



# Electric Vehicles – High Power Charging

James Kennedy



# Quick Facts

**3000+**  
Charging  
Stations

The number of charging  
stations deployed worldwide

**5**  
Buildings

Operating across 5 offices /  
manufacturing buildings

**3** Global  
Locations

Locations worldwide in Brisbane,  
Los Angeles and Amsterdam

**300+**  
Staff

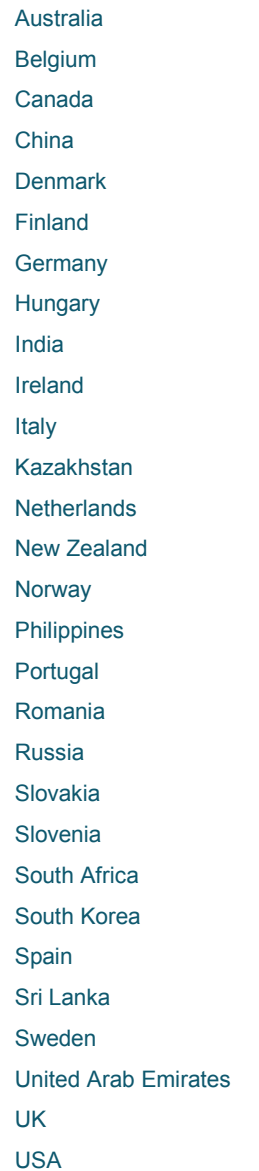
Expected to grow  
even further in 2019

**20+**  
Years

Track record in product  
development for e-mobility,  
renewable energy

**29**  
Countries

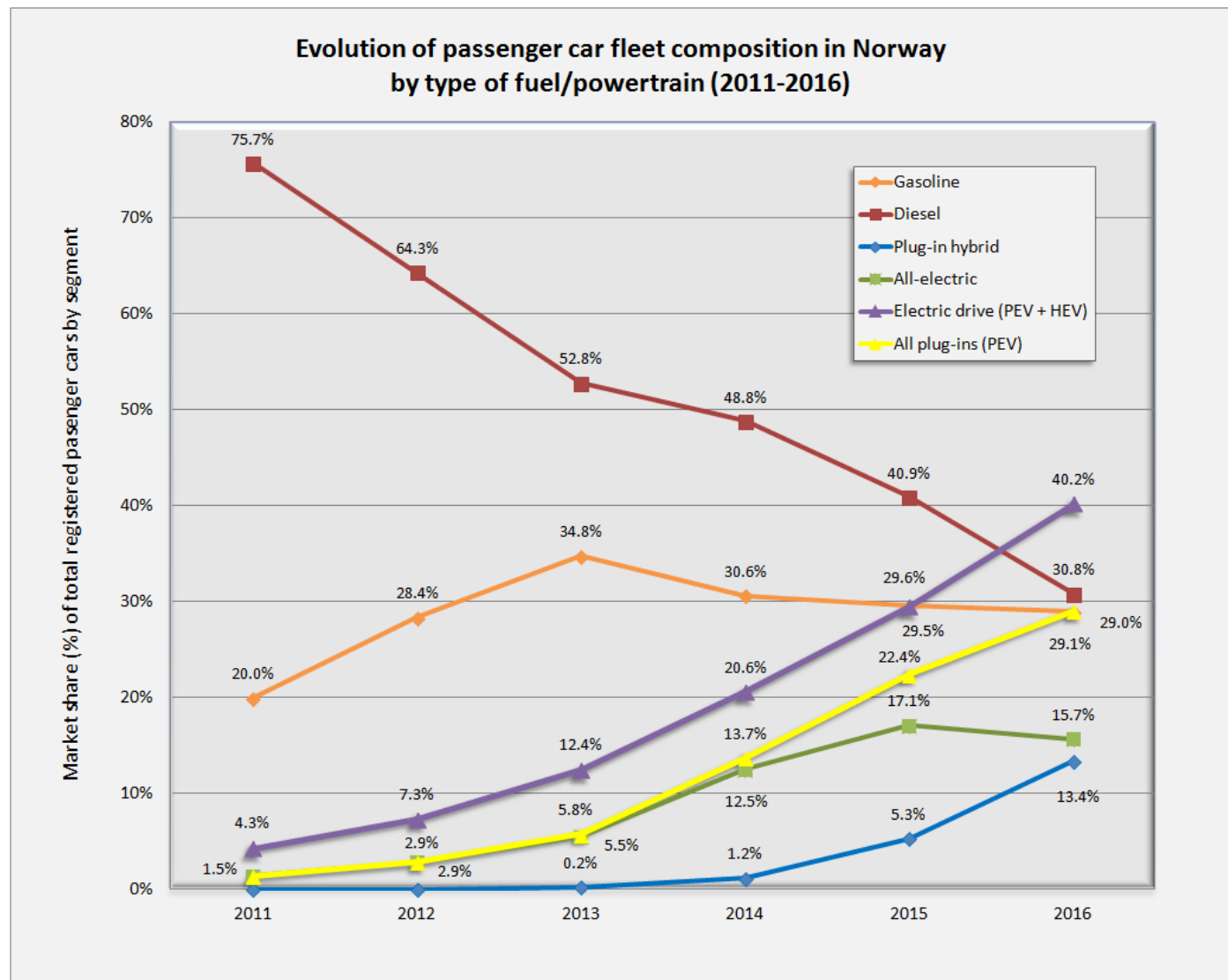
The number of countries  
where Tritium products  
have been installed





# EV uptake

- **Norway** is the example to show what happens when EV prices reach parity with diesel and petrol vehicles
- **25% VAT removal** for EVs meant parity or very close to it
- Almost 50% of new car sales are electric, resulting in:
- Almost 1/4<sup>th</sup> of vehicles on the road are now electric
- Tesla Model S was the monthly highest-selling vehicle, *ever, of any type*, March 2014





# EV Benefits

- ✓ Healthier local environment
- ✓ Better utilisation of power networks
- ✓ Better utilisation of renewables
- ✓ Lower emissions
- ✓ Energy security
- ✓ Less noise










# Charging Speed

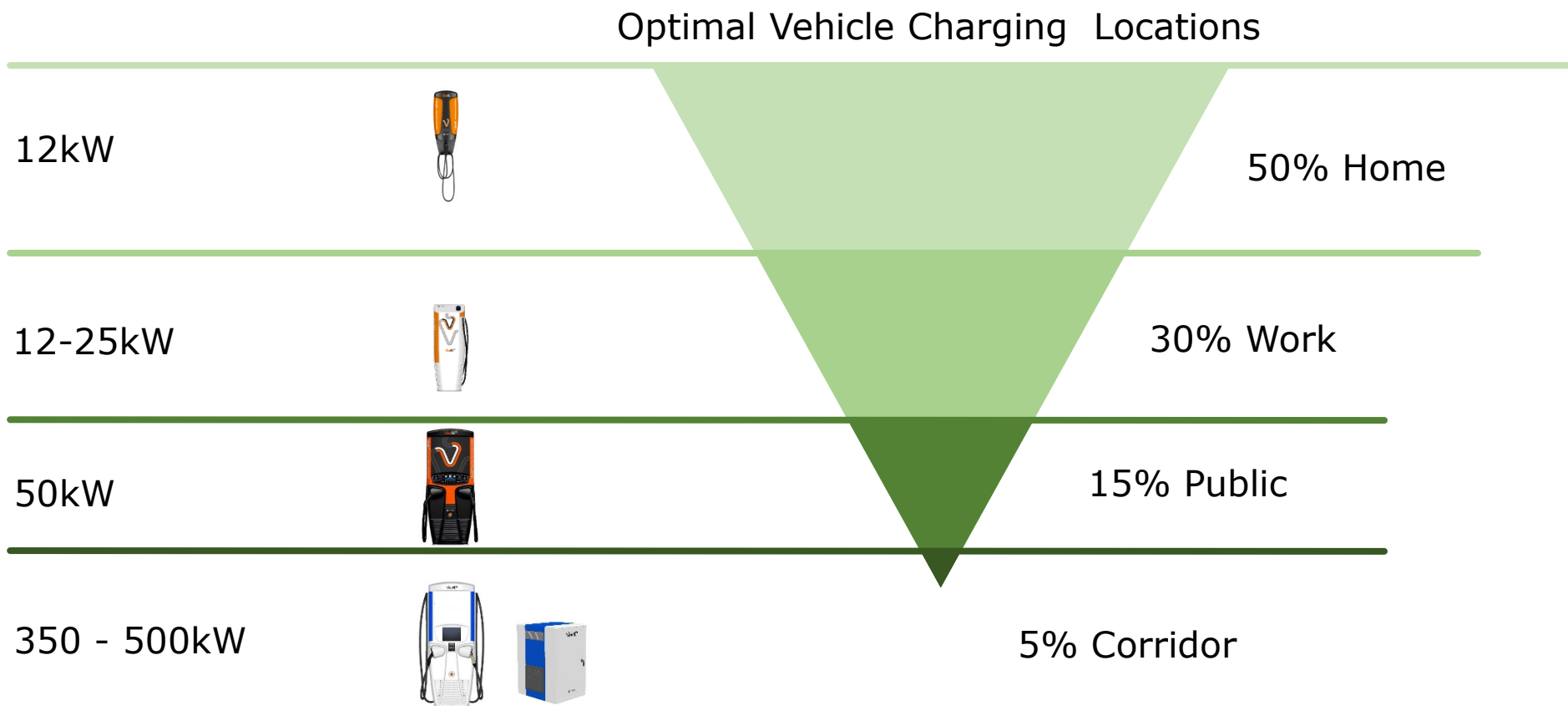
## How fast is fast enough?

						
Type	120V	L2	L3	Supercharge	HPC	Petrol
Power (kW)	1.2	7.6	50	120	350+	5,530
Speed (km/h)	8	50	320	800	2,400	36,400
320 km wait	40 hrs	6 hrs	1 hr	24 mins	8 mins	30 secs



# More convenience

## EV's can charge anywhere





# European Automotive OEM Network

## Announced Nov 2017 – 30% built already

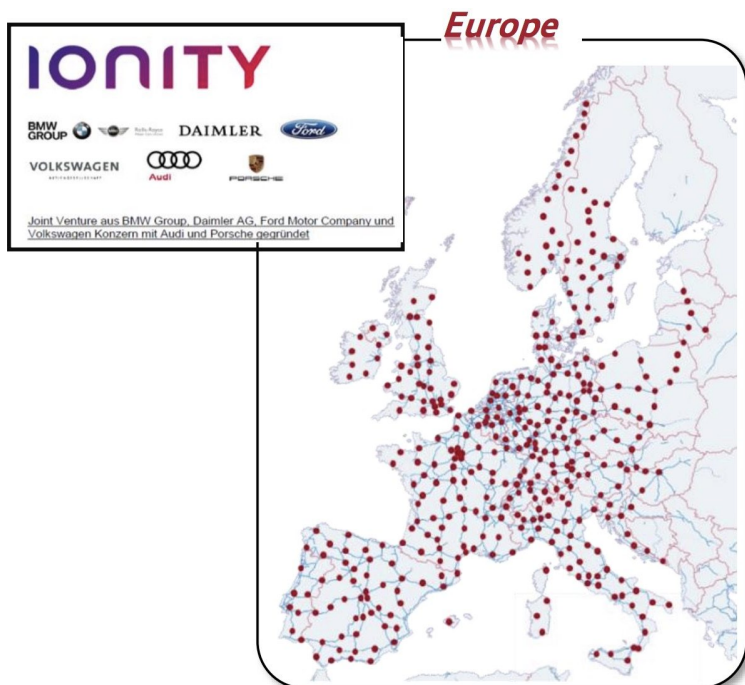
- **IONITY network:** Volkswagen (incl Porsche & Audi), Ford Europe, BMW, Daimler/Mercedes
- **400+** sites across Europe within the next 18 months – expected to only be 10% of final network
- Each site consists of:
  - 1250kVA MV (10/20kV) transformer, metering, and switchgear
  - 6x 350kW charging heads + parking spaces, expandable to 500kW
  - Liquid-cooled charging cables
  - Site power management control (charging head power is greater than site power)
  - Telemetry, remote access, firmware updates, billing system
  - Revenue-grade DC metering equipment





# European Automotive OEM Network

Being built now



- 400 sites until end of 2019 planned
- Roughly 6 charge points per site





# EV Energy Storage

## We can *easily* go to 100% renewable



### Fleet assumptions

- 300km+ range (available 2018-19, <\$40k)
- 14,000km per annum (Australian average)
- 10 million vehicles (13.2 million now)
- 200 Wh/km EV real-world efficiency



### Consumption

- This fleet consumes 28,000GWh/yr
- 14% increase in electricity usage



### Storage

- 500GWh of storage capacity (5000x SA Tesla batteries)
- The entire daily national average energy usage in storage





TRITIUM

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