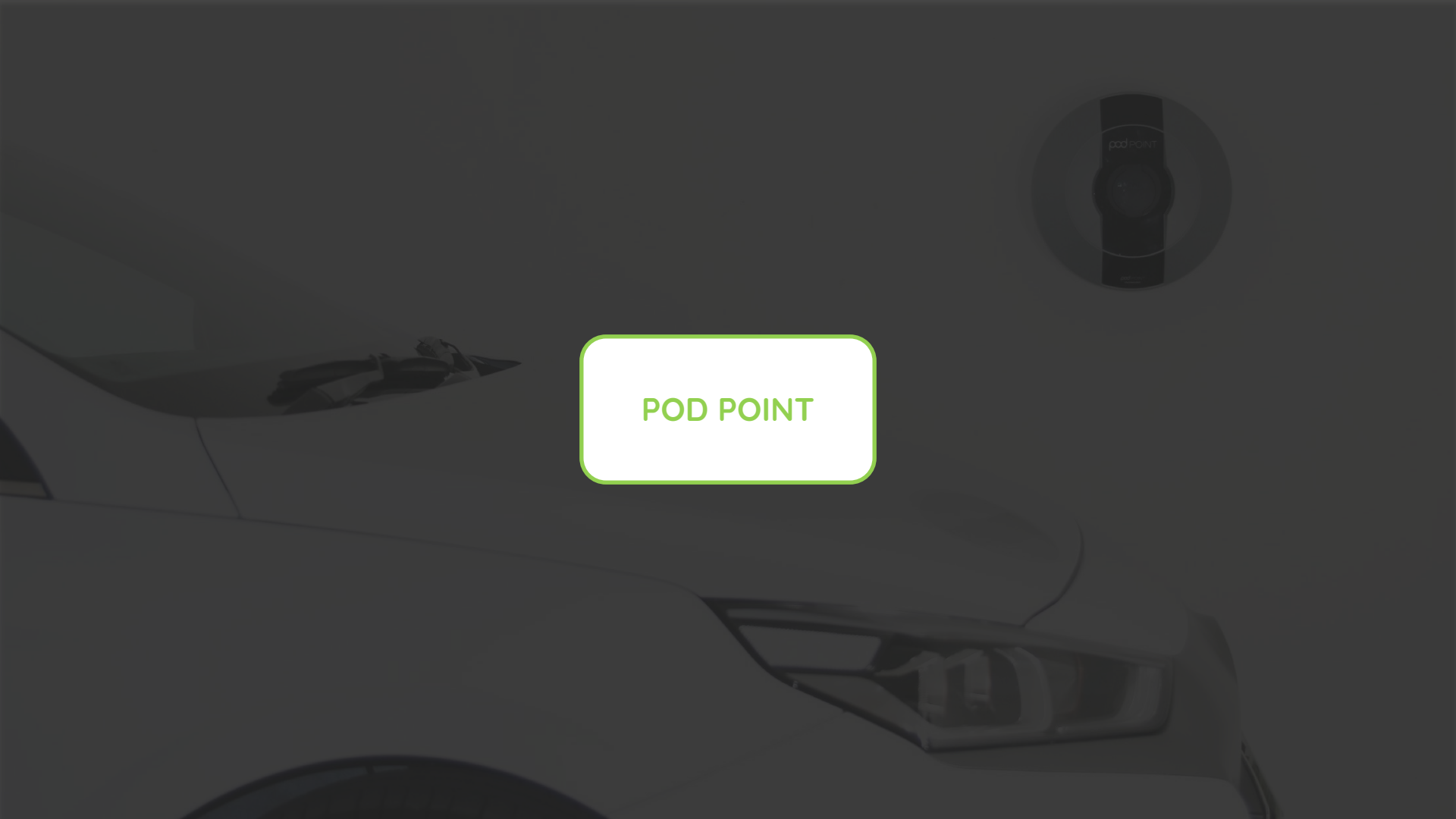
Electric Dreams - The Future for Electric Vehicles

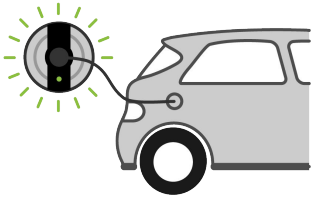
June 2018

pod POINT

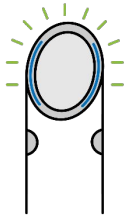

POD POINT

Our Mission

We believe travel shouldn't damage the Earth.



So we're helping people adopt clean transport in their everyday lives.



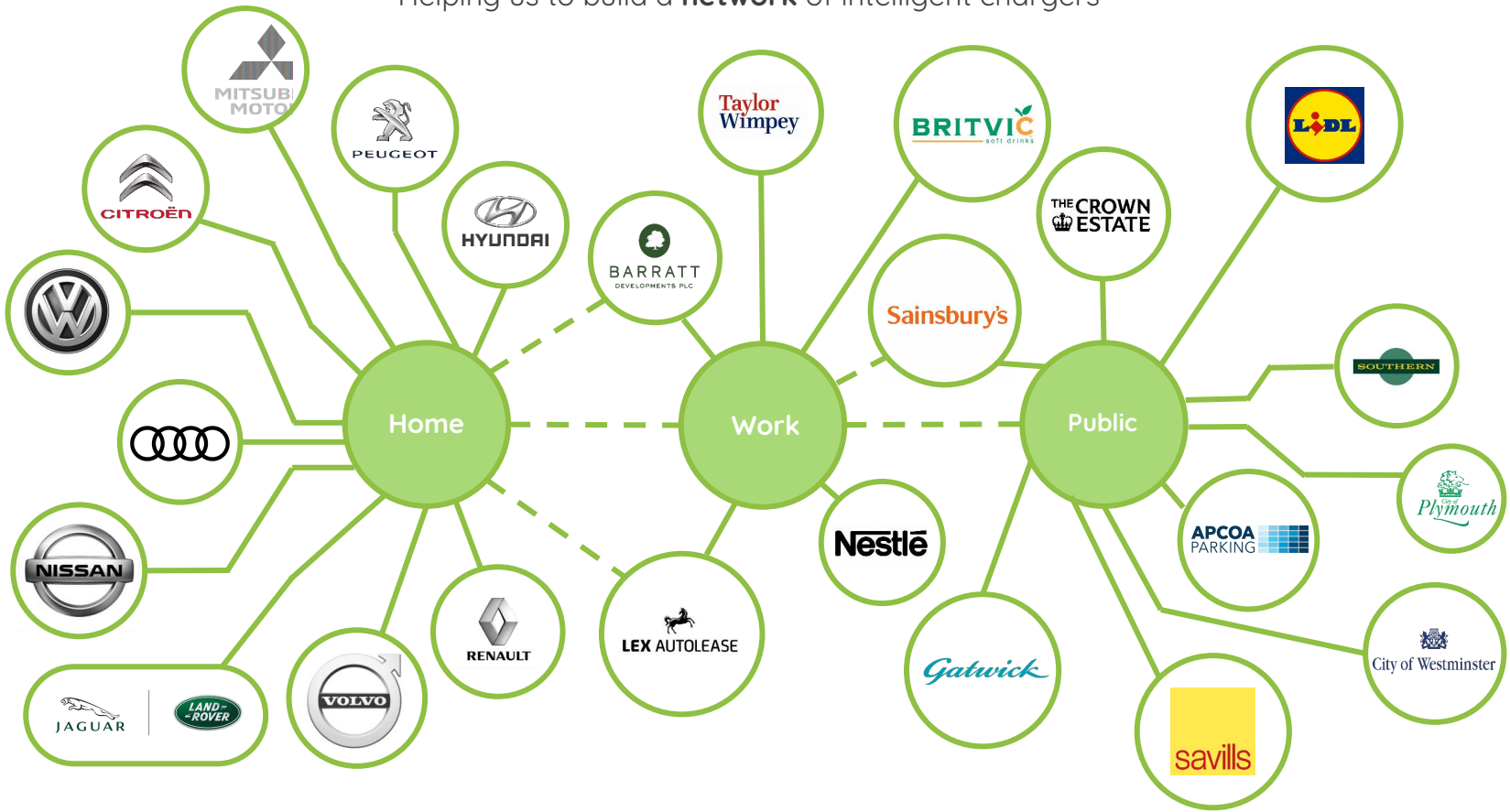
We're doing this by building a network of intelligent charging stations.

Electric Miles Enabled:

1 0 5 0 0 0 0 0 0 0

Customers

Helping us to build a **network** of intelligent chargers



THE CURRENT EV MARKET

Vehicles

Pure EV

100% electric

Driven by an electric motor powered by a battery

Plug-in Hybrid

An electric motor and an internal combustion engine can drive the wheels

Typical 30 mile range in electric mode

Range Extenders

Pure EV range of 40-110 miles

On-board generator provides energy to extend range further 40-250 miles

Vehicles

Plug-in Hybrid

Range Extenders

Pure EV

RUNNING COSTS AND SAVINGS

Individual Running Costs

This calculation was based on a Volkswagen e-up! with an average daily mileage of 22 miles against an “average” ICE car

Average Petrol Costs	Electric Costs	Savings
Per Day: £3.47	Per Day: £0.80	Per Day: £2.67
Week: £24.31	Week: £5.61	Week: £18.70
Year: £1,267.47	Year: £292.00	Year: £974.47

>75% Saving

Direct Fleet Savings on Electric

- 2-4 pence/mile
- 50% less maintenance costs (150 vs. 10,000 moving parts)
- Exemption from VED
- Additional incentives, e.g. congestion zone, parking discounts etc

Car (g/km of CO_2)	Appropriate percentage from April 2020	Appropriate percentage (2019/2020)
0	2%	16%
1 – 50		
• Car with electric range of 130 miles or more	2%	16%
• Car with electric range of 70-129 miles	5%	16%
• Car with electric range of 40-69 miles	8%	16%
• Car with electric range of 30-39 miles	12%	16%
• Car with electric range of less than 30 miles	14%	16%

BiK

1-50 g/km CO_2
Currently 13%

115-119 g/km CO_2
Currently 24%

2020 = cliff drop

Fleet-Scale Cost Savings Example

Fleets switching from petrol to PHEV or;
Encouraging PHEV drivers to charge at home

Assumptions:

- Drivers average 20,000 miles/year
- PHEV with 30 miles of electric range
- ICE engines achieve 55 MPG
- 1 home charge event per day

Other savings:

- Class 1A NIC's based on the vehicle's P11D value and relevant BIK rate
- Additional employer NIC savings via SalSac

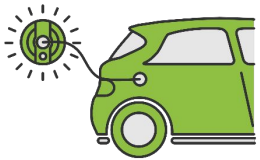
100 vehicles
£48,000 annual fuel saving

500 vehicles
£240,000 annual fuel saving

Government Incentives

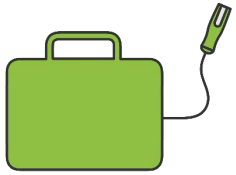
The **EVHS Grant**

reduces the cost of a home charge installation by **£500**



The **Plug-In Vehicle Grant**

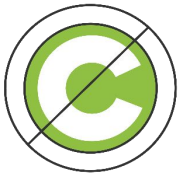
provides up to **£4500** towards the cost of an eligible plug-in car and **£8000** to a commercial vehicle



The **Workplace Charging Grant**

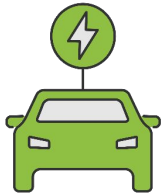
Eligible workplaces reduce the cost of charging points by **£300** up to a maximum of 20 sockets

Zero Congestion Zone Charge, Zero Road Tax & Reduced BIK



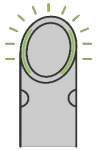
The **Plug-In Taxi Grant**

provides up to **£7500** towards the cost of an eligible plug-in vehicle



The **On-Street Residential Grant**

Local Authorities can apply for 75% funding, up to **£100,000,** to install residential, on-street charge points

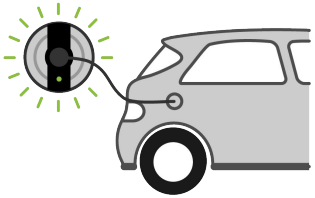


ENVIRONMENTAL AND SECONDARY EV BENEFITS

Environment and Secondary EV Benefits

Environmental Benefits

1. EVs more efficient than ICE cars, even when charged from coal power, or even a diesel generator!
2. EVs in 2017 produce half the CO2 of diesel.
3. Zero emissions means huge reduction in air pollutants responsible for 40,000 deaths p.a. In the UK alone.
4. Grid mix gets greener every year, EVs got twice as green between 2012 and 2017.
5. Charge from zero Carbon sources, e.g. solar.

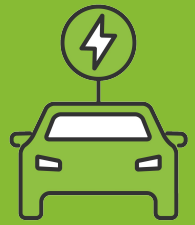


Employee Retention

1. Reduced stress in the driving seat.
2. Cars top themselves up at work/depot, while employee busy.
3. Low cost fuel for employees.
4. Enable those without regular charger access to drive EVs.
5. Positive in terms of PR and CSR.

BARRIERS TO MASS ADOPTION

Barriers to EV



Charging

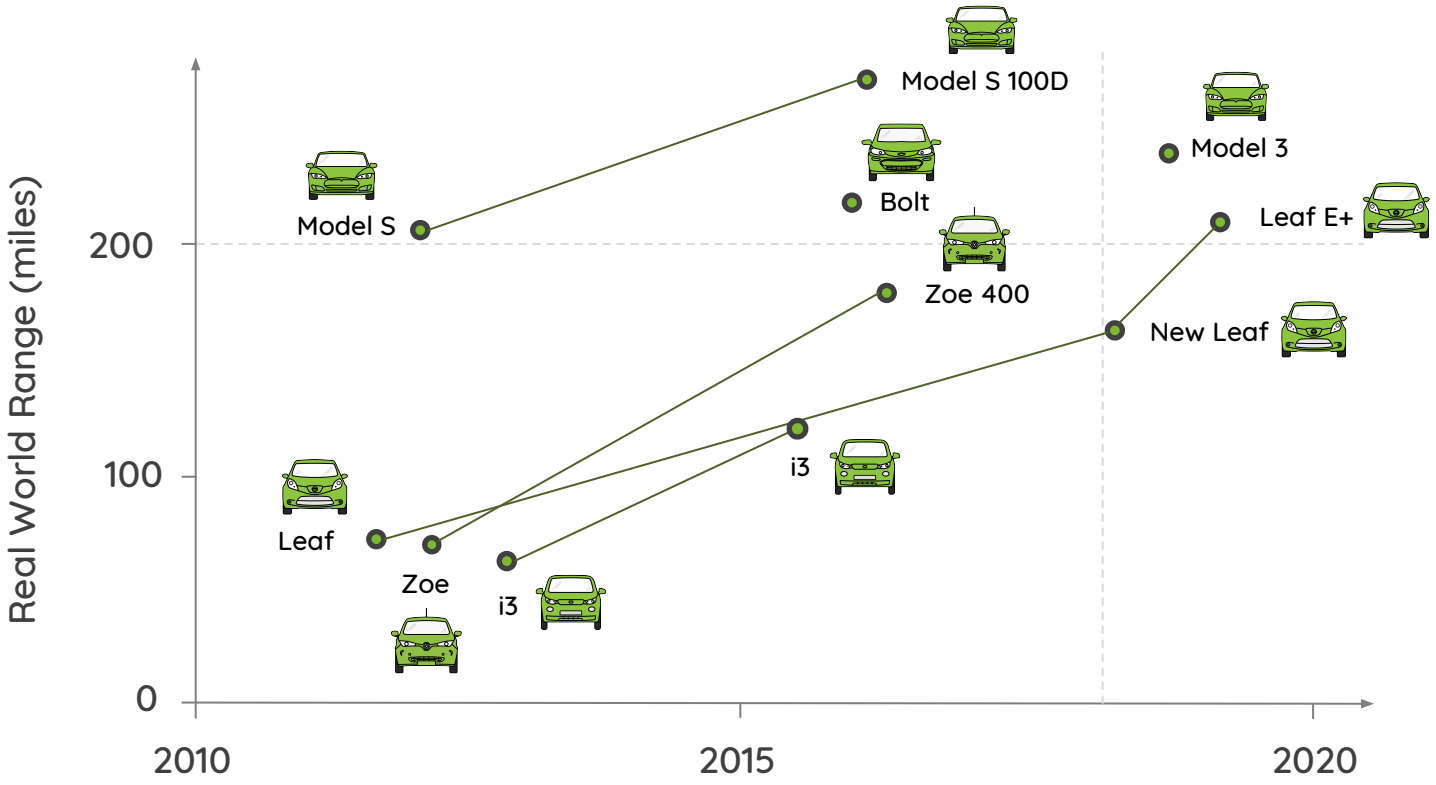
Cost

Performance

Choice

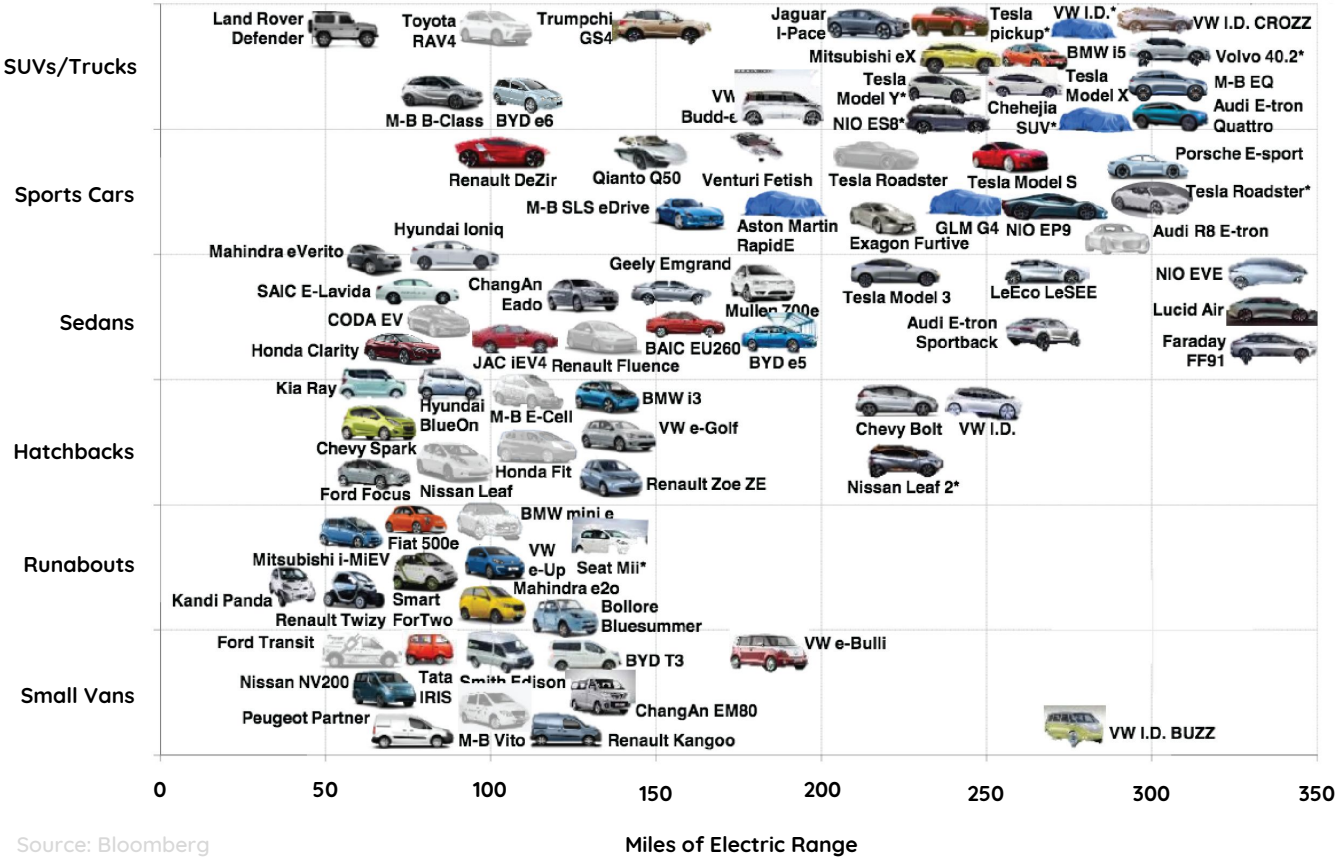
Range

Electric Vehicles Don't Go Far Enough



EVs are slow...

Not enough Choice

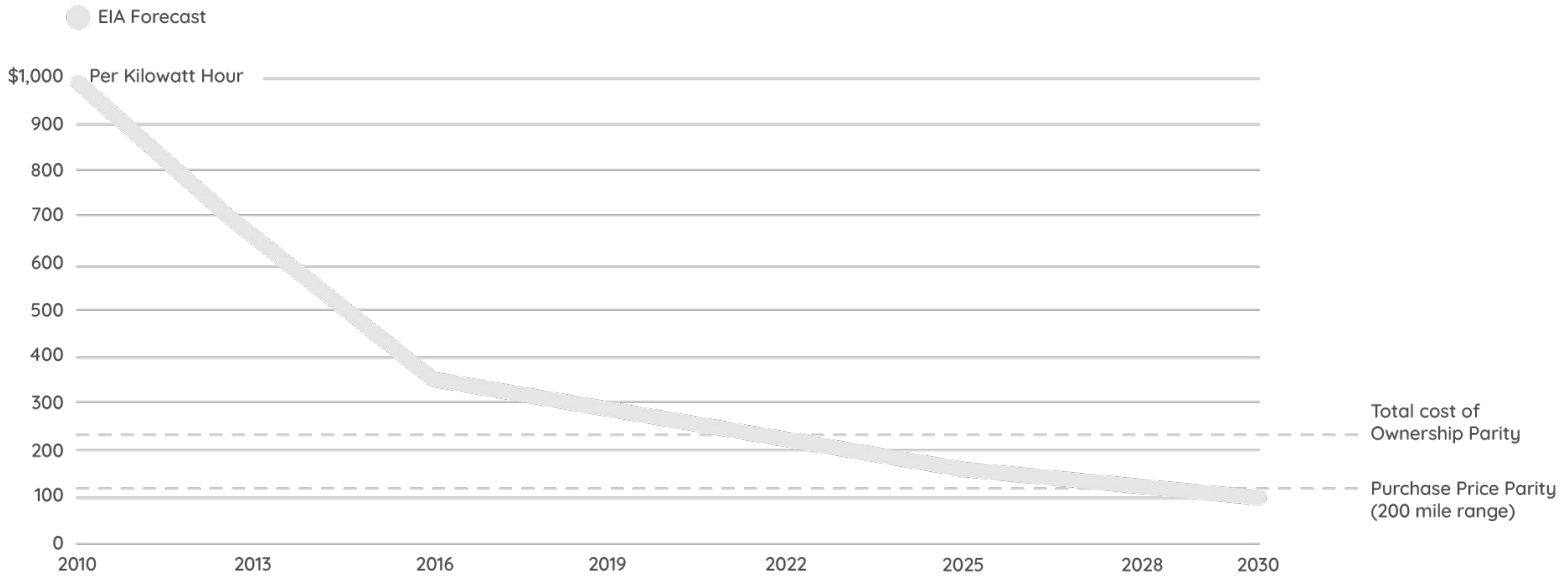


Source: Bloomberg

….and are too expensive

More bang for your buck

Greater efficiency means a $1,000 battery in 2010 will cost $73 in 2030



Source: Bloomberg New Energy Finance

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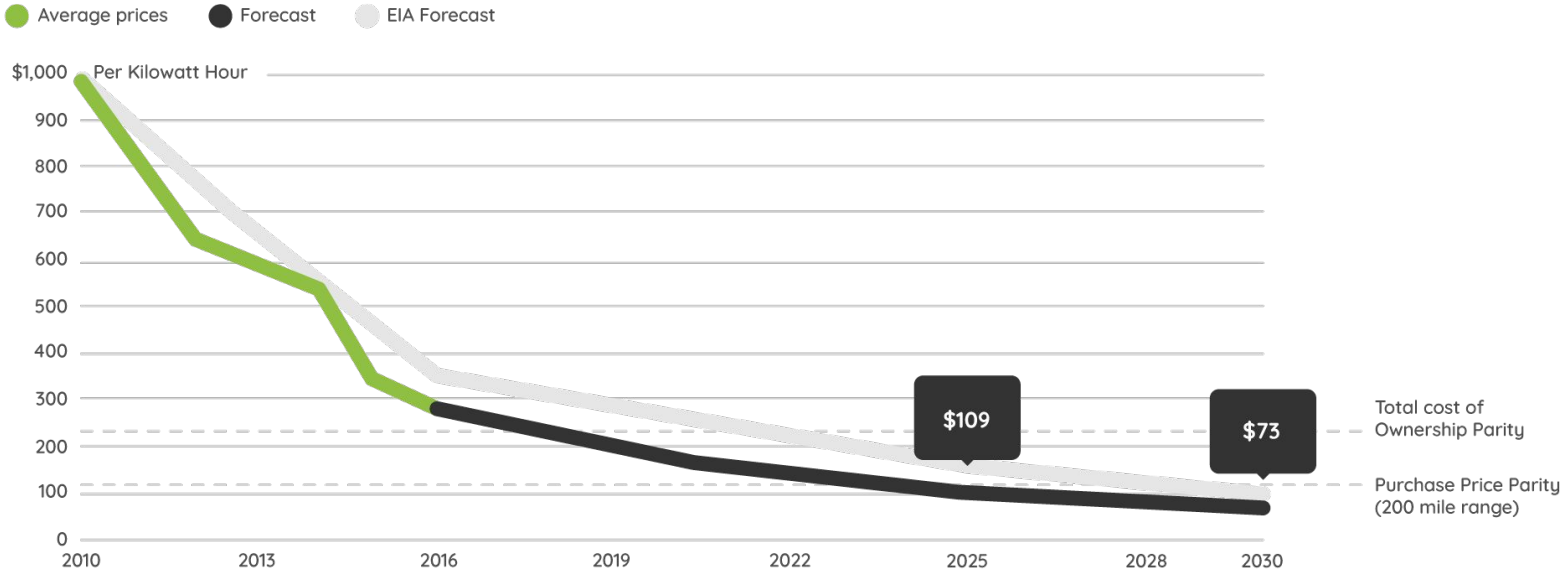

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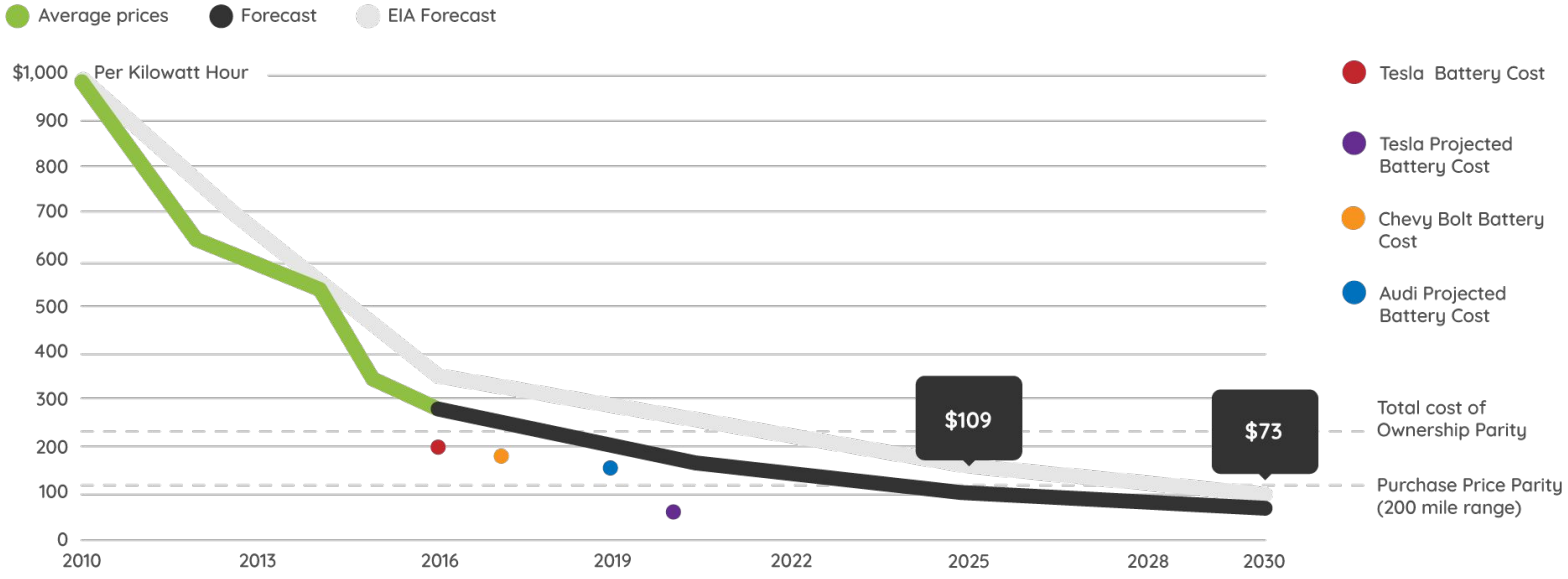

Source: Bloomberg New Energy Finance

The Norwegian Example

52% of new vehicle sales

- 100% sales tax on internal combustion
- 0% tax for electric vehicles

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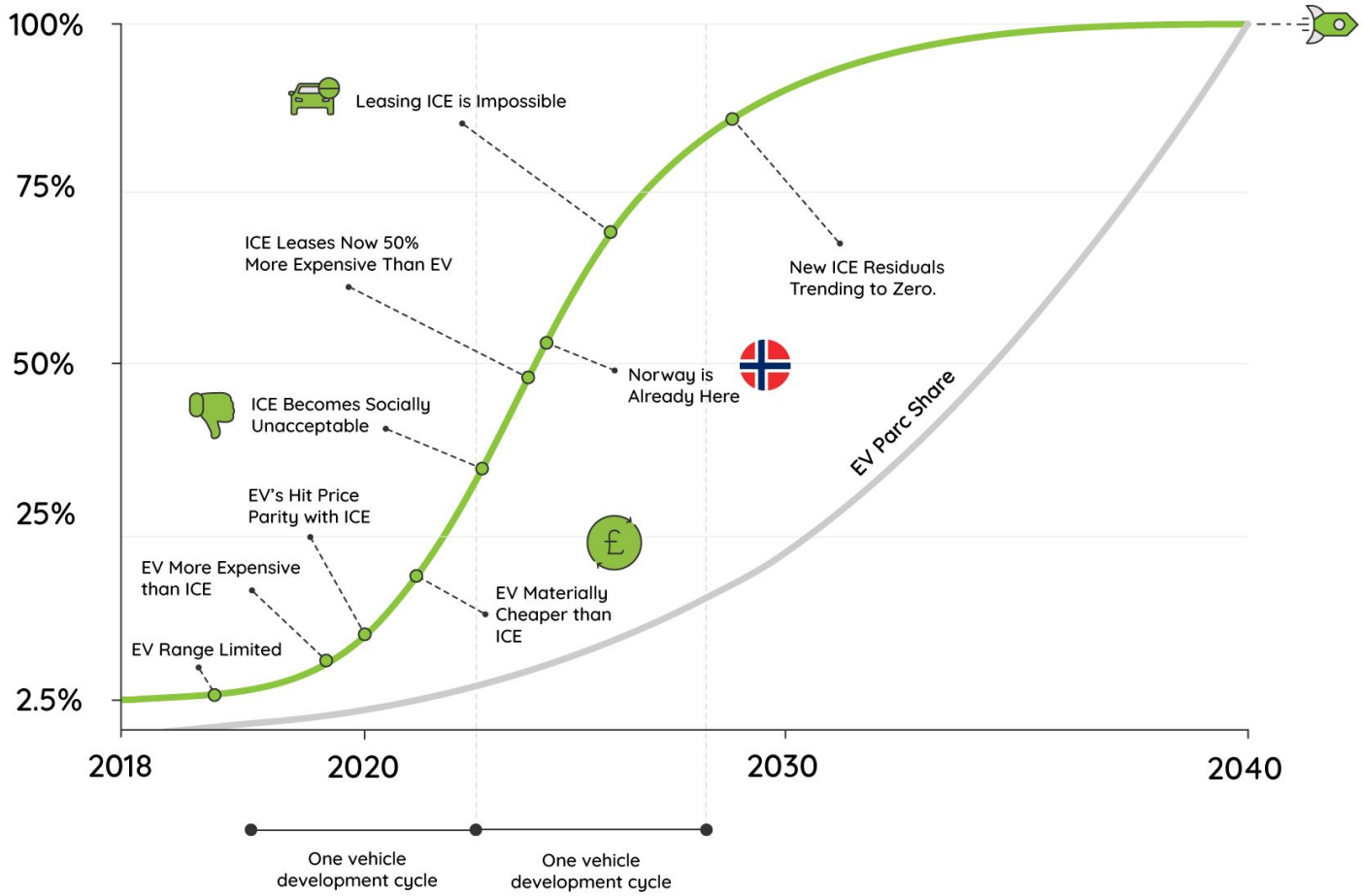
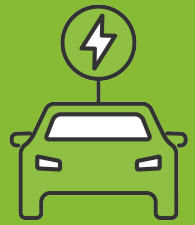
EV Adoption


100%
75%
50%
25%
2.5%
2018
2020
2030
2040
Leasing ICE is Impossible
ICE Leases Now 50%
More Expensive Than EV
New ICE Residuals
Trending to Zero.
Norway is
Already Here
ICE Becomes Socially
Unacceptable
EV's Hit Price
Parity with ICE
EV More Expensive
than ICE
EV Range Limited
EV Materially
Cheaper than
ICE
EV Parc Share
One vehicle
development cycle
One vehicle
development cycle

Barriers to EV



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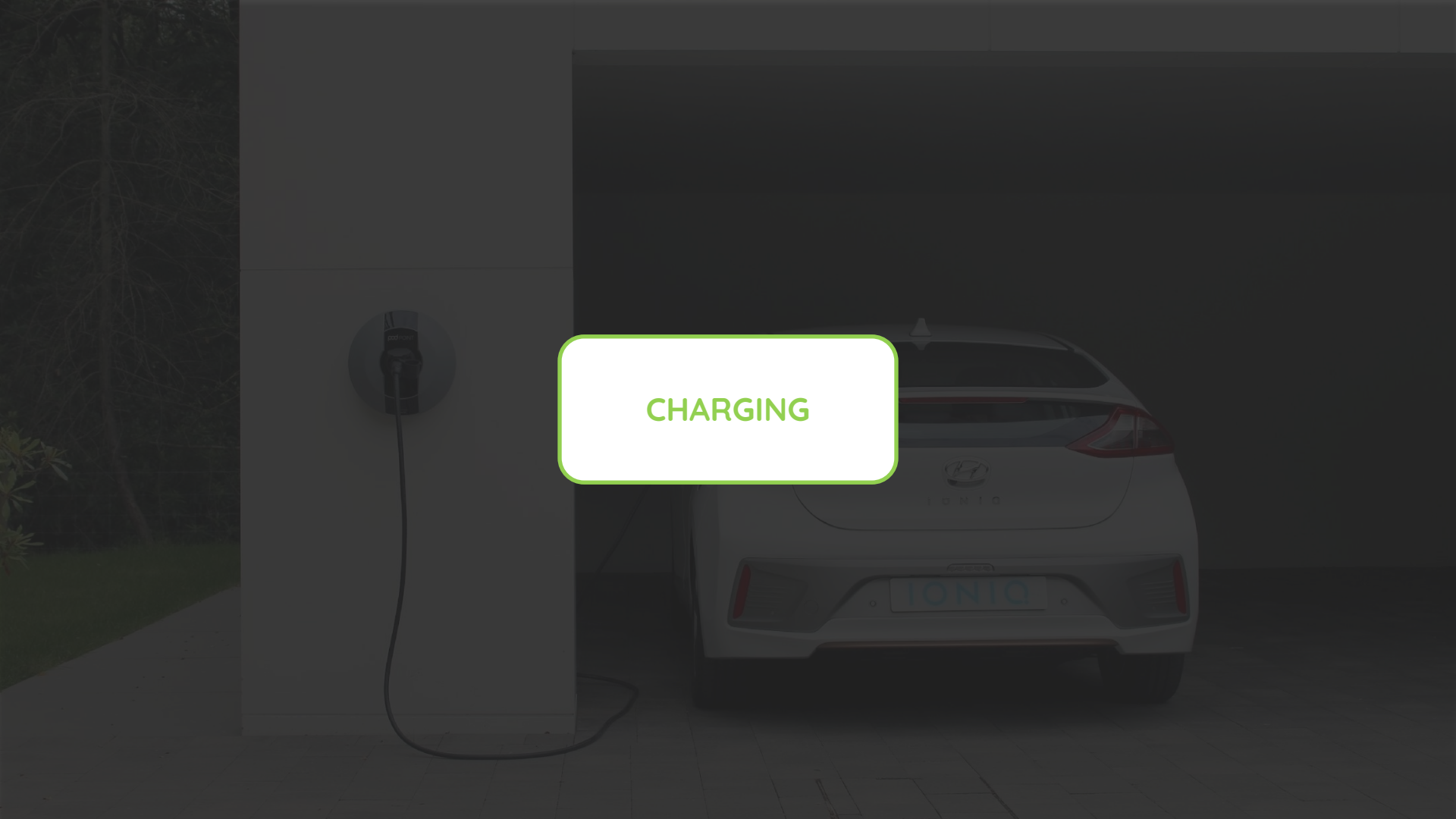
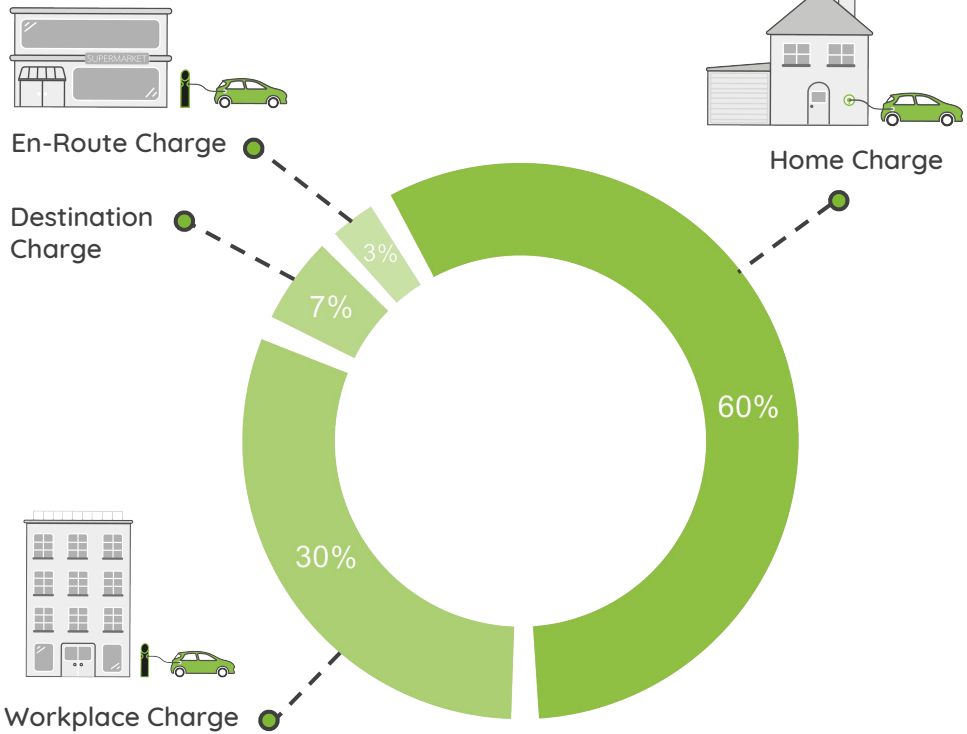
Range


CHARGING

There is no Electric Petrol Pump

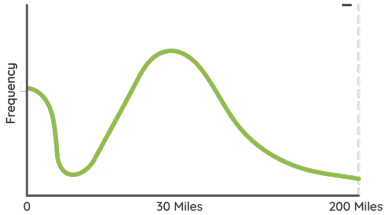
Ecosystem



EV charging is a top-up model, like a mobile phone

1.5

Net 1.5 charge points per EV



Miles Driven/Day

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Charge Points

Solo

Twin

Rapid

Alternative Technologies

Competitive

Hydrogen Fuel Cell

Always far less efficient than EV

Hugely expensive to build refueling infrastructure

Hydrogen is not an environmentally friendly option

Battery Swap

Impossible at scale

A spare battery for every car would be very costly

Swap stations unfeasible

Complementary

Autonomous Vehicles

Autonomous vehicles will be electric

They will still need to charge

Likely to have high overnight redundancy

Wireless Charging

Clear consumer win

Technology is inefficient

Standardisation challenge

We are watching it carefully...

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Twitter: James_McKemey

Supporting Slides


OTHER
CONSIDERATIONS

Market Overview

155,000

Plug-in **Cars**

Reg. UK Jun 2018 (Approx)

5,500

Plug-in **Vans**

Reg. UK Jun 2018 (Approx)

75

Plug-in **Models**

Jun 2018 (Plus variants)

16,584

Public Charging Connectors

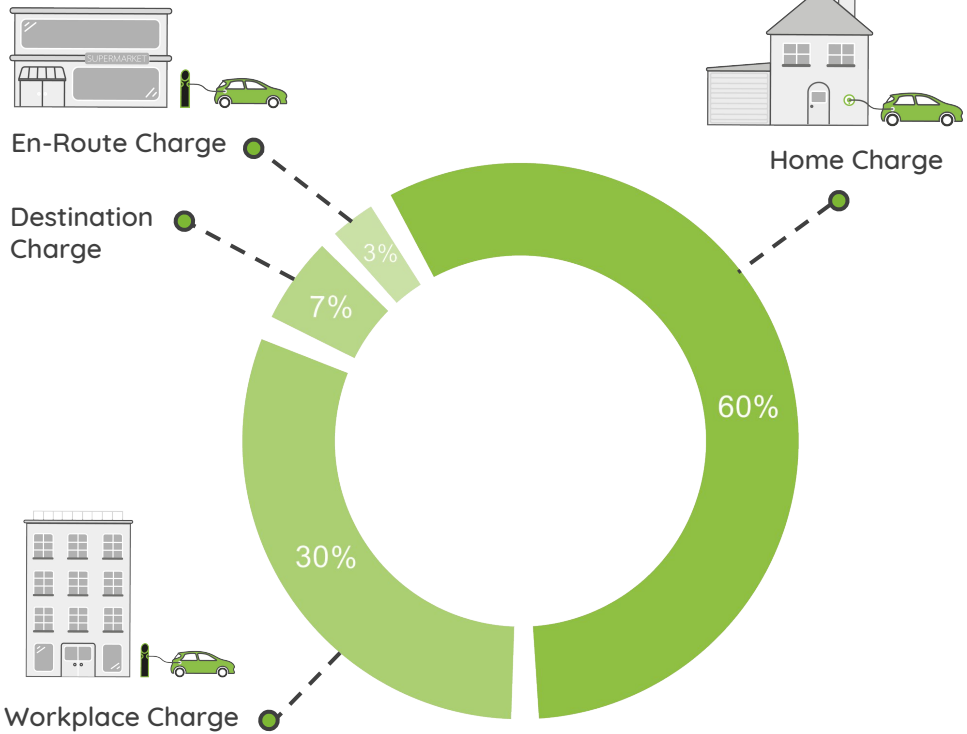
Jun 2018

Source: http://www.nextgreencar.com/electric-cars/statistics/

Plug-in Vehicle Sales to Date

Plug in vehicles as a percentage of all vehicle registrations (UK) - 2.6%

Ecosystem



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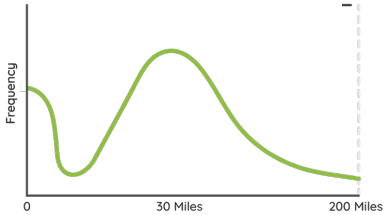

Miles Driven/Day

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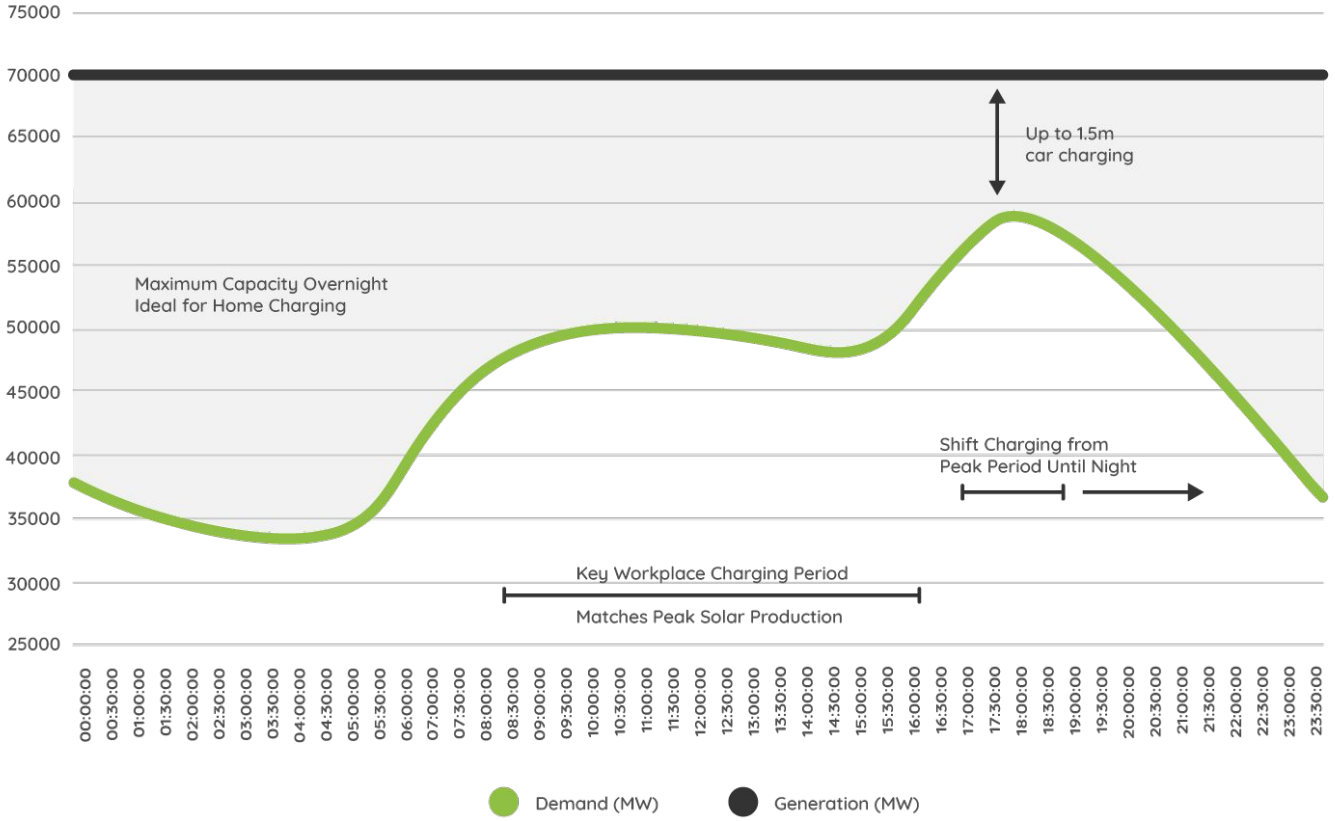
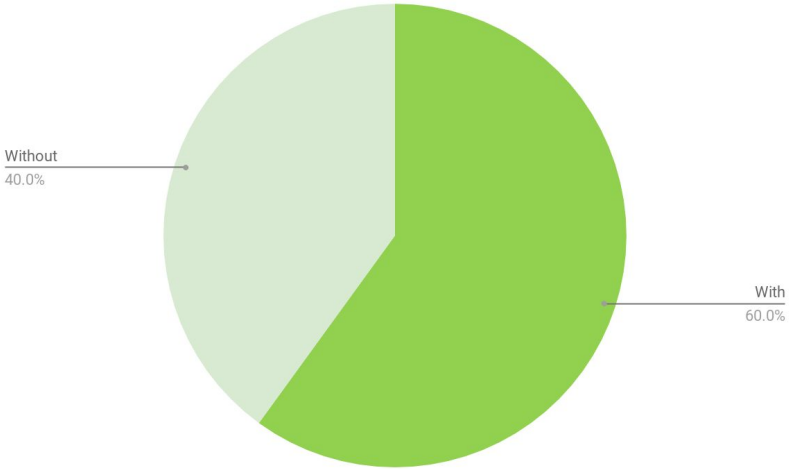
Is there enough electricity?

Typical 24hr Winter Demand vs Generation (MW)



No Home Charging?

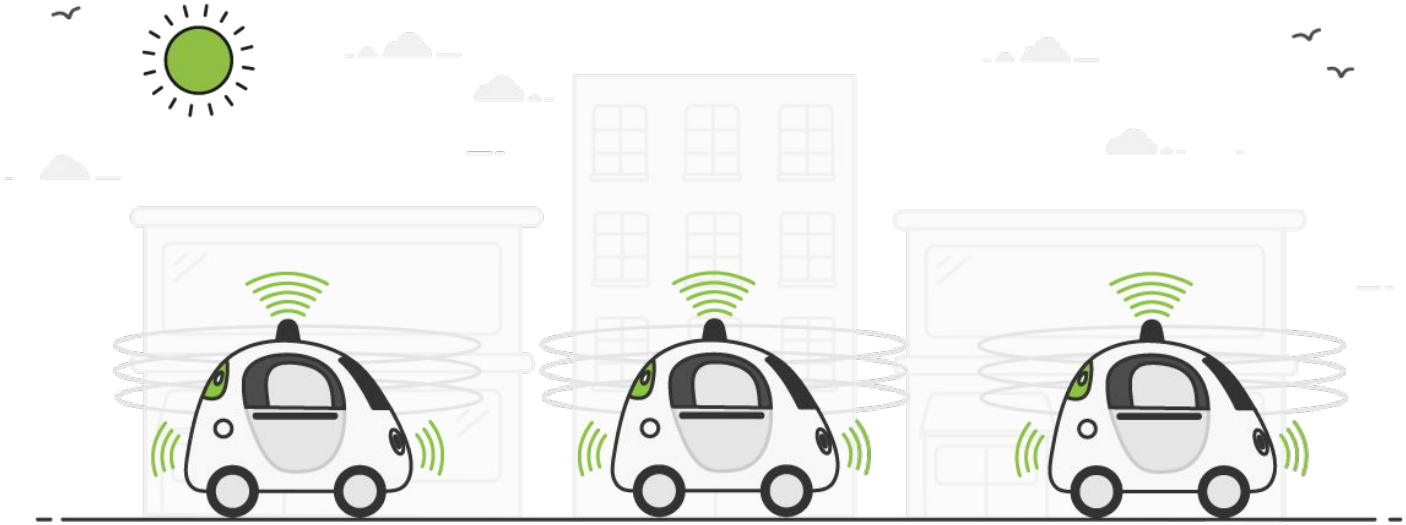
UK households' off-street parking



How to solve for the 40%?

1. **Focus on the 60% first!** We can reach mass adoption through the 60% (could be as high as 84% of drivers).
2. **Use alternative chargers:** Workplace, destination, en route.
3. **On-street charging:** Limited scope at present.
4. **Autonomous features:** Send car to charging facility? Opportunity for car park owners.
5. **Autonomous vehicles:** Reduced car ownership, reduced issue.

Autonomous cars still need charging



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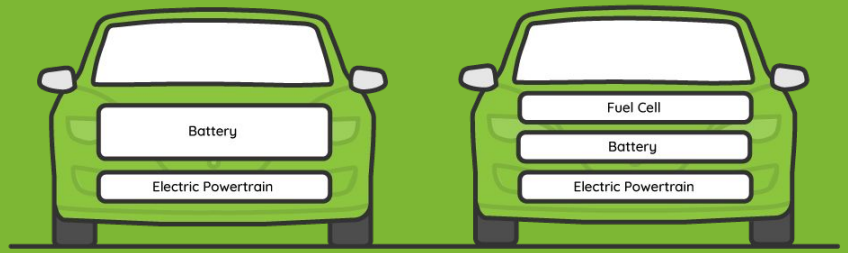
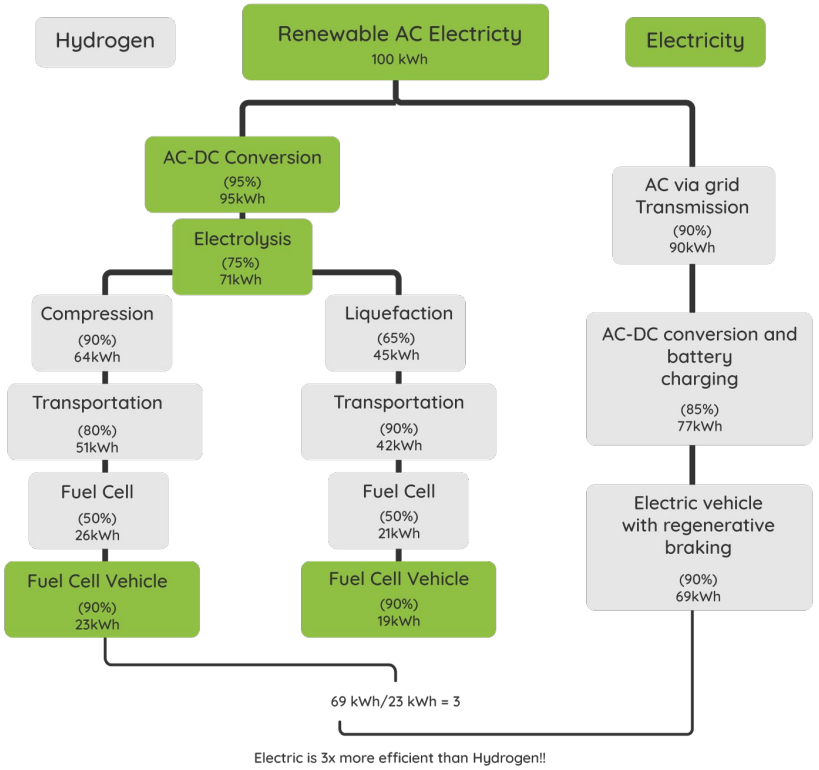
Battery Swap is Nonsense

Hydrogen is a daft idea for cars





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Wireless is cool, but it is a way off :

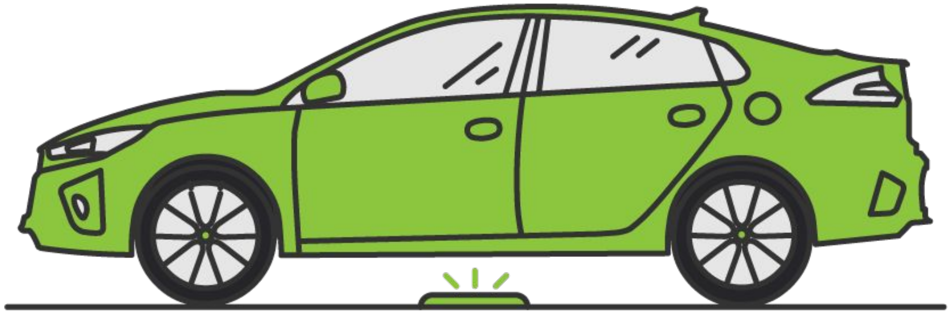
A progression into wireless:

- Toothbrush
- Mobile Phone

Available Today

- Tablet
- Laptop
- Lighting
- TV
- Kettle
- Cars (slowly)
- Cars (quickly)

Increasing Power Transfer



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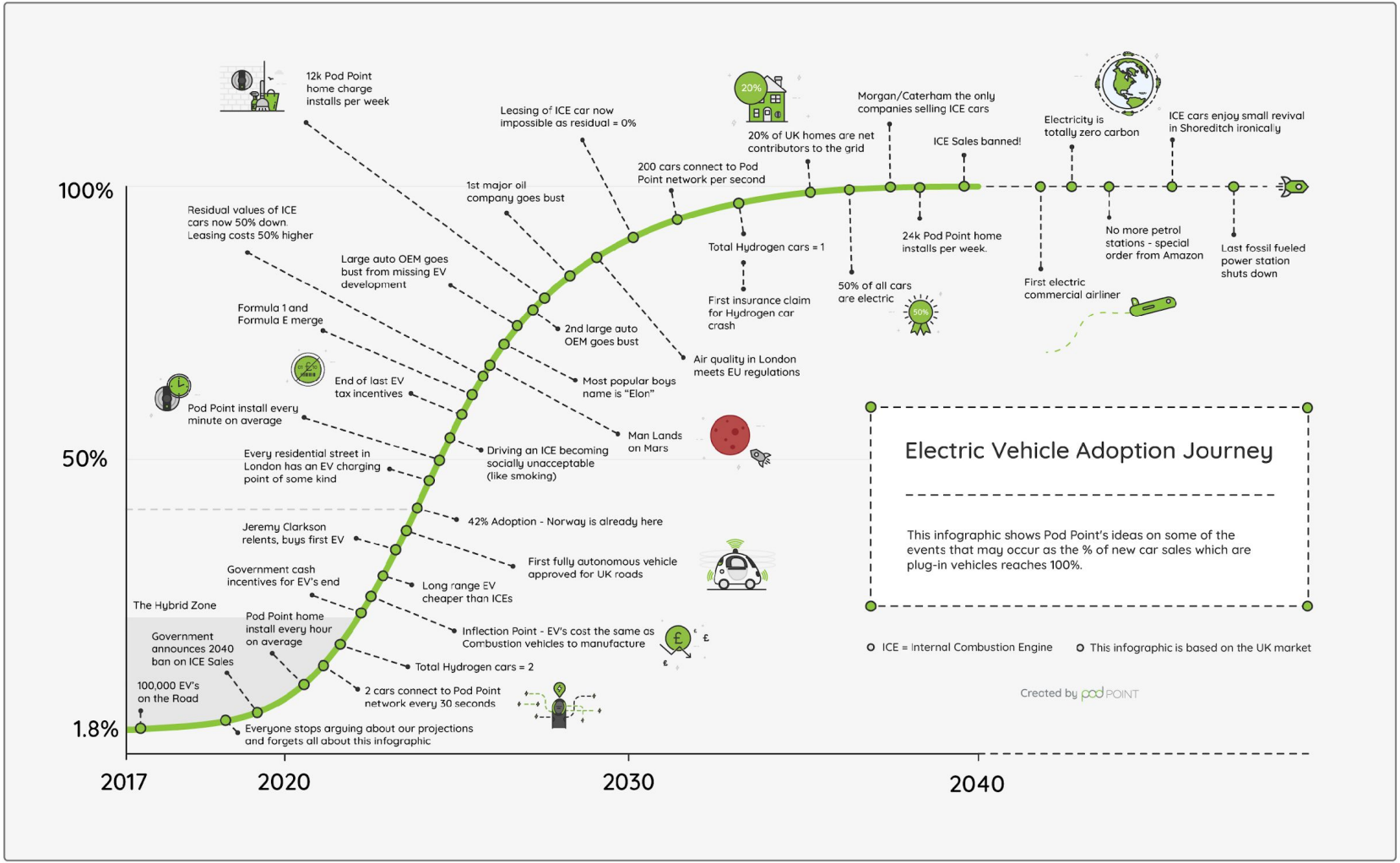
12k Pod Point home charge installs per week
Leasing of ICE car now impossible as residual = 0%
20%
20% of UK homes are net contributors to the grid
Morgan/Caterham the only companies selling ICE cars
ICE Sales banned!
Electricity is totally zero carbon
ICE cars enjoy small revival in Shoreditch ironically
100%
50%
1.8%
1st major oil company goes bust
200 cars connect to Pod Point network per second
Residual values of ICE cars now 50% down. Leasing costs 50% higher
Large auto OEM goes bust from missing EV development
Total Hydrogen cars = 1
24k Pod Point home installs per week.
No more petrol stations - special order from Amazon
Last fossil fueled power station shuts down
First insurance claim for Hydrogen car crash
50% of all cars are electric
50%
First electric commercial airliner
Formula 1 and Formula E merge
2nd large auto OEM goes bust
Air quality in London meets EU regulations
End of last EV tax incentives
Most popular boys name is "Elon"
Pod Point install every minute on average
Man Lands on Mars
Every residential street in London has an EV charging point of some kind
Driving an ICE becoming socially unacceptable (like smoking)
42% Adoption - Norway is already here
Jeremy Clarkson relents, buys first EV
First fully autonomous vehicle approved for UK roads
Government cash incentives for EV's end
Long range EV cheaper than ICEs
The Hybrid Zone
Pod Point home install every hour on average
Inflection Point - EV's cost the same as Combustion vehicles to manufacture
Government announces 2040 ban on ICE Sales
Total Hydrogen cars = 2
100,000 EV's on the Road
2 cars connect to Pod Point network every 30 seconds
Everyone stops arguing about our projections and forgets all about this infographic
2017
2020
2030
2040
Electric Vehicle Adoption Journey
This infographic shows Pod Point's ideas on some of the events that may occur as the % of new car sales which are plug-in vehicles reaches 100%.
ICE = Internal Combustion Engine
This infographic is based on the UK market
Created by pod POINT