel** £1446; **road tax** £273
Total cost £10,712 (exc servicing)



THE SWITCH

The best electric option: Zero DSR Black Forest



SPECS



Max power **Max torque**

Recharge time, **2.5 hrs**
domestic supply:
Range 112 miles **Capacity** 14.4kWh

Price £16,590*. **Cost to fill** £176
Cost after 3 years PCP finance
£15,786; **fuel** £289; **road tax** £0
Total cost £12,232 (exc servicing)

Reasons

The only electric bike currently on the market that is specifically geared up for adventure riding, the Californian-built Zero DSR Black Forest comes with hard luggage as standard (not pictured) alongside a touring windscreen, LED auxiliary lights and a headlight protector. A faster charging 'charge tank' adds a further £2300 to the price.

Is it worth swapping to electric?

This comparison really highlights that electric isn't for everyone. At the moment, for covering big distances in a single hit, petrol is still the best.

CASE STUDY #5

The poseur

ANNUAL MILEAGE: 2000

Owners often spend more time polishing than being out on the road and the only time this rider's bike gets wet is with a hose. Mileage is fairly irrelevant as it only emerges for short rides, but when it does it needs to turn heads.

What he'd ride now Harley-Davidson Breakout

Reasons: Harley-Davidson's take on a modern chopper with 'stop you in your tracks' attitude. Powered by a 1746cc V-twin, it has an enormous 240-section rear tyre and looks and sounds amazing.

SPECS



Max power **Max torque**

4.2 mpg **Range 122 miles**
Capacity 13.2l

Price £18,865. **Cost to fill** £16.50
Cost after 3 years PCP finance
£11,323; **fuel** £270; **road tax** £273
Total cost £11,886 (exc servicing)



THE SWITCH

The best electric option: Harley-Davidson LiveWire



SPECS



Max power **Max torque**

Recharge time, **10 hrs**
domestic supply:
Range 98 miles **Capacity 15.5kWh**

Price £27,495*. **Cost to fill** £2.33
Cost after 3 years PCP finance
£18,109; **fuel** £47.55; **road tax** £0
Total cost £18,157 (exc servicing)

Reasons

Harley-Davidson's first electric-powered two-wheeler has caused quite a stir. Accelerating with the ferocity of a superbike, sounding like a jet fighter and even having a pleasing throb when stationary, it is a Harley like no other. In fact, it is a bike like no other! Not cheap but it's guaranteed to turn heads and it has the advantage of a mainstream brand.

Is it worth swapping to electric?

If anyone can get away with limited range, Harley can and with generally affluent customers the LiveWire price might be less of an issue.

CASE STUDY #6

The new rider

ANNUAL MILEAGE: 2000

The new rider is based in an urban environment and uses their bike to avoid public transport. His bike needs minimal maintenance and should be cheap to run. They have no desire for a full licence.

What he'd ride now Yamaha YS125

Reasons Replacing the popular YBR125, the YS125 is a no-frills 125 that offers hassle-free motoring with a recognised brand name to budget-conscious riders. As basic as it gets, but that also means reliable and frugal.

SPECS



Max power **Max torque**

14.1 mpg **Range 423 miles**
Capacity 14.2l

Price £2914. **Cost to fill** £17.50
Cost after 3 years PCP finance
£2316.72; **fuel** £83; **road tax** £60
Total cost £2462 (exc servicing)



THE SWITCH

The best electric option: Super Soco TS



SPECS



Max power **Max torque**

Recharge time, **8 hrs**
domestic supply:
Range 40 miles **Capacity 3.2kWh**

Price £2349. **Cost to fill** £0.48
Cost after 3 years PCP finance
N/A; **fuel** £24; **road tax** £0 **Total cost** £2373 (bought outright)

Reasons

The UK's best-selling small capacity motorcycle, the Super Soco TS comes with a removable battery, an LCD screen and LED lights. With a range of just 40 miles and a top speed of 28mph, it's ideally suited to urban life and can be ridden on an A1 licence. An extra battery can be added costing £960 which will double its range. It's an in-town no-brainer.

Is it worth swapping to electric?

At a claimed 1p a mile and with a retail price of just over £2000, the Super Soco makes total sense for an urban commuter who is new to two wheels.

TECH BMW CONCEPT BIKE

THE FUTURE IS COMING

The Vision DC Roadster reveals how BMW plan to make e-bikes lighter, greener and smaller

BMW are pushing hard towards an electric future, promising 25 EV models across the business by 2023. The firm already have a

strong base in high-voltage tech and are currently developing their fifth generation of electric drive systems. As such, the Vision DC Roadster concept, revealed earlier this year, could mean the German marque are poised to include these advances in their first production electric motorcycle. The Vision DC Roadster concept keeps the key design components you'd expect from a BMW, such as the horizontally opposed cylinder heads, shaft drive and Duolever front, but the rest of it is like nothing we've seen before.

Perfect packaging

A key aspect of BMW's fifth generation electric drive, which will debut in their new iX3 car next year and will most likely underpin any production version of the Vision DC Roadster, is that the motor, transmission and electronics form a single, highly integrated component, rather than the three separate elements used in previous generations. This allows the package



Juraschek says the unit is ultra compact

to be smaller and lighter than ever before. Stefan Juraschek, head of Development Electric Powertrain at the BMW Group, explains: "This extremely compact unit takes up far less space than the previous solution. Its modular construction means that it is scalable, too, allowing it to be modified to suit all sorts of different spaces and power requirements."

"The BMW Group will start to fit the next generation of cells in the new, scalable and even more powerful vehicle batteries alongside the introduction of the new electric drive components. The modular 'building block' concept will allow the new batteries to be incorporated

flexibly into every vehicle architecture."

These principles can be seen in action in the concept bike, with the central drive system - containing the motor, power controller and transmission - forming the main heart of the machine upon which floats a minimal aluminium frame that supports the suspension. On the sides of the central drive system, a pair of finned 'cylinder heads' pop out to act as radiators to keep the power train cool. Meanwhile, an output shaft provides drive.

Cutting down on the elements

When it comes to keeping things green and ethical, Juraschek says BMW are striving to reduce the volume of critical raw materials used in the production of electric vehicles, with vast amounts of R&D going into figuring out how to use less cobalt - a metal extracted by hand primarily from Chinese-owned mines in the Democratic Republic of Congo - which is used to help keep batteries stable. The firm also say the electric motor within the fifth-generation power train is completely free from rare earth metals.



Cooling fins mimic BMW's boxer image



The wheel doubles as the motor itself

RMK E2 REINVENTING THE WHEEL

The future's hubless

Most electric bikes ape a conventional motorcycle layout of a mid-mounted motor with drive sent to the rear wheel via a belt, chain or shaft. The RMK E2 is completely different; not only does it feature a weight-saving hubless rear wheel, but that eye-catching design feature also doubles as the bike's motor. The wheel's inner rim is effectively a

stator and stays still, meanwhile the outer portion of the rim stashes a bank of magnets which then causes the outer rim and tyre to rotate around the inner rim.

Although it only produces the equivalent of 67bhp, this hubless design means it weighs just 200kg. Expect to see the machine launched at this year's Milan motorcycle show.



The inner rim acts as a stator

● 'The unit is compact and scalable too'

STEFAN JURASCHEK, BMW



Drive unit is integrated

BMW's Vision DC Roadster



The outer portion has a bank of magnets and rotates around the inner wheel rim

HARLEY-DAVIDSON THE SCIENCE OF SOUL

'Bevel-shaped cogs give a jet-fighter like sound'

Think Harley, think V-twin - an engine configuration renowned for soul, character and feedback. It's also quite simply as far away from the silence and stillness of an electric motor as you could possibly get. Yet when the American manufacturer became the first mainstream marque to launch an electric bike they weren't prepared to give up those iconic Harley attributes so artificially injected their new LiveWire electric bike with a bit of all-American soul.

While most electric motors are completely silent and passive when not on the move, the LiveWire's power unit has what the Milwaukee firm calls a 'haptic pulse' that resonates through the chassis like a throbbing heartbeat. The LiveWire does this by electrically jolting the motor, causing it to slightly accelerate and decelerate, creating a torque reaction that rocks the bike with a gentle rhythmic pulse - again a bit like the

lateral lurch you get from revving a BMW boxer at standstill. Once you pull away the pulsing action stops.

Just scream if you wanna go faster...

Harley have also engineered in some mechanical noise, through the only part of the LiveWire's drivetrain that resembles a conventional motorcycle: its gearbox.

To keep the chassis slim, the LiveWire's electric motor is mounted longitudinally in the frame - just like a

'A twist of the throttle sees power surging'

Moto Guzzi or BMW's boxers. But unlike those bikes, the Harley needs a 90-degree gearset to turn the front sprocket, rather than a shaft drive to the rear wheel.

To do this, the LiveWire uses bevel-shaped cogs, which whine (like a car in reverse) and scream the faster you go, giving the bike a jet-fighter-like sound, which is both impressive and slightly sinister in equal measure.

There's no clutch to engage the drive, nor is there a traditional multi-speed gearbox, instead there's a single speed step-down gearbox with a 9.7:1 reduction ratio. Once out of the bevel, power gets to the ground via a typically Harley belt drive, itself running a 3.1 ratio between the front and rear drive sprockets. That means a twist of the throttle will see the power surging from zero right up to the 115mph limiter in one seamless - if not quite silent - tide of uninterrupted drive.



A TFT dash can be paired with your phone for satnav duties



The final drive comes via a typically Harley-Davidson belt

The bike has a 'pulse' so it feels properly alive



ARC VECTOR SAFETY FIRST

'Vibrations warn of danger'



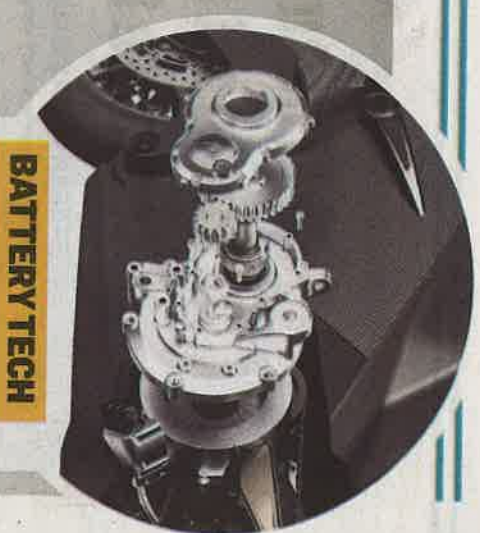
The Arc project is back on track

British firm Arc have pushed the boundaries of technology, not only in terms of performance and rider safety too. Recent funding issues have now been solved and the plan is for the Arc Vector to be supplied to each buyer with its own specialist riding kit, to create what Arc call the Human Machine Interface: HMI.

Their Origin jacket, developed in conjunction with British armour company Knox, features eight haptic transducers inside a back protector. Effectively small audio speakers encased in a rubber surround, each haptic transducer is linked to the bike via WiFi and tuned individually through a wide range of frequencies to correspond to a certain message that the bike is alerting the rider to.

"The Vector has a range of sensors that can be programmed to respond in a variety of ways and make one, all or any pattern we want of the modules in the jacket vibrate," explains Ollie Evans, Arc's COO.

"If you have the indicator on it may pulse gently, whereas the blindspot detector will cause the vibrations to get more intense the closer the object is. It will start with a tap on the base of your spine and then work its way up your back."



BATTERY TECH

Extending the range

Arc's Vector boasts a range of 270 miles between charges, courtesy of prototype battery cell technology from Samsung. The Vector uses 960 super-dense Samsung SDI 21-700 batteries stashed within the bike's carbon-fibre monocoque to power its 399-volt motor. Not much is known about the prototype cells, other than they're of lithium-ion type, cylindrical, smaller and more dense than previous cells and can handle a higher charge rate which results in an 80% change in just 20 minutes. Samsung say production of these cells is slated for 2021. Tesla and Panasonic have already started mass production of their equivalent 2170 cells.

LS-218 LIGHTNING SPEED



Aerodynamics are matched with serious power

It takes a lot of energy to overcome aerodynamic drag at speed. The faster you go, the harder you have to work to push through the air, which is the reason why sportsbikes have slippery fairings. It's something that seems to have passed most electric bike manufacturers by, as nearly all e-bikes available on the market today are naked. However, American manufacturer Lightning have realised the vital importance of aerodynamically sculpted fairings on electric bikes. More than just styling or rider protection, the Lightning's wind-

tunnel developed bodywork has helped their LS-218 Superbike become the world's fastest electric bike, when it reached 218mph on Bonneville salt flats in 2011. The fairing is also what's helped their entry-level Strike become the most aerodynamically efficient electric motorcycle on the market today. When compared to rival non-faired electric bikes, Lightning say the Strike achieves nearly 30% reduction in aerodynamic drag at 70mph resulting in significantly improved motorway range.

HONDA CR-E RACE TECH

CR-E concept uses tech from the TT-winning Mugen



TT tech waiting in wings

Formed by the son of Solihoro Honda in 1973, Mugen Motor sports specialise in performance parts and race developments. They're also the masterminds behind the Shinden TT Zero racer, an electric prototype machine that's dominated the road racing event since 2014 and now capable of a single lap at 121.91mph average speed. Advances to this year's racer came courtesy of technical partner Maxwell who supply prototype batteries for the project. Mugen's European boss Colin Whittamore

explains: "Battery output is 370+ volts. The big challenge remains temperature control. Before the race we cool the batteries to below their optimum working temperature."

So far all we've seen from Honda in terms of electric bikes is the CR-E concept off-roader, which was launched at this year's Tokyo motor show. Based on a CR-F, it uses a miniaturised version of the Shinden's three-phase brushless motor, lithium batteries from Maxwell, and liquid cooling for the motor and inverter.

WHO'S DOING

Think there's only a few electric options on the market? Don't be daft, just

BMW Motorrad

BMW unveiled their C evolution maxi scooter prototype in 2012 before it went on sale in 2014. Now in its second generation, the C evolution costs £14,035 and is the firm's only electric offering – for now. This year they unveiled the Vision DC Roadster, which looked remarkably road-ready and has a motor with twin cooling ducts to mimic a boxer engine. www.bmw-motorrad.co.uk



KTM

With the off-road world facing noise regs, KTM's move into e-bikes has unsurprisingly focused in this direction. Under the banner E-Ride, KTM's Freeride E-XC (£6611) was launched in 2014 with a swappable battery. A prototype electric Duke was spotted testing this year. www.ktm.com



Yamaha

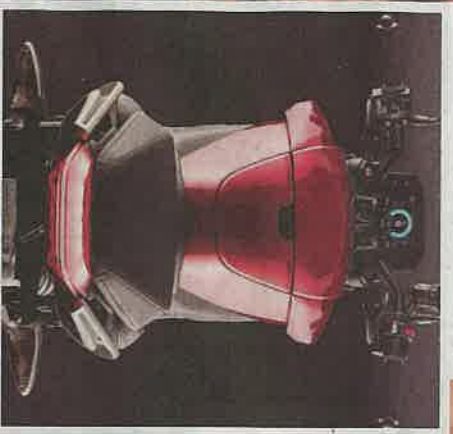
Yamaha have stayed away from e-bikes since the disastrous 2012 EC03 scooter – but they're having another go, revealing three new concepts last week, having already developed an electric trials bike, which competes in the Trials class of the World Trials Championship. www.yamaha-motor.eu



Zero Motorcycles

California's giant leap

Californian-based Zero Motorcycles built their first e-bike in 2006 and are the world's largest manufacturer. Now several generations into their model range, the firm's latest bike, the Zero SR/F, is one of the most advanced electric motorcycles built. Zero have an established UK dealer network with 12 dealers, meaning test rides are available, and have a range of bikes that include learner-legal machines. Prices start at £11,490 and rise to over £25,000 for a full-spec SR/F. www.zeromotorcycles.com/eu



Zero models are classy and sophisticated.



HOW ABOUT THIS ONE?

Zero SR/F £18,990

110 bhp • 140ftlb • 226kg

The SR/F is a big leap forward in speed, sophistication and recharge time. The result is easily the best road-going electric bike yet, offering truly comparable power, weight, handling and excitement to a regular roadster. But despite closing the gap on petrol, for now the catches remain the same three issues: range, recharge time and price. So, if you're waiting for an electric bike which can do everything a petrol bike can, we're not there yet. But the SR/F is another significant milestone on the way to achieving just that.



Cezeta

Czechoslovakian manufacturer Cezeta aims to make just 50 hand-built Type 506 scooters a year, with each one costing around £18,000. At the moment there is no UK importer but we had a test ride on one and it was both eye-catching and fun. www.cezeta.com



OSET

OSET released their first electric trials bike in 2004 and have gone on to dominate the small-size electric off-road bike market. Prices start at £989 for the 12.5 Eco beginner child's bike and rise to £3399 for the 24.0 Racing adult's bike. www.osetbikes.com



Tarform

An American electric start-up, Tarform offer a bespoke motorcycle that is styled to please trends for urban scramblers. The firm estimate the bikes will be ready in late 2019 with non-binding commitment via the firm's website for anyone interested. www.tarform.com



Veitis

British firm Veitis have taken an alternative route, creating an electric V-twin! The eV-Twin is styled to look like a classic British bike but makes 11kW from its electric motor. Hand-built to order at £40,000, it has a claimed range of 100 miles. www.veitis.com



WHAT THEN?

look at this lot... And there's more coming so watch this space

Arc

British business Arc have just had a big funding wobble, but have thankfully been saved. Set to release their first motorcycle, the Vector, imminently, it's aimed at the top end of the market, only 399 Vectors will be built with a predicted price of £90,000. Tech includes advanced rider/bike interactivity with a helmet heads-up display.
www.arcvehicle.com



Kuberg

Manufacturing electric off-roaders for adults and kids, Czech-based company Kuberg have a wide range of products and a 28-strong UK dealer network.
www.kuberg.com



Energica



High-end offerings

Sponsors of the one-make MotoGP World Cup which races alongside MotoGP, Italian firm Energica have concentrated on the high-end of the electric motorcycle world since they produced their first road bike back in 2015. The

Ego sportsbike comes with top-rate chassis equipment and a claimed 143bhp, while the Eva is a de-tuned naked bike version and the Essetesse9 a roadster with panniers. Prices start at £21,999 and rise to £24,999 for the Ego.
www.energicamotor.com



RMK Vehicles

Finnish firm RMK are building a revolutionary electric roadster that houses the motor within its rear wheel's rim, meaning it has a hubless design. The E2 can be reserved with a €2000 deposit with production expected to start in late 2019.
www.rmkevehicles.com



Curtiss

Another company pushing the boundaries in terms of design, American firm Curtiss' Zeus 8 is styled to look like it packs a V8. Production is set to start in 2020 alongside their similarly out-there Hades, with both bikes \$75,000.
www.curtissmotorcycles.com



Artisan Electric

An electric bike brand based in the UK with six dealers, Artisan import components from Asia to build their EV2000R scooter (£2440-£2940), which features removable power cells, and the Evo3 naked (£3295), which has a top speed of 50mph.
www.artisanscooters.com



Vespa

Scooter specialists Vespa have an electric offering of their own. The Elettrica was announced in 2016 but has only just arrived in dealers with a £6249 price tag. It claims to have a 62-mile range and a four-hour recharge time from its 4kW motor.
www.vespa.com



Suzuki

Despite showing a working fuel-cell concept Burghman way back in 2011, Suzuki have gone quiet in terms of electric bike development. The firm does, however, make hybrid cars. "At the moment the infrastructure is not in place for electric bikes in developing countries," said Toshihiro Suzuki, President and CEO of Suzuki Motor Corporation.
www.bikes.suzuki.co.uk



Honda

Honda have teased with several electric concepts, including an electric CR-E off-roader, gorgeous RC-E retro superbike and the self-balancing Assist-e, but are yet to unveil a production road bike. It's unlikely they haven't got something tucked away in an R&D department.
www.honda.co.uk



Ducati

CEO, Claudio Domenicali, says it is a case of when the market is right. In the meantime Ducati have linked up with firms to offer Ducati-branded electric products including a Super Soco CUX Ducati edition and an electric-assist mountain bike, the MIG-RR, built by Thok E-Bikes.
www.ducati.com



Brutus

Formed out of US brand Bell Custom Cycles (BC), the first Brutus electric bike was built in 2011 and the company have gone on to develop a complete model range of hand-built bikes ranging from the track-targeted V2 Rocket to the custom-styled V9 and the naked retro Brutus 2 Cafe. Prices are in the \$35,000 region with a range of 100 miles. www.brutusmotorcycle.com



Gogoro

Gogoro employ a battery sharing scheme where riders slot their used battery into a GoStation charging point and pull out a freshly charged one. Launched in Taipei, Taiwan, the firm now have over 1398 battery stations that support 161,334 battery exchanges every single day. They are now looking to expand. www.gogoro.com

Fly Free

Another American start-up, Fly Free are based in Long Beach, California. They have five bikes in their Smart model range – the Desert, Old Adventure, Supermoto and Classic – with customisation key to their ethos. According to Fly Free, you can have up to 80 combinations of accessories, seat, colours etc. www.flyfreesmart.com



Zapp

British company Zapp's i300 is a creative looking scooter that is claimed to rival a 300cc petrol-powered equivalent. As well as a removable battery, it features a huge variety of colours and options (there is an online configurator) and costs from £5250 with delivery predicted to start this month. www.zappscoter.com



Harley-Davidson

The bike with soul

After a prototype did the rounds to gauge public opinion in 2015, Harley released a road-ready version of the LiveWire this year with bikes arriving in dealers soon. Costing £28,750 it is the most powerful Harley currently in production and comes with advanced



electronic assists including cornering ABS, traction control and connectivity. The firm have also shown electric bicycle concepts and an electric urban scooter, all publicised by X-Games riders via social media to appeal to the younger market. www.harley-davidson.com

HOW ABOUT THIS ONE?

LiveWire £28,750
104 bhp • 86ftlb • 249kg

On paper the LiveWire may appear heavy, lacking range and low on power and torque, but riding tells a different story. It accelerates with the ferocity of a superbike, sounds like a fighter jet and throbs like a pounding heart at a standstill. It has an un-Harley-like liking for corners, is well-built, comfortable, smooth and easy to ride. It'll go for longer than some sportsbikes and takes an hour to fast-charge. But it's pricey, lacks a petrol-engine's drama and will never please the purist. But if this is the future, it's looking bright.



You can switch between modes to go faster or go further with the cool new LiveWire

Triumph

This year Triumph announced that they are bringing electric motorcycles to their range in collaboration with a team of UK innovators that include Williams Advanced Engineering. The project, dubbed TE-1 by Triumph, aims to rapidly evolve a new electric power plant over the next two years that will be used in future electric Triumph models. www.triumphmotorcycles.co.uk

Indian

Indian's parent company Polaris bought electric bike firm Brammo in 2015 and ran Guy Martin and Lee Johnston at the T Zero on a re-branded Brammo carrying Victory's (the firm's other brand) logo. After Johnston finished third and Martin fourth, the bike was never seen again. With Harley releasing an electric cruiser, you have to assume they have something similar in the wings. www.indianmotorcycle.co.uk

Lightning

Founded in 2009 in Silicon Valley, Lightning is an American company which has developed a low-cost electric sportsbike. Launched at the start of 2019, the Lightning Strike has a retail price of \$12,998 (roughly £10,500) and makes 90bhp with a top speed of 135mph. The bikes are built in the company's San Jose facility with the firm planning on expanding into Europe soon. lightningmotorcycle.com



Johammer

One of the more futuristic-looking electric bikes, Austrian company Johammer's J1 Electric Motorcycle costs £20,000 in J1.150 format or £22,000 in higher-spec J1.200 guise. Claimed to have a range of 125 miles (in J1.200 spec) its top speed is limited to 75mph. www.johammer.com



Fuell

With Erik Buell (of Buell fame) involved as Chief Technical Officer, Fuell have a lot of potential. They are focused on urban riding and are developing the Flow motorcycle and Fluid electric bicycle. Pre-orders are being taken with a 11kW version at \$11,000 and the 35kW \$11,995. www.fuell.us



Essence

With their futuristic Concept e-race bike still in the prototype stage (see picture, below), French company Essence Motorcycles have yet to launch a final version of their electric machine but are estimating a price tag of around £30,000 when it does make it to the market. www.essencemotorcycles.com



NIU

Claimed to be the world's leading supplier of smart urban mobility, Chinese company NIU have grown at a tremendous rate in three years and have sold over 400,000 scooters worldwide. They have three models – the U, M and N Series bikes – with prices from £1359 to £3196. www.niu.com



Lito Sora

Based in Montreal, this Canadian electric motorcycle manufacturer were set up in 2014 and are now building their second generation of bike, which will feature increased range and performance. With the original model costing up to £80,000, this is a premium electric bike. www.litomotorcycles.com

Peugeot

Scooter manufacturer Peugeot make the e-Ludix scooter, but it is currently not imported into the UK and their UK range contains no electric scooters. www.peugeotcooters.co.uk

Kawasaki

A few patents filed show Kawasaki are looking at hybrid technology, but the firm are yet to show a concept and instead are more focused on their supercharged vehicles. www.kawasaki.co.uk

Saroléa Motorcycles

Belgium-based Saroléa have been competing in the Zero TT since 2014 with a best finish of fourth and an average lap of 108.064mph. On the back of their race success, the firm has two production motorcycles – the MANX7 and the N60. Prices start at roughly £40,000 and increase depending on spec. www.sarolea.com



Super Soco

Urban mobility

Aiming at the urban mobility market, Super Soco make a range of e-bikes with performance roughly equivalent to a 125 petrol bike. Remarkably cheap to buy with models retailing from £2099 to £3999 after government grants, they claim to be the UK's best-selling e-bike and feature a removable battery for ease of charging. www.supersoco.co.uk



Sur-ron

Mountain men

Sur-ron was founded in 2014 with a range of road-legal (or non-road legal) electric mountain bikes with the LE1 Moped costing £4,495. It has removable batteries and even the option of fitting pedals! www.surron.co.uk



RACING GOES ELECTRIC

1 MotoE World Cup

Running at selected MotoGP rounds, the MotoE World Cup is a one-make series using identical Energica Ego Corsas. At San Marino, the fastest lap from a MotoE bike was just over a second slower than Moto3's fastest lap.

2 FIM Trial-E Cup

Only launched in 2017, the Trial-E Cup is still in its fledgling stages but runs at two rounds of the FIM World Trials Championship. GasGas have won all three titles so far, but Yamaha's TY-E is running them close.

3 TT Zero

The first TT Zero was run in 2010 and was won with an average lap of 96.830mph. In this year Michael Rutter's Mugen lapped the TT at an average of 121.910mph. To put this in context, Hizzy only broke the 120mph barrier in 1983.

4 FIM E-Xbike

This year the first electric E-Xbike World Cup ran at the Italian round of the 2019 MXGP. Both male and female riders compete against each other on electric mountain bikes split into two classes around a motocross track.

5 Pikes Peak

In 2013 the late Carlin Dunne beat all the petrol bikes to win the Pikes Peak hill climb on an electric bike. He recorded a time of 10:00.694 up the 156-turn, 12.42-mile course on a Lightning. The next best bike was a Ducati Multistrada 1200, 21 seconds behind.



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THE DEALER
Alec Sharp, EEMC - Norfolk

Renowned in custom circles for his one-off builds as Old Empire Motorcycles, in 2017 Alec also set up the UK's first all-electric motorcycle dealership, the English Electric Motor Co. With Zero as the core marque, the Suffolk firm is now also agents for Energica, Super Soco, OSETI and more. In 2018 EE were Zero's 2nd most successful UK dealer. We grabbed him for the inside line on what's hot and what you need to look out for.

Alec Sharp set up the English Electric Motor Company just over two years ago

INSIDER DEALER

'Zero is our most popular brand'

UK electric bike super-dealer lifts the lid on what sells – and why

What sort of questions do potential buyers ask most?

A 'How far?' and 'How fast?' Range is by far the most asked question, followed by the length of time it takes to charge.

Are customers usually well informed, with a clear understanding of what they want?

A Generally it's only those who already own electric vehicles that are clued up but that's a very small proportion of the people who come through the door. Most potential buyers come out of curiosity, having spoken to us at a show or seen content online and are open-minded enough to try a test ride.

Which bikes do you sell the most of and why?

A Zero is our most popular brand and people tend to buy the 'half size' battery models, such as the S, FX or FXS. They have a 70-100 mile range and a price point that starts around £9k, making them a viable shorter-distance commuter.

Does it make more sense for people to buy electric bikes on PCP or outright?

A Very few of the bikes we sell are purchased on finance but PCP does make sense. Zeros, for example, come with a two-year bike/five-year battery unlimited mileage warranty. The rate at which battery technology is advancing roughly equates to a 5-10% increase in range over two years, so we estimate that most people wouldn't look at changing their bike until it was 3-5 years old, which ties in with the lifespan of a PCP deal. Finance companies seem to be offering decent guaranteed values, too.

'In a few years every brand will have an electric bike'

How resilient are electric bikes in terms of depreciation (versus petrol)?

A So far, they seem to hold their money very well – especially compared with combustion engined bikes. For example, we recently sold a used 2017 Zero FXS which originally cost £9k new for £7500.

Will battery life match the life of the bike?

A Lithium battery tech is good for around 1500 to 2000 cycles at the moment, so if you multiply that by a 100-mile range a battery should do 150-200,000 miles before it drops to 80% of its original capacity.

Is there a market for secondhand electric bikes, or are buyers too wary of battery degradation?

A There is a market and it's pretty strong, particularly as there's not much out there. Battery degradation might have been an issue in the past but all the brands we deal with have a minimum three

'I can't see it moving any other way than up'

year/30,000 guarantee, which is transferable.

What's the realistic lifespan of a mid-price electric bike?

A In terms of cycle parts it's no different to a conventional combustion engined bike. There are very few moving parts in the motor and everything else is solid state, so in that respect an electric bike should have far lower maintenance costs and a much greater lifespan.

Is it hard to sort insurance/finance for new owners?

A The market is still very small, so we tend to use specialist

insurance companies such as Lexham who are already familiar with electric motorcycles. Premiums are based on value, so it's no different to a similarly-priced petrol machine and the finance works the same way, too.

What's the biggest obstacle to ownership?

A Of everyone who's test ridden a bike with us and been impressed, the number one issue is range, followed by cost. Or to put it another way, it's people's perception of cost compared with how far they can go in one hit.

How do you see the electric bike market developing over the next five years?

A As long as the Government continues to back it, along with the continuing growth of public awareness for alternative fuels, I can't see it moving any other way than up. Within a few years every manufacturer will have some form of electric bike in their range.