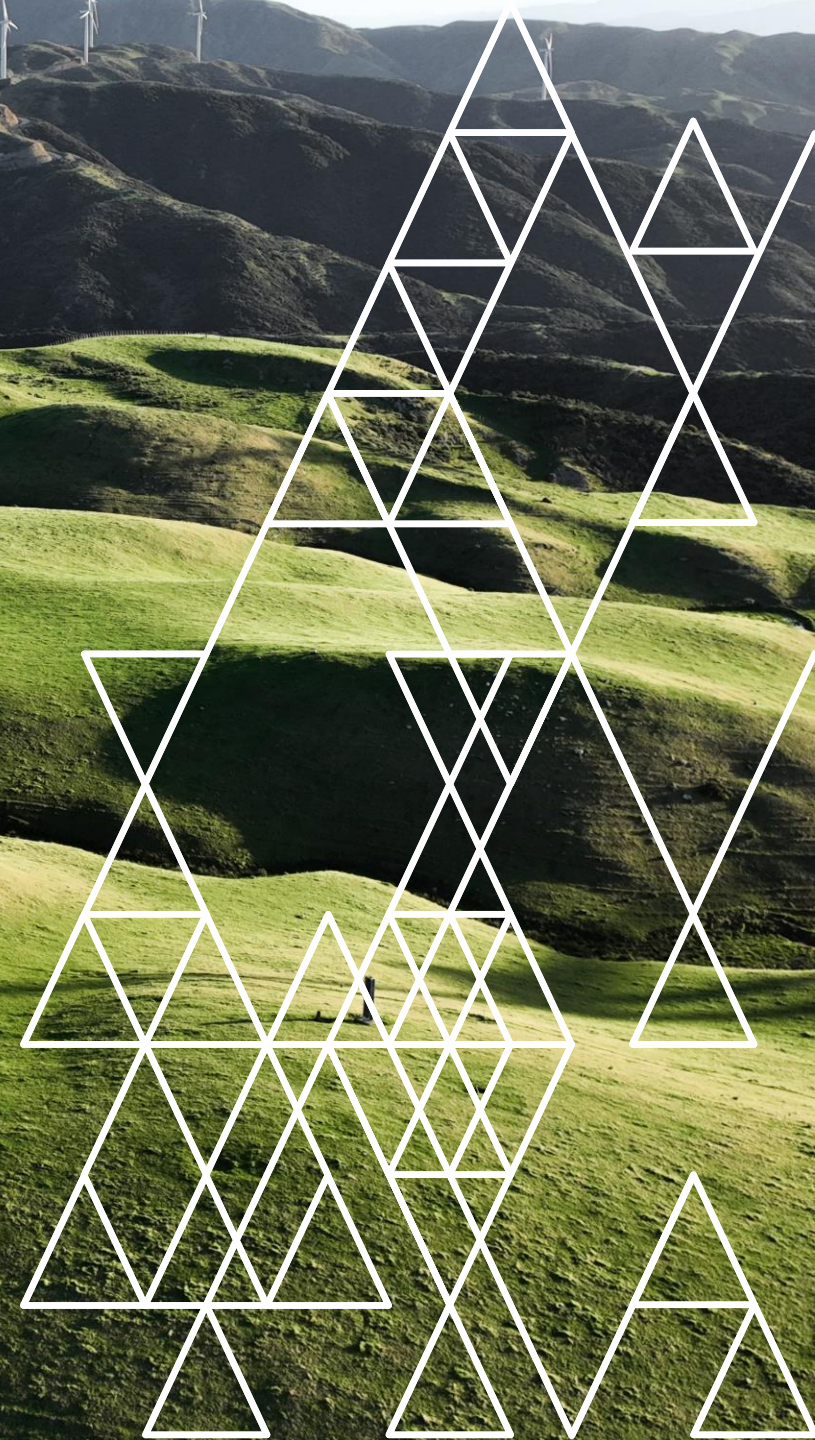


Smart EV Charging Research

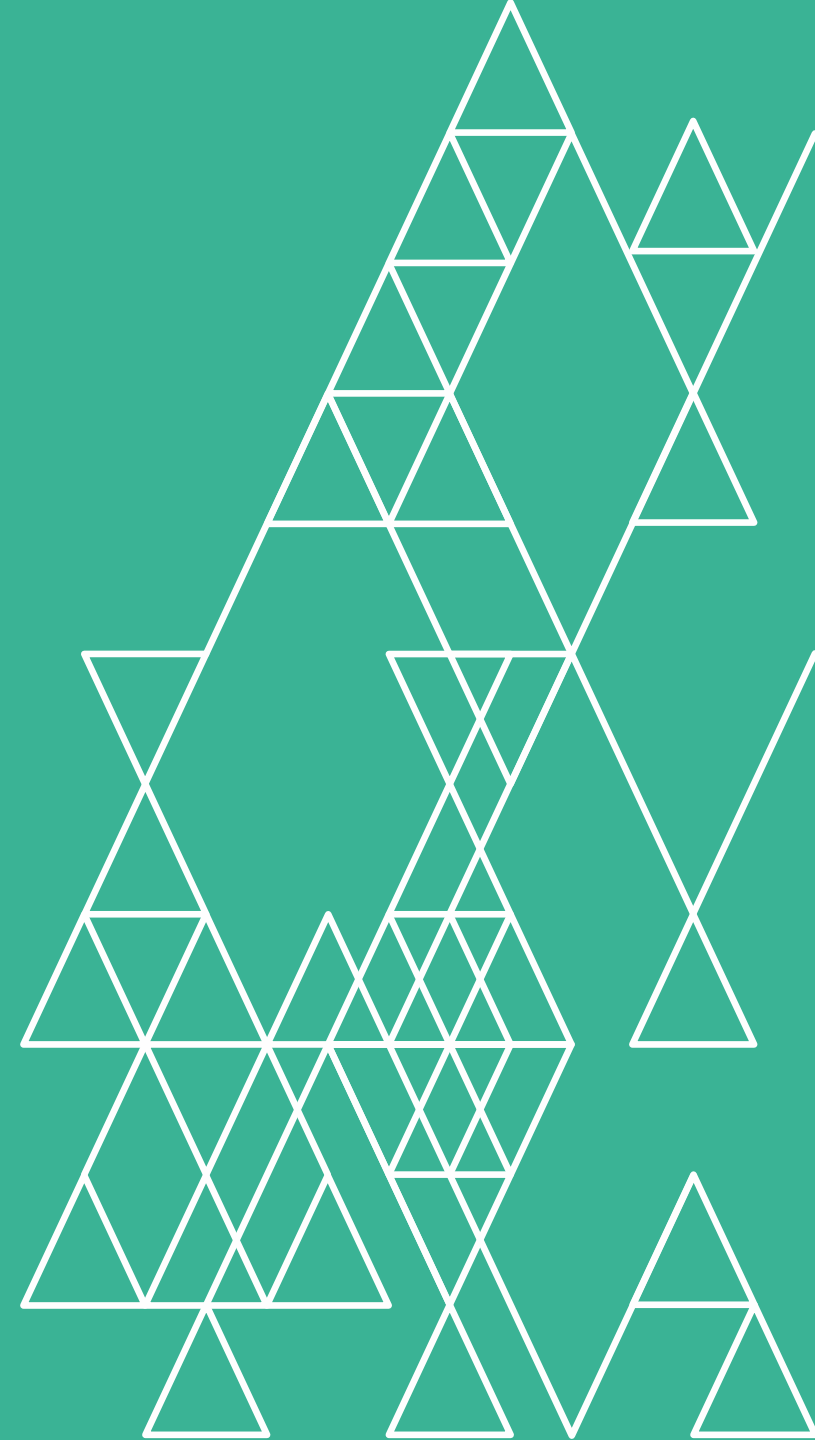
EECA x TRA, April 2024



As EVs increase in popularity, electricity demand will also increase. Data so far shows many users begin charging on returning home after work – which is already a time of high electricity use. By 2050, modeling indicates that uncurbed charging could increase average household peak electricity demand by up to 40%¹. This could mean significant extra costs to supply electricity as more infrastructure would be needed. It could also make it harder to meet our electricity needs using clean, renewable energy.

Smart EV chargers can be readily programmed to make use of off-peak energy, along with a whole range of other features that can reduce costs and emissions for all consumers.

¹ Source: Concept Consulting, [Shifting Gear: How New Zealand can accelerate the uptake of low emission vehicles \(concept.co.nz\)](https://www.concept.co.nz)



The research objectives

Gain insight to understand important and compelling factors in the purchase decision that will influence smart charger consideration, including the impact of possible interventions.

Specific objectives:

1. Explore whether or not consumers understand what a smart charger is and what they think the perceived benefits are – how much of an education job is there to do?
2. Understand key moments when new EV buyers think about how they will charge their EV at home.
3. Explore influences – what the research process looks like, ease of finding information, understanding, and making a decision.
4. What information (e.g. websites, reviews) consumers pay attention to.
5. Pain points / barriers and motivations for choosing different charger options – are the perceived benefits enough to make people invest? How much are they willing to pay?
6. Businesses that can be involved in the pathway to purchase and inform consumer decisions e.g., gentailers, car dealers, insurance companies.
7. Extent to which EV owners without a smart charger are open to purchasing one - how much potential lies in this market vs. new EV buyers.



A 2-stage, mixed-method approach

Foundational qualitative research took place in November 2023.

This involved in-depth interviews with 5 x EV Considerers (looking to purchase an EV in the next 6 months) and 5 x EV Owners (purchased EV in past 2 years). Insights from this phase were reported in an interim briefing and fed into the survey design for the quantitative phase.

The quantitative phase involved a 15-minute online survey that took place between 21st Feb – 11th March 2024 and surveyed those who were 18+ EV owners or considerers:

- **EV considerers** defined as those reporting they are likely to buy an EV (full battery / plug in hybrid) in the next 6 months AND their home must have a garage, carport, or off-street park where an EV charging unit could be installed).
- **EV owners** defined as those who had bought an EV (full battery / plug in hybrid) in the last 2 years. If not a current user of wall mounted chargers, their home must have a garage, carport, or off-street park where an EV charging unit could be installed.

The survey received 253 responses via a consumer panel.



Overview

Charging can be an afterthought in the run up to purchasing an EV. There is work to be done to bring charging options further up the agenda and increase awareness of the benefits of wall chargers.

There is significant potential. Although current familiarity with wall chargers is relatively limited (few in the market for EVs / owners know a lot about them), EV owners are often open to exploring the options. Other owners are a key source of influence, nudging people to carry out more detailed research. Most EV purchasers have healthy appetite for the technical detail as well as strong trust in government sources of information.

Point of EV purchase is the key moment for influencing. But there's still scope for existing trickle charging EV owners to convert to a smart charger later down the track.

Cost of the unit and install is by far the biggest influencing factor in the purchase decision – longer-term cost savings hold little sway and expectation of a 'pay back' period is relatively short. Consumers are thinking about chargers as a short-term outlay, not a longer-term investment.

Agenda

1

The EV charging landscape

2

The EV charger journey

3

Knowledge and perceptions of smart charging

4

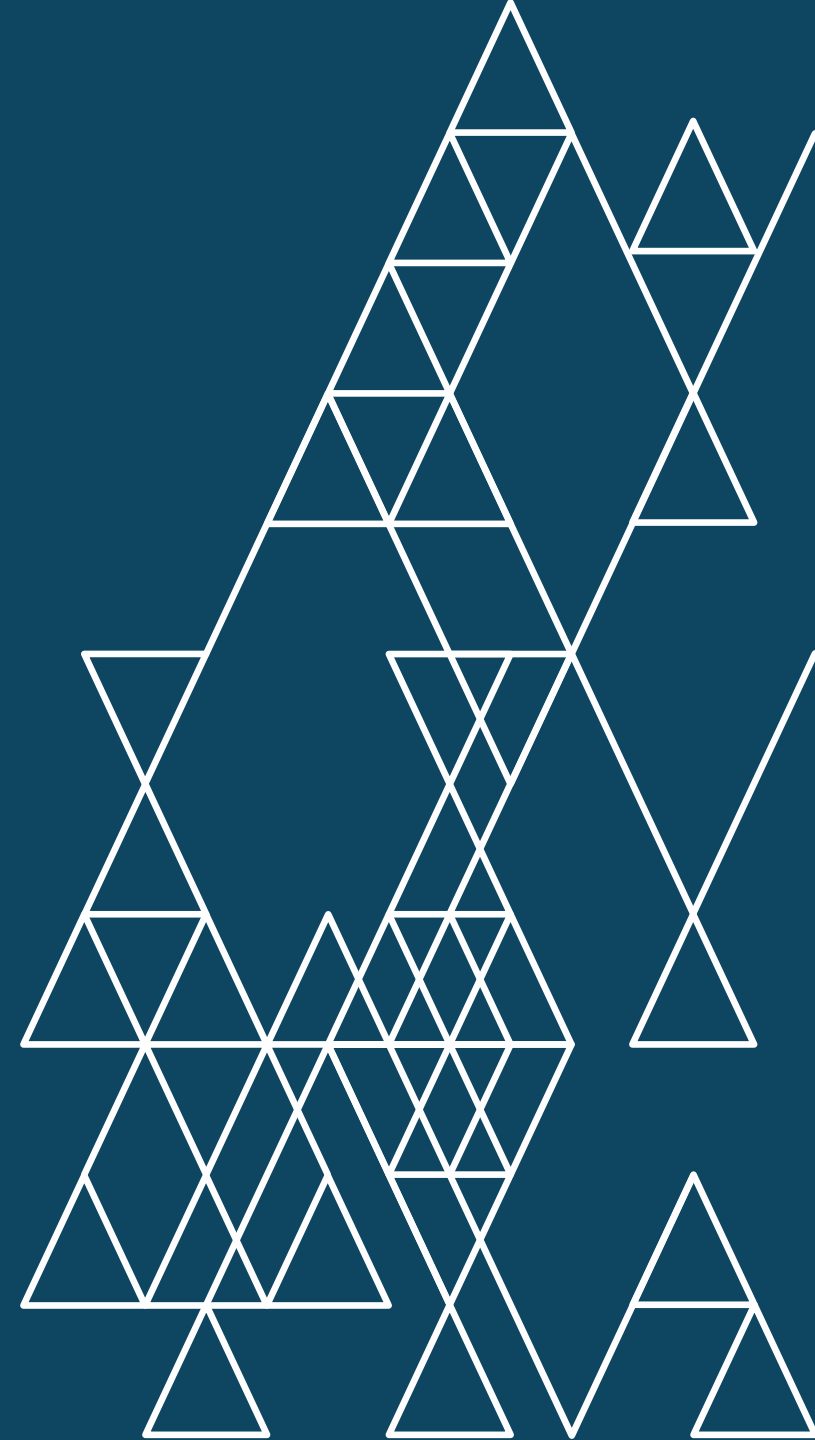
How to influence

5

Bringing it all together



The EV charging landscape



There's a spectrum of EV owners and considerers

There's no clear consensus among Considerers one way or another on how they'll charge their EV, with near equal distribution across those intending to trickle charge, those intending to use a charging unit and those who simply don't know what they'll do. Among owners, around 4 in 10 have a wall mounted charging unit at home. This group is more likely than average to be on an EV power plan and to be interested in new technology and innovation.

EV CHARGING LANDSCAPE: EV OWNERS AND CONSIDERERS

EV Considerers intend to charge by...

3 pin trickle charging	Caravan Charger	Charging unit/home charging station	Don't know
35%	8%	38%	35%

EV Owners currently charging by...

3 pin trickle charging	Caravan Charger	Charging unit/home charging station	Don't know
66%	13%	42%	0%

19% Smart
12% Non-smart
11% Don't know

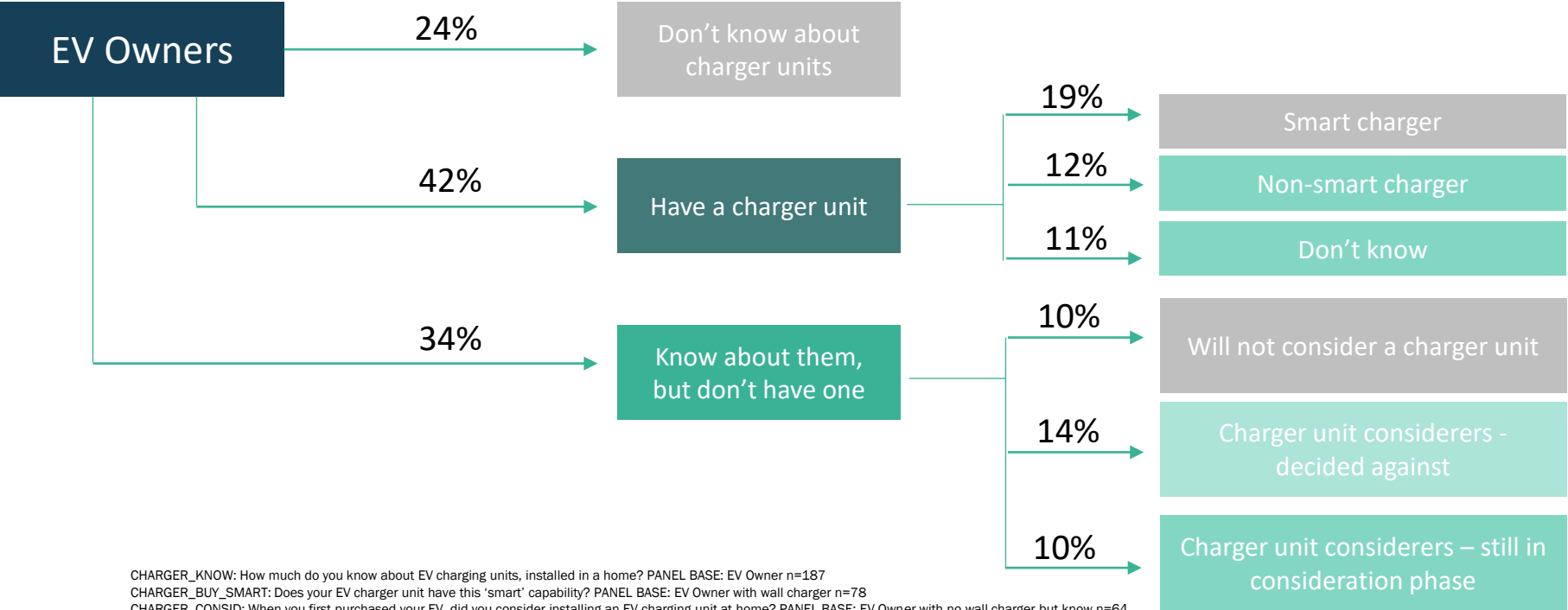
- 83% bought their first EV in the last 2 years
- 24% charge their EV daily
- 65% know a little / a lot about EV charging units, installed in a home
- 69% always or almost always charge at specific times to reduce costs
- 48% aware of EV power plans and on one
- 38% very interested in new technology and innovation

- 83% bought their first EV in the last 2 years
- 27% charge their EV daily
- 90% know a little / a lot about EV charging units, installed in a home
- 68% always or almost always charge at specific times to reduce costs
- 59% aware of EV power plans and on one
- 51% very interested in new technology and innovation

CHARGER_KNOW_FUT: Have you already decided how you will charge your EV at home once you've bought it?
 CHARGE_CURRENT: How do you currently charge your EV at home?
 CHARGER_BUY_SMART: Does your EV charger unit have this 'smart' capability?
 TIME_HELD: When did you first buy an EV?
 CHARGE_FREQ: How often do you charge your EV?
 CHARGER_KNOW: How much do you know about EV charging units, installed in a home?
 CHARGE_HABIT2: And do you purposefully charge your car during specific times of the day to reduce the cost to charge?
 ENERGY_TARIF: Are you aware that some energy companies offer specific plans for EV owners to make use of lower off-peak electricity costs for charging i.e., an EV power plan?
 TECH_ATTITUDE: How interested are you in new technology and innovation?
 PANEL BASE: EV Considerer n=66, EV Owner n=187 (3 pin trickle charging n=123, charging unit n=78)

Most at least consider a wall-charger when purchasing their EV, and if they don't go down this route at time of EV purchase, they may still convert later down the track

WALL CHARGER UNIT UPTAKE AND CONSIDERATION ACROSS EV OWNERS

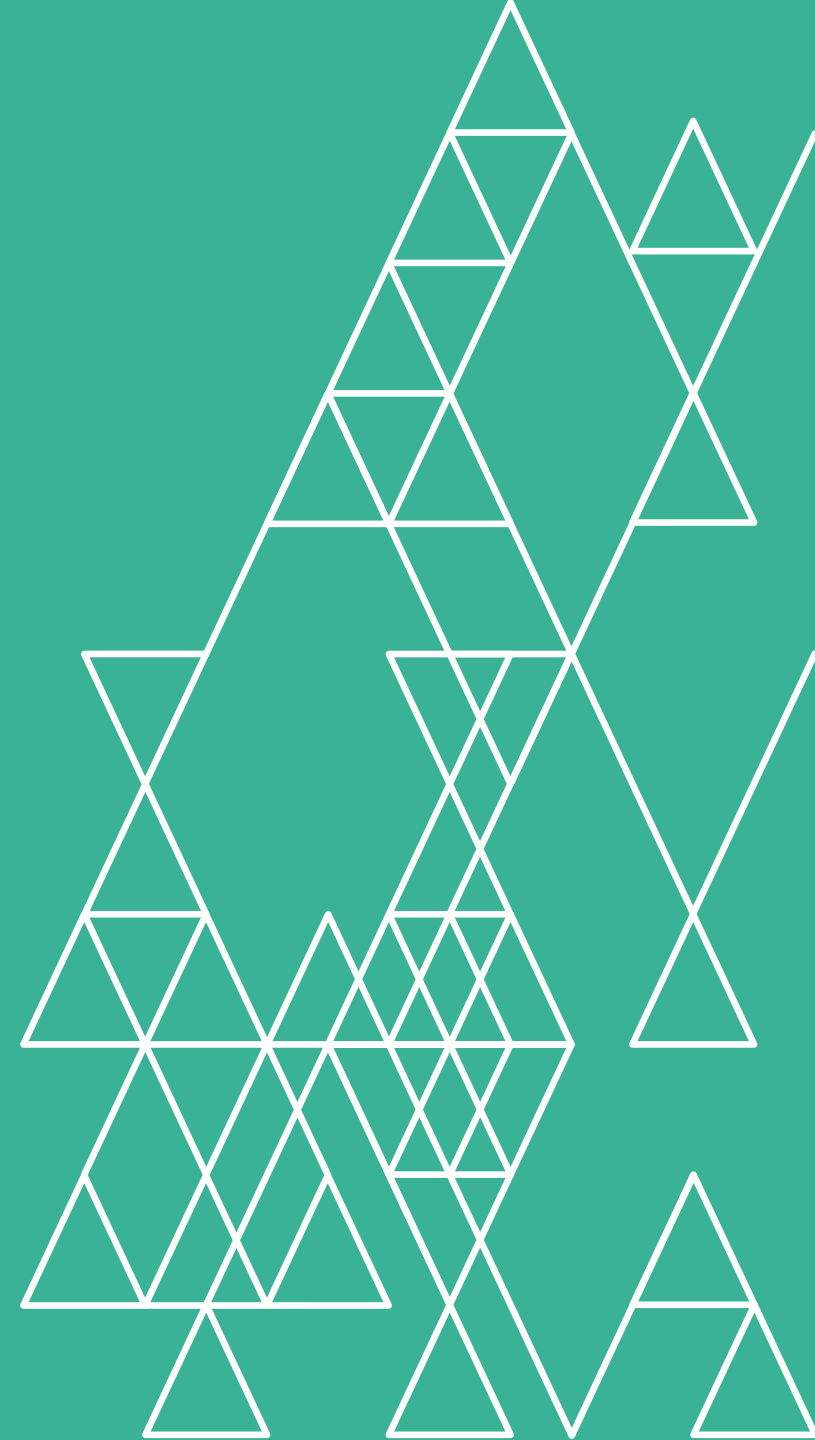


CHARGER_KNOW: How much do you know about EV charging units, installed in a home? PANEL BASE: EV Owner n=187
 CHARGER_BUY_SMART: Does your EV charger unit have this 'smart' capability? PANEL BASE: EV Owner with wall charger n=78
 CHARGER_CONSID: When you first purchased your EV, did you consider installing an EV charging unit at home? PANEL BASE: EV Owner with no wall charger but know n=64

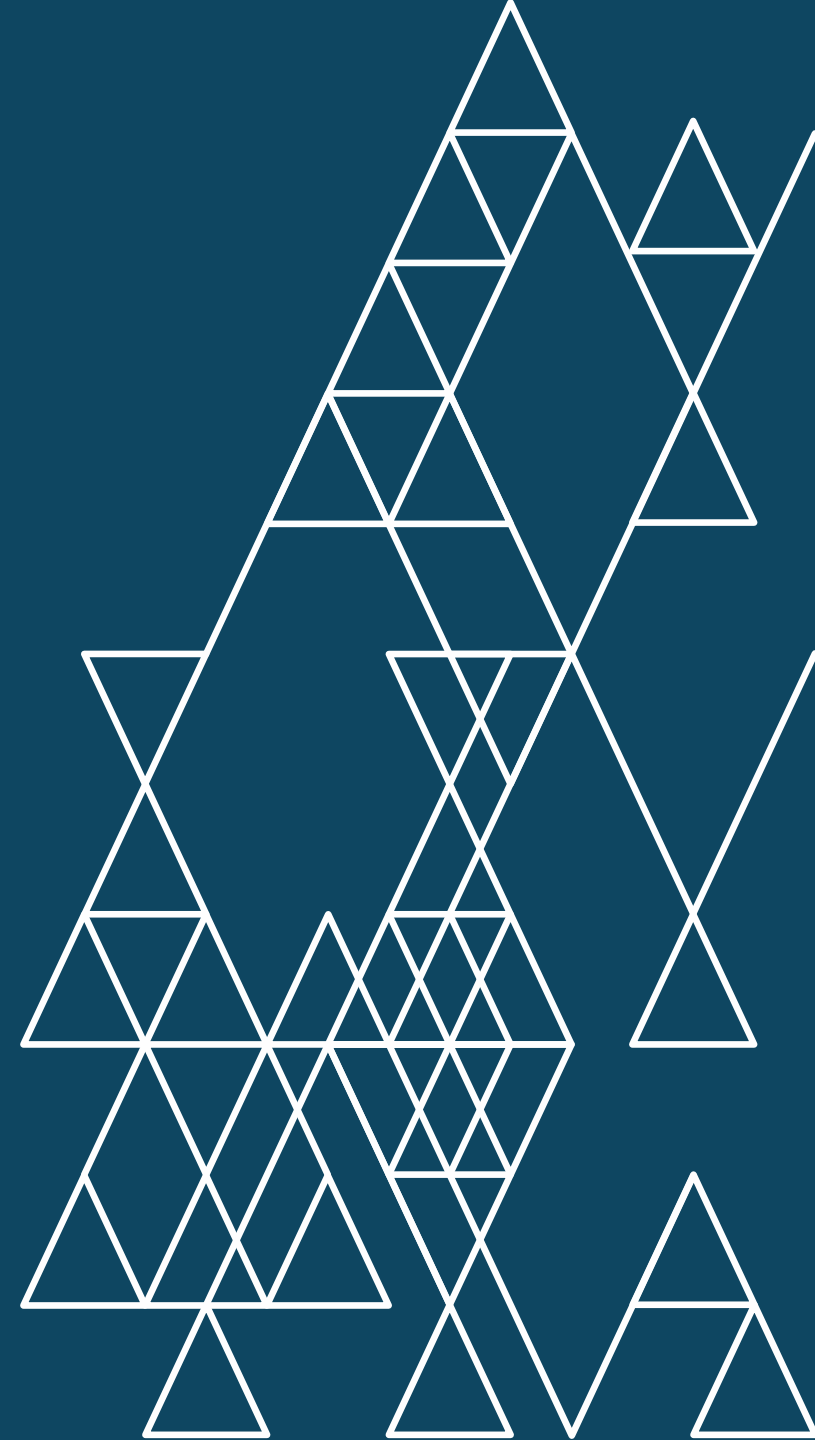
It's an open field in the EV consideration stage. With only around one-third intending to trickle charge, and a similar proportion unsure what they will do, it's all to play for.

Most EV purchasers give wall chargers some consideration.

So, what are the key moments to reach people?



The EV charger journey



There are key moments and opportunities in the journey towards EV charging decisions



In 6 months leading to EV purchase

- For most charging isn't a key consideration when researching an EV: over one-third don't know what method they'll use to charge in the run-up to the EV purchase.
- But around 4 in 10 have already decided on a wall-charger unit, although very few purchase this before the car itself.

Around the time of EV purchase

- Two-thirds of EV purchasers consider wall-charging units.
- This is the key moment for conversion: around 7 in 10 who invest in wall chargers do so around the same time as purchasing their EV.
- Many prospective EV owners carry out parallel admin tasks at this stage, including reviewing insurance policies and power plans.

Post-EV purchase

- There is still opportunity for wall charger adoption: around one-quarter (26%) of EV owners with a wall-charger unit purchased the charger at least 3 months after buying their EV.
- And for 28% of those without a wall charger unit and knowledgeable about them, it's something they're still considering.

CHARGE_CONSID_INTEND: Which of the following best describes how much you have considered or planned how you would charge your EV at home, if you go ahead with buying an EV? PANEL BASE: EV Considerer n=66

CHARGER_KNOW_FUT: Have you already decided how you will charge your EV at home once you've bought it? PANEL BASE: EV Considerer n=66

CHARGE_CONSID: Before you bought your EV, which of the following best describes how much you considered or planned for how you would charge your EV at home? PANEL BASE: EV Owner n=187

CHARGER_PURCHASE_LAG: Earlier you mentioned that you use an EV charging unit (box mounted on your wall which was installed specifically for charging an EV). When did you purchase your EV charging unit? PANEL BASE: EV Owner wall charger n=78

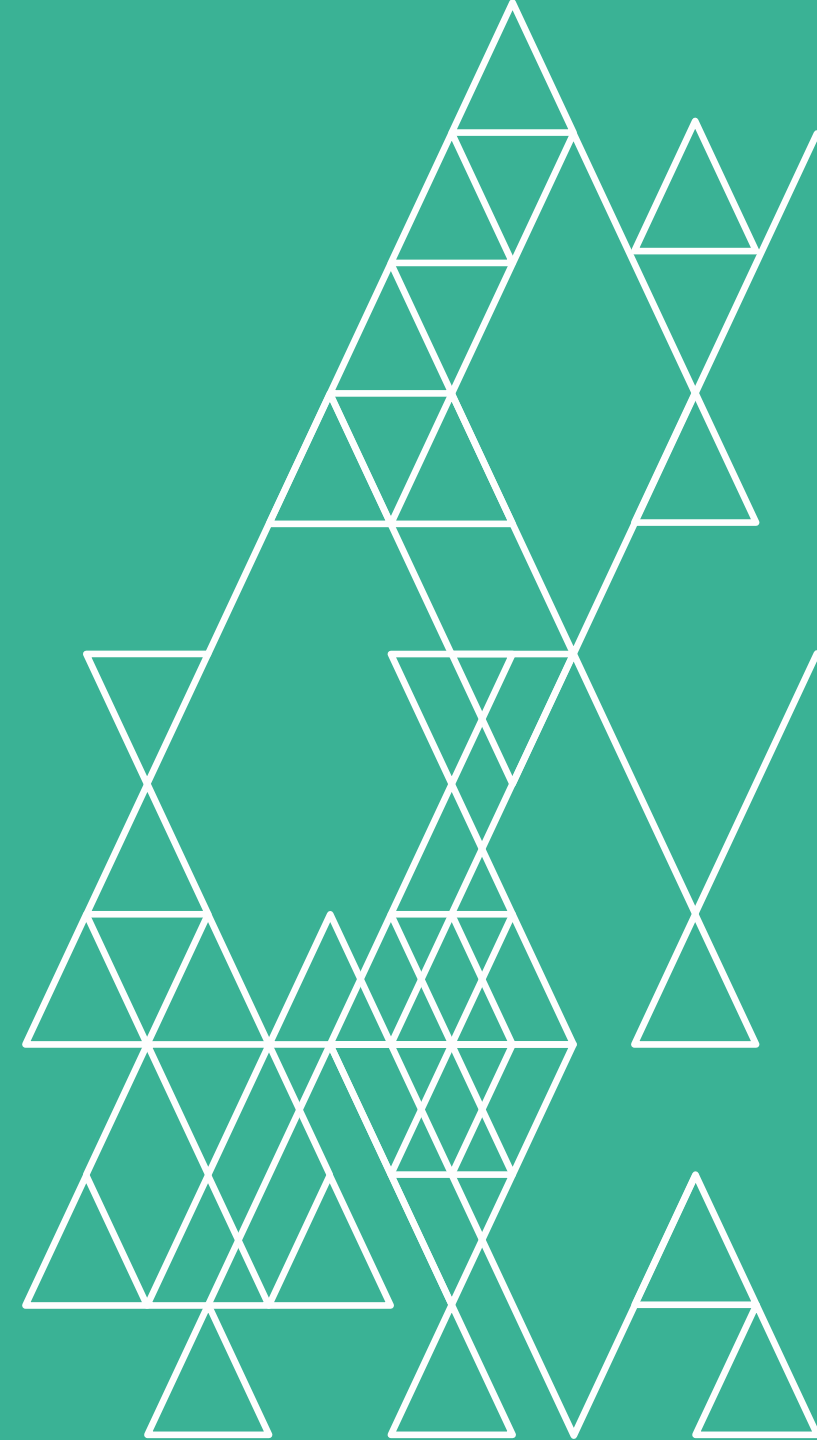
ACTIONS: Did you do any of the following around the time of purchasing your EV? PANEL BASE: EV Owner n=187, EV Owner no wall charger n=109, EV Owner wall charger n=78

CHARGER_CONSID: When you first purchased your EV, did you consider installing an EV charging unit at home? PANEL BASE: EV Owner no wall charger and knows about them n=64

Charging practicalities aren't a focus for most in the run up to an EV purchase – there are more exciting decisions to make.

But there are key moments to capture attention in the run up to purchase, culminating in the EV purchase itself. And most EV purchasers at least consider a wall charger unit.

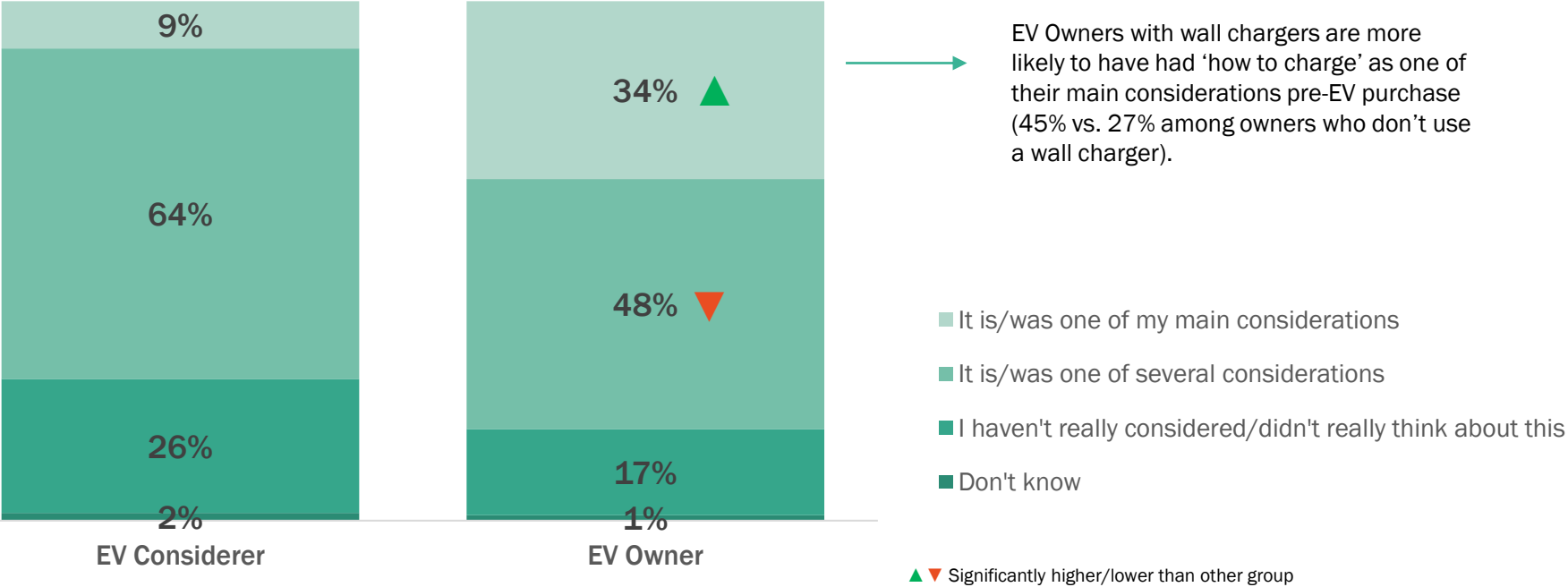
If attention hasn't been secured at this stage all is not lost, but the likelihood of consumers converting to a wall-mounted charger is significantly reduced as they get into the habit of trickle charging.



Charging is not top-of-mind when considering buying an EV

Consideration of a wall-charger likely intensifies as people get closer to EV purchase, but even among owners, charging is a main consideration for a minority (34%) and approaching 1 in 5 still don't really think about their options.

CONSIDERATION OF HOW TO CHARGE

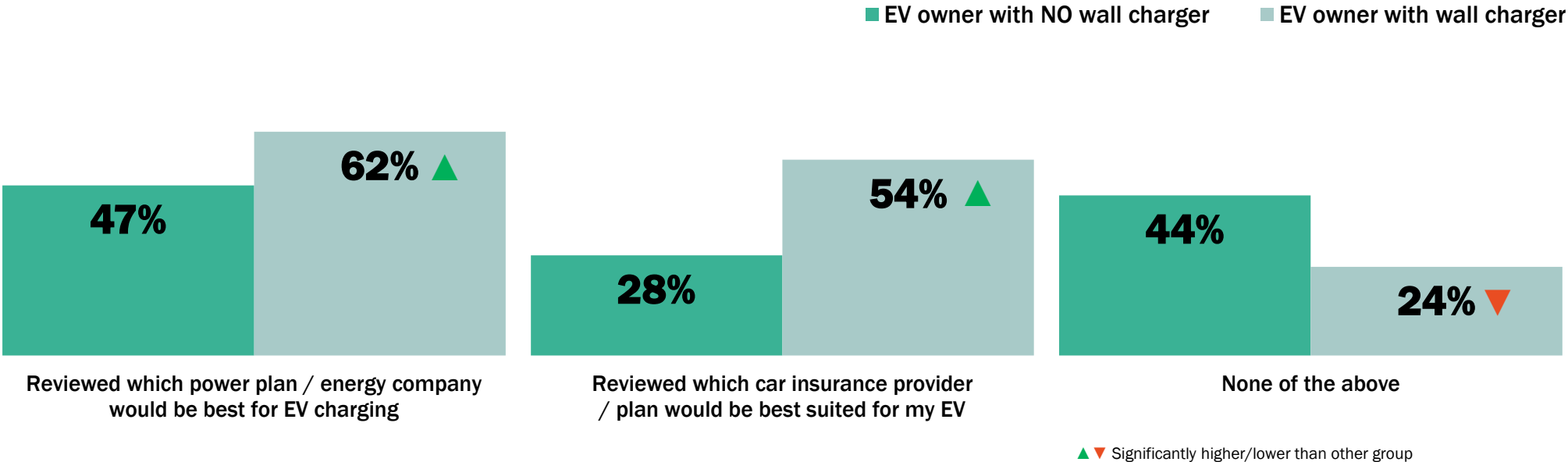


CHARGE_CONSID_INTEND: Which of the following best describes how much you have considered or planned how you would charge your EV at home, if you go ahead with buying an EV? PANEL BASE: EV Considerer n=66
 CHARGE_CONSID: Before you bought your EV, which of the following best describes how much you considered or planned for how you would charge your EV at home? PANEL BASE: EV Owner n=187

There are important key ‘admin moments’ many prospective buyers go through in parallel to their EV purchase

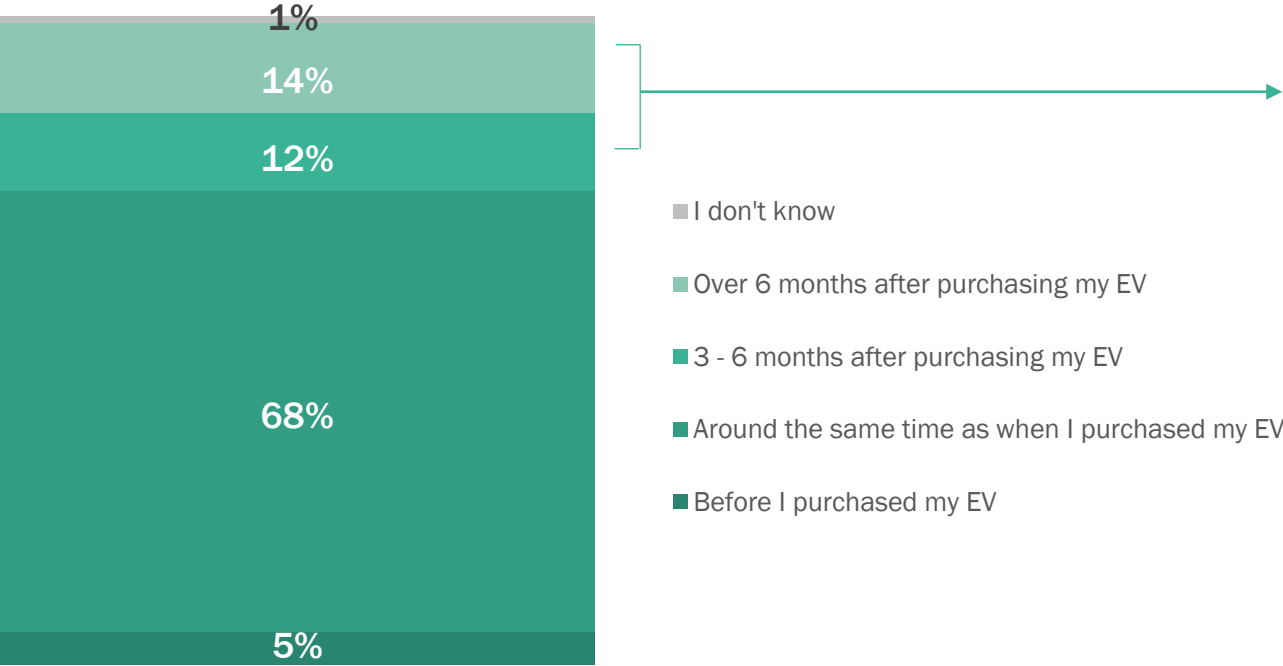
Across all EV owners, just over half reviewed their power plan around the time they purchased their EV, and around 4 in 10 reviewed their car insurance plans. Existing wall-mounted charger owners are clearly more thorough in these areas – they’re significantly more likely to have taken both of these actions than those without.

ACTIONS AT TIME OF EV PURCHASE (ALL OWNERS)



The EV purchase is the key moment: the majority of current wall charger users bought it at the same time as their EV

EV CHARGING UNIT – TIME OF PURCHASE FOR EV OWNERS WITH WALL CHARGERS

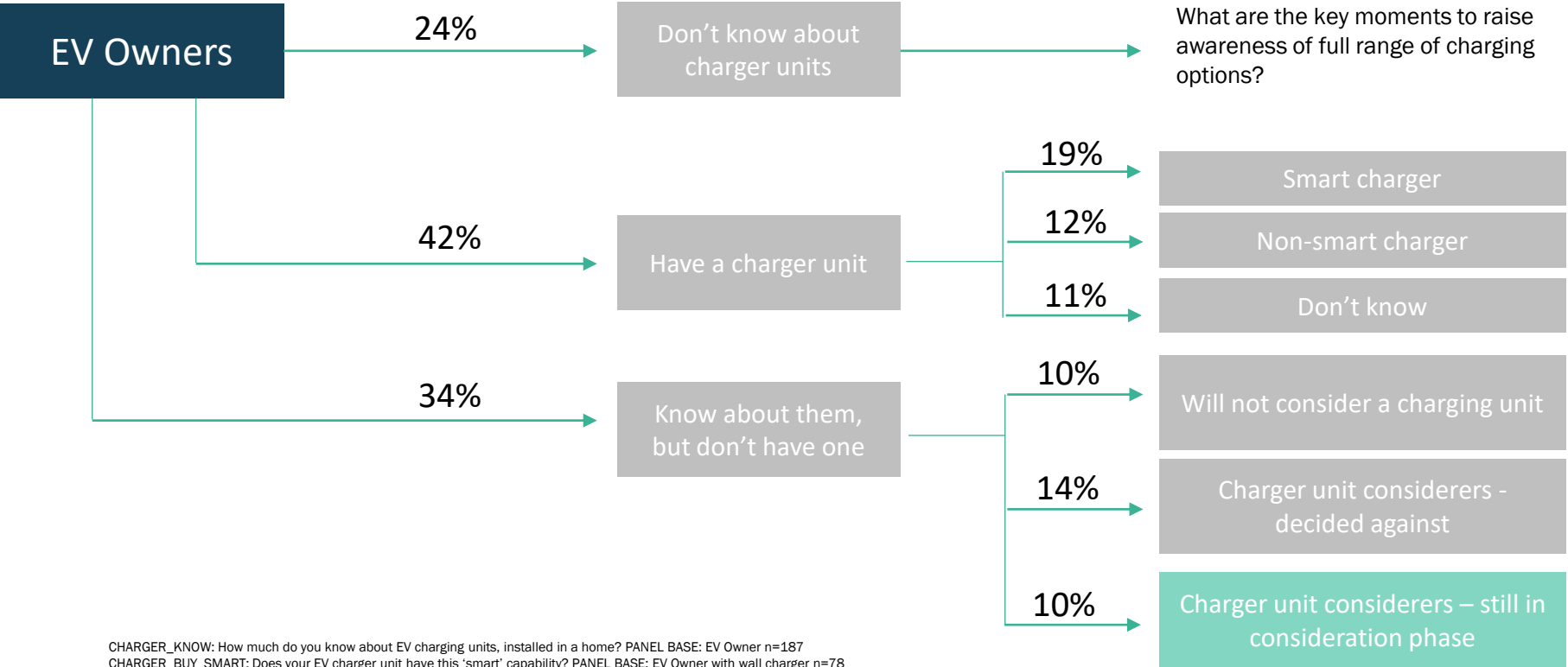


But around one-quarter of wall charger owners purchased it at least 3 months after the EV itself.

CHARGER_PURCHASE_LAG Earlier you mentioned that you use an EV charging unit (box mounted on your wall which was installed specifically for charging an EV). When did you purchase your EV charging unit? PANEL BASE: EV Owner wall charger n=78

And around 1 in 10 EV owners haven't yet invested in wall chargers – but they're still open to making the switch

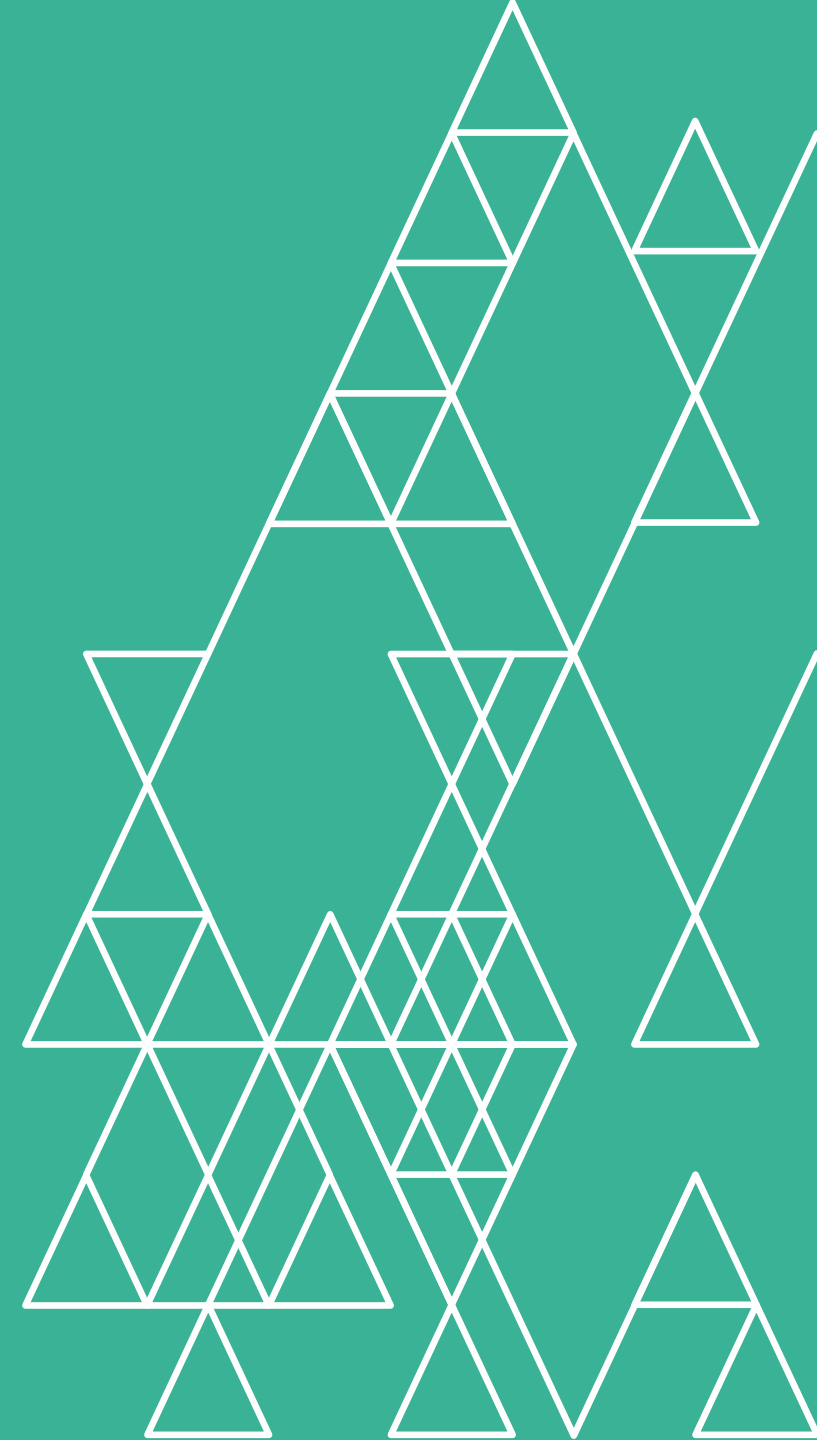
WALL CHARGER UNIT UPTAKE AND CONSIDERATION ACROSS EV OWNERS



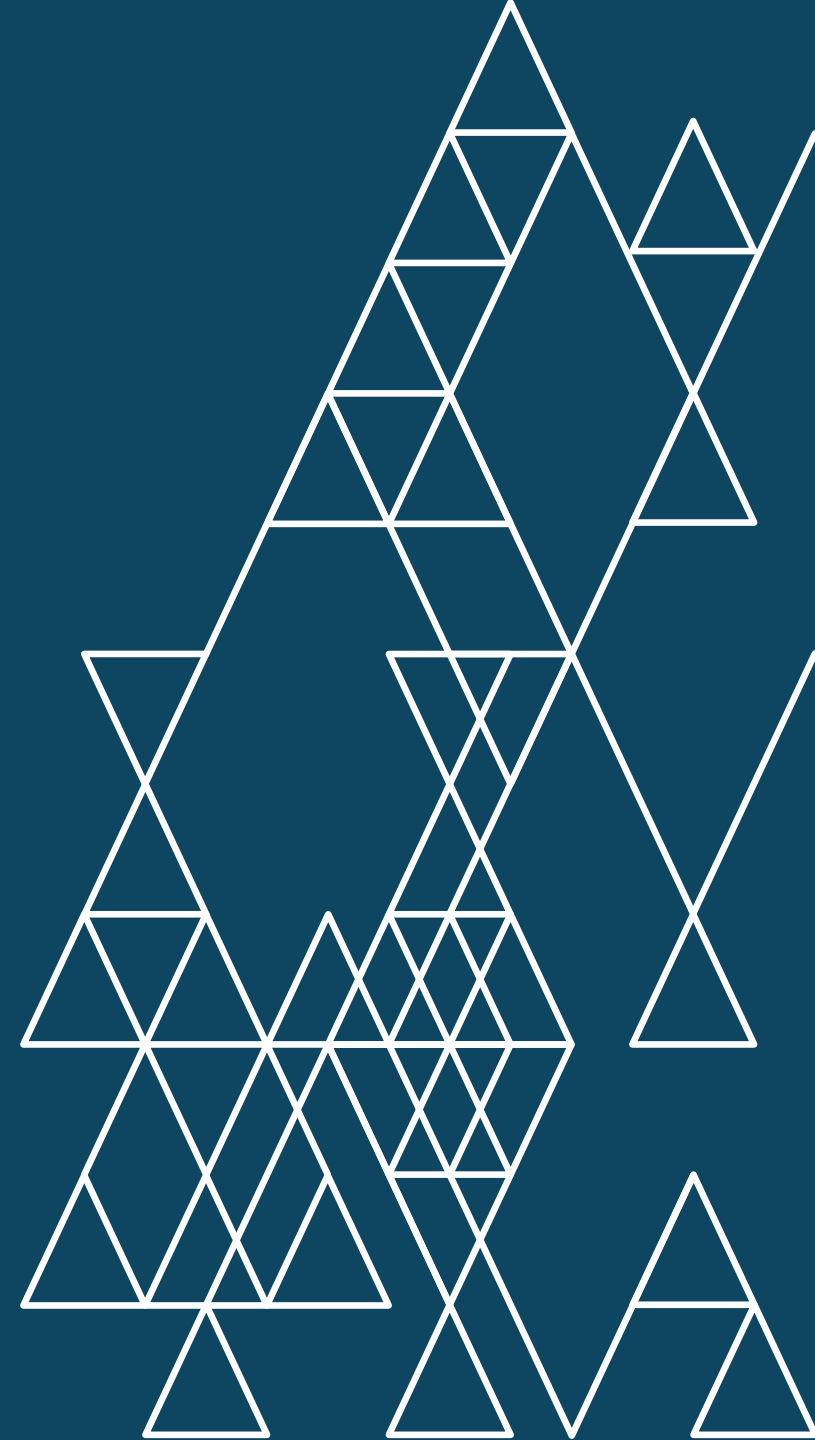
CHARGER_KNOW: How much do you know about EV charging units, installed in a home? PANEL BASE: EV Owner n=187
 CHARGER_BUY_SMART: Does your EV charger unit have this 'smart' capability? PANEL BASE: EV Owner with wall charger n=78
 CHARGER_CONSID: When you first purchased your EV, did you consider installing an EV charging unit at home? PANEL BASE: EV Owner with no wall charger but know n=64

With two-thirds of purchasers at least considering a wall charger unit when buying their EV, consideration to some degree is high.

The key question is, what information do consumers need to strengthen consideration?



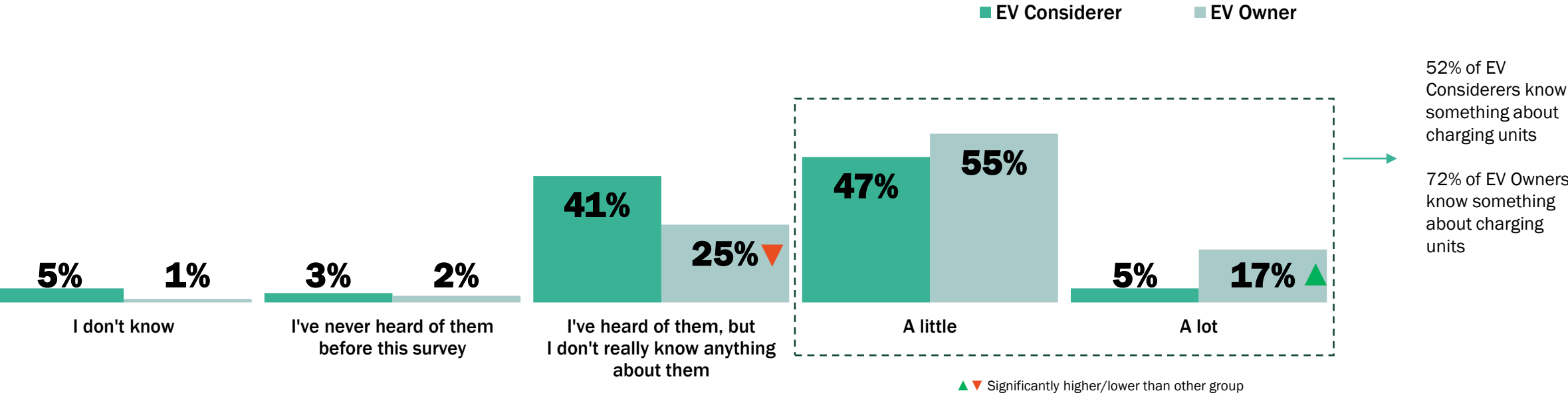
Knowledge and perceptions of smart charging



There's a clear education job to do

Nearly half of Considerers know very little about home EV charging units, and over one-quarter of Owners are also in the dark. There's a clear education job to do to raise awareness, not only in the lead up to an EV purchase, but also post-purchase.

KNOWLEDGE OF EV CHARGING UNITS



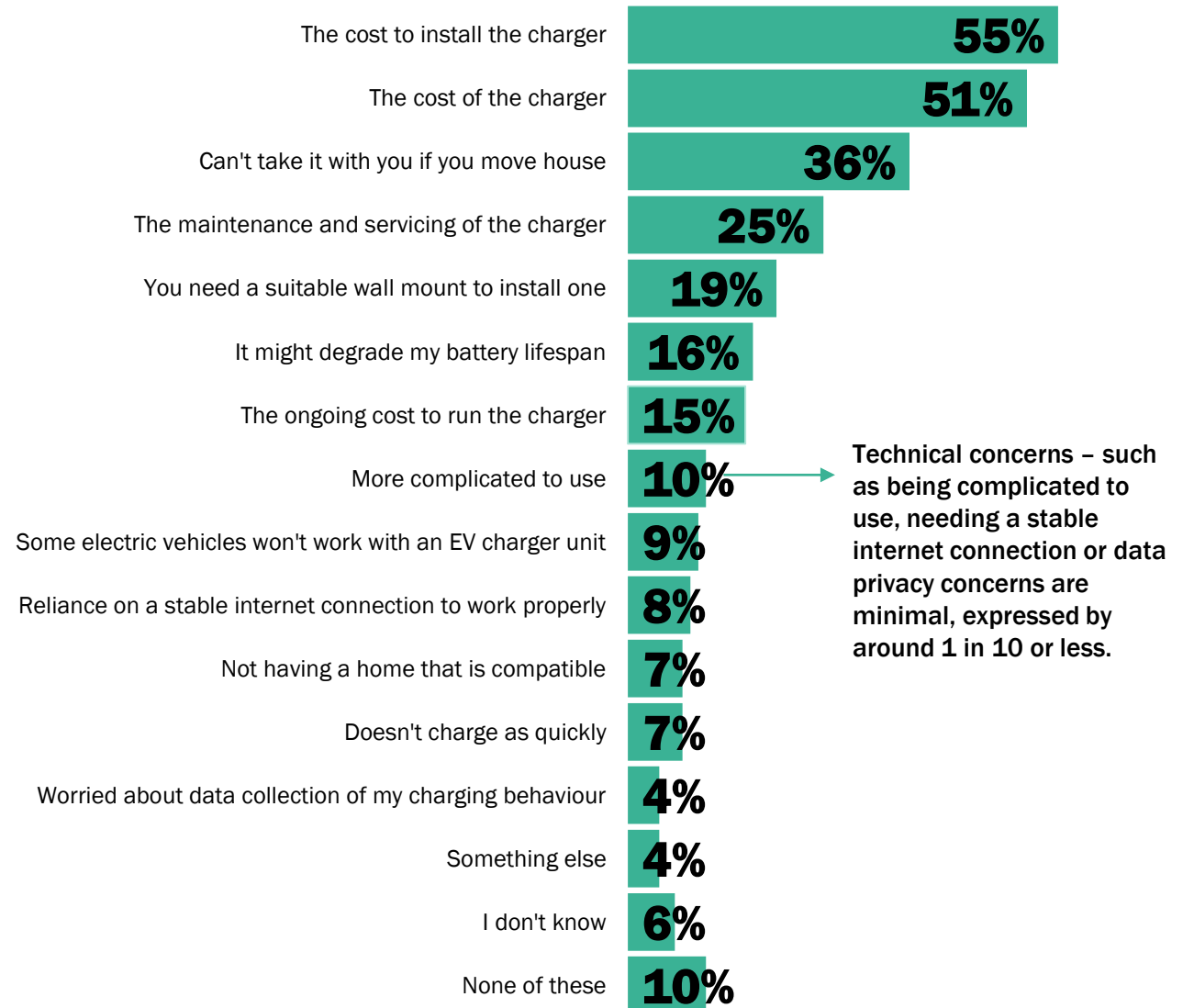
Purchase cost and installation fees are the strongest perceived disadvantages

Cost is the key barrier. As a disadvantage this is more prominent among those without a wall charger than those with a charger – this is particularly the case for installation costs, suggesting reassurance on likely cost for install could help strengthen consideration.

	EV owners WITHOUT wall charger unit	EV owners WITH wall charger unit
The cost to install the charger	67% ▲	44%
The cost of the charger	59%	44%

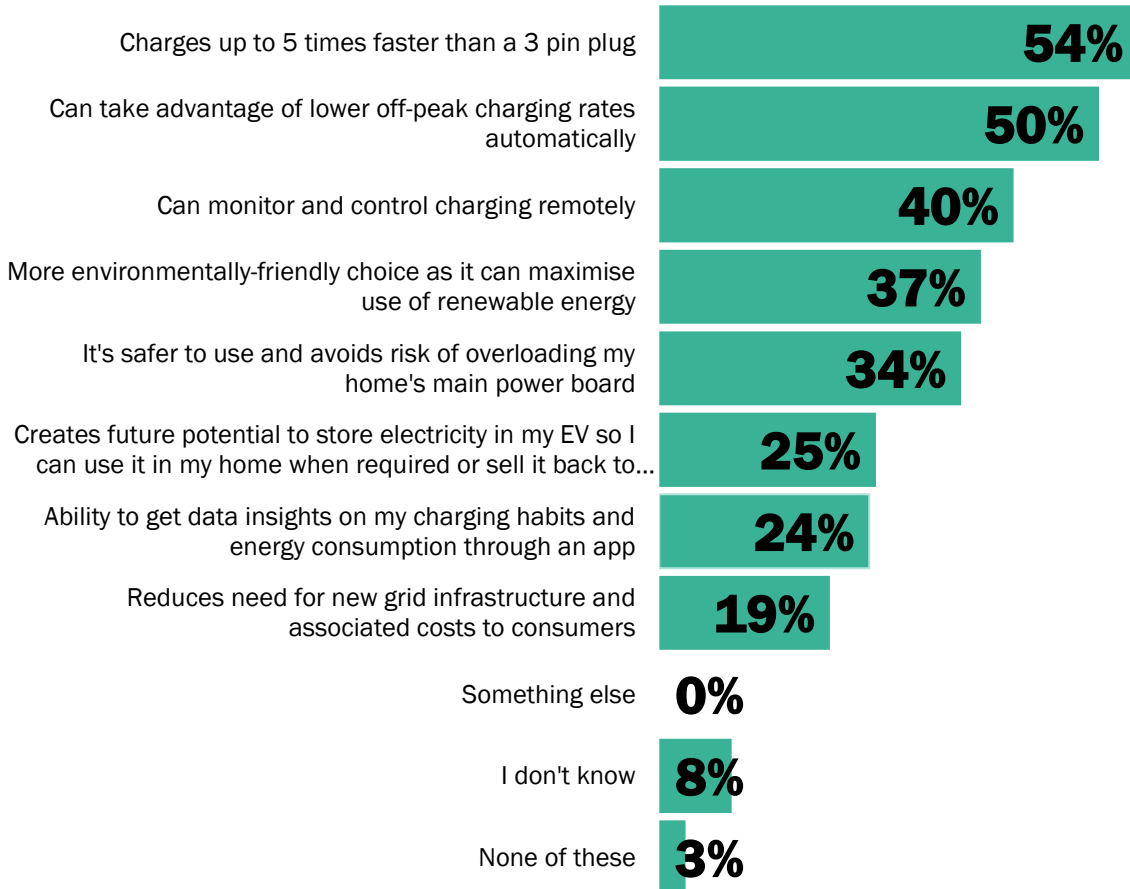
▲ ▼ Significantly higher/lower than other group

Perceived disadvantages of wall-chargers among EV owners aware of EV charger units



Speed of charge and greater ability to use off-peak power are the most prominent perceived advantages

Perceived advantages of wall-chargers among EV owners



Speed of charging is an equally strong perceived advantage across those with and without a wall charger unit – but beyond this, advantages are generally much weaker among those without a wall-charger unit. The gap is particularly wide for ability to remote charge, being a more environmentally-friendly choice and access to insights on charging habits and energy consumption.

	EV owners WITHOUT wall charger unit	EV owners WITH wall charger unit
Charges up to 5 times faster than a 3-pin plug	55%	54%
Can take advantage of lower off-peak charging rates automatically	44%	56%
Can monitor and control charging remotely	31%	49% ▲
More environmentally-friendly choice	23%	49% ▲
It's safer to use	27%	41%
Ability to get data insights on my charging habits	16%	31% ▲
Creates future potential to store electricity in my EV	20%	29%
Reduces need for new grid infrastructure and associated costs to consumers	19%	20%

▲ ▼ Significantly higher/lower than other group

Smart features of wall-mounted chargers aren't commonly known about



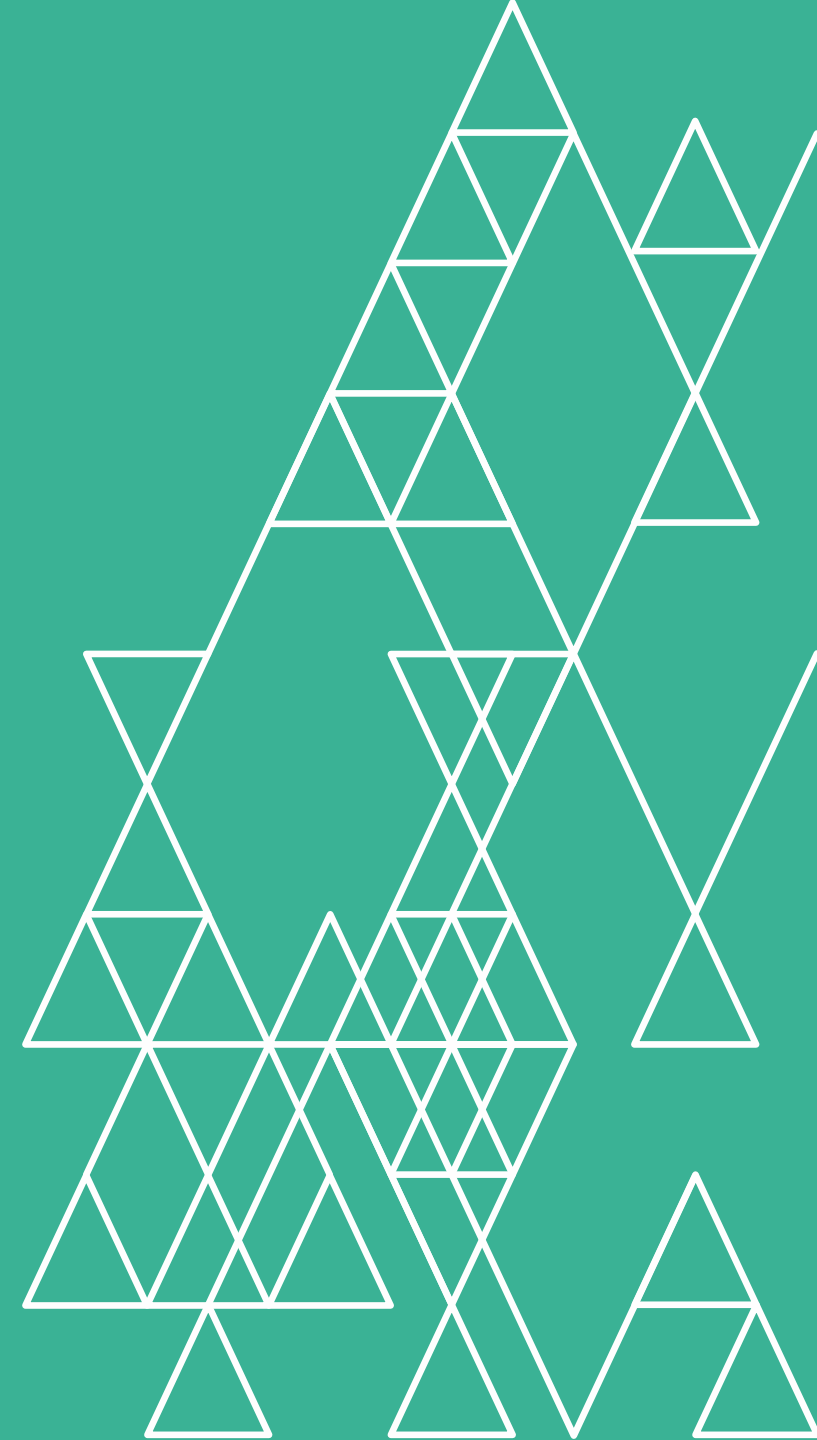
75%

... of EV owners who know a little or a lot about wall-mounted chargers are **unaware of smart features** that could benefit users and the national electricity grid.

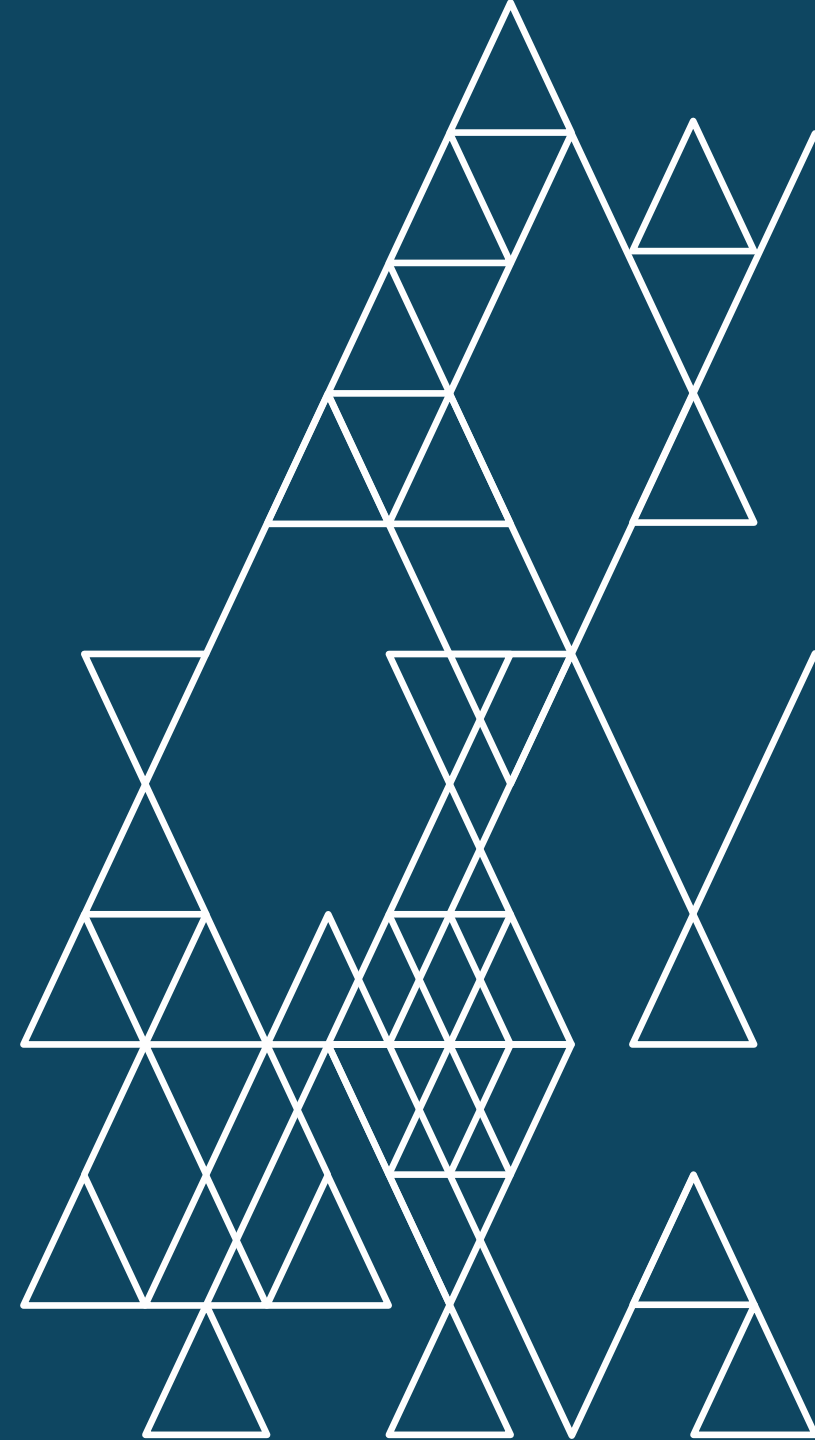
EECA's qualitative research suggested that the term 'smart charger' is instead predominantly associated with wall mounted chargers that come with an app.

There are clear market education opportunities:

- **At a basic level, letting around one-quarter of EV owners know about wall charger units as an option**
- **For those aware, helping consumers see the value beyond the investment and install cost, which are prominent barriers**
- **And helping consumers understand the range of benefits from wall charger units: it's not just about speed and using off-peak power**



How to influence



Other owners are a key influence

People consult a wide range of sources, with personal recommendations / seeking experience of others particularly influential. People also often do independent research online. The EV purchase focusses on specific car brands and their websites, but charger research is broader.

INFORMATION SOURCES

When purchasing EVs

	EV Considerer	EV Owner
Vehicle websites	58%	56%
NET: word of mouth (friends, family, colleagues)	50%	47%
Looked online in a general search	45%	48%
Car dealer(s)	29%	43% ▲
Existing owners	38%	32%
Online forums	27%	35%
Friends	29%	32%
Family members	18%	24%
Government website(s)	15%	22%
Social media (e.g. Facebook)	17%	18%
Work colleagues	18%	15%
Insurance company	5%	9%
Somewhere else	5%	1%
I don't know	2%	2%
None of these	2%	1%

When researching how you might charge an EV at home

	EV Considerer	EV Owner
Vehicle websites	29%	15% ▼
NET: word of mouth (friends, family, colleagues)	48%	36%
Looked online in a general search	58%	38% ▼
Car dealer(s)	32%	30%
Existing owners	44%	27% ▼
Online forums	32%	29%
Friends	35%	24%
Family members	27%	16%
Government website(s)	26%	14% ▼
Social media (e.g. Facebook)	11%	16%
Work colleagues	18%	10%
Insurance company	15%	7%
Somewhere else	5%	1%
I don't know	2%	2%
None of these	3%	10% ▲

▲ ▼ Significantly higher/lower than other group

VEHICLE_INFO: When you were first considering purchasing an EV, which source(s) of information did you use? PANEL BASE: EV Considerer n=66, EV Owner n=187
 CHARGER_SOURCE: And did you use any of these sources of information when researching how you might charge an EV at home? PANEL BASE: EV Considerer n=66, EV Owner n=187

But investing in wall-charging units is not a light-touch decision: people often seek / need the technical detail to be informed

LEVEL OF INFORMATION DESIRED BEFORE PURCHASING A WALL CHARGER UNIT

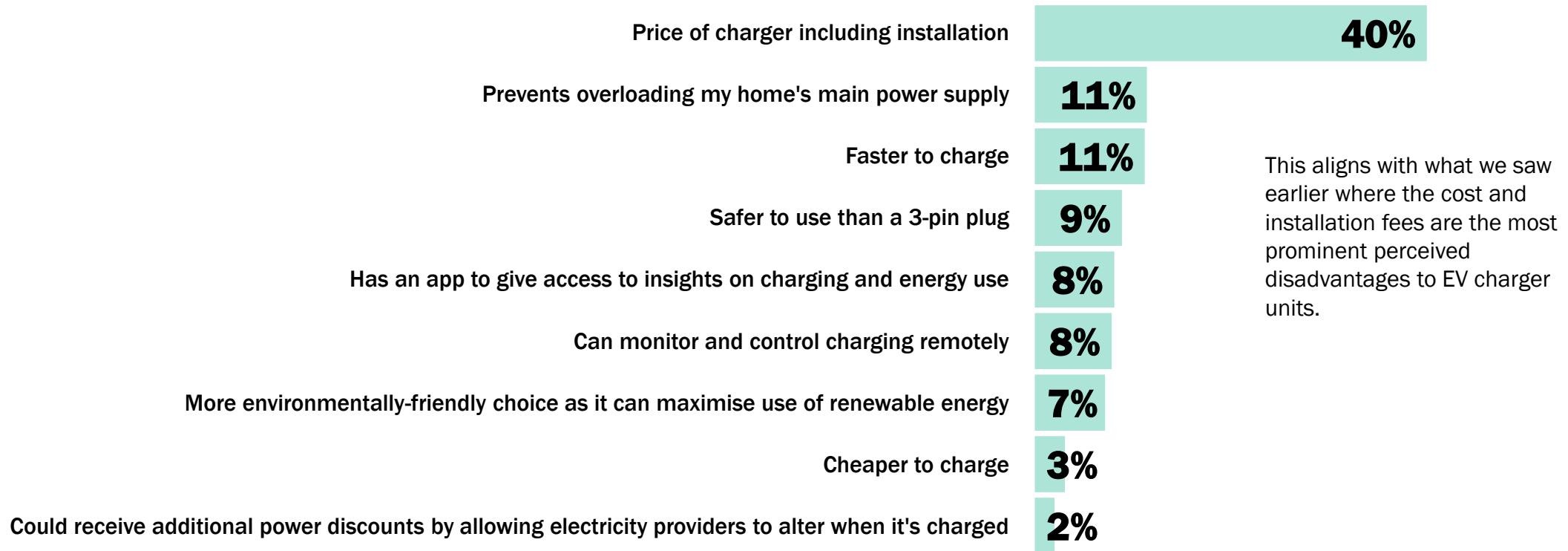
	EV considerer	EV owners WITH NO wall charger unit
1 - I would want a deep level of technical information	20%	17%
2	35%	38%
3	41%	31%
4	5%	8%
5 - I wouldn't want much technical information	0%	6% ▲

▲ ▼ Significantly higher/lower than other group

CHARGE_CONSID_INFO: Thinking now about the level of information you'd want before purchasing an EV charging unit, where would you place yourself on the following scale for how much information you would personally want / seek? PANEL BASE: EV Considerer n=66, EV Owner with no wall charger n=109, EV Owner with wall charger n=78

Initial cost outlay is by far the greatest consideration at point of purchase – ongoing cost-savings hold little weight

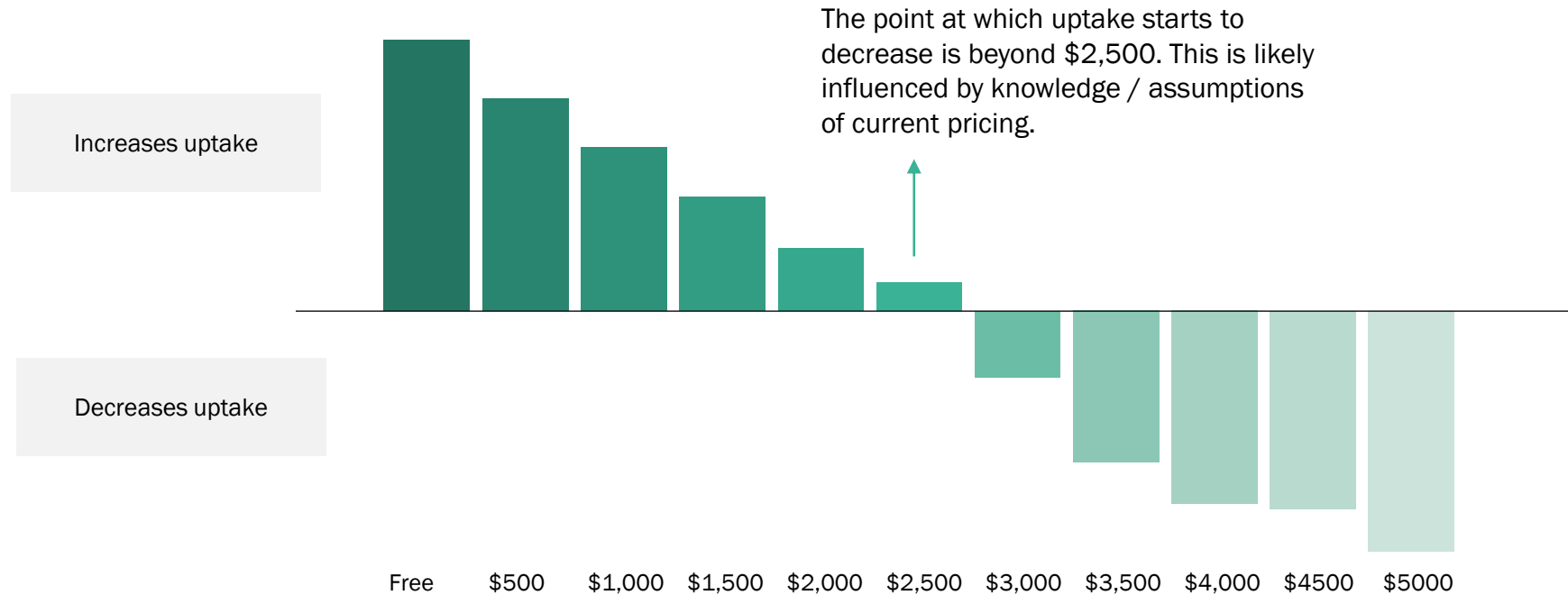
CHOICE MODEL – FEATURE IMPACT



CHOICE1: Which of the following options would be your most preferred choice for an EV charger? PANEL BASE: Total n=253. EV Considerer n=66, EV Owner n=187
 CHOICE2: If this option was available when you buy your EV, how likely would you be to buy this EV charger? / If this option was available, how likely would you be to buy this EV charger? Total n=253. EV Considerer n=66, EV Owner n=187

Pricing of unit and install beyond \$2,500 is likely to decrease potential uptake

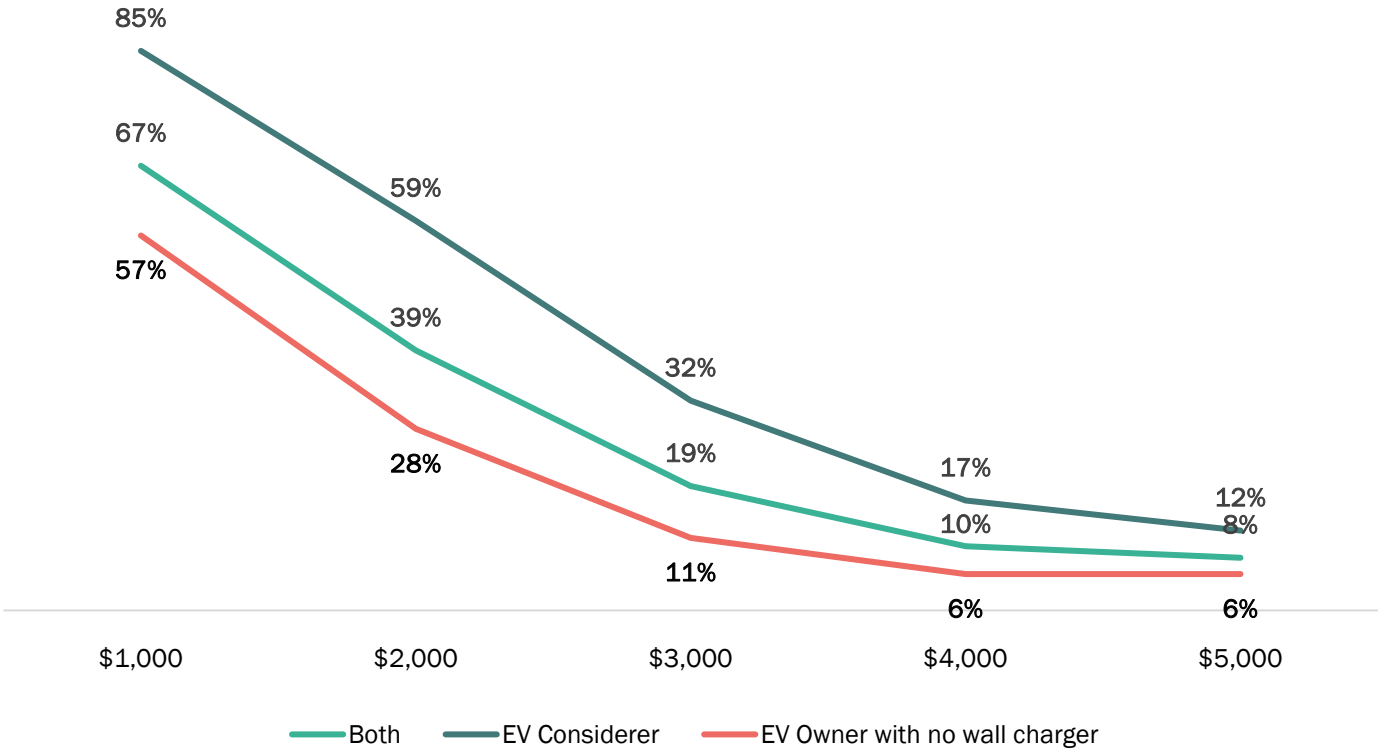
PRICE ATTRIBUTE – LEVELS OF PRICE OF CHARGER INCLUDING INSTALLATION TESTED



CHOICE1: Which of the following options would be your most preferred choice for an EV charger? PANEL BASE: Total n=253. EV Considerer n=66, EV Owner n=187
CHOICE2: If this option was available when you buy your EV, how likely would you be to buy this EV charger? / If this option was available, how likely would you be to buy this EV charger? Total n=253. EV Considerer n=66, EV Owner n=187

We also see price within this boundary through price laddering

PRICE LADDERING – LIKELIHOOD TO BUY AT DIFFERENT PRICE POINTS



CHARGER_PRICE: Would you buy an EV charger unit for \$X,000? PANEL BASE: EV Considerers and Owners without wall chargers n=175. EV Considerer n=66, EV Owner without wall charger n=109

The threshold for payback period is relatively low

Most (around 8 in 10) would want to be paid back from running-cost efficiencies within 4 years. Existing EV owners without a wall charger are particularly sensitive to longer payback periods, with around 6 in 10 in this group wanting the initial cost investment to have paid for itself within 2 years.

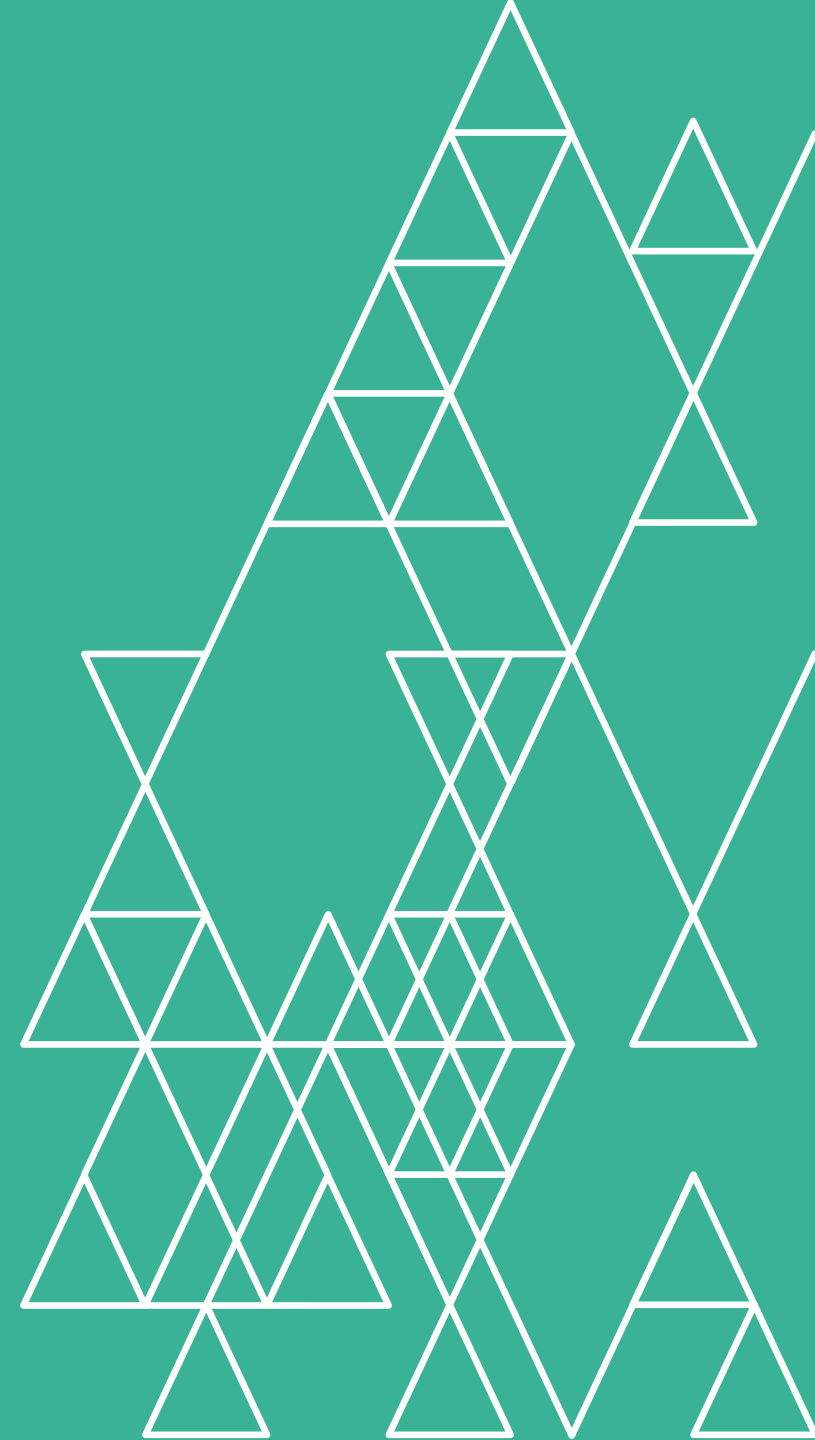
LONGEST PAYBACK PERIOD ACCEPTABLE

	EV considerers	EV owners with NO wall charger
Within two years	47%	61%
2 to 4 years	35%	20% ▼
5 to 7 years	9%	6%
8 to 10 years	6%	2%
More than ten years	0%	0%
Don't know	3%	11% ▲

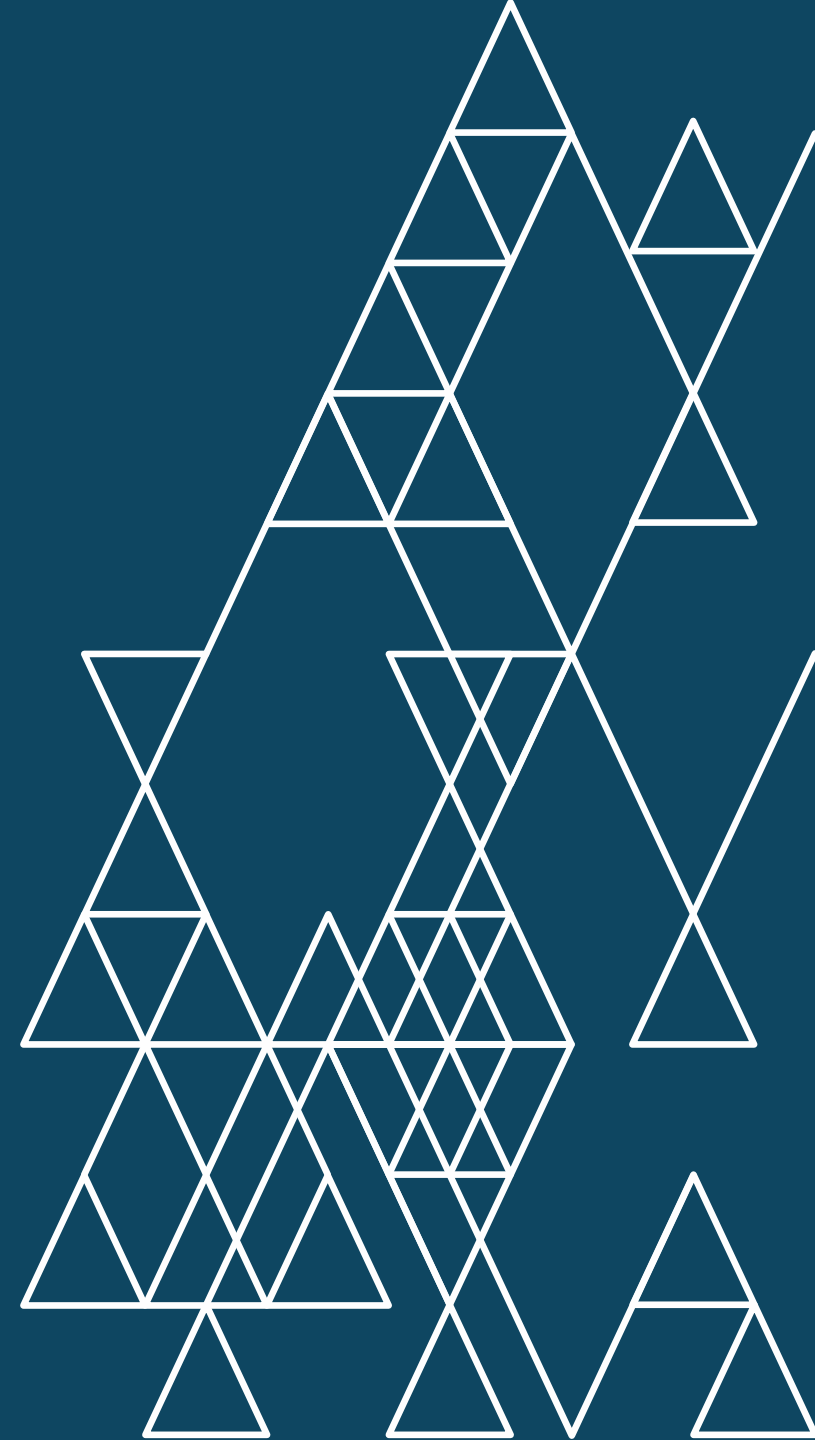
▲ ▼ Significantly higher/lower than other group

Consumers have a short-term mindset when considering a wall charger purchase: it's the initial cost that is by far the biggest focus. The longer-term savings aren't seen as valuable, unless they recoup the cost of the charger within a short window.

Cost outlay aside, the safety features of wall chargers hold valuable influence on consumers, with technological features a weaker consideration at point of purchase.

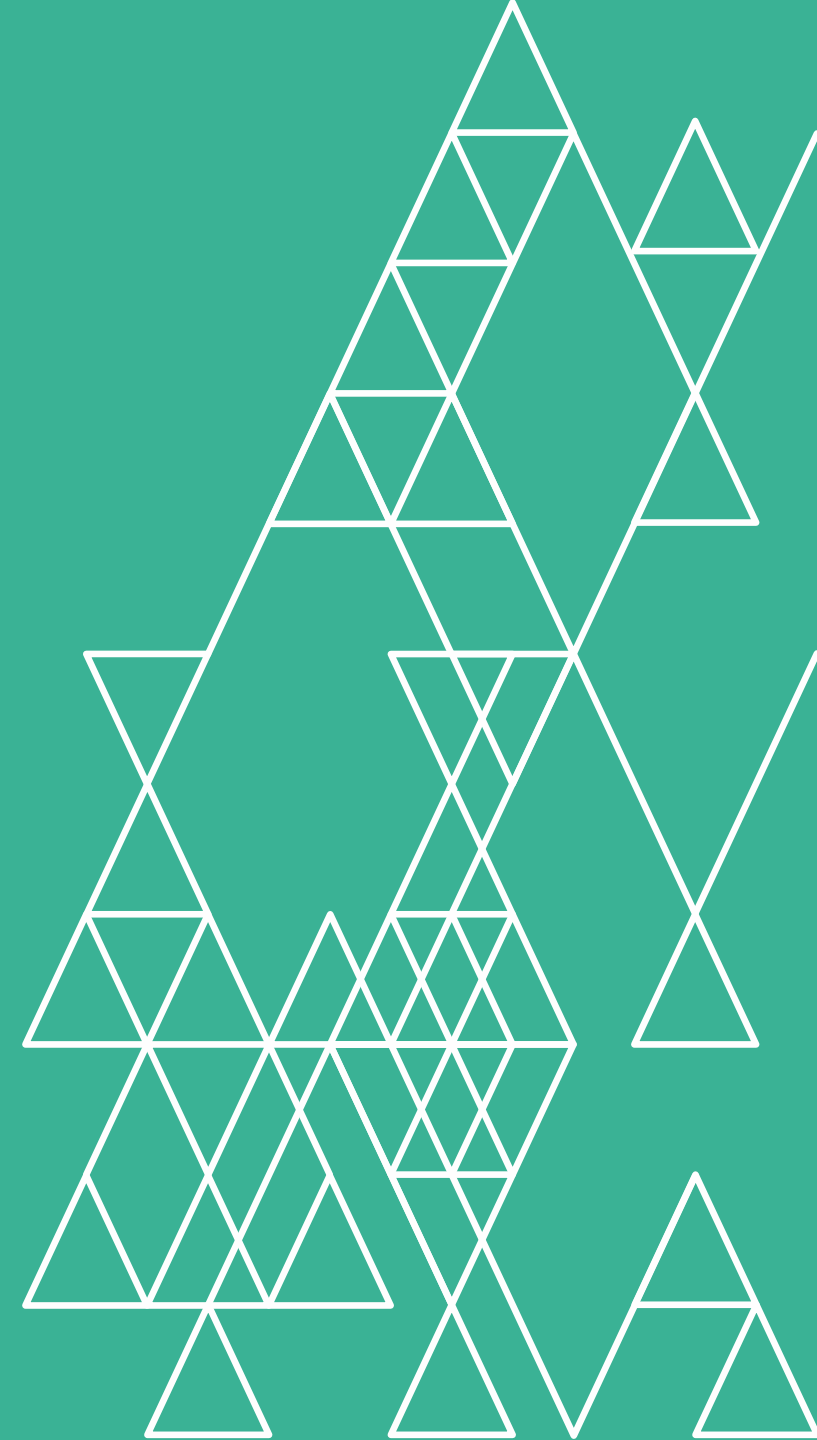


Bringing it all together



Key insights on consumer uptake of wall chargers:

1. Charging is not a key focus in the run-up to an EV purchase. But the EV purchase itself is the key moment for wall charger adoption. Charging options can be pushed further up the agenda through targeting key 'functional' moments around the EV purchase – including reviewing insurance and power plan tariffs and at point of sale through car dealers.
2. First-hand experiences are hugely influential. Owners want to hear from other owners. Stimulating the conversation will help raise awareness and consideration.
3. Technical detail is useful. EV owners aren't generally confident / knowledgeable in charging options, and most don't understand potential smart features. But many welcome information on the options and benefits, particularly from impartial, government sources.
4. Cost is a key barrier, and consumers think about the cost outlay in the short-term, not the eventual cost-saving benefits. While cost – including install – is the key consideration, safety benefits are also compelling.



**To find out more about
smart charging, visit
eeca.govt.nz**

