

CTEK - ELECTRIC VEHICLE SURVEY
OWNING AND CHARGING
AN EV IN EUROPE | 2023





FOREWORD

Our annual survey of European car owners – some Electric Vehicle drivers, some not – discovered what they think about Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs), what they like and dislike, how and where they charge and what would encourage greater take up of an EV future.

Our survey expanded its questions in 2023 to gain further insight into the charging experience across five countries. We found many similarities and many differences too. EV drivers face some common challenges everywhere, thanks to an insufficient and unreliable public charging provision.

That in itself is both a challenge to and an opportunity for our industry and our governments. Our survey reveals a big appetite amongst a substantial number of petrol and diesel owners to switch to electric.

They need to know that the public charging infrastructure will be there for them when the time is right to buy an EV. Destinations and car parking providers can boost footfall and workplaces can attract and retain employees by stepping up to be ready for this surging demand for charging that is reliable and available.

Here at CTEK we are ready to continue playing our part. From our award winning charge point technology to our back end systems, from our innovative R&D to our ground-breaking partnerships, CTEK is committed to enabling the green transport revolution.

Cecilia Routledge, Global Director Energy & Facilities

INTRODUCTION

The European appetite for Electric Vehicles (EVs) – new and used – is substantial and growing, but the charging experience must improve. Too often the already insufficient number of charge points are broken or occupied.

The results of the third annual CTEK YouGov survey of Europeans found charger anxiety on the rise. The number of people saying there is not enough public charging infrastructure was also up on previous years.

The survey shows EV drivers are hungry for a future where many can plug & charge automatically or use one payment app, at popular locations such as destinations, workplaces and car parks.

And they want to help the power grid by exporting energy from their EVs when it's valuable and needed.

European drivers are keen to switch to EV in substantial numbers, with one in three (33%) saying their next vehicle will be electric. New EVs look set to outsell new petrol and diesel vehicles by two to one.

But women and older drivers are lagging behind in EV ownership and the intention to buy a Battery Electric Vehicle (BEV) next.

CTEK asked YouGov to survey adults in the UK, France, Netherlands, Norway and Sweden on their attitudes to and experience of Electric Vehicles.

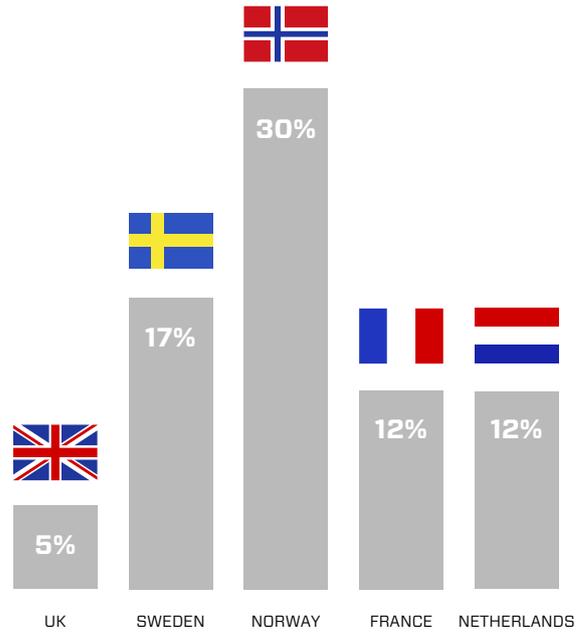
NUMBER OF EVs

The number of EVs in Europe continues to increase, with both BEVs (Battery Electric Vehicles) and PHEVs (Plug-in Hybrid Electric Vehicles) becoming more prevalent on our roads. In our 2023 survey 12% of respondents drove either a BEV or a PHEV or both.

Men are twice as likely as women to own/drive a BEV and twice as likely to own/drive a PHEV. There is almost no gender difference for ICE (Internal Combustion Engine) vehicles (67% of women, 66% of men).

Norway maintained its driving role at the head of our survey nations, with 30% owning/driving an EV.

The percentage of people who believe EVs are the future of road travel has increased from 47% in 2022 to 55% in 2023, with the highest proportions of EV believers in the younger age groups (59% of 18-24 year olds, 58% of 25-34 year olds and 59% of 35-44 year olds).



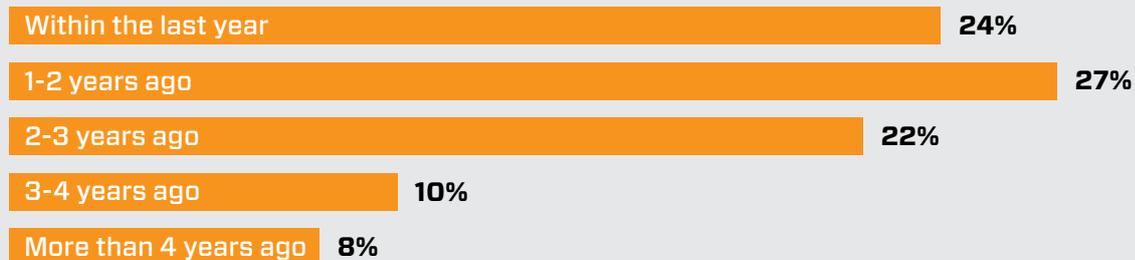
Current owners/drivers of EVs, by country

55% agreed that EVs are the future of road travel

LENGTH OF OWNERSHIP

Some EV drivers have now owned their EV for several years. Almost a fifth (18%) bought their EV more than three years ago. More than a fifth (22%) have had their EV between two and three years. About a quarter (24%) bought their EV in the last 12 months.

When did owners buy their EV?



WHY EV

Despite recent rises in the cost of electricity, the most popular reason for buying an EV was that they are cheaper to run than ICE petrol and diesel cars. One in three EV drivers (34%) said this was one of their reasons for choosing an EV.

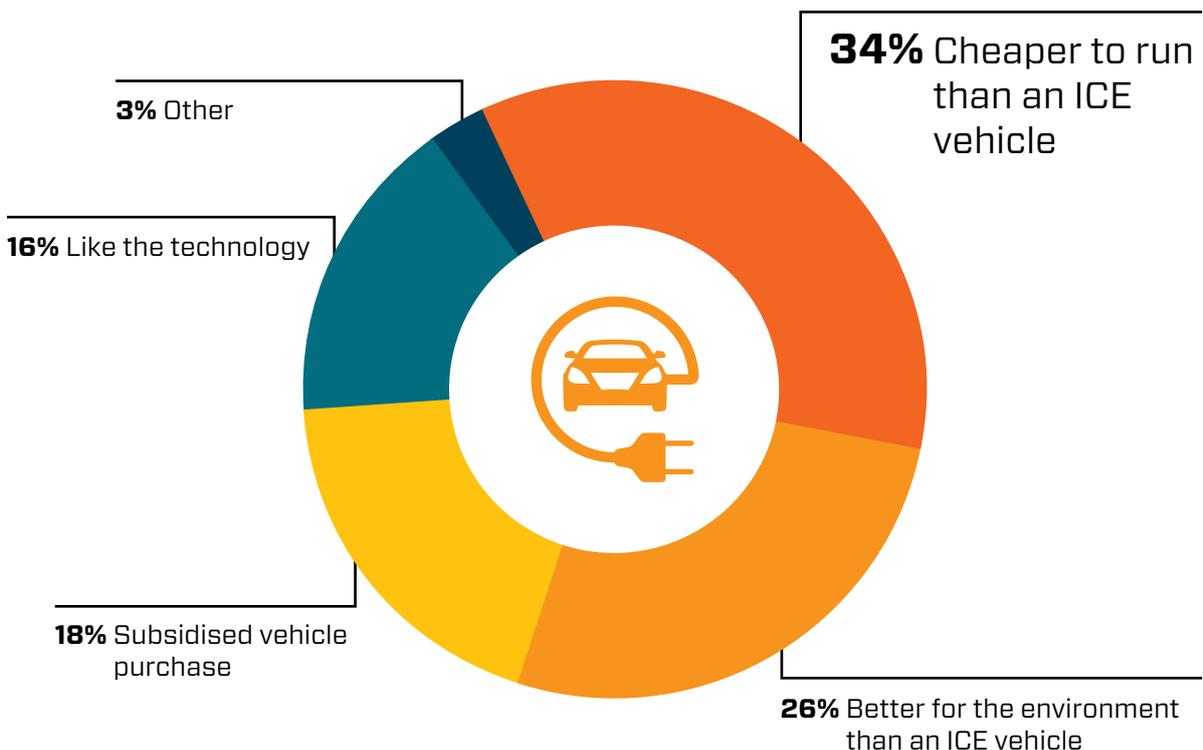
Impact on the environment was the next most popular reason, with one in four (26%) saying they chose an EV because they are better for the environment. The third most cited reason was a subsidy or grant that came with the EV (18%).

Range is still a disadvantage cited by the most EV drivers (17%). But vehicle purchase price has fallen from the second most cited downside (13% in 2022) to the fourth (9% in 2023), behind the cost of electricity (11%) and the inconvenience of sometimes having to wait to charge (10%).

EV drivers' favourite aspects of EV motoring were unchanged from 2022: lower running costs; environmental benefits; less visits to a fossil fuel station; and the pleasure of driving an EV.



MAIN REASON FOR PURCHASING AN EV



NEXT VEHICLES

There is a big appetite for the switch to EVs. One in three people (33%) say their next vehicle purchase will be an EV, with PHEVs (18%) ahead of BEVs (15%). The one in three wanting an EV almost equals those whose next intended vehicle is an ICE (34%).

Looking at just those who want to buy a new car, the desire for a new EV is (at 18%) double that of ICE cars (9%). So, new EVs look set to outsell new ICEs by two to one.

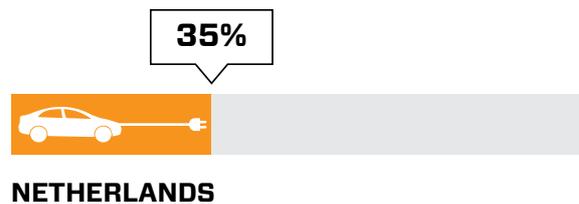
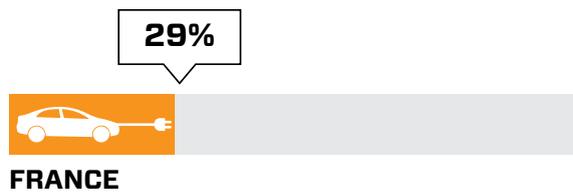
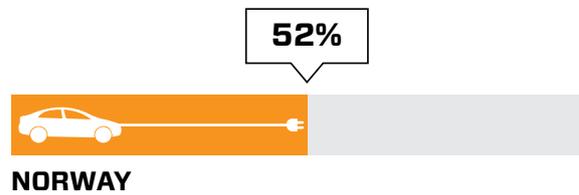
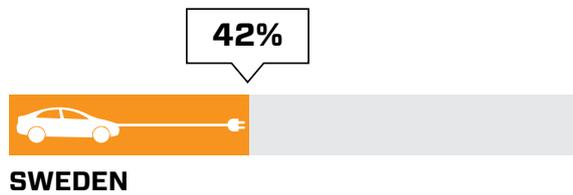
It's a different story for used cars, with ICE still ahead of EV. But 16% of current ICE owners/drivers say they will purchase a used EV next. And with ICE owners still far outnumbering EV drivers, the market for used EVs looks promising.

Almost 80% of current EV drivers plan to buy an EV again. But women and older people (aged 55+) are less likely to purchase an EV as their next vehicle - whether it's new, a BEV or a PHEV.



1 in 3 people say their next vehicle purchase will be an EV

FUTURE EV PURCHASES, BY COUNTRY



WHAT'S HOLDING OTHERS BACK

Almost a third of people (32%) consider ICE vehicles more cost effective to run than EVs. But more than two thirds of EV drivers (69%) – who likely have much better knowledge of such vehicles – say EVs are more cost effective, and they should know best.

However, the cost of buying an EV compared to an ICE remains the number one reason (25%) that non-EV owners have not made the switch to EV. Half of them said a lower purchase price would encourage them to choose an EV.

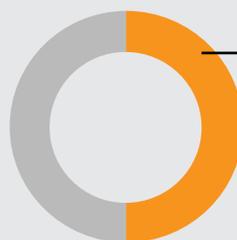
An EV's range was also a factor for more than a tenth of non-EV owners (10%). And not having anywhere to install a charger at home was also a barrier (5%).

Asked what factors would make them more likely to buy an EV, 43% of non-EV owners said the availability of public charging in their neighbourhood (38% said this in 2022). For non-EV drivers who work, the ability to charge at work was a strong incentive (48%, up from 46% in 2022).

Highway charge points proved to be the number one reason, with exactly half of non-EV owners wanting to see this, with destination chargers also high at 45%.

Some 55% of younger drivers (aged 18-24) said more destination charging would make them more likely to buy an EV. And the UK (49%) and France (47%) had the drivers most keen to see more destination charging.

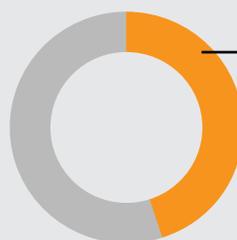
TO WHAT EXTENT WOULD EACH OF THE FOLLOWING MAKE YOU MORE LIKELY TO BUY AN EV?



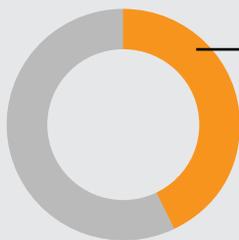
50%
More chargers on the major highways for longer journeys



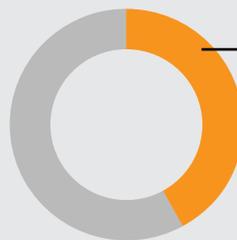
48%
Charging options (private or public) at my workplace



45%
More chargers in local places I visit a lot, ie shops, leisure venues



43%
Installation of public charging in my street/ neighbourhood



42%
Installation of a wall box in my garage

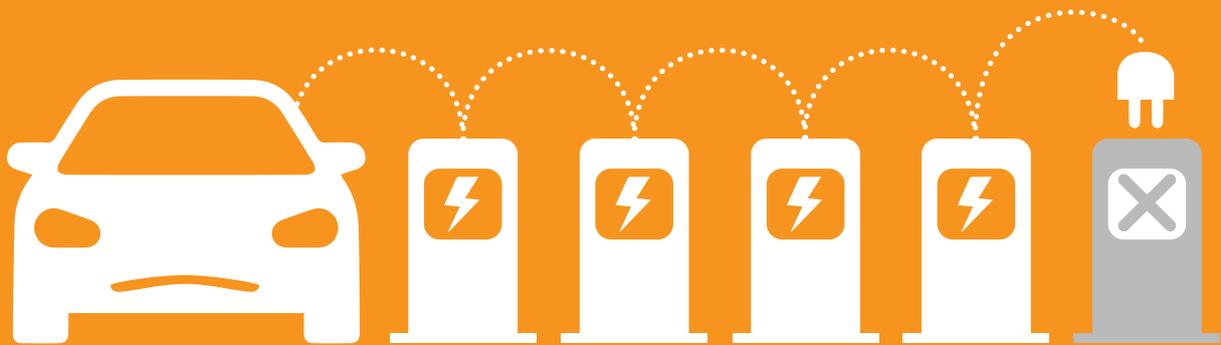
BROKEN

ICE drivers fear it, EV drivers endure it – the increasingly common experience of broken public charge points or queues. Fixing broken charge points and installing new ones have not kept pace with the rising number of EV owners.

More than half of EV drivers (56%) now encounter broken public chargers at least one in five times when they arrive hoping to charge. An astonishing one in 25 EV drivers (4%) said charge points are always broken.

Broken charge points were most often found at destinations (29%), ahead of public car parks (22%) and on the highways (14%).

They are, of those ever experiencing this, most often broken in France and the UK (where 62% and 50% respectively said they encounter them more than one in four times) and least often broken in Norway, where 14% of drivers say they never encounter broken chargers. In France, this figure is just 4%.

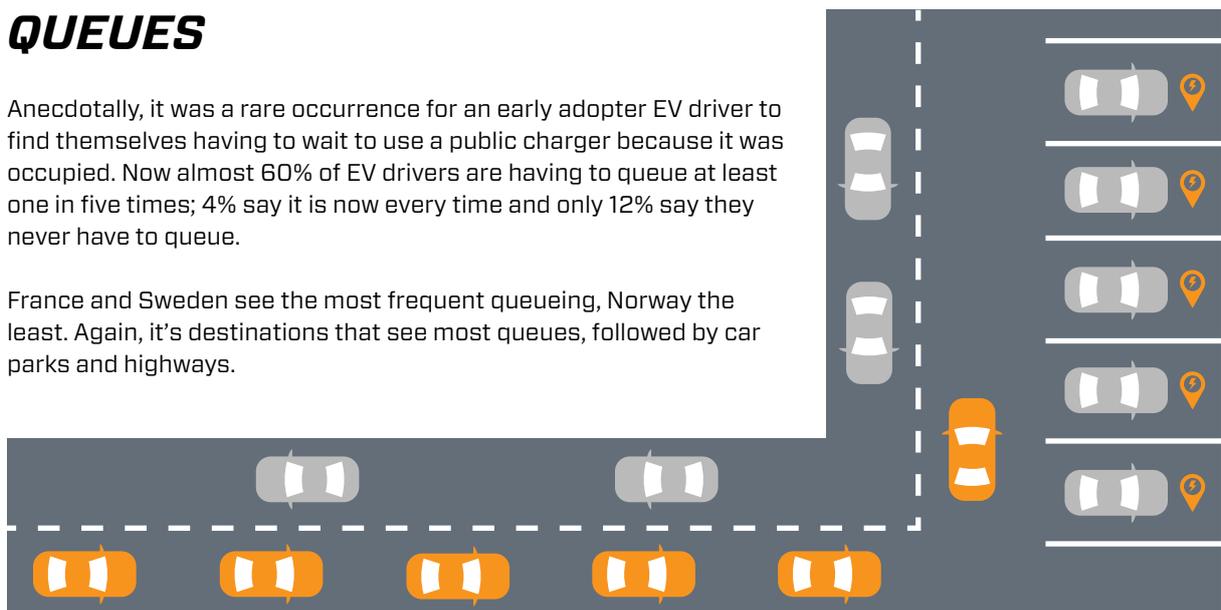


56% encounter broken public chargers at least one in five times when they arrive hoping to charge

QUEUES

Anecdotally, it was a rare occurrence for an early adopter EV driver to find themselves having to wait to use a public charger because it was occupied. Now almost 60% of EV drivers are having to queue at least one in five times; 4% say it is now every time and only 12% say they never have to queue.

France and Sweden see the most frequent queueing, Norway the least. Again, it's destinations that see most queues, followed by car parks and highways.

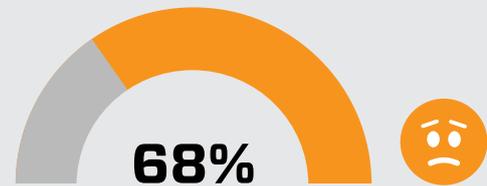


ANXIETY

It all adds up to rising levels of anxiety – are there enough public charge points? Will they be working? Will I have to queue?

A startling 68% of respondents agree EV drivers have charger anxiety – this figure was already 59% in 2022. Almost three quarters (74%) of our survey respondents said there is not enough charging infrastructure, up noticeably from 2022 (62%).

Agreement that EV drivers have charger anxiety was up in all five countries surveyed compared to last year. As was the feeling that there are not enough charging facilities. In the unwanted top spots were the UK and France. In the UK, a survey-wide high of 83% disagreed that the existing infrastructure was enough.



Agree EV drivers have
charger anxiety



74%

Not enough charging infrastructure

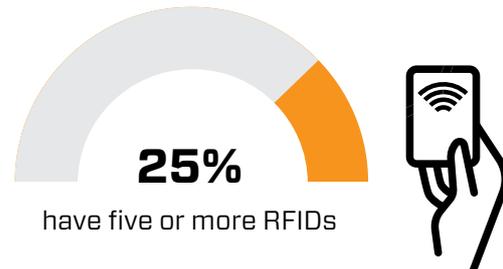
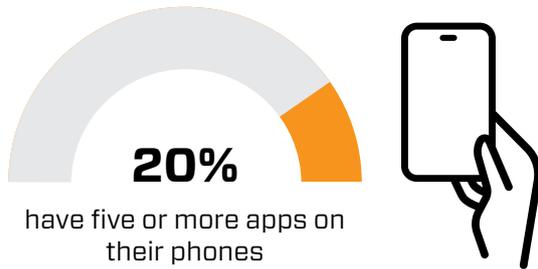
APPS AND RFIDS

The early years of public charging saw payment dominated by membership schemes (which often came with an RFID (radio frequency identification) tag or card to identify the user to the charge point's back-end system) and charge point operators' individual apps.

The result was car key fobs with multiple RFIDs attached and EV drivers' phones with several charging apps. We asked how many RFIDs and apps EV drivers currently have.

One in five (20%) have five or more apps on their phones and one in four (25%) have five or more RFIDs. Swedish EV drivers have the most apps and RFIDs. One in five Swedish drivers has more than seven RFIDs.

Of the other countries, French drivers also have a relatively high number of RFIDs (29% have at least five) whilst it is UK drivers who rival the Swedes for the number of apps (24% have five or more apps in the UK and 26% in Sweden).



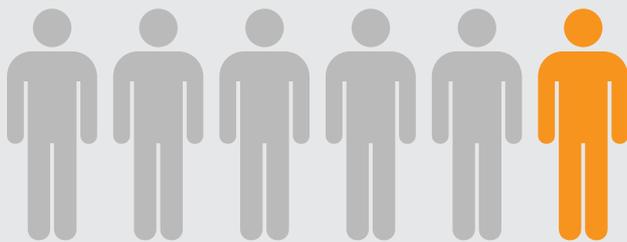
MOVING ON

The ongoing emergence of e-roaming (where drivers have one app or RFID which gives them access to the charge points of multiple operators) and the now more widespread option of tapping a contactless debit or credit card have given EV drivers more payment options.

And they are proving welcome. Asked for their preferred payment method, 19% said one app for all charging stations (e-roaming) and 18% would like to tap with their bank card.

Interestingly, they were closely followed by a likely next major innovation in charge payment – ISO15118, the communications standard that will enable the car to identify itself to the charge point system and deliver power billed to the owner's account.

For the EV driver it means 'plug & charge' – no app, no RFID and no bank card. As an encouragement to those in the industry pursuing ISO15118, one in six (17%) of EV drivers said that's what they would prefer their charging experience to be.



1 in 6 EV drivers prefer 'plug & charge' as a payment option

LOCATION

Around half of EV drivers have a home charge point (52%) and/or a charging option on a street or in a car park near to where they live (30% each). Norway is the surveyed country where home charging is most commonly available (66%), whilst France leads for availability of on-street charging (39%).

At home remains the most desired location, with 60% choosing home – outstripping the number of people who actually have home charging available.

As such, any solutions which emerge for novel kerbside charging are likely to be well received.

Workplace charging continues to grow as a preferred charging location, up from 14% in 2022 to 25% this year. Destination charging is also 50% more popular than it was. Destinations were a preferred charging location – 18% in 2023 versus 12% in 2022 (which was then calculated as the combined total for shopping centres, hotels and restaurants).



25% prefer workplace charging

↑78% compared to 2022



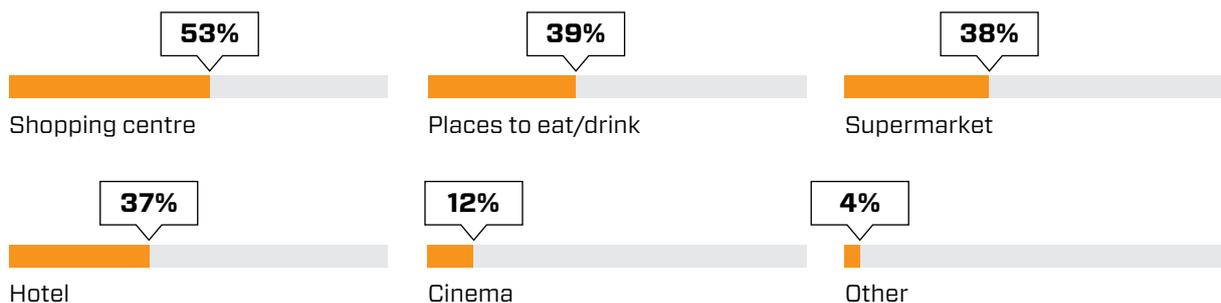
DESTINATION CHARGING

Charging whilst you do something else at a destination remains an important topping up option for EV drivers. More than half of EV drivers who charge at a destination do so at shopping destinations, such as a shopping centre (46%) or a supermarket (29%).

Places to eat, drink or sleep are also popular destinations for charging, with a third of EV drivers who charge at destinations doing so at hotels and/or at venues for filling up their body and their battery (35%).

And if charging was available more widely at destinations, the demand is there. Out of the drivers who would prefer charging at destination (18%), shopping centres were top of the list (53%).

If you prefer destination charging, what types of destination would you prefer to charge at?



POWER FROM THE PEOPLE

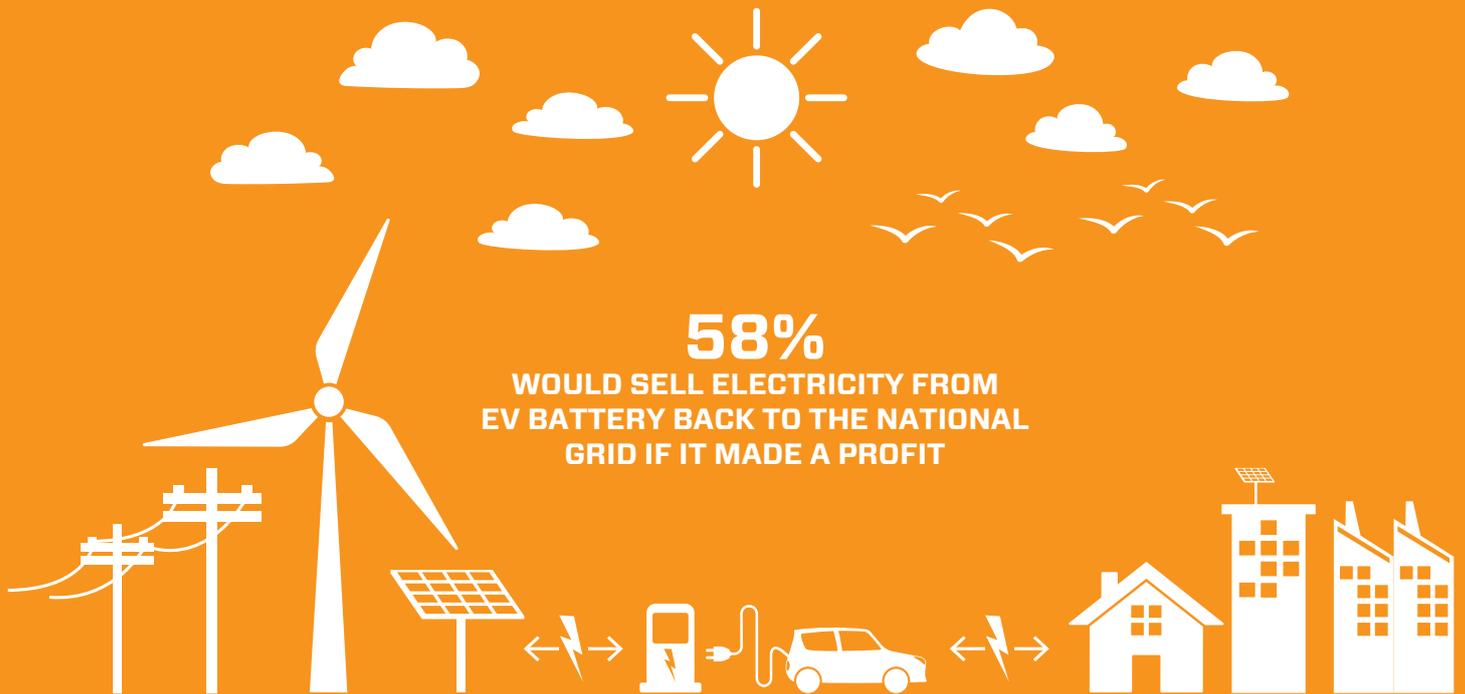
As we look ahead to the next two decades, when it is expected that EVs will overtake ICE vehicles on the road, countries are laying the foundations for electricity generation and distribution systems to enable and manage this increased demand.

The first experiments are being undertaken to manage the peak demands for electricity through incentivising consumers (domestic and commercial) to smooth total demand by shifting some of their usage to previously off-peak times.

Parallel to that are V2G (vehicle to grid) innovations and policy makers will be pleased to learn how open and keen EV drivers are to this concept of reducing the total generation required during peak periods by drawing power back from millions of EV batteries.

Asked if they would sell electricity from their EV back to the grid if it made them a profit, 58% of EV drivers said yes. Only 24% said no, leaving 18% 'don't knows' potentially open to being persuaded as the technology arrives.

If more than two out of three of the future legions of EV owners contribute to this collective effort to limit the required generating capacity, mass EV driving will be cleaner and greener.



COUNTRY SNAPSHOTS



NORWAY

Number one for:

- EV drivers
- BEV drivers
- Next purchase will be EV
- Home chargers
- Least charger anxiety



SWEDEN

Number one for:

- PHEV drivers
- Next purchase will be PHEV
- Highway charging
- Shopping centre charging
- Highest proportion charging once a day



UK

Number one for:

- Purchasing an ICE next
- Charger anxiety
- Not enough charging
- Queueing to charge at destinations
- Choosing EV for the environment



FRANCE

Number one for:

- Charger anxiety
- Least convinced EV is the future
- Most on-street charging
- No charging at or near home
- Biggest rise in not enough charging



NETHERLANDS

Number one for:

- Buying a used vehicle next
- Car park charging
- EV purchase cost is least favourite thing
- Most put off by EV purchase price
- Keenest to sell electricity to the grid

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Which, if any, of the following vehicles do you currently own or drive

BEV	6%
PHEV	6%
ICE	67%
None of these	24%

By country

	UK	Sweden	Norway	France	Netherlands
BEV	3%	8%	21%	6%	6%
PHEV	2%	10%	10%	8%	6%
ICE	67%	62%	55%	76%	67%
None of these	29%	26%	22%	15%	24%

Which, if any, of the following vehicles are you/your household most likely to purchase in the future

New BEV	10%
New PHEV	8%
New ICE	9%
Used BEV	6%
Used PHEV	9%
Used ICE	26%
None of these	15%
Don't know	18%

Net totals (new and used)

BEV	15%
PHEV	17%
ICE	34%

By country (new and used)

	UK	Sweden	Norway	France	Netherlands
BEV	10%	18%	36%	12%	18%
PHEV	14%	24%	16%	18%	17%
ICE	38%	29%	26%	37%	33%

EV drivers have charger anxiety

Agree	68%
Disagree	12%

There is not currently enough infrastructure to meet growing demand for EV charging

Agree	74%
Disagree	11%

Electric/hybrid motoring is the future of road-travel

Agree	55%
Disagree	29%

It is more cost effective to run an EV than an ICE vehicle

Agree	40%
Disagree	32%

When did owners buy their EV

Within the last year	24%
1-2 years ago	27%
2-3 years ago	22%
3-4 years ago	10%
More than 4 years ago	8%

What was your main reason for purchasing an EV

Cheaper to run than ICE	34%
Better for the environment than ICE	26%
Subsidised vehicle purchase	18%
Like the technology	16%
Other	3%

What is your least favourite thing about owning/driving an EV

Driving range	17%
The cost of electricity	11%
Having to wait while my vehicle charges	10%
The purchase price	9%
Having to queue for an available public charger	7%
Complexity of payment for out of home charging	7%
Difficulty of charging in nearby/public places	6%
Not having enough charging locations nearby	6%
Reliability of out of home charging	6%
Difficulty of charging at home	5%
Not being able to charge at home	5%
Lack of choice of EVs on the market	4%
Other	2%

What is your favourite thing about owning/driving an EV

Lower running costs compared to ICE	21%
Environmental benefits	17%
Driving pleasure	11%
Fewer visits to petrol stations	9%
Benefits such as free parking and no/less congestion charges	8%
Driving the latest technology	8%
Power response of an EV	6%
Latest models are electric	5%
Availability of parking and charging points when needed	5%
Better resale value than ICE	4%
Other	1%

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In which, if any, of the following places near your home do you/your household have EV charging stations

At home	52%
On a street near home	30%
In a nearby car park	30%
Other	6%
No access to charging at or near home	7%

Where do you usually charge your EV

At home	45%
At work	27%
At a destination	24%
On a highway	20%
In a public or private car park	11%
Other	3%

If you charge at destinations, what type of destinations do you charge at frequently

Shopping centre	46%
Hotel	35%
Places to eat/drink	35%
Supermarket	29%
Cinema	9%
Other	7%

Where would you prefer to charge your EV

At home	60%
On a highway	30%
At a work	25%
At a destination	18%
In a public or private car park	10%
Other	1%

If you would prefer to charge at destinations, what types of destination would you prefer to charge at

Shopping centre	53%
Places to eat/drink	39%
Supermarket	38%
Hotel	37%
Cinema	12%
Other	4%

How often you charge your EV

More than once a day	4%
Once a day	15%
4-6 times a week	20%
2-3 times a week	29%
Once a week	16%
Once a fortnight	6%
Once a month	2%
Less than once a month	2%

What would be your preferred way of paying for charging

One app for all charge points	19%
With a credit/debit card	18%
Plug & charge automatically (ISO15118)	17%
Through an app	14%
Through an app via a QR code	8%
Through SMS	6%
Traditional parking meter	6%
None of these	6%

How often, if at all, do you encounter public chargers that are not working

Every time	4%
One in two times (50%)	11%
One in three times (33%)	14%
One in four times (25%)	16%
One in five times (20%)	11%
One in ten times (10%)	9%
Less than one in ten times (<10%)	9%
Never	9%

Where do you most often encounter public chargers that are not working

At a destination (ie shopping, leisure venue)	29%
In a public car park	22%
On motorways or major highways	14%
Near my home (on street or in car park)	9%
None of these	7%

At a public charger, how often, if at all, do you have to wait until another EV has finished charging:

Every time	4%
One in two times (50%)	15%
One in three times (33%)	17%
One in four times (25%)	13%
One in five times (20%)	9%
One in ten times (10%)	6%
Less than one in ten times (<10%)	9%
Never	12%

Where do you most often have to wait until another EV has finished charging

At a destination (ie shopping, leisure venue)	29%
In a public car park	22%
On motorways or major highways	19%
Near my home (on street or in car park)	10%
None of these	7%

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How many EV charging apps are on your phone/other device

None	18%
1-2	33%
3-4	21%
5-6	12%
7-8	5%
9-10	2%
More than 10	1%

How many RFID charging cards/tags do you have

None	26%
1-2	26%
3-4	14%
5-6	9%
7-8	9%
9-10	5%
More than 10	2%

If your EV and home charger enabled it, would you sell electricity from your EV battery back to the national grid if it made you a profit

Yes, I would	58%
No, I wouldn't	24%
Don't know	18%

As an EV driver, how much cheaper, if at all, do you think it is currently to run an EV than an ICE vehicle, or do you think it costs the same

Much cheaper	17%
Slightly cheaper	44%
It costs the same	22%
Slightly more expensive	7%
Much more expensive	3%
Don't know	7%

Which is the main reason why you have never purchased an EV before

The cost to buy an EV	25%
I do not want to replace my current car	13%
Concern about range	10%
Nowhere to install home charger	5%
Other	5%
No charging in local area/at work	4%
Overall cost of running an EV	3%
Cost of replacing an EV's battery	3%
Do not drive	3%
The cost of charging at home	2%
I don't understand enough about EVs	2%

To what extent would each of the following make you more likely to buy an EV

	More likely	Not more likely
Installation of public charging in my street/ neighbourhood	43%	43%
Installation of a wall box in my garage	42%	41%
Charging options (private or public) at my workplace	48%	39%
More chargers on the major highways for longer journeys	50%	37%
More chargers in local places I visit a lot, ie shops, leisure venues	45%	41%

Which of the following would encourage you to buy an EV in the future

Lower purchase price	51%
Lower running costs than an ICE	34%
Government subsidy/scheme to make EV more affordable	34%
Better access to EV charging points	30%
Nothing in particular would encourage me to buy an EV	25%
Lower servicing costs	25%
Lower environmental impact	20%
Knowing more about EVs and how they work	12%
If a Low Emission Zone was planned in my area	7%
Other	4%

NOTES ON THE SURVEY

All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 11,176 adults in UK, France, Netherlands, Norway and Sweden. Fieldwork took place between 13th and 24th April 2023. The survey was carried out online. Figures in each country have been weighted to be representative of the adult population of each country respectively (18+). All figures are percentages unless stated, excludes some 'don't know' answers.

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