Electrical Vehicles
&
EVlink

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South & Eastern Europe

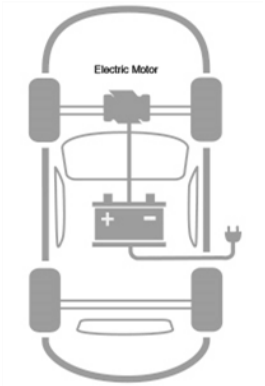
Electric vehicles basics

What’s an electric vehicle?

2 types of EVs can be charged

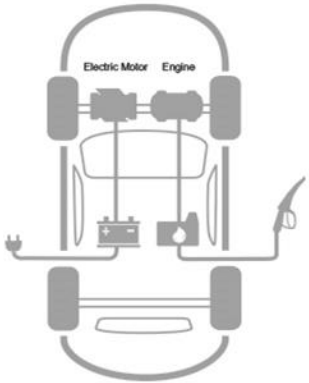
Battery Electric Vehicles (BEVs)

They rely entirely on rechargeable batteries to provide power



Plug-in Hybrid Electric Vehicles (PHEVs)

They have batteries that can be recharged but have conventional engines as back-up



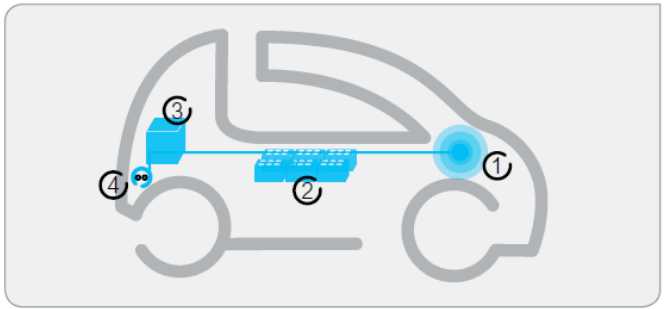
Note:
Conventional cars are also called ICE (Internal Combustion Engine)
Hybrid EV cannot be charged

Electric vehicle basics

The car

1. **The motor**
   - Total power: from 15 and 500 kW
2. **The battery set**
   - Where energy is stored
   - Capacity: between 5 to 100 kWh at a voltage of 300 to 500 V
3. **The on-board charger**
   - converting alternating current from charging station into direct current stored in the battery
4. **The charging inlet**
   - At least one for normal (AC) charging
   - Possibly a second for fast (DC) charging

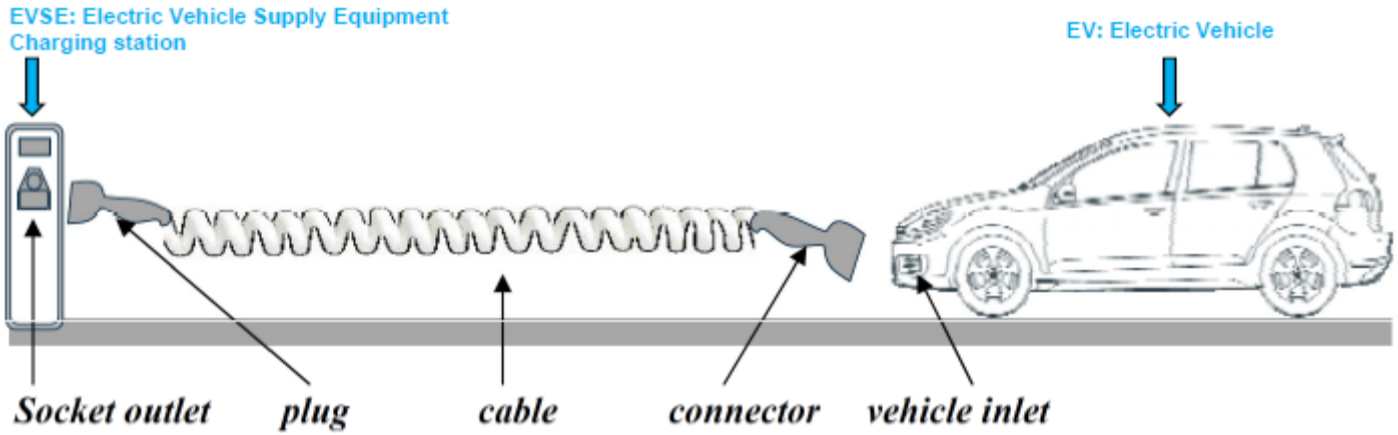
4 major items:



EV	Motor	Battery Set	On-board charger	Charging inlet
Renault Zoe	65 kW	41 kWh	22 kW	T2 / NA
BMW i3	125 kW	22 or 33 kWh	7 kW	T2 / Combo
Tesla Model S	Up to 440 kW	100 kWh	10 or 20 kW	T2 / Adaptor required
Nissan Leaf	80 kW	30 kW	7 kW	T1 / CHAdeMO

Electric vehicle basics

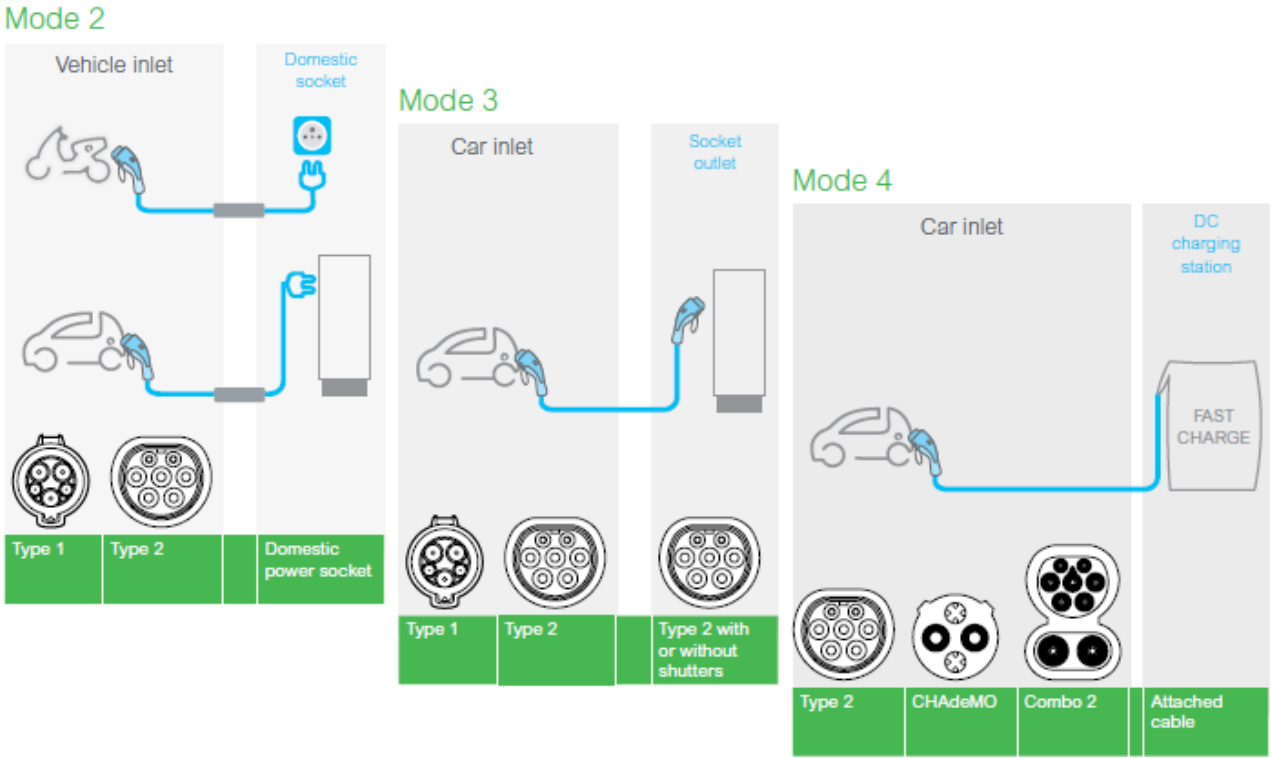
Terminology



Charging capacity is defined by the weakest element,
either the charger capacity or the charging station capacity

Electric vehicle basics

Charging modes



Charge of electric vehicle

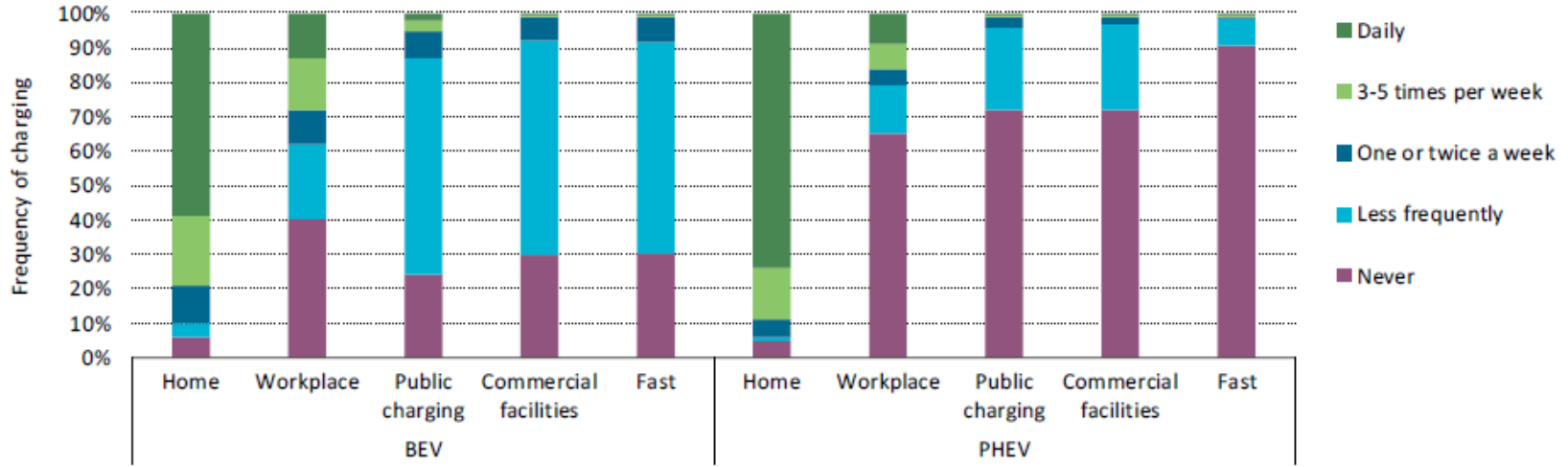
Time to refill for the 5 most sold EVs in Europe

			Time to fill up						
			Renault Zoé	Mistubishi Outlander PHEV	Nissan Leaf		Tesla Model S		Golf GTE
		Battery (kWh)	*22*	*12*	*24*	*30*	*60*	*100*	*8,7*
		EV Charger (kW)	*22*	*3,7*	*3,7*	*7,4*	*11*	*22*	*3,7*
		Range (km)	*240*	*50*	*150*	*180*	*400*	*600*	*50*
Normal charger	Single phase	3,7 kW - 16 A	6,00h	3,25h	6,49h	8,10h	16,20h	27,00h	2,40h
		7 kW - 32 A	3,00h			4,10h	8,10h	13,50h	
	Three phases	11 kW - 16 A	2,00h				5,50h	9,10h	
		22 kW - 32 A	1,00h					4,50h	
Fast charger	Three phases	50 kW - 80 A	30,00min	24,40min	38,80min	46,00min	1,40h	2,20h	Not available

Charging capacity is defined by the weakest element,
either the **EV charger capacity,** the **charging station capacity,** or the **cable**

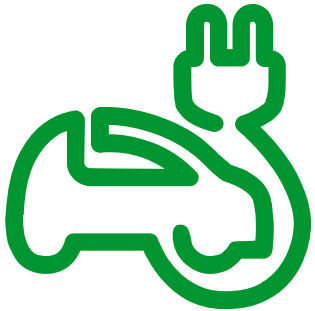
Customers don’t charge EV the way they fill in the tank

Figure 13 • Charging habits for a sample of Norwegian electric car users, 2016



Source: IEA elaboration based on results from Figenbaum and Kolbenstvedt (2016).

Charging stations market



Electric vehicle market

Facts and figures

Vehicle cost

+

Vehicle range

=

Consumer barriers

Electric vehicles

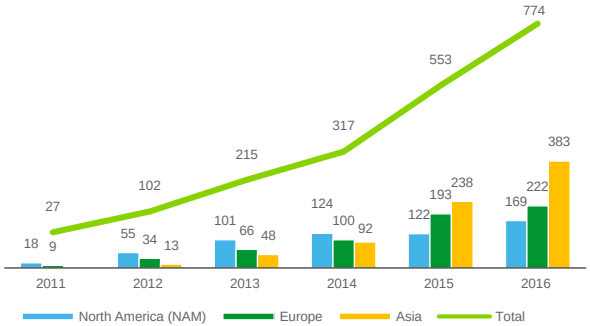
Government incentives to

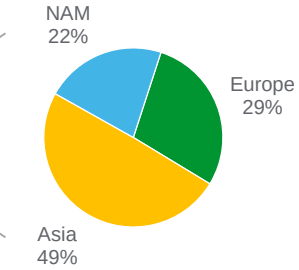
- Favor EV purchase
  - E.g. Tax reduction
- Develop charging infrastructure
  - E.g. Regulation to impose EV parking spaces on public parking

Source: Global EV Outlook 2016, International Energy Agency

Charging stations market – Regional / Country / OEM

EV global sales volume (k units) regional split (*)

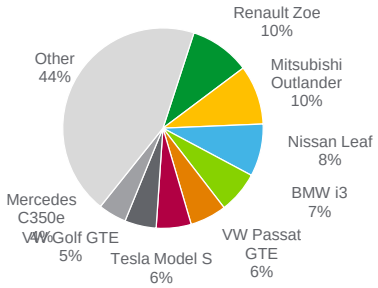




European sales breakdown per nation - 2016

	EV sales volume (*)	Passenger car sales volume (**)	EV share of total car sales
	34 574	2 015 177	1,7%
	27 404	3 351 607	0,8%
	23 114	382 825	6,0%
	39 283	2 692 786	1,5%
	45 662	154 603	29,5%

European sales volume breakdown per model & OEM – 2016 (*)



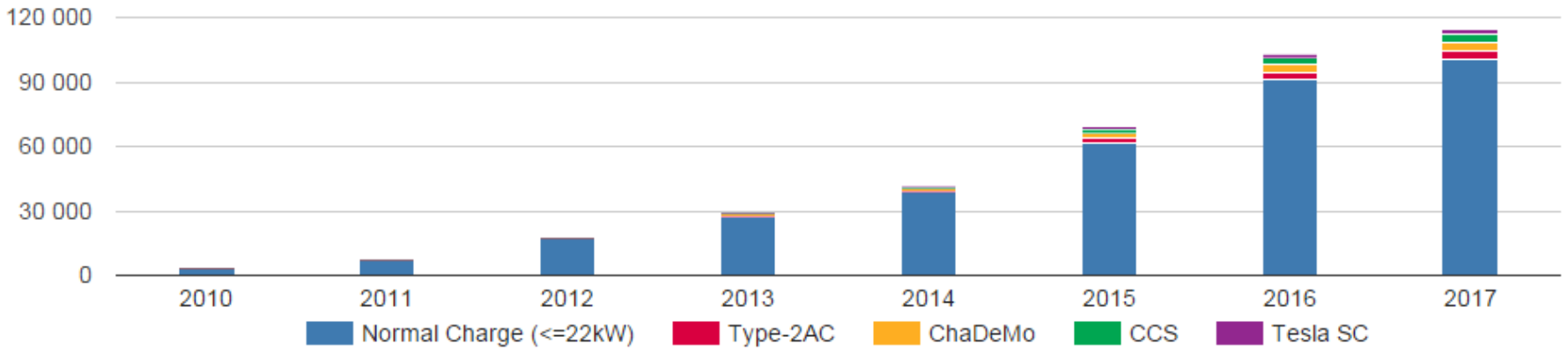
Ranking	OEM	Country
1	BMW	
2	Volkswagen	
3	Renault	
4	Nissan	
5	Mitsubishi	
6	Mercedes	
7	Tesla	

(*) Source http://ev-sales.blogspot.it/
(*) Source http://www.acea.be/

Schneider Electric

Electric vehicle charging places

Focus in Europe



EVlink Offer

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EVlink is

the worldwide market leader

with >68 000 points of charge

in 40 countries

since the earliest stage
of e-mobility

EVlink covering the full market segments

EVlink Wallbox or
Smart Wallbox

Residential

Fastcharge

EVlink Parking

EVlink
Smart Wallbox
or Parking

EVlink Wallbox

Offer description

Attached cable

Type 1 | Type 2

Socket Outlet

Type 2 | Type 2S

- Plastic cover
- Easy to install (<30 min)
  - On the wall, on a pole
- Key lock access control
- Energy management
  - Deferred start **or** charging current limitation

Available at 3.7, 7.4kW, 11kW and 22 kW (except ACT1 from 3.7 to 7.4kW)

EVlink SmartWallbox

Offer description

Attached cable

Type 1 | Type 2

Socket Outlet

Type 2 | Type 2S

- Plastic cover
- Easy to install (<30 min)
  - On the wall, on a pole
- User authentication
  - Key lock or RFID card
- OCPP connection to back-end
- Energy management
  - Deferred start **and** charging current limitation
- Easy commissioning
  - use of a laptop connected to a web server embedded in the Smart Wallbox

Available at 7.4 or 22 kW (except ACT1 only at 7.4kW)

EVlink Parking

Offer description

- 2 charging points on the same unit
- Metal enclosure
- Protection devices can be installed in the floor base
- User authentication
  - RFID card
- OCPP connection to back-end
- Energy management
  - Load management per socket outlet or for the charging station
  - Automated load balancing for dual sockets
  - Load shedding
- Easy commissioning
  - use of a laptop connected to a web server embedded in the Evlink Parkign

Type 2

Type 2S

Domestic socket

Available at 7.4 or 22 kW

PULSE QC 50 – Reliable, Smart and Robust

80% charged in less than 30 minutes

Charge time
15-30mn > 80%*

Plug types
Combo 2, CHAdeMO, T2 AC

Charge power
AC 43kW/DC 50kW
Efficiency rate: 96%

Charge Mode
Mode 3 and 4
AC/DC simultaneous charge

Number of plugs
1 to 3 depending on configuration

Authentication
RFID badges
(Options: SMS, Barcode or QR code)

Connection
GPRS

Monitoring
Chargepulse or 3rd party back-end OCPP 1.5

Housing
Painted stainless steel customizable

*Depending on the EV

EV Standards

- **IEC 61851: EV Charging system**
- Characteristics of CS
- Communication EV <->CS
- Electrical safety requirements
- **IEC 62196**
- Plugs, socket outlets, vehicle couplers and inlets
- **IEC 60364-7-722: LV electrical installation**
- Supply for EV

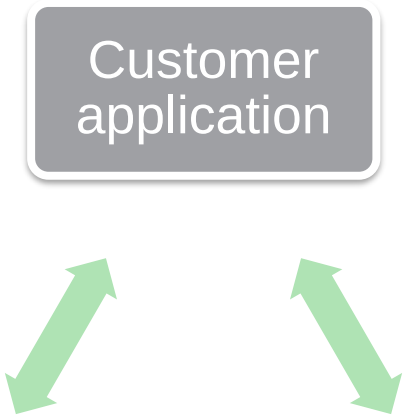
- Consortium between Renault-Nissan, Peugeot-Citroën and Mitsubishi
- Scope: certify all the elements that are required to charge an EV safely
- Managed by ASEFA

- Driven by Renault
- Scope: guarantee that charging stations are compatible with ZE vehicles
- Managed by LCIE

- List of certified installers are available on ASEFA and LCIE websites

We offer what customer needs and not what he think he wants

Good to know (1)



Type of cars
Charging place (Public, Private)
Parking time
User authentication
Billing
…

Parking configuration
Available power
Energy management strategy
Local regulations
….

Total budget including civil works, protective devices, supervision software…
Deadline for installation and commissioning

We offer what customer needs and not what he think he wants

Good to know (2)

- Parking configuration
  - Indoor/outdoor
  - Location of the charging stations: 1 CS for 2 EV, fixed on the wall
  - Distance between distribution board and charging station
- Local standard, regulations
- Available power to the connection point for the electrical installation
  - Energy management strategy
    - Standalone, Static, Dynamic
- Installation requirements - EV/ZE-ready prescriptions
  - Cable cross-section
  - Earth measurement
  - Phase and neutral connections must be stricly done

We offer what customer needs and not what he think he wants

Good to know (3)

1

50kW DC
charging station

=

10

2x 22kW AC
charging station

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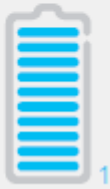
We offer what customer needs and not what he wants

Good to know (4)

Most of the refills are done at home and battery capacity is **often not empty**

=> Customer just need to get enough power to drive home!

Example: for a vehicle with a 24 kWh battery:

Source used	Domestic power socket	Dedicated AC power socket		Dedicated DC power socket
Power	Single-phase: 2.3 kW	Single-phase: 7.4 kW	Three-phase: 22.1 kW	Three-phase: 43 kW
Time to "fill up"	 12 h	 5 h	 1h 30 min	 30 min
% of charge reached in 30 min	 4%	 10%	 34%	 100%

* Subject to the use of a suitable cable.

Thank you !

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