mina

EV Report, April 2023

Winter Edition I Dec 22 - Feb 23

How we did it...

Mina's platform is built on a rich bed of data which comes from EV charges performed by employees with company electric vehicles at home using Mina Homecharge® and also on the road using a Mina Chargepass®.

"From this we have the ability to see costs, trends and behaviours in a way no other business can. We are able to understand when a particular vehicle is charged, how long for, and how much power it consumed.

"Combined with Mina's unique energy supplier tariff monitoring system, and key partnerships with our public charging networks, including Allstar and InstaVolt, we can then track the accurate cost per kilowatt for each employees' charges.

"Taking this a step further, when we then cross-reference this against the mileage efficiency of their vehicle, we're able to see how much it ultimately costs per mile for each and every charge made through Mina.

MATT BETTINSON
PRINCIPAL PRODUCT MANAGER

When it comes to running electric cars and vans, one thing is for certain: it's never dull.

Our latest research of more than 125,000 real-life charges from the previous quarter show a calming down in the rising price of electricity, which is at least a relief after the chaos of last year. It could still do with dropping from its current high level, but at least we have some stability.

But, that doesn't mean it's all quiet on the EV front.

We've been digging into our numbers to find out how winter and the accompanying cold weather really affects EVs, and the results are fascinating. Even though this was a relatively mild winter, our data shows a distinct correlation between energy consumption and the number of charges needed each week as the temperature dropped: in the coldest periods drivers are needing a third more charge per week - equivalent to 27kWh.

Because we're able to track and report on this kind of thing, it makes our data more valuable than ever. Businesses can budget ahead, or even put in place strategies to mitigate against the extra spend, by changing how they work, or putting in place plans for cheaper charging to offset the increased consumption.

And talking of planning ahead, we've also been looking at when drivers plug in at home, when they really start changing, and how much power on average they consume. What we've discovered about charging behaviours, scheduling and consumption shows that the National Grid has more than enough capacity already for a vast expansion in the number of EVs, despite what you might have read elsewhere.

Finally, we're back on the Advisory Electricity Rate too. It's been revised in the hope it will more accurately reflect drivers' charging costs, and as our data shows, it aligns with a few more journeys than before - albeit still a small percentage. Problem is, now more businesses are losing out if they use it. No matter how much effort goes into producing this single figure, somebody, somewhere is usually on the wrong end of it.

ASHLEY TATE
CEO AND CO-FOUNDER, MINA

Dec 22 - Feb 23
Data Download

Average cost of **home** charging (p per kWh):

31p

Up **1p** (Autumn 2022)

50p
Highest recorded cost

5p
Lowest recorded cost

The cost of home charging continued to rise over the winter, but only marginally, and certainly not by the rate that critics claimed would happen as demand grew for heating and power in the colder months. The energy market, although still charging high rates for domestic electricity, has stabilised, and there are some low EV-tariffs still available as the 5p recorded costs shows. On the flip side though, drivers need to be careful, because we have seen multi-rate tariffs as high as 50p to charge at peak times.

Average cost of **public** charging (p per kWh):

74p

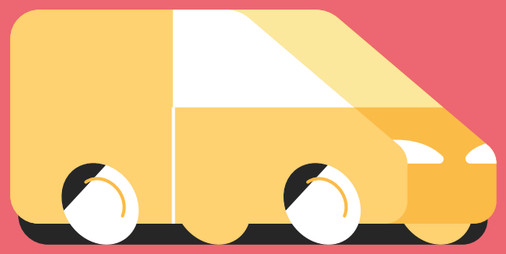
Up **4p** (Autumn 2022)

£4.38*
Highest recorded cost
*Including overstay parking charges

30p
Lowest recorded cost

While home charging costs stay relatively flat, partly as a result of the domestic energy price cap, no such intervention exists for public charging suppliers, and so the costs involved are still increasing and have risen another 6% over the past three months. One charging cost we have tracked that requires close attention is charging with parking and overstay fees (often set by the car park operator rather than the chargepoint provider) included. The previous high was £2.53p but the new record is £4.38p. One to watch out for...

...and broken down by vans and cars

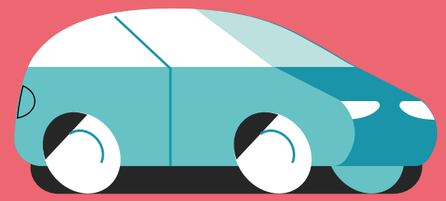


14p

Overall average van ppm cost (home and public)

13p (Autumn 2022)

There's been a slight increase in the costs of running electric vans over the winter, but it is marginal – only increasing by 1p per mile. This is surprising. Vans do hard graft during the winter months, especially those that stop and start a lot, and colder temperatures should hit the efficiency of EVs.



9p

Overall average car ppm cost (home and public)

9p (Autumn 2022)

If you've read the many articles claiming electric cars are getting too expensive to run compared to ICE, then this quarter's overall figure definitively disproves that. Even with energy prices rising, the cost has barely increased. February saw a slight upshift to 10p, but overall, average costs stayed flat. Why? The energy cap helps, but an increase in home charging, more efficient cars and savvier drivers means that in a world of high inflation, one thing not rising now is the costs of running an electric car.

29p

Average van ppm cost (public)

28p (Autumn 2022)

In line with the overall cost, the ppm for those vans charged in public have risen only slightly, defying the received wisdom that winter will prove brutal for electric commercial vehicles. But it's still a costly way to run an electric van: a commercial vehicle running on diesel at 160p per litre would have to run at around 25mpg or lower to be more expensive.

13p

Average van ppm cost (home)

12p (Autumn 2022)

If you can charge electric vans at home, then the picture is transformed. That way, they're more than twice as cheap to run. The amount of time plugged in at home is increasing too and as our figures show, with the overall average across all charging being 14p, most fleets are now doing this.

20p

Average car ppm cost (public)

19p (Autumn 2022)

Public charging costs have risen to 74p this quarter, yet pence per mile costs have only slightly risen to 20p. As we've said, drivers are getting clever about how and when they charge, and cars are getting better – offsetting electricity increases.

9p

Average car ppm cost (home)

8p (Autumn 2022)

The fact that the ppm cost of home charging matches the overall cost is no surprise. The number of vehicles we manage has doubled in the past quarter, yet plugging in at home still makes up around 90% off all charging and so overall costs reflect that.

Charging at home: how people really plug in

Our data shows that around 55% of all charging for vans and cars at home starts with being plugged in between 4pm and 7pm.

This coincides exactly with peak demand on the National Grid, as people also get home from work and school.

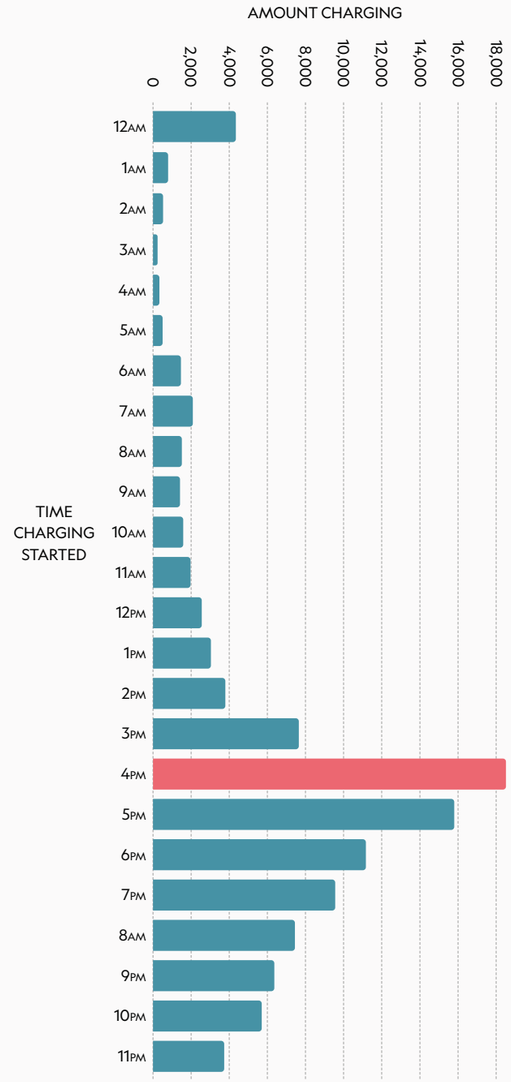
Mina drivers are usually at the front end of this period though, with 22% of all plugging in taking place in the 4pm-5pm slot.

You'll note we only talk about plugging in, not charging though. The two things are quite separate, as our data shows.

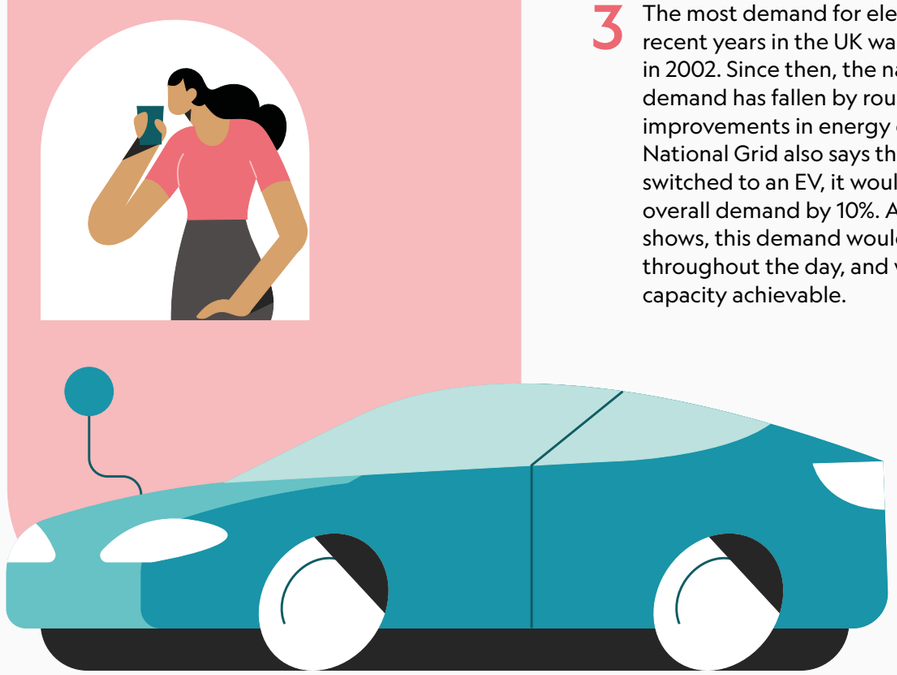
In the average home charge, the vehicle's battery takes on 26kWh of electricity. We can measure all these charges so accurately because they are through connected home chargers, of which almost always charge at around 7kW. So that equates to three and a quarter hours of charging.

If all these cars and vans were plugged in and started charging at this peak time (or indeed any other peak tariff time between 8.30am and midnight), we'd expect to see higher overall costs as almost all charges would take place at peak prices.

Add in then that the average plugged-in time for home charges is just under 12 hours. It would stand to reason that if cars and vans were charging for all that time, the average charge would be far more than the 26kWh we're seeing.



> "There's clearly a home plug in peak time, but our data shows that there is still plenty of capacity in the grid as charging demand is spread out."
>
> **ASHLEY TATE**
> CEO AND CO-FOUNDER, MINA



So what's going on?

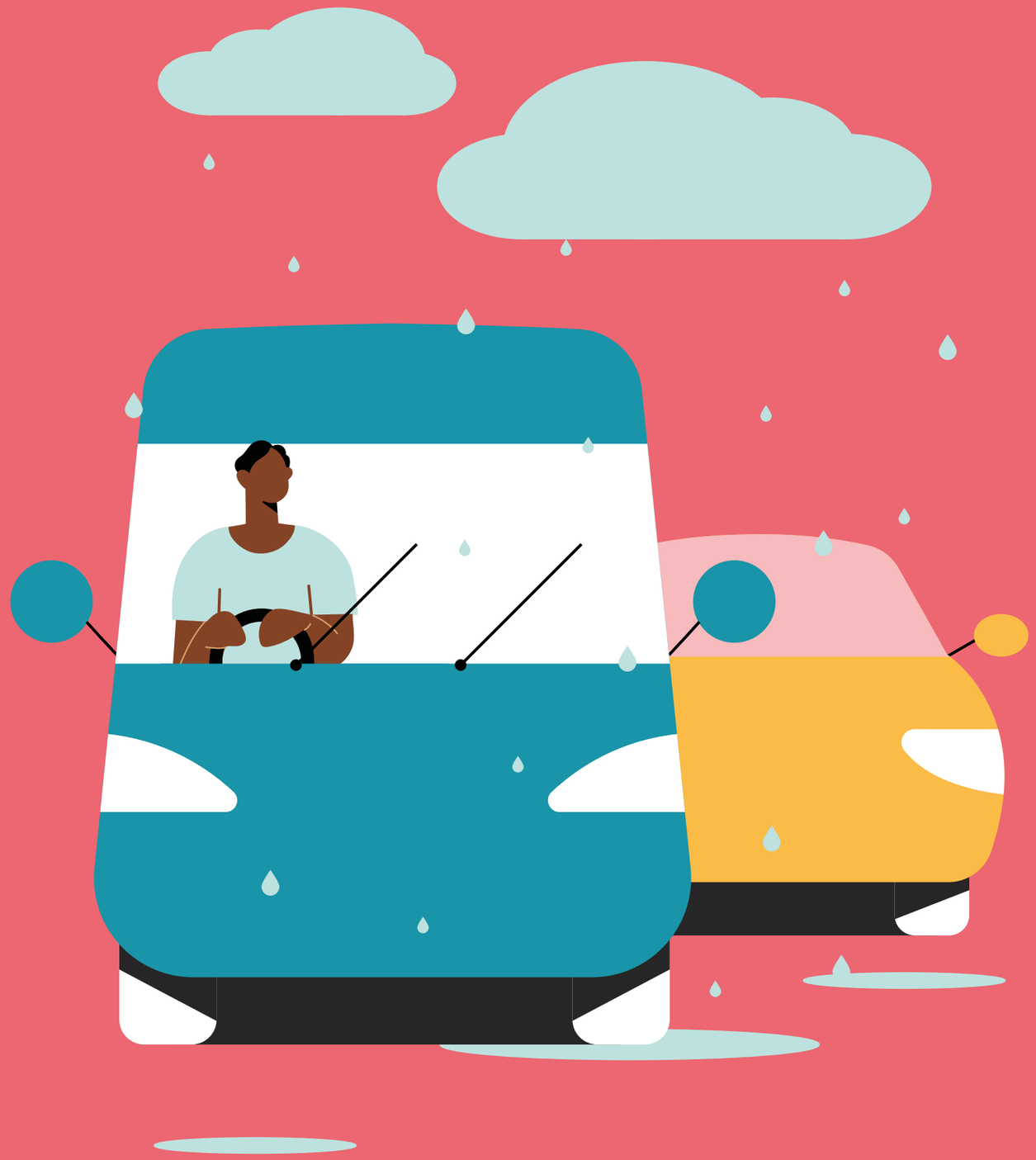
Combining all these factors, it's clear that a lot of drivers are using scheduling, either to charge during off-peak times or just to add a smaller amount of charge regularly, rather than full charges every now and again.

This behaviour points to some useful trends as we look to ensure the National Grid can cope with an explosion in EV numbers.

1. EV drivers don't demand big 0-100% charges all the time at home. They want little, and often.

2. EV drivers do a lot of scheduling, either to just add enough energy for the next day, or to charge later at night when electricity is cheaper. By taking energy from the grid when demand is at its lowest, this will help smooth out peaks in energy demand.

3. The most demand for electricity in recent years in the UK was for 62GW in 2002. Since then, the nation's peak demand has fallen by roughly 16% due to improvements in energy efficiency. The National Grid also says that if everyone switched to an EV, it would increase overall demand by 10%. As our data shows, this demand would be spread throughout the day, and week, making capacity achievable.



How winter hits EVs

Does cold weather really reduce range?

One of the big questions asked about EVs is how hard are they hit by winter? There are many factors involved of course, including temperature, routing, vehicle technology and driving style, but for the first time our data is able to show just what the effect is across thousands of vehicles.

From the start of September until the end of February, we've tracked a huge amount of information about this, including the number of charges needed a week and the average kWh consumption per driver every week.

And because we have such big numbers of drivers in our system, the results aren't affected by major changes in overall mileage, vehicle type or driving style - and it shows some very clear results:

At the start of September, drivers needed on average 3.6 charges per week, with a total consumption of 79.8kWh, taking on board 22.2kWh of charge every time. This stayed roughly about the same until the last week of October, when things started to change.

Through November, the number of weekly charges rose steadily to 4.0, while consumption was averaging 97.1 by the last week of that month, meaning they were taking on 24.3kWh.

Then December hit. Just before Christmas the number of charging sessions had reached 4.6, and consumption hit 111kWh. Drivers were still averaging about the same amount of charge per session but to do the same amount of work and mileage needed an extra charge a week, compared to September.

Other than over the Christmas and New Year period, when the amount of charging needed dropped by a third or more, this level of demand continued steadily throughout January and February.

With these figures, we can work out an indicative spend per week for a driver through the autumn and winter, to see how hard-hit EVs are by winter - or not...

	Consumption (kWh)	Increase in consumption on September	Indicative extra weekly spend (30p per KWh)
September	79.8		
October	78.9	-1.14%	-22p
November	91.7	+11.9%	+£3.57
December	104.9	+31.5%	+£7.53
January	107.5	+34.7%	+£8.31
February	106.8	+33.8%	+£8.10

> "We've proved colder weather increases consumption by a third - but we've also shown you can plan for this and offset costs."

ASHLEY TATE
CEO AND CO-FOUNDER, MINA

These figures might look dramatic. Assuming mileages don't change much, EVs are needing a third more energy during the coldest months. But there are some other things to consider.

1. For a start, we don't know whether drivers are taking on more charge just to be sure they can get home or to their destination in the winter - a battery banker – which is pushing up the numbers.

2. Also, there is the effect of pre-conditioning in cold weather to defrost or warm up the EV. It usually draws less power than charging – perhaps between 3-5kw, and for about 15-30 minutes. But do it every day and it could equate to about 3 hours charging a week, and around 12-15kWh of consumption, which would affect those overall consumption figures.

3. Compared to September, drivers in January and February are needing about 27kWh more a week. Prices were a bit cheaper in the autumn, but assuming a unit charge of 30p per kWh, they'd be spending around £8 more a week if they charge at home over the winter. If they're on an EV-specific tariff, the cost could be a third of that, at around £2.70.

How accurate is the new Advisory Electricity Rate system?

At Mina, we've long been of the opinion that the Advisory Electricity Rate for reclaiming charging costs just isn't fit for purpose – there's too much going on with tariffs and EVs for one simplistic figure to do the job for everyone.

But recently HMRC announced new factors which will be included in its calculation to make the AER more accurate, including figures from the Office for National Statistics' quarterly index for domestic electricity, which forms part of the Consumer Price Index. This is combined with data it receives from the Department for Business, Energy & Industrial Strategy and the Department for Transport.

So how is it working? Well, OK. Ish.

In March, HMRC announced the rate would rise from 8p to 9p per mile, after it had already gone up from 5p in December 2022.

Certainly, our research in 2022 showed the AER was massively out of step with electricity prices, which have risen by nearly 67% in the last year. And a rise to 9p should in theory allay many fleets' (and drivers') concerns about not being reimbursed properly.

> "The AER is now aligned with a few more charging events, but the vast majority are still either under or over, that figure."
>
> **ASHLEY TATE**
> CEO AND CO-FOUNDER, MINA

However, the story largely remains the same. Look at these numbers in December:

80%
of home charging sessions cost more than the AER

100%
of public charging sessions cost more than the AER

In September, when the AER was 5ppm, it wasn't much different (and even a bit worse):

95%
of home charging sessions cost more than the AER

100%
of public charging sessions cost more than the AER

Does the higher 9p rate fare better?

Well, we've modelled it and it will come as no surprise that all public charging costs more than what can be reclaimed.

The number of home sessions that cost less than the AER has doubled, but still in four out of five charges the driver is losing out.

And the number of charges that are exactly 9p per mile is less than 1%, as it always is. So in one out of five charges, the business is paying too much. It seems that somebody, somewhere is always either paying too much, or too little,

The fact remains that the AER is a blunt tool that doesn't work for business or drivers, despite HMRC's best efforts to make it more accurate. And because energy prices are so volatile, there's always a lag, where the AER reflects what has just happened, not what will.

So if prices drop in the next few months, it won't be drivers who are out of pocket – it will be businesses. Using the AER is a lose/lose situation.

The AER: a lose /lose situation...

1
in 5 charges
business is paying too much

4
in 5 charges
Driver is out of pocket

The Mina EV Drivers

Driving electric for work, with our real life Mina motorists.

Sarah

Nissan e-NV200

Florist

9,000 miles a year, mostly urban deliveries

	Dec 22 - Feb 23 average	12 month average
Miles	1,245	9201
Real world efficiency	2.8 m/kWh	3.78 m/kWh
Total consumption	444.6 kWh	2549 kWh
Home charging cost	£96.50 (97% off peak/3% peak)	£396.83
Public charging costs	£0	£90.90
PPM	7.7	5.3

Sarah's mileage has reduced over the winter period, but her efficiency has been hit by the colder weather too. **Overall, her Nissan is around 20% less efficient than when it's warmer**, and her home tariff has risen slightly as well, to 21p per kWh off peak and 45p peak.

Because she's doing less miles, almost all of her charging is done off peak (and still doesn't need to use public chargers), and as a result, she's paid out around £5 less for power this quarter than the previous one, but her pence per mile costs have risen to 7.7p, from 5.7p, and overall for the year to 5.3p.

It's still incredibly good value and shows the huge benefit of being able to charge off peak at home.

Noah

Jaguar iPace

Sales Director

18,000 miles a year, nationwide

	Dec 22 - Feb 23 average	12 month average
Miles	3,178	18,055
Real world efficiency	2.4 m/kWh	2.9 m/kWh
Total consumption	1,324 kWh	6,123 kWh
Home charging cost	£313.82	£1,299.54
Public charging costs	£293.92	£858.28
Home/public charging split	70%/30%	76%/24%
PPM	13.5	11.9

Noah's charging behaviour hasn't changed much over the past quarter: he's still plugging in mostly at home but tops up quite a bit on the road too. **He's absolutely typical of average costs for both domestic and public charging, at around 34p per kWh and 74p per kWh respectively.**

The winter has seen his average consumption increase too, with the result that for the past three months his pence per mile cost was at 13.5p, dragging up his overall ppm cost for the year to 11.9p.

It's still a lot cheaper than a diesel car. If he'd managed to achieve 50mpg at an average of 170ppl in the past year (no mean feat!), it would have cost his business 15.4ppm. A petrol car at 40mpg and 170ppl would have been 19.3ppm. EVs are often still the most economical option.

Estelle

Polestar 2

Account Manager

27,000 miles a year, nationwide

	Dec 22 - Feb 23 average	12 month average
Miles	3,156	27,168
Real world efficiency	2.8 m/kWh	3.4 m/kWh
Total consumption	1,127 kWh	7,988 kWh
Home charging cost	£93.50 (98% EV tariff/2% standard rate)	£264.75
Public charging costs	£145.60	£1,490.16
Home/public charging split	81%/19%	69%/31%
PPM	7.5	6.4

Estelle makes great use of her EV-specific tariff, although it has risen from 5p to 10p over the past quarter.

It's been a quieter three months out on the road as well, doing almost half the mileage she usually does. The amount of public charging (at an average of 68p per kWh) has dropped significantly too this quarter, probably as a result of doing less miles and needing to top up while she's out and about.

The result of all of this is her PPM cost has dropped significantly, showing the positive effect EV-specific tariffs can have. But it will clearly rise again just as quickly as she starts to drive more through the spring. And this shows how you need to have all the bases covered, because c**osts can swing a lot depending on the type of driving and charging each employee is doing.**

Jordan

Vauxhall e-Vivaro

Engineer

10,000 miles a year, mostly urban

16.9	Dec 22 - Feb 23 average	12 month average
Miles	2,478	9,709
Real world efficiency	2.1 m/kWh	2.5 m/kWh
Total consumption	1,180 kWh	3,961
Home charging cost	£118	£118
Public charging costs	£0	£1529.66
PPM	4.7	16.9

In the last quarter Jordan's van was running at 27p per mile because he had no access to home charging, and so was having to plug into public chargers. Well, things have clearly changed on the home front...

Our figures show he's plugging in at night exclusively now, and on a 10p EV-specific tariff, which means his costs have plummeted to 4.7p per kWh for the quarter. He's not a high mileage driver by any means, but the difference in running costs are remarkable. Before getting home charging, the company was paying out £2,100 a year for approximately 10,000 miles. After, it's dropped to £470 – easily recouping the cost of a wallbox in the first year alone.

It's worth noting that if he had not been using Mina Chargepass and Homecharge, pre-home charger, J**ordan would have been out of pocket by about £1,300 a year** had he claimed mileage back at the AER, while the company would have been short-changed by about £330 annually now he can charge at home. But all costs are paid exactly, no matter how much they change now that he's a Mina customer.

Please contact **sales@mina.co.uk**
should you have any enquiries
about our products or services.

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