



2023 GLOBAL DRIVER SURVEY

Understanding driver attitudes and behaviour surrounding parking, EV charging and connected car services

For more information:

marketing@parkopedia.com

<https://business.parkopedia.com>

<https://www.parkopedia.com>

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Survey Highlights

- 92% of drivers worldwide experience difficulties in finding parking with 8% highlighting that this happens every time they look to park
- 18% of US drivers encounter difficulties on every parking search
- Nearly half deem parking information as very/extremely important
- 77% of drivers want integrated parking services with a similar proportion valuing in-car features to find and pay for EV charging
- More than 90% of EV drivers feel anxious about charging with 66% having run out of charge at least once
- 58% of the EV drivers surveyed have been issued with unexpected parking fines while charging, including 68% of American EV drivers

Survey Highlights

Parking Situation

- 54% of the global motorists surveyed park away from home at least once a month **(page 12)**
- Paid off-street parking (63%) and Private parking (63%) are the most commonly used parking formats **(page 13)**
- 20% of drivers start searching for parking 24+ hours ahead. A further 24% search up to 24 hours ahead **(page 14)**
- 32% of Internal Combustion Engine drivers and 39% of EV users start searching for parking en-route to their destination **(page 14)**
- 92% of drivers face difficulties when locating parking, rising to 94% in the US **(page 19)**
- 18% of US drivers face problems locating parking “all the time” compared with 2% in Japan and 3% in Europe **(page 19)**

Survey Highlights

Parking Data and Preferences

- 55% of drivers would be willing to hover for up to five minutes to park at their preferred location **(page 18)**
- 51% of motorists would pay a premium of up to 10% to secure a space at their preferred location **(page 18)**
- 24% of drivers claim that they “frequently” face challenges finding parking, rising to 33% in Europe **(page 19)**
- 14% “very frequently” have issues locating parking with 8% having problems “all the time” **(page 19)**
- Nearly half of drivers deem parking information “very important” or “extremely important” **(page 20)**
- 77% of drivers would prefer their vehicles to offer integrated parking services that enable them to navigate directly to parking locations, with a higher rate recorded among EV drivers, at 84% **(page 22)**

Survey Highlights

Electric Vehicle (EV) Ownership

- Of those who would not buy an EV, 44% are worried about being able to find charging away from home **(page 24)**
- 35% who would not get an EV worry about home/near home charging. 44% see range as insufficient **(page 24)**
- Charging concerns were even more significant amongst those who would consider an EV as their next car: 53% are worried about finding charging away from home, while 48% have concerns about home charging **(page 25)**
- Of those who wouldn't consider an EV as their next car, 52% say that the current number and setup of public EV chargers prevents them from getting an EV **(page 26)**
- 84% of all respondents would be more likely to buy an EV if it had in-car Park and Charge functionality, enabling them to locate and navigate to chargers and pay for parking and charging through the car's media system **(page 27)**
- 77% of all drivers surveyed would prefer to drive a vehicle that provides information about public EV charging and enables them to navigate directly to specific charging locations **(page 28)**
- 73% of all drivers would prefer a vehicle with integrated in-car EV charging activations and payments **(page 29)**

Survey Highlights

Charging Situation

- 36% of EV drivers charge away from home at least once a week, with 9% charging away from home every day **(page 31)**
- That figure rises to 48% of American EV drivers, with 15% plugging in away from home every day **(page 31)**
- Only 3% of EV drivers never charge away from home, including just 2% of American EV drivers **(page 31)**
- 66% of EV drivers have run out of charge, with this happening multiple times to 1/3 of the same drivers **(page 32)**
- 22% find it challenging to locate EV charging points away from home “very frequently” or “all the time” **(page 33)**
- 60% of EV drivers consider charging information accuracy as “very important” or “extremely important” **(page 34)**
- More than 70% of US EV drivers rate charging information accuracy “very important” or “extremely important” **(page 34)**

Survey Highlights

Charging Data and Preferences

- 42% of EV drivers start searching for public charging up to 24 hours before their journeys, showing that a large proportion of electric car drivers like to plan ahead in terms of where to charge **(page 36)**
- 52% of EV drivers would be willing to pay up to a 10% premium to use their preferred charger location **(page 40)**
- 15% of EV drivers would be open to paying a more-than-10% premium to charge in a specific location **(page 40)**
- 44% of EV drivers would be willing to wait more than 5 minutes to charge in a specific location **(page 40)**
- The most widely used charging payment method is card at location (27%), closely followed by contactless payment (25%), and app/website payment (25%) **(page 41)**
- The most popular method for how drivers would like to pay for charging in future is in-car payment (43%) **(page 42)**

Survey Highlights

Charging and Fines

- EV drivers reported a broad range of issues when charging or attempting to charge in public, from physical problems, such as being unable to find or access chargers to account problems, such as trouble accessing payment methods **(page 45)**
- The most common issue is chargers being occupied by other vehicles, reported by 49% of EV drivers **(page 45)**
- 48% of EV drivers have also had issues with not being able to use chargers as they were out of order **(page 45)**
- 30% of EV drivers have unexpectedly been issued with multiple parking fines while charging **(page 46)**
- A further 28% of EV users have received one unexpected parking fine while charging (resulting in a total of 58% fined) **(page 46)**
- 68% of American EV drivers have received at least one unexpected parking fine while plugged in **(page 46)**
- Of those fined, 55% believe that “more accurate parking information” would have prevented this **(page 47)**
- 39% of drivers see in-car payments as a solution, covering the cost of parking and charging together **(page 47)**

Survey Highlights

Preference of Features

- 55% of drivers would like automatic guidance to the parking/charging site closest to their destination **(page 49)**
- 54% want automatic guidance to places with likely parking/charging availability near their destination **(page 49)**
- 60% would like in-car payments for vehicle-centric services (such as parking, charging, fuelling and tolls) **(page 50)**
- 48% want Single Sign-On, for access to multiple providers for in-car payments through one account **(page 50)**
- 64% of drivers want in-car payments for car parking, making it the most popular in-car service **(page 52)**
- The next most popular in-car payment type is EV charging, wanted by 56% of drivers (74% of EV users) **(page 52)**
- 85% of drivers would value navigation of underground/multi-storey car parks **(page 53)**
- 76% of drivers would value navigation to their specific car when returning to a car park **(page 53)**

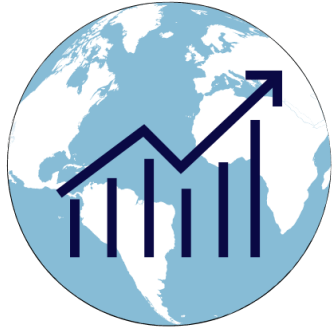
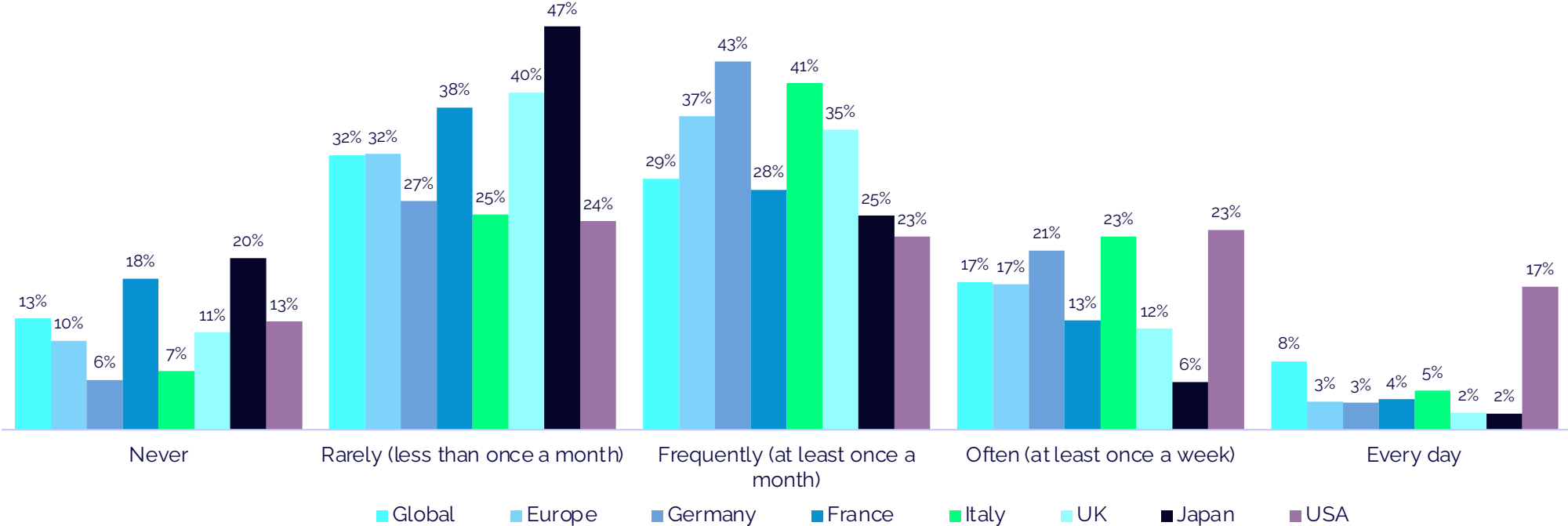


Parking Situation

- Parking frequency
- Parking locations
- Planning for parking
- Methods currently used to find parking
- Methods wanted for finding parking in future

How often do you pay for parking away from home?

- 54% of drivers park away from home at least once a month, with 17% doing so at least once a week and 8% seeking parking every day
- This increases to 69% in Italy and 63% in the USA, with 17% of American motorists looking for parking away from home every day
- Drivers in Japan are less likely to pay for parking away from home, with 20% never doing so and 47% doing so less than once a month. This may result from Japanese drivers being more likely to use private parking and free off-street spaces than those in other countries
- German and Italian drivers, meanwhile, are comparatively likely to pay for parking away from home at least once a month or more than once a week, while American drivers are the most likely to pay for parking every day or at least once a week
- Significantly more urban drivers pay to park every day (10%), or at least once a week (21%), than rural drivers, at 3% and 9% respectively
- EV drivers are typically more likely to pay for parking at least once a month or week than drivers with petrol or diesel cars, which is likely due to the additional need to pay for parking to access many public EV chargers



German and Italian drivers are likely to pay for parking away from home at least **once a month or more than once a week**, while American drivers are the most likely to pay for parking **every day or at least once a week**

Which type of parking locations do you mainly use when away from home?

- Paid off-street parking and private parking at destination are the most widely used, being regularly used by 63% of drivers, with free on-street parking being the third most widely used parking format, often used by 59% of drivers when away from home
- Due to the lack of on-street parking in Japanese city centres, local motorists are most likely to choose paid off-street parking, with 75% regularly using this type of location, and 72% often using private parking at destination.
- Free on-street parking is the most widely used parking type across Europe, being chosen by 70% of French and Italian drivers
- Free on-street parking is also more widely used by those in rural areas, at 63%, (plus EV drivers, at 63%), than urban dwellers, at 58%
- Paid on-street parking, meanwhile, is used more widely by those in urban areas, at 59%, than rural dwellers, at 48%
- Rural drivers are more likely to use free on/off-street parking than urban drivers, likely due to greater availability of free rural parking

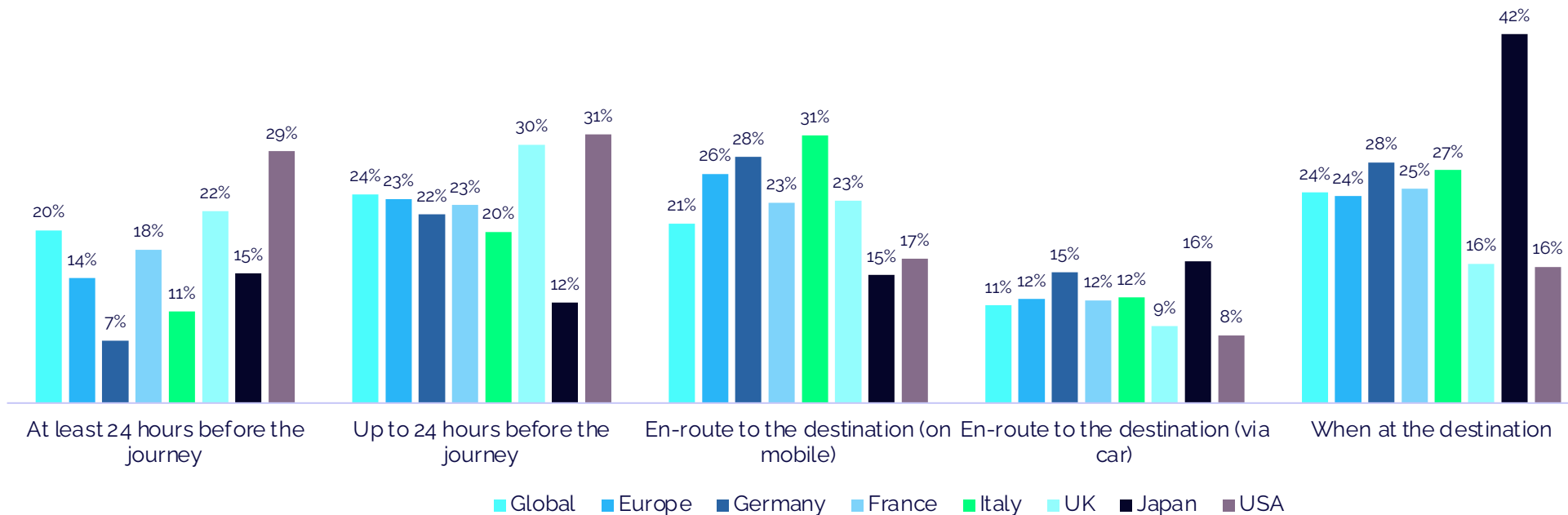
	Global	Europe	Japan	USA
Paid on-street parking	55%	60%	37%	59%
Paid off-street parking	63%	62%	75%	59%
Private parking at destination	63%	54%	72%	70%
Free on-street parking	59%	68%	45%	56%
Free off-street parking	48%	45%	58%	46%
Other (e.g. private driveway rental)	11%	11%	13%	10%



The most common types of parking location drivers use away from home are **paid off-street** and **private parking at destination** and is regularly used by **63% of drivers globally**

When do you normally start searching for parking?

- A large proportion of drivers globally search for parking ahead of their journeys, with 20% searching more than 24 hours before their journey and a further 24% doing so up to 24 hours ahead. Less than a quarter leave finding parking until they are at the destination
- Drivers are most likely to plan ahead in the USA, (with 29% starting to look for parking more than 24 hours ahead and 31% searching up to 24 hours ahead) and the UK, (where 22% search more than 24 hours ahead and 30% begin up to 24 hours before their journey)
- Japanese drivers are by far the least likely to pre-plan parking, with 42% searching for a space when they arrive at their destination
- EV drivers are more likely than ICE drivers to search for parking en-route to their destination, via mobile or in-car navigation
- EV drivers are also less likely to start looking for parking when at the destination, likely because EV drivers often prefer to charge when parking for any length of time, which requires more planning, to establish where the most suitable chargers are located
- Urban drivers are more likely to plan parking over 24 hours ahead, at 22% compared with 16% for rural drivers. Similarly, 22% of urban drivers start looking for parking at their destination compared with 29% of rural drivers, likely due to rural parking being easier to find



A large proportion of drivers globally search for parking ahead of their journeys, with **20% searching more than 24 hours in advance** and a further **24% do so up to 24 hours ahead**



How do you currently search for parking?

In the future, how would you like to search for parking?

- The most widely used tools to find parking are mobile apps and in-car navigation, both used by 44% of drivers
- US drivers are most likely to use mobile applications, at 59%, or in-car navigation, at 54%, to search for parking
- Japanese drivers are most likely to leave searching for parking until at their destination, with 51% doing this
- Drivers want to rely less upon finding parking on arrival. In future, drivers would most like to use mobile apps to find parking, with 52% wanting this and in-car navigation parking search functionality wanted by 50% of motorists
- Urban drivers are more likely than rural drivers to use all parking search formats, suggesting that finding parking in urban areas is significantly harder than in rural areas. Urban drivers are 14% more likely to search for parking online than rural drivers, with a 12% higher likelihood of using a mobile application than rural drivers and 10% more chance of using in-car navigation to find parking
- EV drivers are more likely to use mobile apps, online tools and in-car navigation than ICE drivers but less likely to search on arrival
- This is likely due to EV users often wanting to charge when parking for any length of time, which requires a greater level of planning

	Global	Europe	Japan	USA
Current: Using a mobile application	44%	37%	30%	59%
Future: Using a mobile application	52%	47%	45%	61%
Current: Online	41%	37%	23%	54%
Future: Online	43%	38%	29%	55%
Current: In-car navigation	44%	36%	43%	54%
Future: In-car navigation	50%	42%	51%	58%
Current: When arriving at destination	38%	34%	51%	36%
Future: When arriving at destination	29%	22%	31%	36%

In the future, **50%** of drivers globally would like **in-car navigation parking search functionality**





Parking Data and Preferences

- Factors affecting choice of parking location
- Preferences regarding parking in preferred location
- Frequency of facing difficulties while locating parking spaces
- Importance of parking information accuracy
- Preference for driving vehicles with integrated parking services

What are the top factors affecting your decision when selecting a parking location?

- The most important factors when choosing a parking location are the distance from the driver's destination, selected by 57% of drivers and parking charges, chosen by 55%. Availability and the type of parking location are the next most important factors at 43%
- Japanese drivers focus very much on parking charges, with 85% of drivers rating cost as a highly important factor, with distance to their destination also being a very important consideration, being chosen by 67% of Japanese motorists
- American drivers, meanwhile, rate parking space availability very highly, with 51% citing this as an important factor in choosing where to park, while 46% see the ability to reserve spaces as very important - significantly more than in any other country
- EV chargers are important for a significant proportion of US, French and German drivers, though they are of less importance to Japanese motorists, similar to parking space reservations in Japan

	Global	Europe	Japan	USA
Distance to destination	57%	51%	67%	59%
Parking costs	55%	50%	85%	46%
Parking availability	43%	36%	44%	51%
Ability to reserve spaces	35%	32%	20%	46%
Type of parking location	43%	36%	44%	50%
Payment type	35%	33%	35%	36%
EV stations	22%	24%	4%	29%

Most important factors when choosing a parking location selected by motorists globally:

Distance from driver's location - 57%
 Parking charges - 55%
 Parking availability - 43%
 Type of parking location - 43%



Japanese drivers focus on **parking charges** with **85%** of drivers rating cost as a highly important factor



American drivers rate **parking space availability** very highly, with **51%** citing this as important. **46%** see the **ability to reserve spaces** as very important - significantly more than in any other country

What would you be willing to do to park in your preferred location?

- A significant proportion of drivers would be open to paying extra or waiting to access their desired parking location
- 55% of drivers would wait up to five minutes to park in a specific location while 49% would hover for over five minutes to do so
- Similarly, just over half would pay a premium of up to 10% to park in a specific place, with 19% willing to pay over 10% extra
- A third of Americans would pay over 10% extra, with two thirds open to a premium of up to 10%
- Meanwhile, Japanese drivers are far less willing to pay any premium for convenience or to wait to park in a specific location
- US drivers are also particularly open to waiting to park, with 67% willing to wait for up to five minutes and 62% for over five minutes
- Only 8% of respondents would not be willing to pay a premium or hover to park in their desired location

	Global	Europe	Japan	USA
Circle for up to 5 mins	55%	51%	42%	67%
Circle for more than 5 mins	49%	47%	26%	62%
Pay a premium up to 10%	51%	44%	36%	67%
Pay a premium of over 10%	19%	14%	8%	32%



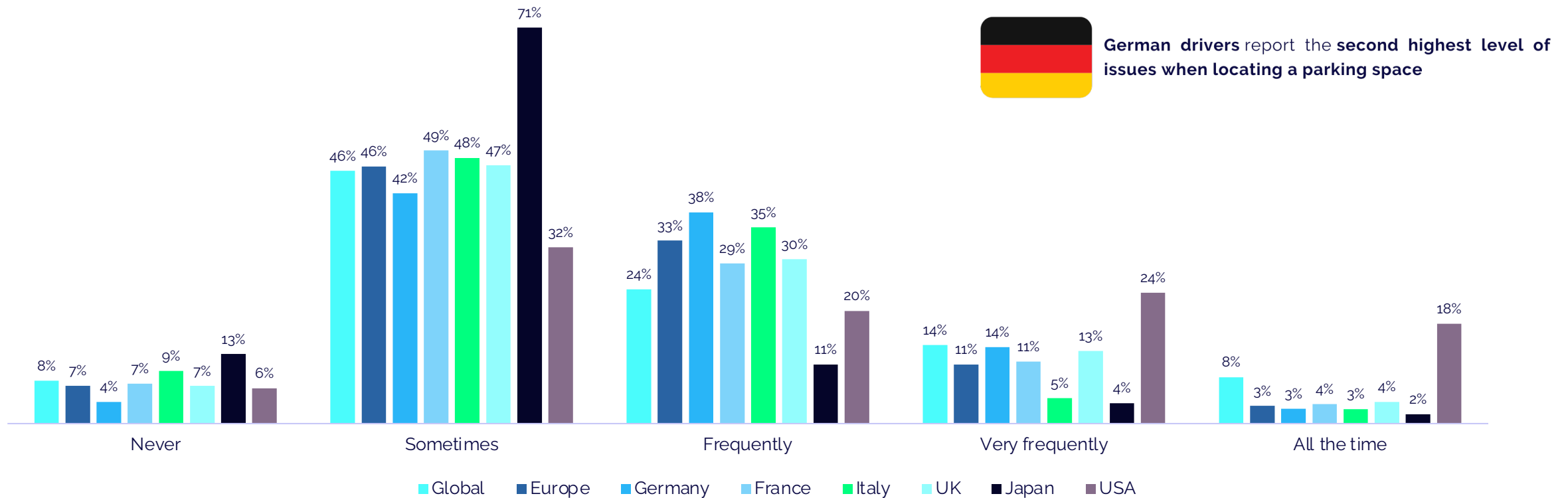
A third of **Americans** would **pay over 10% extra**, with **two thirds open to a premium of up to 10%** to park in their preferred location



Japanese drivers are **far less willing to pay any premium for convenience** or to **wait to park in a specific location**

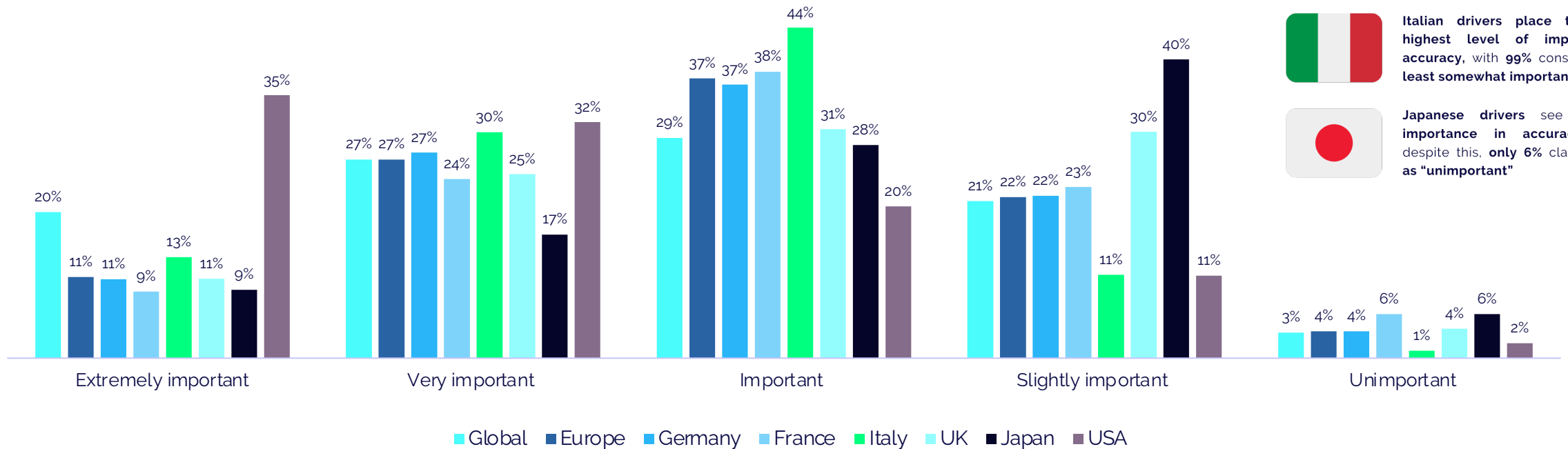
When parking away from home, how often is it challenging to locate a space?

- 46% of drivers "sometimes" find it challenging to locate an available parking space, suggesting widespread global parking issues
- Meanwhile, 24% of drivers face challenges "frequently". US drivers have the most regular issues, Japanese drivers the lowest level
- 24% of American motorists experience issues "very frequently", with a further 18% having trouble finding parking "all the time"
- German drivers report the second highest level of issues - 14% encounter problems "very frequently" and a further 38% "frequently"
- Only 4% of motorists in Germany report "never" having challenges in locating available parking spaces
- There are regional variations in the level of parking problems experienced in the US, with 58% of New Yorkers, 47% of Californians and 46% of Texans facing parking issues "very frequently" or "all the time", compared with the American nationwide average of 42%



How important is the accuracy of information regarding parking options?

- Just under half of drivers consider parking information accuracy as “extremely important” or “very important”, with 20% selecting the highest “extremely important” category. American drivers place the most importance in accuracy, Japanese drivers the least
- As drivers in the US face significant challenges with parking, American drivers consider it particularly important to get accurate information regarding parking; 67% considering this as “extremely important” or “very important”, rising to 72% among EV drivers
- More than a third of US drivers rated parking information importance in the top band - far higher than those in any other country
- Italian drivers place the second highest level of importance in accuracy, with 99% considering it at least somewhat important
- Japanese drivers see the least importance in accuracy, though despite this, only 6% class accuracy as “unimportant”



More than a third of US drivers rated parking information importance in the top band - far higher than those in any other country



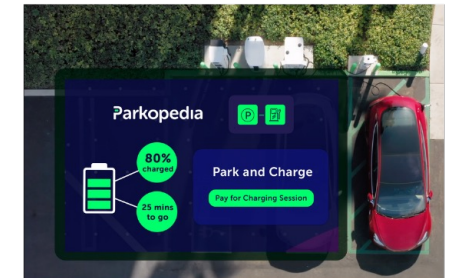
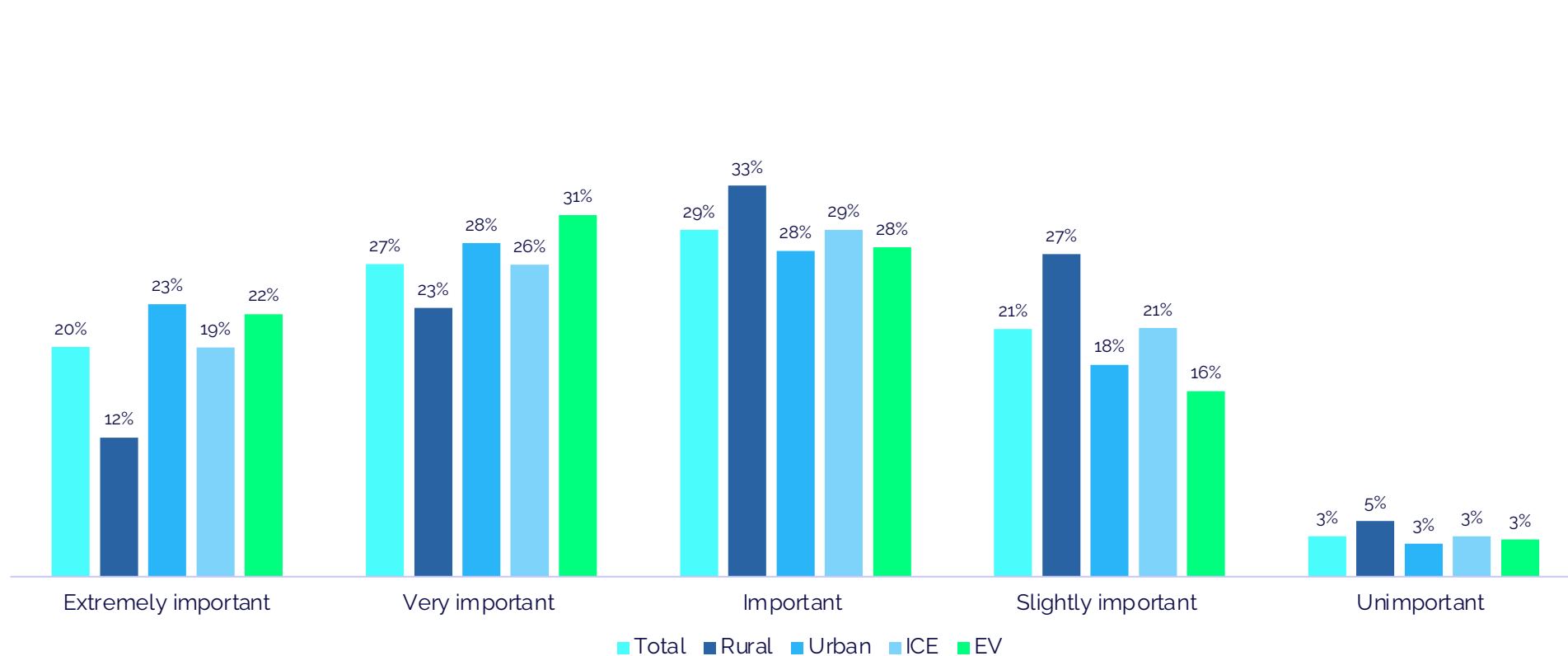
Italian drivers place the second highest level of importance in accuracy, with 99% considering it at least somewhat important



Japanese drivers see the least importance in accuracy, though despite this, only 6% class accuracy as “unimportant”

How important to you is the accuracy of information regarding parking options?

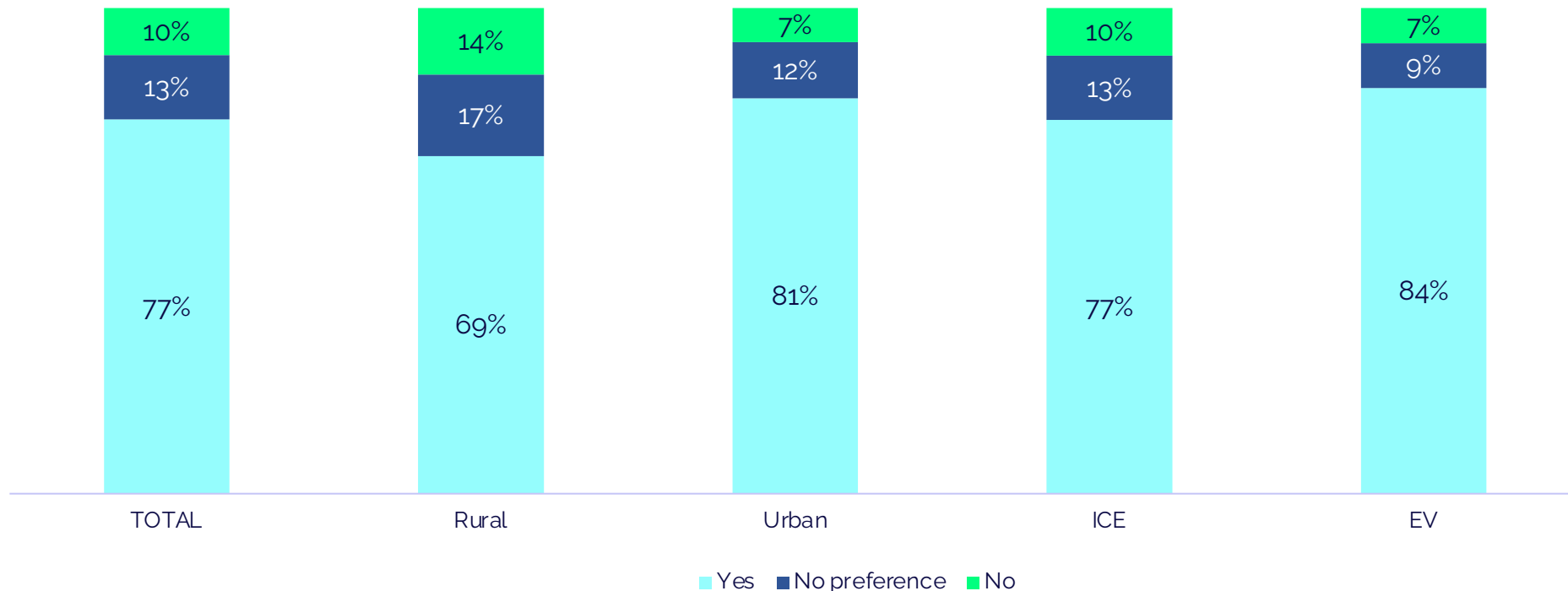
- Urban drivers place more importance on parking information accuracy than those in rural areas, likely due to greater competition for city spaces and the increased value in being able to trust information on elements such as location, opening times and availability
- More EV drivers than ICE drivers rate accuracy as "extremely important" or "very important", likely due to charging considerations
- As charging an EV is more time-consuming than filling up an ICE car, this is likely to encourage many EV drivers to consider whether they need to charge when parking for a long period of time - hence why accurate parking information may be particularly important
- Being unable to charge while parked or only having access to slow charging can result in much greater journey times on long trips



More EV drivers than ICE drivers rate accuracy as "extremely important" or "very important", likely due to charging considerations. Being unable to charge while parked or only having access to slow charging can result in much greater journey times on long trips

Would you prefer to drive a vehicle with integrated parking services that can direct you to verified parking locations?

- 77% of drivers would prefer their cars to offer integrated parking services that enable them to navigate directly to parking locations
- EV drivers place particularly value in this, with 84% wanting access to integrated parking services within their car, potentially due to such services enabling EV drivers to more easily plan when and where to charge their car to minimise their overall journey time
- Urban drivers also place higher importance in integrated parking services, with 81% valuing such services, which is likely due to the greater level of challenges in finding suitable parking in urban areas compared with less congested rural areas



Urban drivers also place **higher importance** in **integrated parking services**, with 81% valuing such services, which is likely due to the greater level of challenges in finding suitable parking in urban areas compared with less congested rural areas





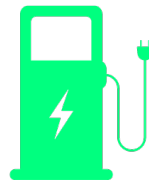
Electric Vehicle Ownership

- Reasons for not considering an EV
- Concerns over owning an EV
- Effect of current number and setup of public EV chargers on considering whether or not to purchase an EV
- Preference for driving vehicles that provide information about public EV charging and provide navigation to chargers
- Preference for driving vehicles that offer integrated in-car activations and payments for EV charging

What are the reasons for not considering an Electric Vehicle (EV) as your next car?

- A large proportion of respondents are open to purchasing an EV, though those who are not have a broad range of concerns
- The most significant of these is expense, with 47% of those who would not consider an EV believing that they are too expensive
- Drivers in Japan are most concerned about the ability to find charging away from home, which was presented as a concern by 54% of those who aren't ready to get an EV, with 53% also being concerned that EV range per charge may not be sufficient
- Nearly half of Japanese drivers who would not get an EV also believe that charging is likely to take too long for their needs
- Meanwhile, relatively few American and Italian drivers are concerned about charging at home/near home or range issues
- Italians are also particularly unfazed by EV charging costs compared with those in every other country surveyed

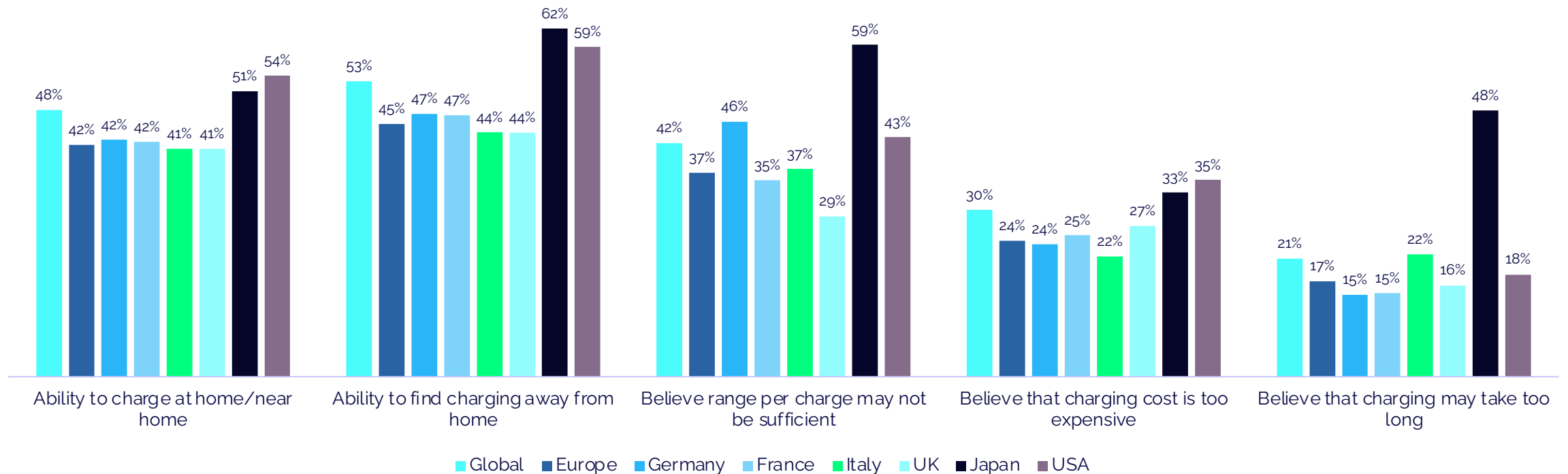
	Global	Europe	Japan	USA
Concerns over ability to charge at home/near home	35%	33%	40%	26%
Concerns over ability to find charging away from home	44%	36%	54%	33%
Believe range per charge may not be sufficient	44%	41%	53%	26%
Believe that charging cost is too expensive	23%	23%	23%	23%
Believe that charging may take too long	35%	27%	47%	21%



47% of those who **wouldn't consider an EV** believe that they are **too expensive**. Drivers in **Japan** are most **concerned** about the **ability to find charging away from home**, which was presented as a concern by **54%** of those who **aren't ready to get an EV**, with **53%** also being concerned that **EV range per charge may not be sufficient**.

Would you consider any of the following a 'concern' when it comes to owning an EV?

- Among those who would consider an EV as their next car, 53% have concerns over the ability to find charging away from home
- 62% of Japanese drivers are concerned about public charging along with 59% of US drivers - far higher than in other countries
- Japanese drivers are also particularly apprehensive about EV range per charge, with 59% seeing this as a problem
- More than half of Japanese and US motorists who would consider purchasing an EV, also have worries over home charging
- Prospective EV drivers in Japan are also far more concerned about charging times than those in any other country

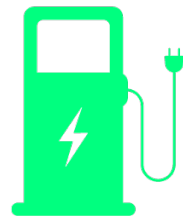


62% of **Japanese** drivers are concerned about **public charging** along with **59%** of **US** drivers

Does the current public EV charging infrastructure prevent you from getting an EV?

- Of those who wouldn't consider an EV as their next car, 52% say that the current number and setup of public EV chargers puts them off
- Japanese drivers are most likely to be dissuaded from getting an EV due to public charging infrastructure, with 67% put off by this
- A large proportion of the US drivers who wouldn't consider an EV are unconcerned about the current public EV charging situation, with 28% feeling the current charging situation is sufficient for their needs and a further 41% only being somewhat worried by this
- Of those who wouldn't consider an EV as their next car, existing EV drivers are less likely to be put off by public charging infrastructure than ICE drivers, suggesting that the number and format of chargers is not the main thing dissuading them from getting another EV
- Rural drivers are slightly more likely to be put off getting an EV than urban drivers, which is likely due to the lower density of chargers in rural areas and, subsequently, the greater distance between chargers, which could cause greater issues should one be out of order

	Global	Europe	Japan	USA
Yes - I will not get an EV with the current public charging situation	52%	42%	67%	31%
Somewhat - the current public charging situation makes me less likely to get an EV	31%	38%	22%	41%
No - the current public charging situation is sufficient for my needs	17%	20%	11%	28%



On a global scale, **52%** of respondents say that the current number and setup of public EV chargers **puts them off from buying an electric vehicle.**

Would in-car Park and Charge functionality make you more likely to purchase an EV?

- 84% of drivers would be more likely to buy an EV if it had Park and Charge functionality - enabling them to locate, navigate to and pay for parking and charging through their media system, including 92% of Americans, 91% of Italian drivers and 90% of UK motorists
- Drivers in Japan are least likely to be influenced by Park and Charge, though 58% would still be more likely to choose an EV due to it
- Existing EV drivers are most likely to be convinced to get another EV as their next car due to Park and Charge functionality
- While ICE drivers are less likely to be persuaded by Park and Charge, 84% would still be more likely to choose an EV due to it
- Rural drivers see less value in Park and Charge than those in urban areas, though 79% of rural motorists would still be persuaded to choose an EV due to Park and Charge, demonstrating that it holds universal appeal to drivers in simplifying EV ownership

	Global	Europe	Japan	USA
Effect of in-car park and charge functionality on EV purchase consideration	84%	89%	58%	92%



84% of drivers would be **more likely to buy an EV** if it had **Park and Charge functionality** - enabling motorists to locate, navigate to and pay for charging through their car media system, including **92% of Americans, 91% of Italian drivers and 90% of UK motorists**

Would you prefer a car that provides information about public charging and enables you to navigate directly to specific chargers over an equivalent that does not?

- More than three quarters of drivers would prefer a vehicle that shows public charging locations and can navigate them directly there
- Italian drivers are particularly keen on this functionality, with 85% of respondents preferring to have this, followed by 84% of Americans
- Japanese drivers value this less, though more than half of Japanese respondents would still prefer to have EV charging information
- Unsurprisingly, EV drivers would particularly value in-vehicle information about public charge points, with 86% preferring to have this
- Those in urban areas, meanwhile, value this functionality more than those in rural areas, with 80% of urbanites wanting EV information

	Global	Europe	Japan	USA
Preference for driving vehicles that provide information about public electric vehicle and provides navigation	77%	78%	57%	84%



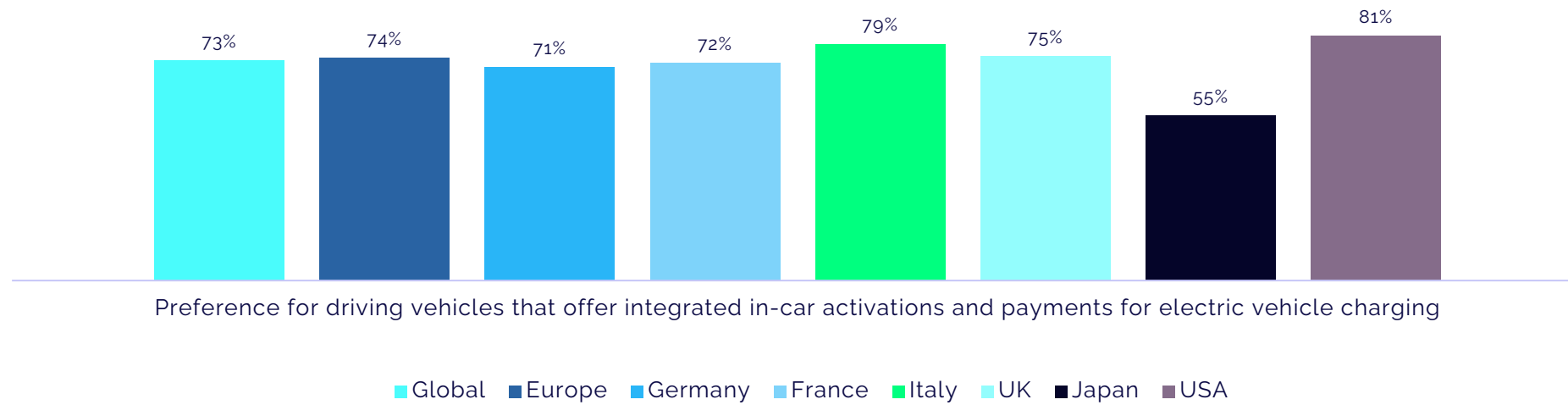
More than three quarters of drivers would prefer a **vehicle** that shows **public charging locations and can navigate them directly there**. **Italian drivers** are particularly keen on this functionality, with **85%** of respondents preferring to have this, followed by **84% of Americans**



Japanese drivers value this less, though more than half of Japanese respondents would still prefer to have EV charging information

Would you prefer to drive a vehicle that offers integrated in-car activations and payments for EV charging over an equivalent that does not?

- Nearly three quarters of drivers would prefer to drive a vehicle that offers integrated in-car activations and payments for EV charging
- American drivers value this most, with 81% wanting in-car activations, followed by Italian respondents, 79% of whom would value this
- Japanese drivers are least interested in in-car activations and payments for charging, though more than half would still like to have it
- EV drivers and urban dwellers value in-car activations and payments most, with 82% of EV users and 77% of urbanites wanting these
- Despite this, even rural drivers would prefer to have integrated in-car activations and payments, with 65% wanting these features



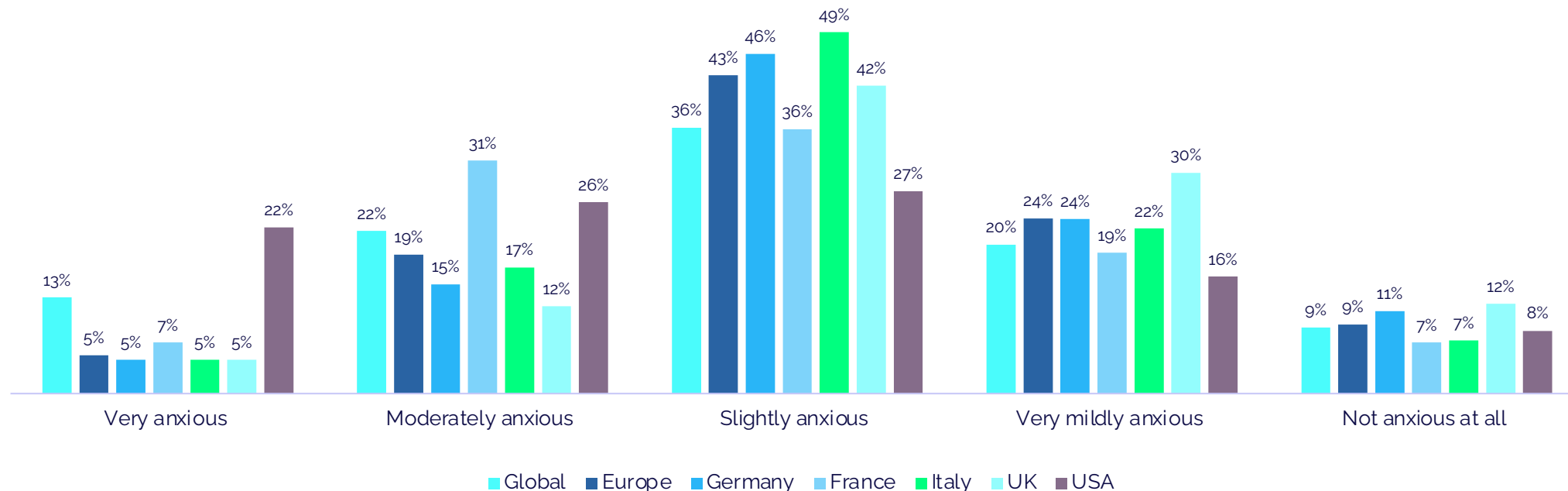


Charging Situation

- Anxiety over finding charging away from home or work
- Running out of charge
- Frequency of challenges to locate a charging point
- Importance of the accuracy of the information received regarding charging points

How anxious do you feel about finding somewhere to charge away from home or work?

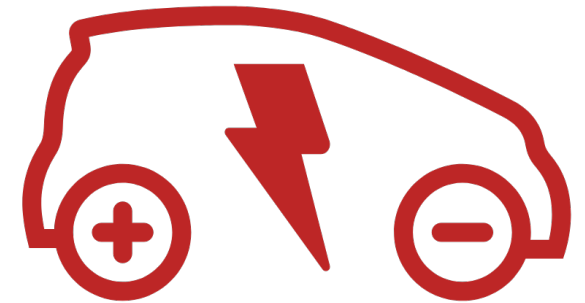
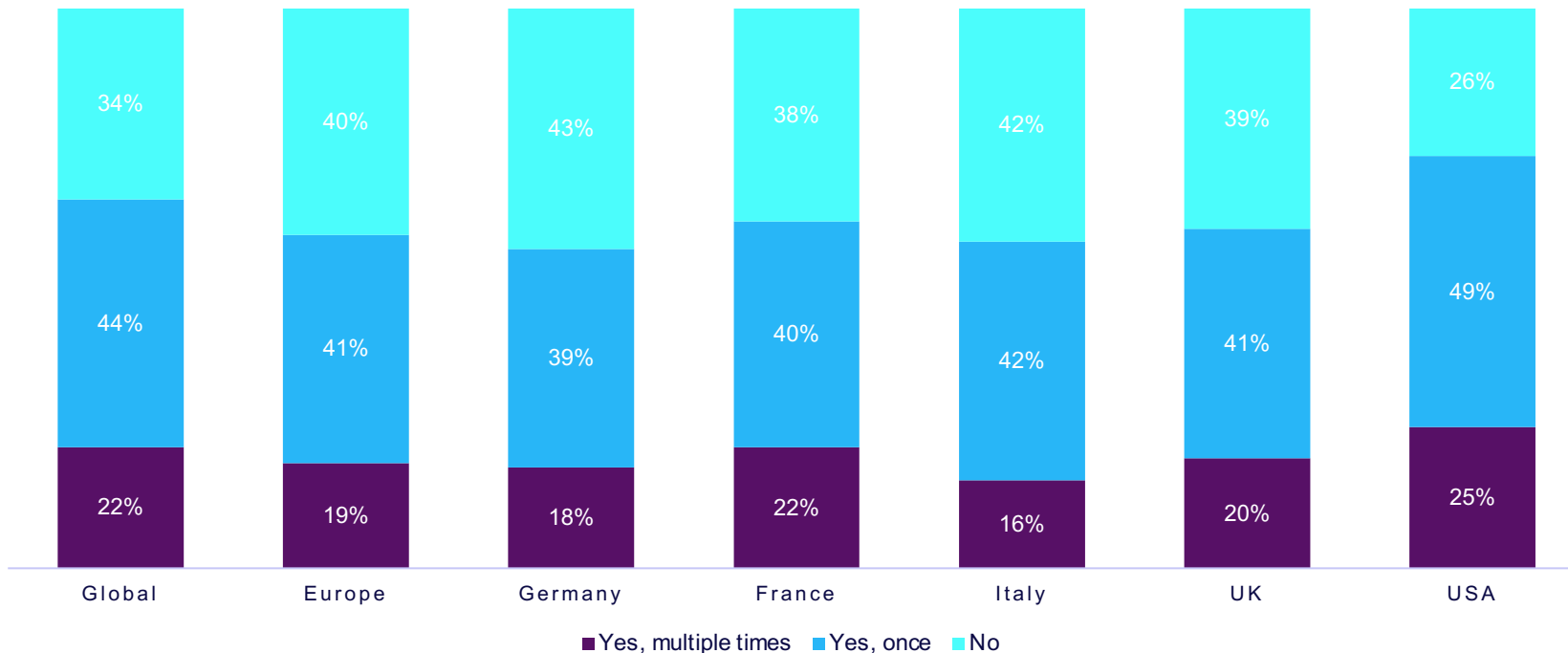
- 36% of EV drivers charge away from home once a week or more, while 9% do so every day and only 3% never charge away from home
- This rises to 48% among US EV drivers, with 15% charging their car away from home every day
- Finding somewhere to charge causes significant stress for drivers around the world, with more than a third being “moderately anxious” or “very anxious” overall - with 13% reporting the highest level of worry. Anxiety levels are highest amongst drivers in the US and France
- Just under half of American drivers are ‘moderately anxious’ or “very anxious”, with 22% classing themselves as “very anxious”
- Meanwhile, 7% of French drivers are “very anxious” about charging, with a further 31% being “moderately anxious”
- This potentially results from the US and France being the two largest countries surveyed, meaning that drivers may cover longer journeys more regularly than those in smaller countries and consequently experience problems charging more often
- Urban drivers are more anxious than those in rural areas, with more classing themselves as “very” or “moderately” anxious and fewer being “not anxious at all” or “very mildly anxious”, likely due to the heavier traffic and greater competition for chargers in urban areas



Finding somewhere to charge causes significant stress for drivers around the world, with **more than a third** being “moderately anxious” or “very anxious” overall - with **13%** reporting the highest level of worry. Anxiety levels are highest amongst drivers in the US and France

Have you ever run out of charge?

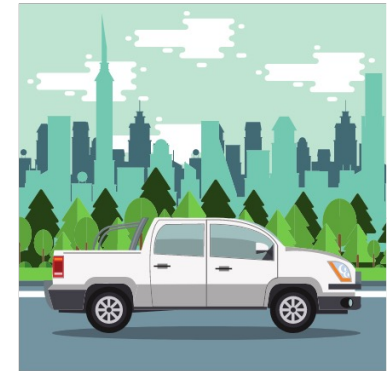
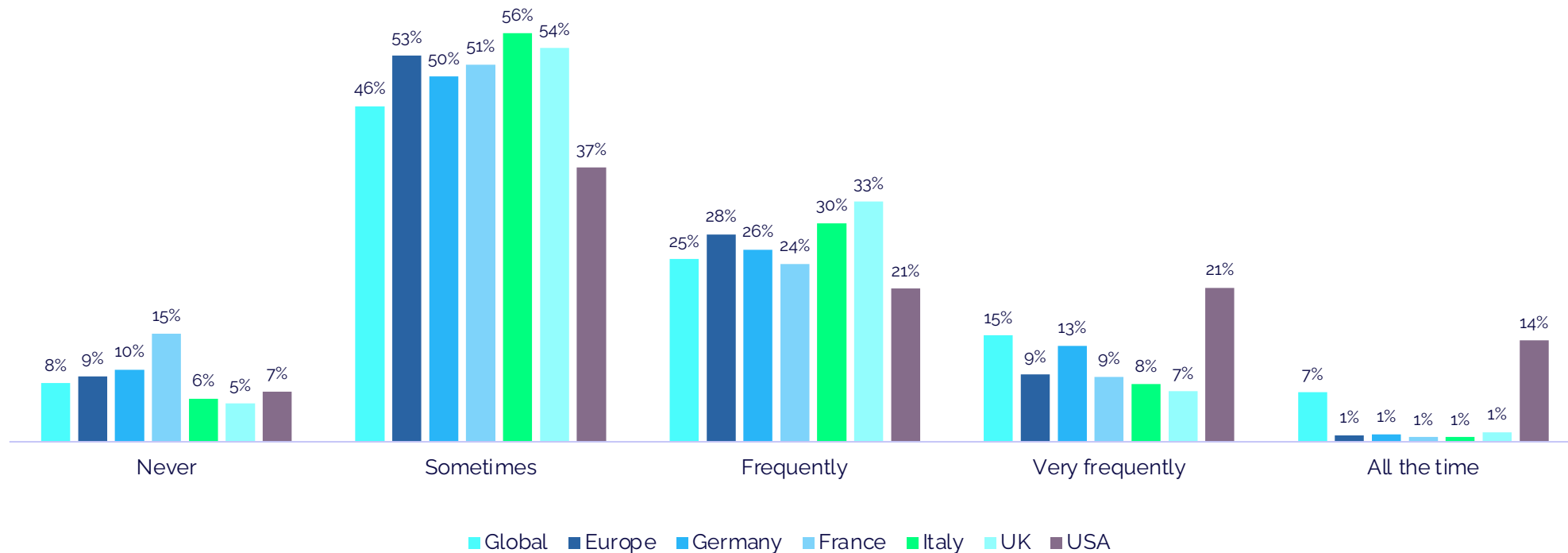
- Surprisingly, two thirds of EV drivers have run out of charge at least once, with 73% of American EV drivers having run flat before
- Even more concerningly, 22% of global respondents have run out charge more than once, including a quarter of US EV drivers
- German and Italian drivers are the least likely to have run out of charge, though in both cases nearly six out of 10 EV drivers have still found themselves with a flat battery before, with nearly one in five drivers in both countries experiencing this multiple times
- Running out of charge is a significant problem for both those living in rural and urban areas, though those in urban areas are more likely to have found themselves stranded, with 68% having experienced this before compared with 58% of rural residents
- Significantly, though, more than 20% of both rural and urban drivers have run out of charge multiple times, suggesting that all drivers would benefit from greater provision of in-car charging information, to simplify finding chargers and paying for charging



Running out of charge is a significant problem for both those living in rural and urban areas, though those in **urban areas** are **more likely to have found themselves stranded**, with 68% having experienced this before compared with 58% of rural residents

How often do you find it challenging to locate a charging point away from home?

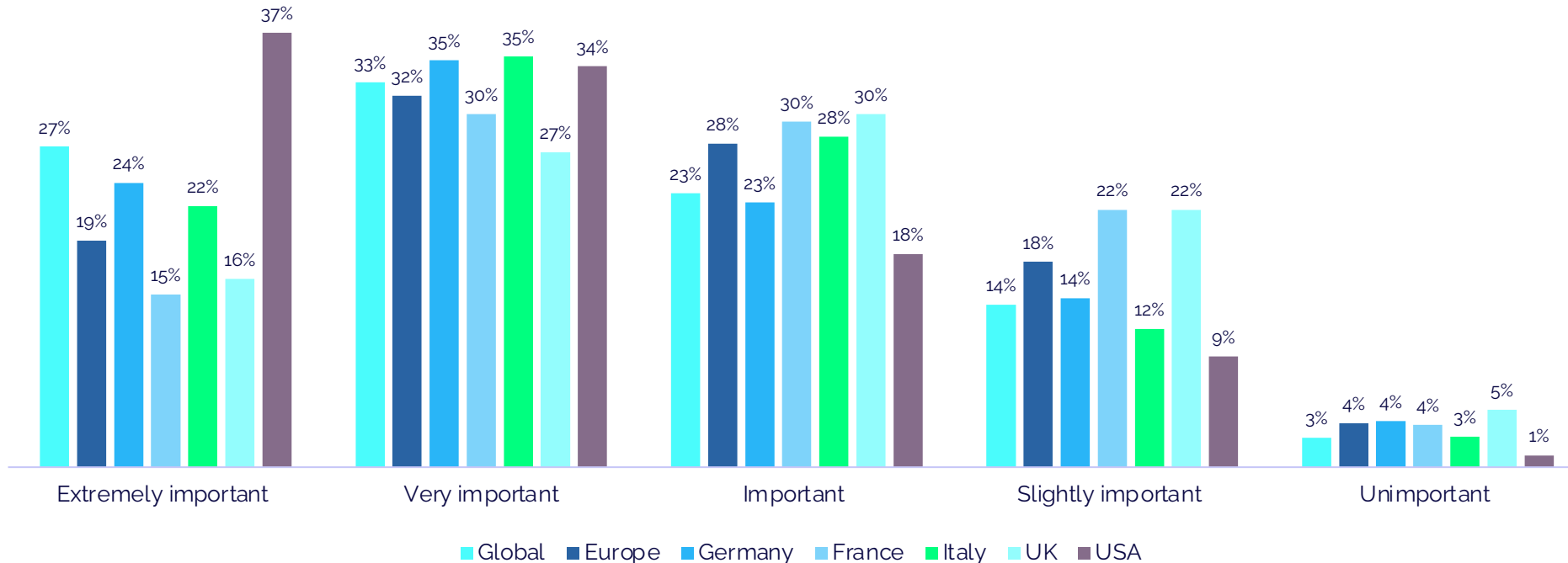
- More than one in five drivers find it challenging to locate EV charge points away from home “very frequently” or “all the time”, though this is a much more significant problem in the US, where 14% struggle “all the time” and a further 21% “very frequently” have difficulties
- French drivers are least likely to have problems locating chargers, though 10% still have difficulties “very frequently” or “all the time”
- Urban drivers are more likely to have regular problems with finding EV charging points when away from home than those in rural areas
- This potentially results from greater competition for urban chargers and the higher likelihood of other cars occupying spaces, physical problems accessing chargers in car parks with set opening times or a greater chance of heavily used urban chargers being out of order



1 in 5 drivers find it difficult to locate EV charge points away from home

How important to you is the accuracy of information regarding EV charge points?

- A significant proportion of EV drivers believe that the accuracy of charging point information provided by their vehicle is particularly valuable, with 27% rating it “extremely important” and a further 33% “very important”. Only 3% consider accuracy as “unimportant”
- American drivers place particular value in accuracy, with 71% of US EV drivers deeming it “extremely important” or “very important”
- German and French drivers also prize charging point accuracy, though even UK and Italian drivers see significant value in accuracy
- 60% of EV drivers feel that the accuracy of charging point information is “extremely important” or “very important”, along with 64% of urban drivers. Meanwhile, 47% of rural drivers rated this information as “extremely important” or “very important”
- The fact that nearly half of rural drivers see accuracy as so important shows that all types of EV drivers value accurate information



60% of EV drivers believe the **accuracy of charging point information** provided by their vehicle is **very important**. American, German and French drivers in particular value the accuracy

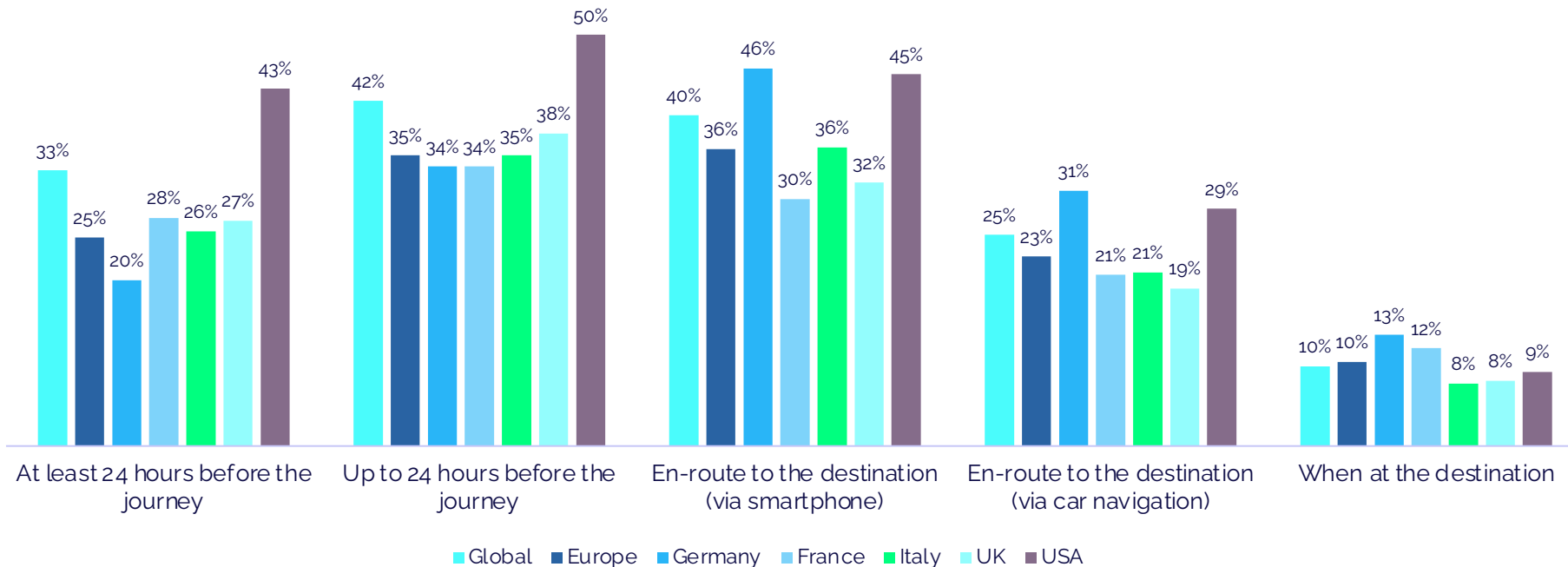


Charging Data and Preferences

- Time of searching for public charging location
- Factors affecting choice of charging location
- Methods currently used to search for public charging locations
- Methods requested in future to search for public charging locations
- Behaviour at preferred charging locations
- Mode of payment currently used for charging
- Mode of payment most wanted in the future

When do you normally start searching for a public charging location?

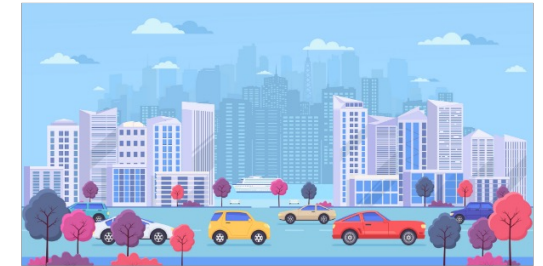
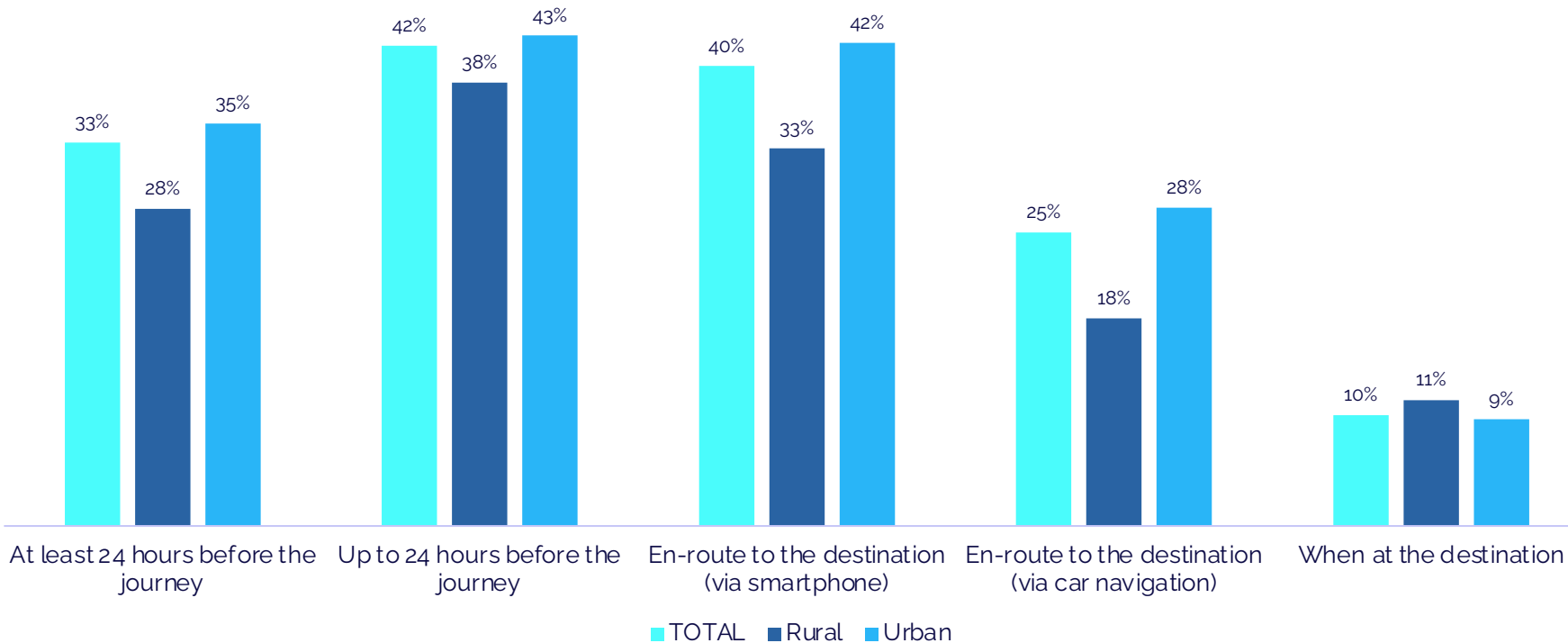
- 42% of EV drivers start searching for charging up to 24 hours before a journey, with half of American EV drivers doing so
- Meanwhile, 40% of EV drivers start searching for charging en-route to their destination on their phone
- Searching for charging by phone is most common in Germany, where it is used by 46% of drivers and the US, at 45%. However, there are limitations regarding the usability of phone-based mapping, due to increasingly tight legislation preventing using phones while driving
- Only a small minority of EV drivers search for charging at their destination, implying that EV users are more comfortable planning where to charge before their journey or en-route, rather than relying upon being able to easily find suitable charging near their destination



Globally, 42% of EV drivers search for charging up to 24 hours before a journey. **EV drivers** in general are likely to **plan ahead or en route**, rather than rely on finding suitable charging near their destination

When do you normally start searching for a public charging location?

- Urban drivers are far more likely than rural ones to start searching for charging before setting off on their journey, potentially in attempt to pre-empt any issues with charger availability or even finding a charger, which can be challenging in urban environments
- Both rural and urban drivers are keen to plan ahead, though, with only around 10% of each leaving finding charging until they get to their end destination, implying that very few drivers feel confident enough that they'll find suitable charging without concerted effort



Urban drivers are more likely than rural ones to start searching for charging before setting off on their journey, potentially in attempt to pre-empt any issues with charger availability or even finding a charger, which can be challenging in urban environments

What are the top factors affecting your choice of public charging location?

- The top three factors that affect EV drivers' decision when selecting a public charging location are practical considerations: the overall distance to the final destination (55%), charger availability (53%), and charging costs (51%)
- US drivers are most concerned about distance to the destination and are particularly swayed by payment type
- German motorists' choice of where to charge is also particularly affected by the payment types available, but German drivers are less worried about the cost of charging, which is UK drivers' top concern, just ahead of the distance to the final destination
- Charger availability, meanwhile, is the factor most likely to affect French EV drivers' choice of where to charge, with German, US and UK drivers also rating this as a highly important consideration

	Global	Europe	USA
Distance to destination	55%	51%	60%
Parking costs	45%	42%	48%
Charging costs	51%	53%	48%
Charger availability	53%	53%	54%
Ability to reserve chargers	37%	34%	41%
Payment type	48%	43%	55%
Opening times where charger is located	35%	32%	38%



The top three factors that affect EV drivers' decision when selecting a public charging location are:

The overall distance to the final destination (55%)
 Charger availability (53%)
 Charging costs (51%)

How do you search for public charging locations?

In the future, how would you like to search for public charging locations?

- Half of the EV drivers surveyed currently use in-car navigation to search for public charging locations, with German motorists most likely to do so, at 57%, closely followed by drivers in America, at 55%
- A higher proportion of drivers want to use in-car navigation to find suitable public EV charging in future than currently do so - across all surveyed countries - showing that drivers expect to be able to rely on integrated in-car media systems
- However, fewer drivers plan to search for charging when arriving at their destination in future than currently do so, except in the US
- Urban drivers typically have greater challenges than rural ones in terms of finding charging, which can be seen here, as urban drivers are more likely to use all forms of searching for charging, including, surprisingly, simply searching for charging on arrival

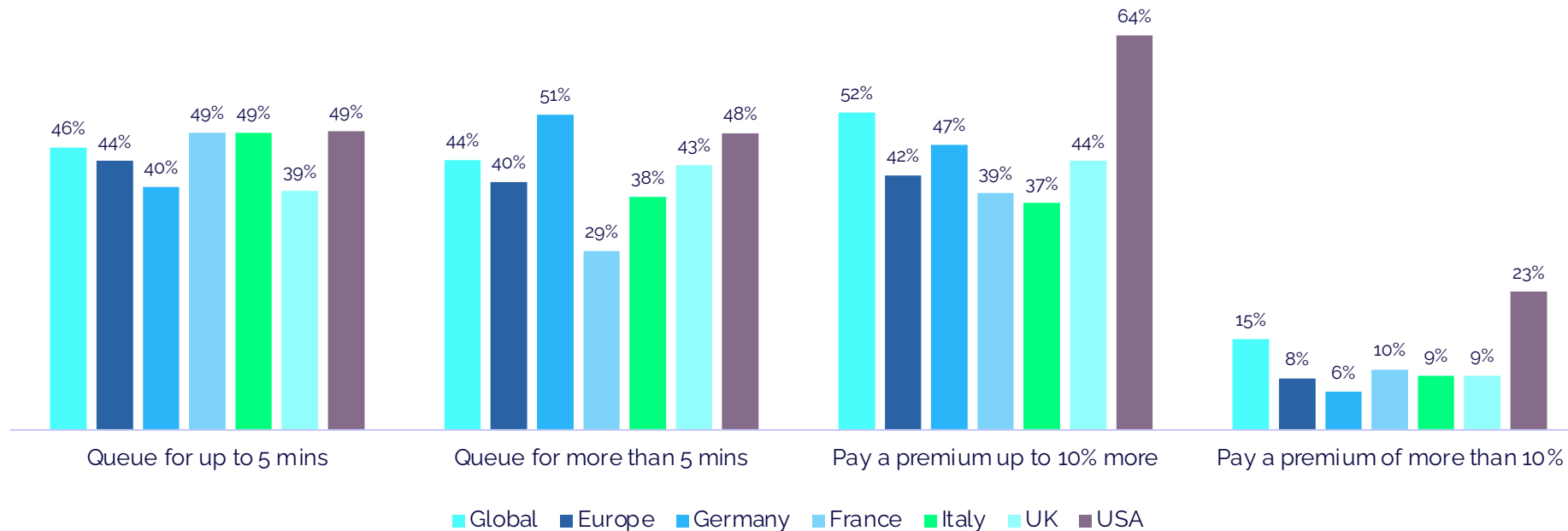
	Global	Europe	USA
Current: In-car navigation	50%	47%	55%
Future: In-car navigation	57%	54%	60%
Current: When arriving at destination (visual search)	22%	17%	28%
Future: When arriving at destination (visual search)	22%	14%	31%
Current: Mobile App	57%	50%	65%
Future: Mobile App	58%	52%	67%



Currently, half of the EV drivers surveyed use **in-car navigation to search for public charging locations**, with **German motorists** most likely to do so, at **57%**, closely followed by drivers in **America**, at **55%**

What would you be willing to do to charge in your preferred location?

- Around half of drivers would be willing to queue or pay extra to access their preferred charging location
- American EV drivers are the most open to queuing and paying a premium to charge where they want to
- Nearly two thirds of US EV drivers would be willing to pay a premium of up to 10% - around 20% more than those in other countries
- Far more Americans, at 23%, would be willing to pay a premium of more than 10%, too, compared with 10% or less for other markets
- This data suggests that convenience is more important to a large proportion of American EV drivers than the cost to charge
- German EV users are particularly open to waiting over five minutes, with 51% open to this, compared with 29% of French EV drivers



How do you pay for charging currently?

- The top currently used payment methods are card at location (27%), contactless payment (25%), and app/website payments (25%)
- However, a number of individual countries have their own distinct payment preferences regarding the most widely used formats
- UK EV drivers are particularly keen to use contactless payment when charging, while French drivers like to pay by card at location
- RFID cards are the least used payment type, potentially due to driver frustration over needing multiple cards for multiple providers
- Urban drivers particularly value apps/websites, advance payments and Plug & Charge when it comes to paying for charging
- Rural drivers, meanwhile, particularly value card at location and contactless payments, implying that they have less willingness to sign up for multiple alternative EV-specific payment methods or accounts than urban drivers
- Tesla is currently the only car manufacturer with its own Plug & Charge service and its drivers made up a significant proportion of EV drivers surveyed. Therefore, the Plug & Charge figures highlighted below consist almost entirely of Tesla drivers

	Global	Europe	USA
Contactless payment systems at location	25%	28%	22%
Advance payment through charging website/app	20%	16%	24%
Via an app or website at the time of charging	25%	23%	28%
RFID charge card	11%	11%	10%
In-car payment option	17%	13%	20%
Plug & Charge: you plug-in and your account gets charged automatically	21%	18%	25%

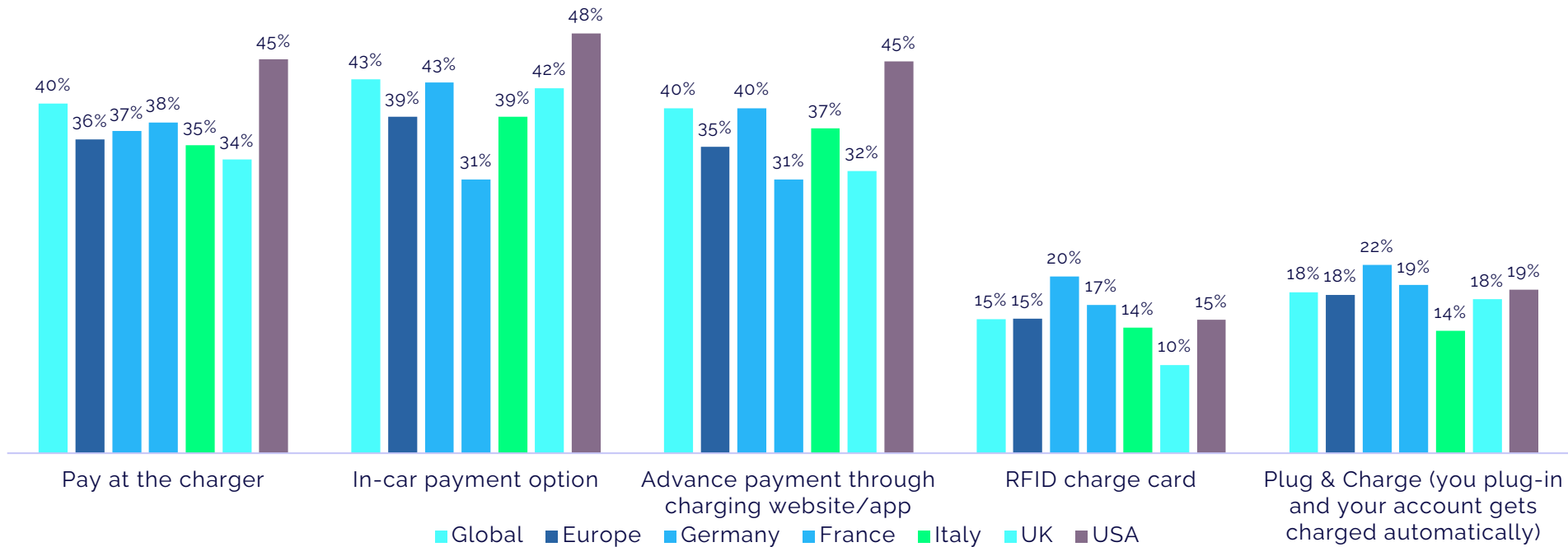


The most popular ways to pay for EV charging currently are:

- Card at location (27%)
- Contactless payment (25%)
- App/website payments (25%)

In the future, how would you like to pay for charging?

- Drivers in every country, bar France, would most like to pay for charging through in-car payment, selected by 43% of respondents
- Paying at the charger is the second most popular option, selected by 40%, with this being French drivers' top choice
- Advance payment through a charging website/app is also popular, though few drivers want to use RFID charge cards, with other research showing significant driver dissatisfaction with having to rely on numerous RFID cards to access different networks



43% of all respondents would like to **pay for charging through in-car payments** in the future

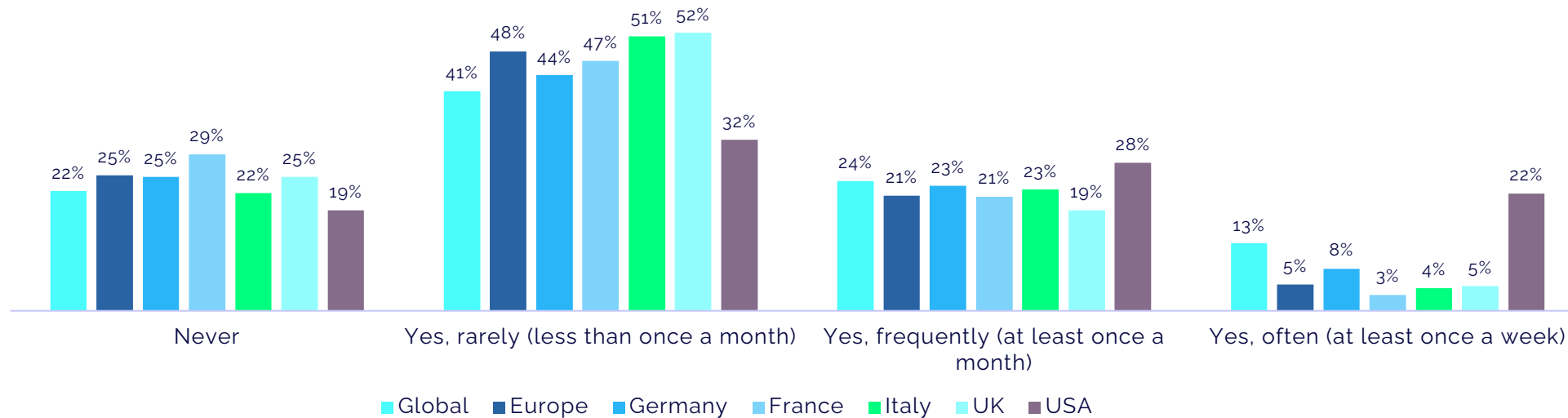


Charging and Fines

- Failure to locate EV charging points
- Issues encountered while charging/attempting to charge
- Fines issued while charging
- Ways in which fines could have been prevented

Have you ever failed to locate an EV charging point you were trying to navigate to, using your in-car media system?

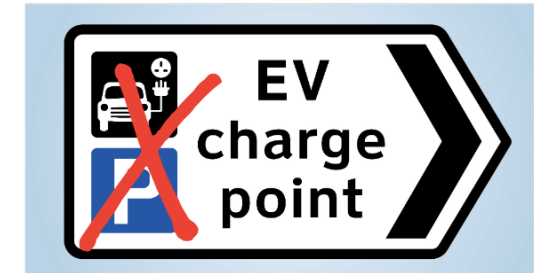
- Locating charging points is a challenge for a large proportion of EV drivers around the world, with half of US drivers facing monthly or weekly problems to find chargers using their in-car media systems, including 22% who struggle to do so at least once a week
- More than 30% of German drivers experience monthly or weekly difficulties, while around a quarter of drivers experience the same issues in France, the UK and Italy, showing widespread global difficulties in finding charging by relying on in-car navigation systems
- Drivers in urban areas are far more likely to experience difficulties in finding charge points, which is likely due to the greater density of buildings in highly populated areas making it harder to spot chargers, even if a car navigation system gets the driver close
- Consequently, urban drivers are around twice as likely to have weekly or monthly problems than those in rural areas



Which of these have you experienced while charging/attempting to charge in public?

- Half of EV drivers have failed to charge due to cars occupying their desired chargers - with particular issues in the US and Germany
- Similarly, just under half of EV drivers haven't been able to plug in due to out-of-order chargers - especially in the UK and US
- Around a quarter of EV drivers have had problems accessing chargers and not being able to find them initially, highlighting the value of accurate charging information and in-car navigation systems that can direct drivers to chargers with high precision
- This is a greater issue with EVs than ICE cars, as EVs typically cannot travel as far per charge as ICE cars can on a tank of fuel and take much longer to 'fill up', meaning there's a much higher likelihood of EV drivers becoming stranded if unable to find chargers
- Competition for chargers is particularly problematic for urban drivers, who often aren't able to plug in as chargers are occupied. Rural and urban drivers are equally likely to experience out of order chargers, suggesting widespread charger maintenance problems
- Around 30% of rural and urban drivers have had physical difficulties accessing chargers, showing that drivers would benefit from more parking information covering aspects such as opening times to ensure they can charge when and where they need to

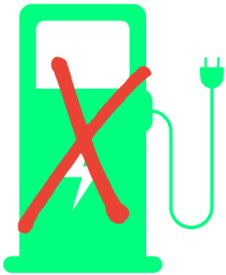
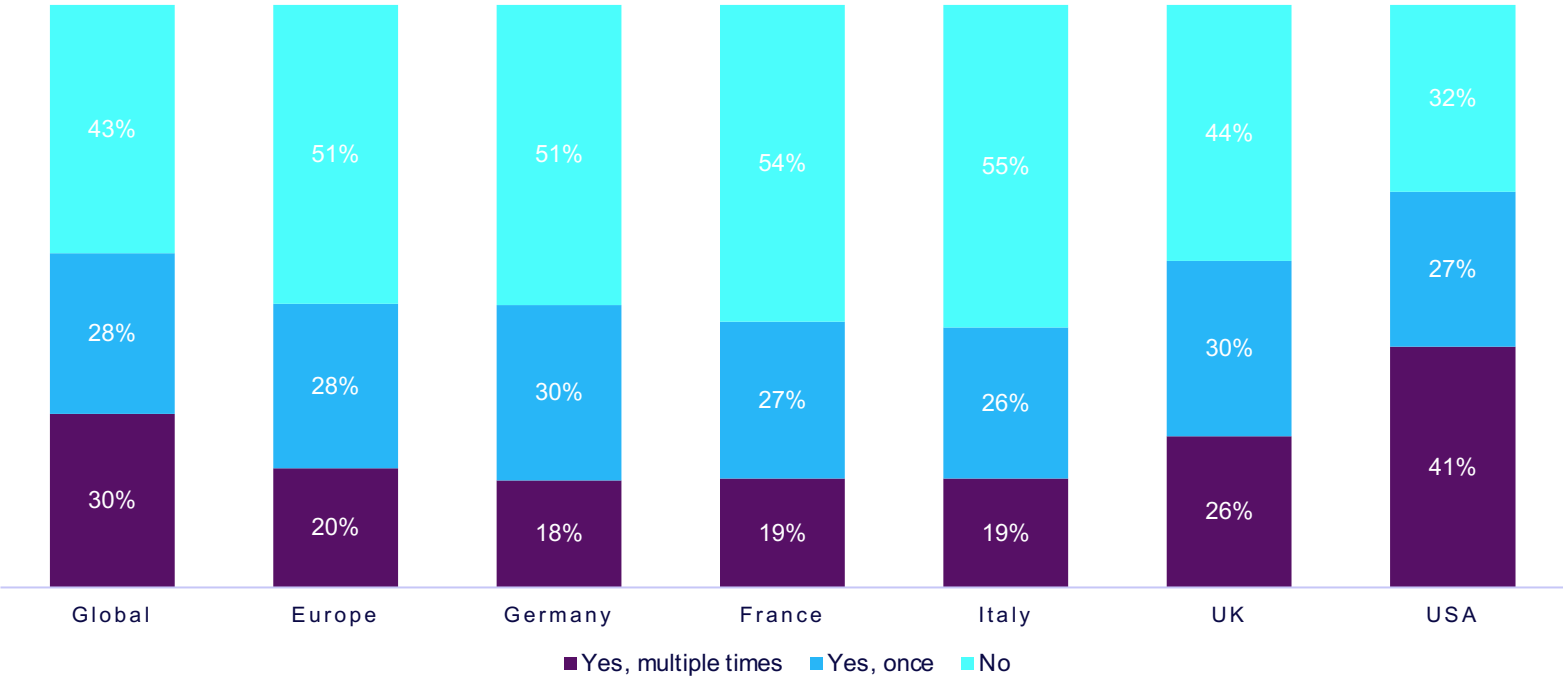
	Global	Europe	USA
Not being able to find desired charger	23%	23%	22%
Inability to access charger (e.g. located in closed car park)	30%	27%	33%
Charger being out of order	48%	46%	49%
Charger occupied by another vehicle	49%	45%	53%
Inability to access account/payment method	19%	15%	24%
Charger incompatible with car	11%	7%	17%



49% of EV drivers have **failed to charge due to cars occupying their desired chargers** - with most issues in the **US and Germany**. **48%** haven't been able to plug in due to **out-of-order chargers** - especially in the **UK and US**

Have you ever been issued with a parking fine while charging an electric vehicle, without realising that you would be fined?

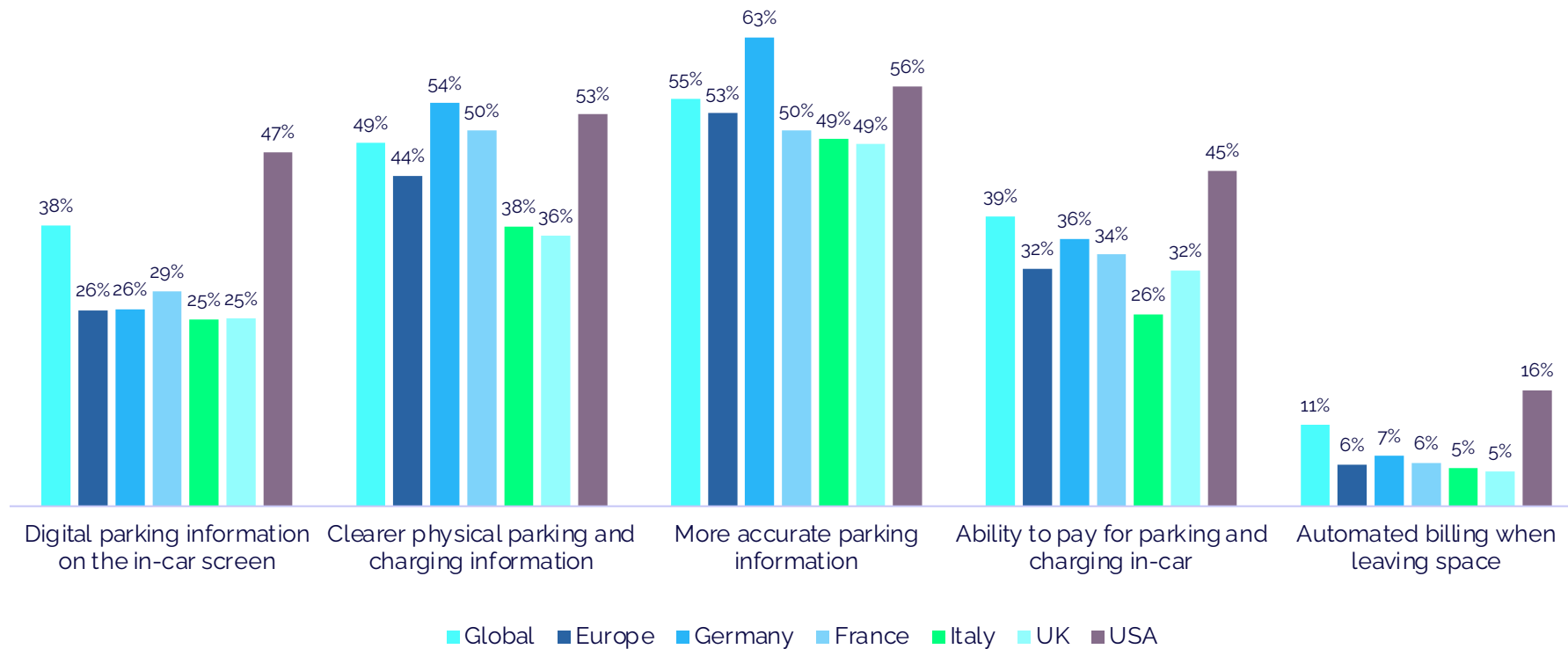
- Staggeringly, 57% of EV drivers - including 68% of US EV owners - have received unexpected parking fines while charging, showing a significant need for EV drivers to be provided with parking information when searching for and navigating to charging locations
- In-car parking and charging payments are another way for EV users to avoid fines, as they cover parking as well as charging costs
- 41% of US EV and 26% of UK EV drivers have received multiple fines, suggesting that charging space parking signage is insufficient
- Even the country with the lowest level of parking fines while charging - Italy - still sees 45% of EV drivers being issued with fines
- Urban drivers are more likely to receive fines, though half of rural drivers have been fined unexpectedly - a quarter multiple times
- The higher rate of urban drivers receiving multiple fines than rural dwellers is likely due to the greater incidence of parking restrictions on charging spaces in densely populated urban areas than equivalent charging spaces in rural locations



57% of EV drivers - including 68% of US EV owners - have received unexpected parking fines while charging, showing a significant need for EV drivers to be provided with parking information when searching for and navigating to charging locations

What would have prevented you being fined in that scenario?

- Among those who were issued fines while charging their car, 55% of drivers feel that “more accurate parking information” would have prevented the fine with 63% of German EV drivers seeing this as solution to the problem, along with 56% of US EV owners
- Meanwhile, half of EV drivers feel that “clearer physical parking and charging information” would have prevented their fine
- In-car payments for parking and charging, meanwhile, are seen as a solution by 39% of EV drivers, including 45% of US EV drivers
- The accuracy of parking information is seen as important by more than half of urban and rural drivers, while 52% of urban residents also see clearer physical parking and charging information as a solution, though that figure falls to just 37% among rural drivers
- Nearly twice as many urban EV drivers consider in-car digital parking information as a solution than rural dwellers. Urbanites also place more value in the ability to make in-car payments for parking and charging as a way of avoiding fines, with 41% citing this



Accurate parking information and **clearer physical parking and charging information** would help prevent parking fines



Preference of Connected Features

- Connected Car features requested by drivers
- Payment features desired by drivers
- In-car commerce options wanted within media systems
- Value of features that are made possible by indoor mapping

Which of the following features would you like your car to offer?

- Automated connected car services, such as automatic guidance to parking/charging locations are seen as valuable by more than half of drivers, with particularly high interest amongst US, Japanese and German motorists
- Automatic payment for parking/charging is popular with American motorists, too, being wanted by 53% of US respondents
- Urban drivers are more interested in all features that assist with finding parking or charging and automating part of the process, than rural drivers, with urban motorists being particularly interested in personalised parking and charging recommendations
- Meanwhile, EV drivers are more interested than ICE drivers in automatic guidance and payments, though ICE drivers are more interested in personalised parking recommendations and pre-booking/pre-payment for parking/charging

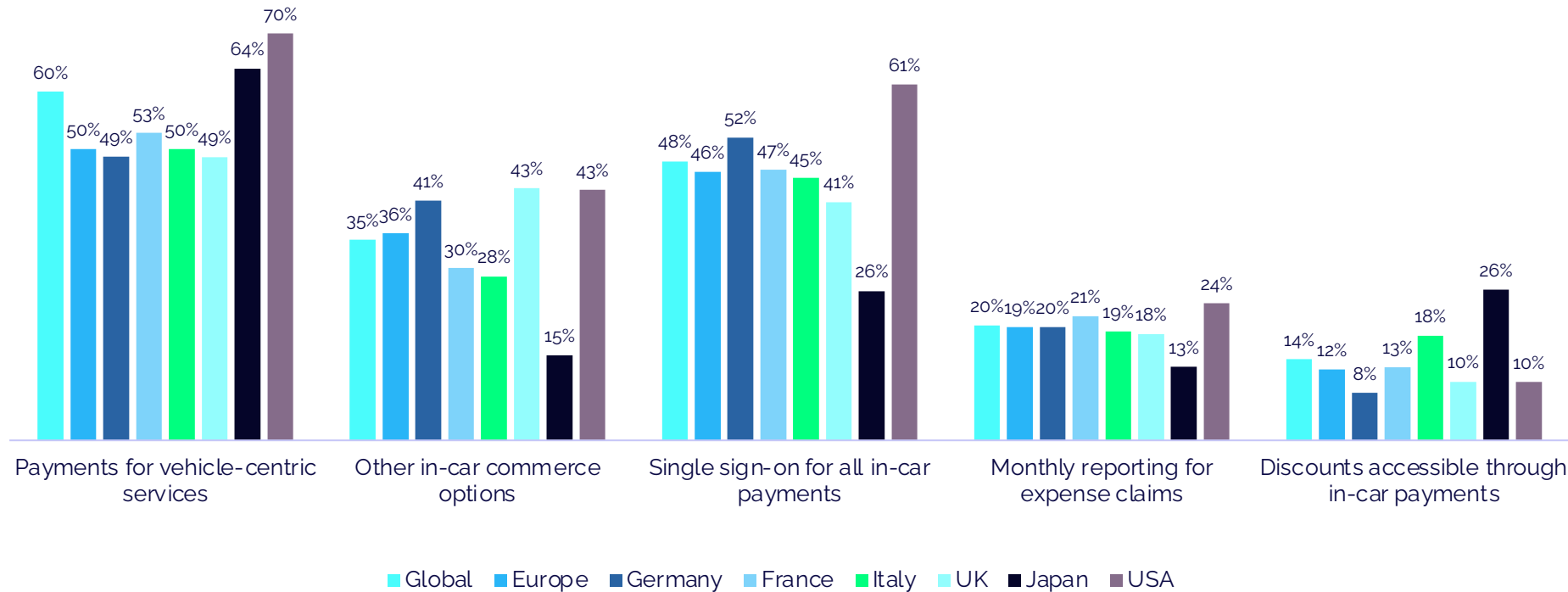
	Global	Europe	Japan	USA
Personalised parking/charging recommendations	50%	45%	46%	58%
Automatic guidance to locations with likely availability close to your destination	54%	50%	57%	57%
Automatic guidance to the parking location/charger closest to the destination	55%	48%	62%	60%
Automatic payment for on-street parking/charging (automatic recognition of location/cost)	45%	46%	28%	53%
Automatic opening of car park gates and monthly invoicing	25%	26%	12%	30%
Reservation and pre-payment	12%	14%	20%	6%



Automatic guidance to parking and charging locations is seen as **valuable** by **more than half of drivers**, with particularly high interest amongst US, Japanese and German motorists

Which payment features would you value in your car's integrated media system?

- Payments for vehicle-centric services are wanted by 60% of global respondents, including 70% of US and 64% of Japanese drivers
- Single Sign-On (SSO) functionality is popular, too, being wanted by 48% of respondents and enabling drivers to access multiple charging and payment accounts through one vehicle login. US drivers very much value SSO, with more than 60% wanting to have it
- Other in-car commerce functions, such as paying for food and drinks are desired by just over a third of drivers, including 43% of American and UK drivers plus 41% of German motorists
- Japanese drivers, meanwhile, value discounts accessed through in-car payments, more than those in the other countries surveyed



US drivers value **Single Sign-On (SSO)**, with more than **60%** wanting to have it.

Other in-car commerce functions, such as **paying for food and drinks** are **desired** by just over a third of drivers, including **43%** of **American and UK drivers** plus **41%** of **German motorists**.

Japanese drivers, meanwhile, value **discounts accessed through in-car payments**, more than those in the other countries surveyed

Which payment features would you value in your car's integrated media system?

- Urban drivers see more value in in-car payments for vehicle-centric services, Single Sign-On (SSO) and other in-car commerce functionality than rural drivers, implying that convenience is more important for those living in busy, densely populated areas
- EV drivers are particularly interested in Single Sign-On functionality, which enables them to easily access charging from numerous providers without having to login to multiple accounts manually, along with pre-booking and pre-payment for parking/charging
- The popularity of pre-booking and pre-payment with EV drivers is likely down to the issues experienced by EV drivers in finding available chargers, so being able to book parking/charging gives drivers confidence about when and where they can charge

	Global	Rural	Urban	ICE	EV
Payments for vehicle-centric services (fuel, charging, parking etc)	60%	53%	64%	60%	54%
Single Sign-On for all in-car payments	48%	42%	51%	48%	53%
Monthly reporting on payments for expense claims	20%	16%	21%	20%	23%
Discounts accessible by paying through the car	14%	15%	14%	14%	13%
Reservations and pre-payment for parking/charging	12%	14%	11%	9%	22%

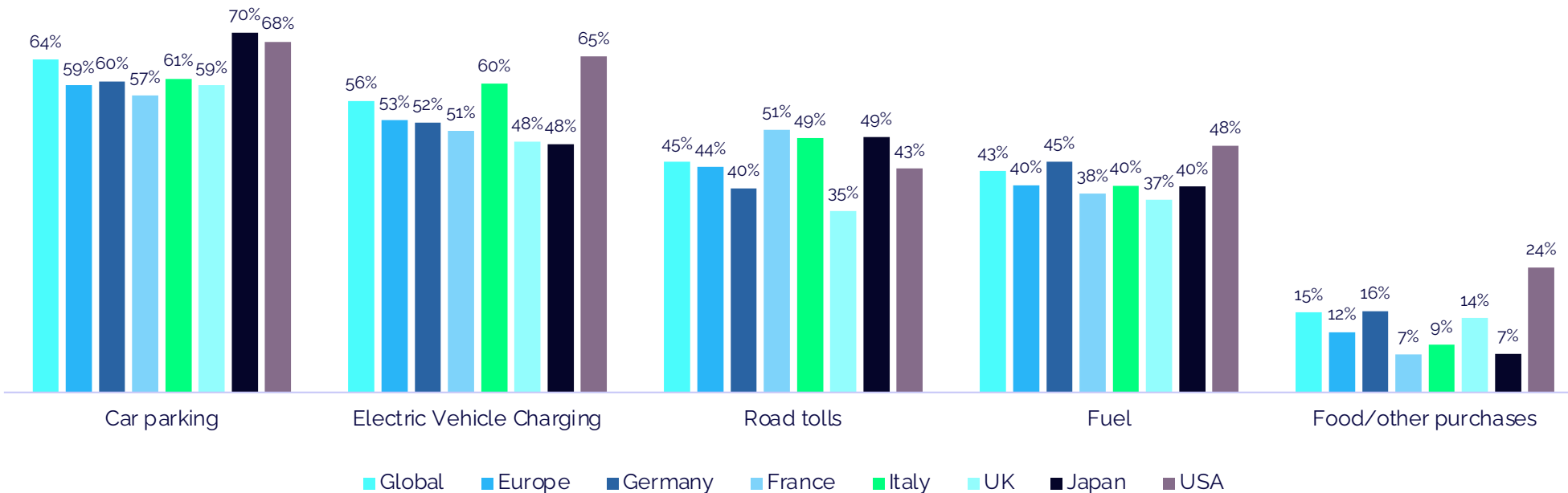


Urban drivers value **Single Sign-On (SSO)** for **all in-car payments** and **other in-car commerce functionality** more than rural drivers, implying **convenience** is more important for those living in busy, densely populated areas.

EV drivers show interest in **Single Sign-On** functionality, which enables them to easily **access charging from numerous providers** without having to login to multiple accounts manually, along with **pre-booking and pre-payment for parking/charging**

Which in-car commerce options would you like through your car's media system?

- Drivers have a strong appetite for in-car payments with parking and EV charging being the most popular services
- Japanese and US drivers have particular interest in these, with around 70% wanting in-car commerce functionality for parking
- 56% of drivers would value in-car payments for charging, including 74% of EV drivers, with US and Italian drivers particularly keen
- Nearly half of drivers would also value the option to pay for tolls and fuel through their car, showing that these are no longer niche services, but features demanded by a large proportion of motorists and, therefore, offering significant commercial scope for OEMs
- Three-quarters of EV drivers would value in-car payment functionality for charging, though over half of ICE drivers still value this
- Urban and rural motorists plus ICE and EV drivers value in-car payments for parking. ICE drivers and urbanites are particularly keen
- In-car commerce for tolls and fuel are popular across the board, regardless of where drivers live and the types of car they drive (barring EV drivers, who unsurprisingly have a higher level of interest in charging and less interest in fuel payments)

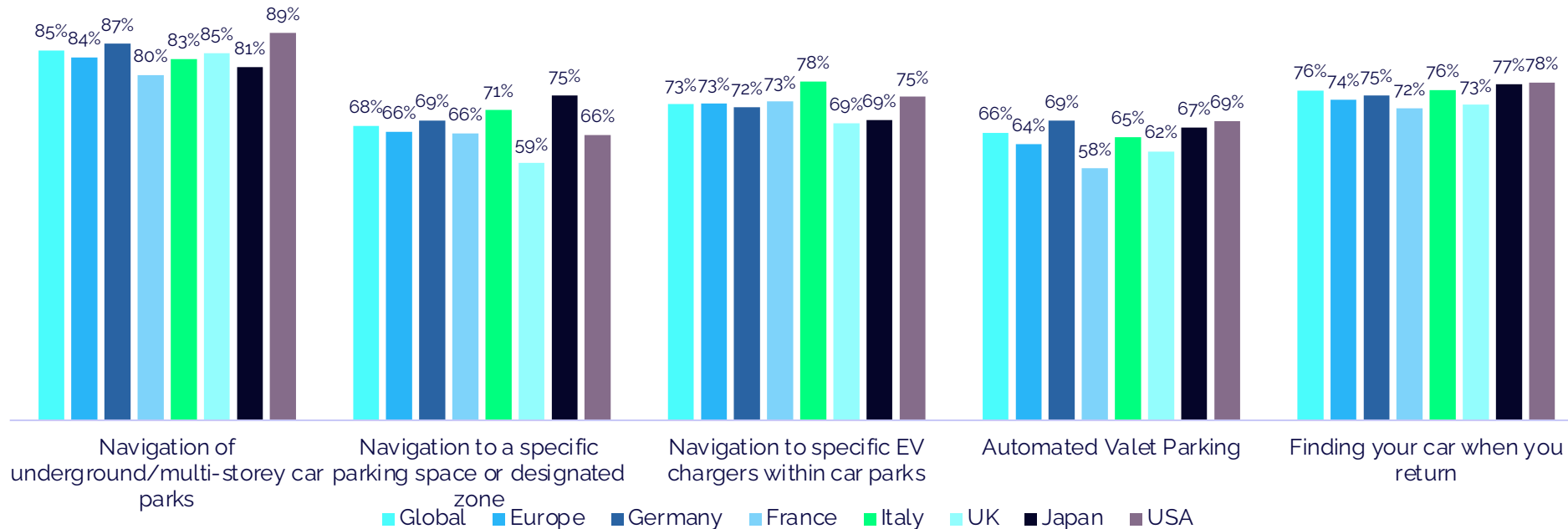


Most popular services are in-car payments for parking and EV charging.

44% of drivers globally, would also value the option to pay for tolls and fuel through their car, showing that these are no longer niche services, but features demanded by a large proportion of motorists offering significant commercial scope for OEMs

Indoor navigation is often not possible with standard navigation, as buildings can block GPS signals. Would you value any of the following features made possible by indoor mapping?

- Survey respondents showed particular interest in indoor mapping functionality, across all countries and function types
- Most popular of all is navigation of underground/multi-storey car parks, wanted by 85% of respondents, with the ability to use this to navigate back to the specific space where they parked being wanted by three quarters of drivers
- Nearly three quarters would also value being able to navigate to specific EV charging points within car parks
- Meanwhile, two-thirds of drivers also value being able to navigate to specific parking spaces/zones along with Automated Valet Parking, where they can simply drop their car off at a convenient location and then summon it when they return



Research Methodology

Methodology	Sample size	Date	Countries	Demographic	Vehicle types	Key topics
<p>Independent survey: Online quantitative research</p> <p>Screening questions to understand drivers' personal and car ownership situation (focusing on those whose main car is a connected car that is less than five years old) along with 42 questions covering drivers' parking and charging habits</p>	<p>5454 respondents including 2225 EV drivers.</p> <p>Weighting For questions answered by ICE and EV drivers, EV drivers' responses have been weighted to reflect the proportion of EVs on the road in the respective country</p>	<p>May 2023</p> <p>Research was carried out by international market research company Borderless Access</p>	<p>USA (1005 ICE drivers, 1005 EV)</p> <p>Germany (305 ICE drivers, 305 EV)</p> <p>France (305 ICE drivers, 305 EV)</p> <p>UK (305 ICE drivers, 305 EV)</p> <p>Italy (305 ICE drivers, 305 EV)</p> <p>Japan (1004 ICE drivers, 0 EV)</p>	<p>Gender: Male: 62% Females: 38% Other: 0% Prefer not to say: 0%</p> <p>Age: 18-24: 16% 25-39: 44% 40-54: 26% 55-69: 12% 70+: 2%</p> <p>Location: Urban: 71% Rural: 29%</p>	<p>Internal Combustion Engine (ICE) cars (50% of respondents, 100% in Japan)</p> <p>Electric Vehicles (EV) (50% of respondents, 0% in Japan). Drivers were only taken into account where their main car is an EV</p>	<p>Parking habits (and charging habits for EV drivers) plus the problems faced during daily motoring and when using connected car services such as parking, EV charging and in-car commerce</p>