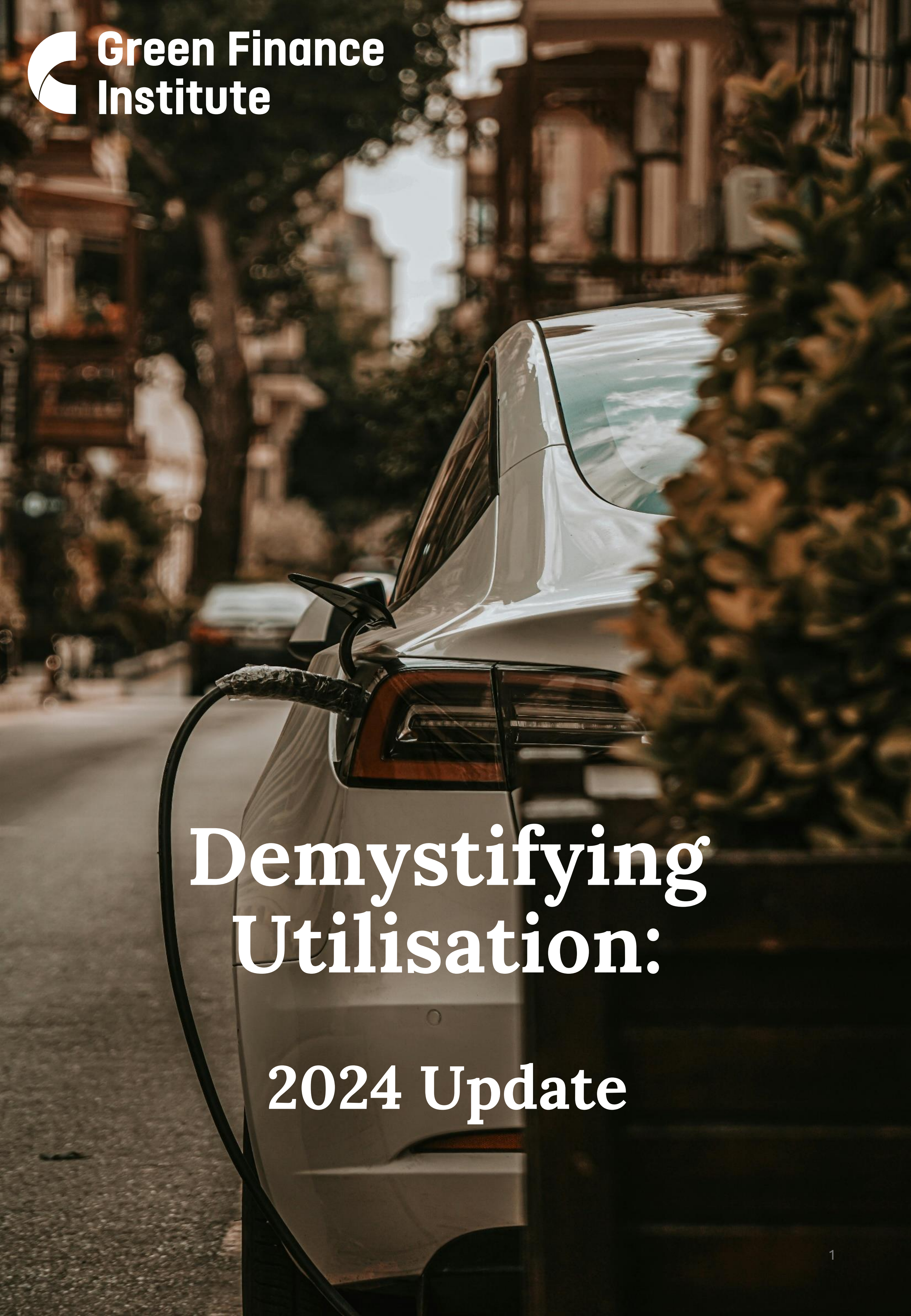
Green Finance Institute



Demystifying Utilisation:

2024 Update

Introduction

In June 2023, the Green Finance Institute and Zapmap published a whitepaper on 'Demystifying Utilisation'. This paper contains updated national utilisation averages provided by Zapmap, discusses how these averages have changed, and what this therefore means for industry and investors who are looking to deploy charging infrastructure.

This paper sets out both time-based and energy-based utilisation – further detail of the definition of utilisation and the different chargepoint use cases can be found in the original paper.

Utilisation rates for the different chargepoint use cases

The below tables use data collected from Zapmap via live CPO data feeds, covering approximately 76% of all UK public chargepoint. The categorisations have remained consistent with those used in the original whitepaper to allow for straightforward comparison. Since the release of the original paper, the most significant changes to the industry-recognised bandings have been to include 7kW devices within the slow category and only include devices of 150kW+ in the Ultra-Rapid category. Standardisation of naming conventions remains a goal of the Office for Zero Emission Vehicles (OZEV).

Time-based utilisation rates:

Below is time-based utilisation data, supplied by Zapmap, for their UK network coverage from 2022 – 2024.

Average time-based utilisation (%)					
	Q2 2022	**Q4 2022**	**Q2 2023**	**Q4 2023**	**Q1 2024**
Slow (3-6kW)	13.7%	13.7%	12.6%	13.6%	12.9%
Fast (7-22kW)	15.0%	15.7%	11.7%	11.5%	12.5%
Rapid (25-99kW)	13.3%	14.8%	11.4%	12.0%	11.3%
Ultra-Rapid (100kW+)	12.9%	16.1%	13.2%	15.1%	14.1%

Energy-based utilisation rates:

Estimated energy-based utilisation (%)							
	Weighted kW (2022)	**Q2 2022**	**Q4 2022**	**Weighted kW (2023-2024)**	**Q2 2023**	**Q4 2023**	**Q1 2024**
Slow (3-6kW)	4	10.3%	10.3%	5	7.6%	8.2%	7.7%
Fast (7-22kW)	12	8.8%	9.2%	12	6.8%	6.7%	7.3%
Rapid (25-99kW)	49	9.5%	10.6%	49	8.1%	8.6%	8.1%
Ultra-Rapid (100kW+)	183	3.5%	4.4%	183	3.6%	4.1%	3.9%

There are multiple ways to calculate energy-based utilisation. The calculation provided in this paper is one example and should be taken into consideration when used for further analysis.

The assumptions and data that the GFI used for estimating energy-based utilisation are set out below:

- The average energy supplied — Zapmap has provided an analysis of the average energy transfer from the last 12 months of Zap-Pay sessions: slow devices transfer at an average rate of 3kW, fast devices at 7kW, rapid devices at 35kW, and ultra-rapid devices at 50kW.
- The potential maximum energy that could have been supplied — using the weighted average power rating of all devices listed on Zapmap, which covers approximately 95% of UK devices in each category band.

The full calculation that the GFI used for estimating energy-based utilisation is set out below:

- A slow charger's Q2 2023 time-based utilisation of 12.6% equates to 3.02 hours, 3 hours and 1 minute of active charging in a 24 hour period
- A slow charger on average transfers energy at a rate of 3kW
- Total energy supplied across a 24 hour period equals 3kW * 3 hours and 1 minute = 9.07kWh
- Using the weighted average power rating to calculate the potential maximum energy that could have been supplied in a 24 hour period, the final calculation is: 9.07kWh / (5kW * 24 hours) = 7.6%

When analysing this data it is worth noting the below points:

1 **The above data sets includes all devices on Zapmap, regardless of maturity.**
As discussed in the previous paper, there is a gap experienced between a chargepoint being installed and being visible on digital services such as vehicle navigation and roaming apps. This is followed by a longer period for a new chargepoint to embed itself in local knowledge and to the local EV driver's consciousness. As a result, many do not include data from these devices until they have matured.

2 **The above data represents national averages.**
A number of CPOs and LAs generously provided GFI with supplementary data on a more local basis. While some of this data aligns with the figures presented above, it has revealed significant regional variances, for example between London and Wales. For more granular data, please reach out to the Insights team at Zapmap.

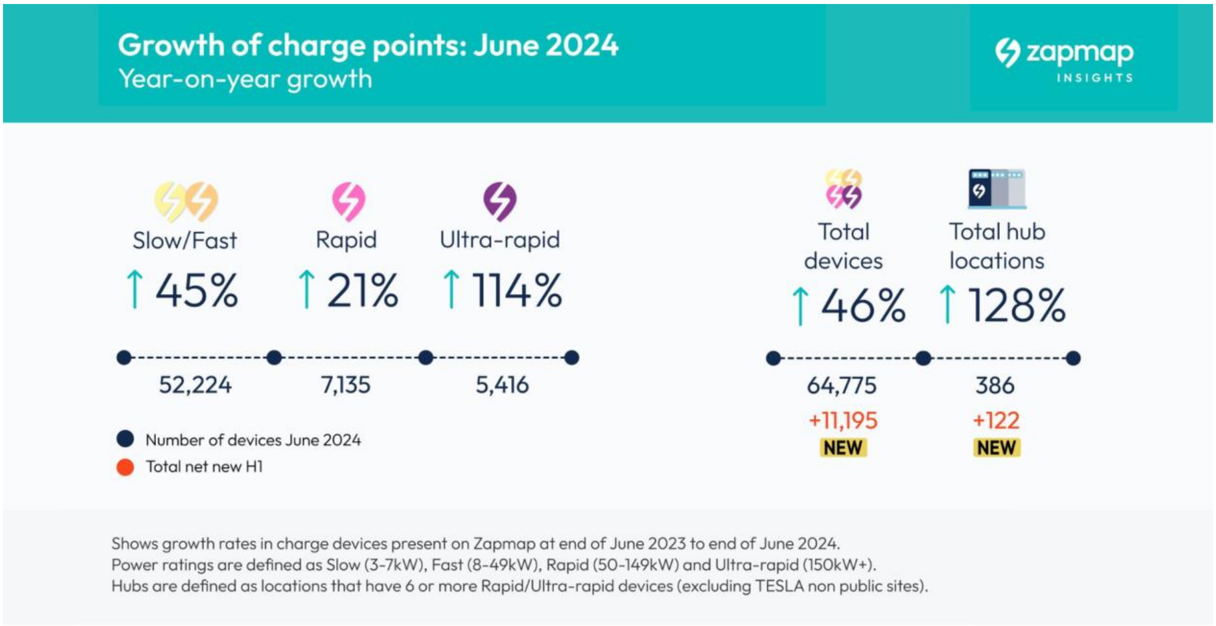
3 **This includes utilisation data from MSA sites, which experience significantly higher traffic flows than non-motorway sites.**
All types of charging location are used in the above averages, from on-street to destination charging and en route. The utilisation rates for different location types can vary significantly.

What does this mean for industry?

Since the last paper, we have seen a high growth in infrastructure deployment with a year-on-year increase of 46% in the number of public devices. The highest growth is seen in the most powerful devices, with the 150kW+ devices growing the most substantially. Despite this significant increase in the highest powered devices, average time based and energy based utilisation have remained relatively constant. Demonstrating that when the higher powered infrastructure is in place, EV drivers are taking advantage of the quick charging speeds possible for the majority of the more recent models of EV on the market.

Low-powered devices under 50kW grew by 45% during the same period, with both time-based and energy-based utilisation remaining relatively stable.

Alongside the increase in infrastructure, the number of EVs on the road rose from 817,113 in June 2023 to 1,145,483 in June 2024 — an increase of 40%, slightly below the growth in charging infrastructure. However, it is important to note that the majority of EV drivers have access to private charging, showing that the infrastructure roll-out is outpacing the registration of EVs that rely upon the public network. This can explain the stable utilisation rates observed. To maintain or improve upon these rates, it is important to keep this balanced supply and demand. Therefore, the EV parc must continue to grow in alignment with the Zero Emission Vehicle (ZEV) mandate, to provide a supportive environment for infrastructure deployment.



Compared to last year's figures, the difference for energy-based utilisation still remains wide for the ultra-rapid chargepoints. This is expected, as we have gone from installing rapids at the lower end of the rapid power rating spectrum, at around 60kW, to now installing second generation devices that are typically 150kW+, with a range as powerful as 350kW.

Additional factors have also contributed to the utilisation rates we are observing today. These include the cost of living, an increase in installations of private chargepoints, and CPOs beginning to build larger sites. Furthermore, last year saw the building of several large charging hubs, which feature anywhere from 6 to 32 chargepoints. This may result in slight decreases in individual asset utilisation. However, EV drivers are given confidence that when arriving at a larger hub, they are more likely to be able to charge without queuing. Consequently, these types of sites are preferred by EV drivers when deciding where to stop and charge.

What does this mean for financing charging infrastructure?

As supply and demand begin to balance, it has never been more important to ensure that the right chargepoints are in the right place, so that investors can maximize utilisation and ensure they have the greatest returns. It is interesting to see the impact of seasonality across the data series, with spikes in Q4 in both papers. It is important that installers and financiers are aware of the impacts of seasonality in their analysis.

As we continue the roll out of charging infrastructure, success metrics such as utilisation rates are important, however, additional data such as optimal performance and considerations of consumer behaviour need to be factored into analysis to ensure a strategic approach.

Below is a case study from a CPO that shows the importance of considering local data insights in deploying the right chargers in the right places.

Chargepoint 60,000 and its neighbours

char.gy

What does this mean in practice? Let's look at the real world utilisation of the UK's 60,000th public chargepoint and a few nearby chargepoints. These are all lamppost chargers, operated by char.gy providing 5.1kW of charging power to nearby residents without driveways.

Chargepoint 60,000 is located on Natal Street in Streatham, South London. All the houses in the north side of the road are terraced with front gardens too small to convert to driveways, with most houses on the south side having driveways. There's another char.gy less than 2 minutes' – 120 metres – walk away, chargepoint A.

In its first three months of operation (April to June 2024), chargepoint 60,000 was regularly used by 4 nearby households and a handful of other drivers who normally used the neighbouring char.gy. It delivered 842 kWh in the period, which equates to an energy utilisation rate of 7.6% and a time-based utilisation of 9%.

Is that good or bad?

Assessing utilisation on time-based and energy-based percentages reveals different insights:

Time:

Shows the theoretical headroom for more residents to use the chargepoint. At 9% there appears to be lots of headroom, but this needs to be contextualised against local residents' driving, parking and charging behaviours.

Energy:

Shows the revenue that a chargepoint is generating which helps determine whether it is economically viable – 7.6% equates to 9.4kWh per day. Whether that is enough to be economically viable depends largely on the chargepoint's install and operational costs, and the operators underlying energy costs. As a rule of thumb, a 1:2:3 ratio describes the difference in the number of kWhs that the three common on-street charging technologies – 5kW lamppost : 7kW bollard : 22kW pedestal or flat & flush – need to be viable, assuming drivers pay the same p/kWh at each chargepoint. In other words, the higher cost to install and operate a 22kW chargepoint means it must be used at least 3 times as much as a lamppost chargepoint to be economically viable, at the same price for residents.

So let's dig a little deeper into how the residents charged. Let's look at their behaviours.

Frequency:

On average each regular driver plugged in once every 8-10 days.

Time:

The average length of a charging event was just under eight hours. The longest was 15 hours, from 7pm to 10am the next day. Three out of the four regular users did most of their charging overnight.

Energy:

The largest charging session supplied 70kWh, the average being 32kWh per charge. Drivers were typically charging for 84% of the time they were plugged in.

Is that normal?

Chargepoint A performed almost identically, however the story is very different 2 streets away, where 2 more char.gys were installed within a few days of chargepoint 60,000 and its neighbour, chargepoint B and chargepoint C. Utilisation is much higher: one at just under 30%, the other over 20%, that's 38 & 25kWh per day respectively.

Why such a big difference in such a small distance? The chargepoints are clustered close enough for differences in demographics to be insignificant. Although there is a greater walking distance between chargepoint B & C – between 500 and 700 meters, and almost no households in these streets have driveways. More households per chargepoint is obviously helpful but it doesn't explain everything.

The difference is mostly down to driver type, with chargepoint B and C both servicing high mileage drivers. Although they are similar to chargepoint 60,000 in the number of regular users they have, 4 and 3 respectively, each have 2 high mileage users. One of chargepoint B's regular users has done enough charging to cover an average of 2,000 miles per month! Chargepoint B's other characteristics are very similar to chargepoint 60,000 with an average plug in time of 8.3 hours and the average kWh/session is 27.6kWh. The same goes for chargepoint C with an average plug in time of 7.3 hours and the average kWh/session is 29.2kWh.

This shows that the toughest forecasting challenge in this immature EV market is the high degree of variability in the key local energy demand factors: the density of EVs per street and those EV drivers' individual driving patterns. So while EVs remain the minority of cars on the road we should expect to see large differences in utilisation from street to street, and neighbourhood to neighbourhood.

Of course a look at four new chargepoints doesn't explain the full picture when local charging networks now number in the hundreds or thousands. But this case study helps to illustrate some of the challenges that make the investment case in on-street charging challenging without local insights.

Conclusion

It is encouraging to see that charging infrastructure is growing slightly ahead of the overall EV parc, and with early adopters of EVs predominantly installing home charging, the user case for public charging is expected to expand. The utilisation rates that we are seeing today does not indicate a lack of usage or poor investment – in fact it means the opposite. In order to have a just and equitable transition, we must keep up with demand, future proof sites and ensure that the deployment of infrastructure is led smartly by data, so that the right chargepoints are in the right place to serve the needs of EV drivers now and support the demand of the future.

About the Green Finance Institute

The Green Finance Institute (GFI) was launched in 2019 to support the mainstreaming of green finance both in the UK and overseas. Uniquely positioned as an independent, commercially-focused organisation led by bankers and seed-funded by government, the GFI adopted a pioneering strategy of identifying the barriers to investment in real economy decarbonisation by sector, and committing to develop the solutions to demonstrate they could be overcome – a "think and do tank" of financial professionals, unencumbered by the short-term profit-making pressures of mainstream finance.

The GFI's programmes and partnerships are all thoughtfully constructed to expand our influence with the decision-makers who are key to transforming systems and our efforts are supported by an effective communications strategy.

The GFI's transport coalition was set up to unlock the financial barriers to the decarbonisation of road transport and enabling infrastructure, initially in the UK, to support the transition to a zero-carbon and climate resilient economy.

For more information, please visit www.greenfinanceinstitute.co.uk/programmes/cdrt

About Zapmap

As a pioneer in the early days of electric cars, Zapmap was founded in 2014 with a mission to make the EV charging experience simple, wherever you go.

Zapmap currently has almost 850,000 registered users and over 95% of the UK's public points on its network, more than 76% of which show live availability data.

An integral part of supporting the wider EV industry, Zapmap Insights is the leading source of EV charging data and insights, providing unrivalled data and expert analysis into the shape and usage of EV charging infrastructure, as well as the attitudes and behaviours of EV drivers.

For more information, please visit: The UK's leading source of EV charging data and insights - Zapmap (zap-map.com)