

# NEW-GENERATION ELECTRIC VEHICLES



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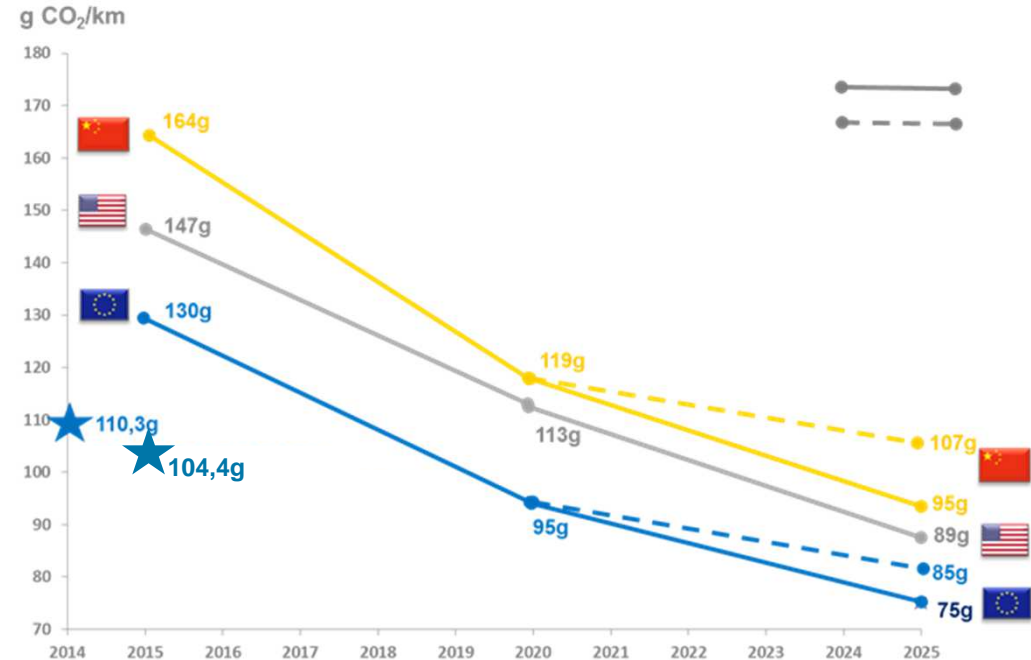
## AN ENERGY TRANSITION INTENDED TO REDUCE GREENHOUSE GAS EMISSIONS

### CHINA: “The 2nd biggest NEV market aiming to be the first”

- Encouragement measures for NEVs’ daily using:
  - Traffic privilege
  - Charging infrastructure
- New fiscal support policy for NEV

### EUROPE:

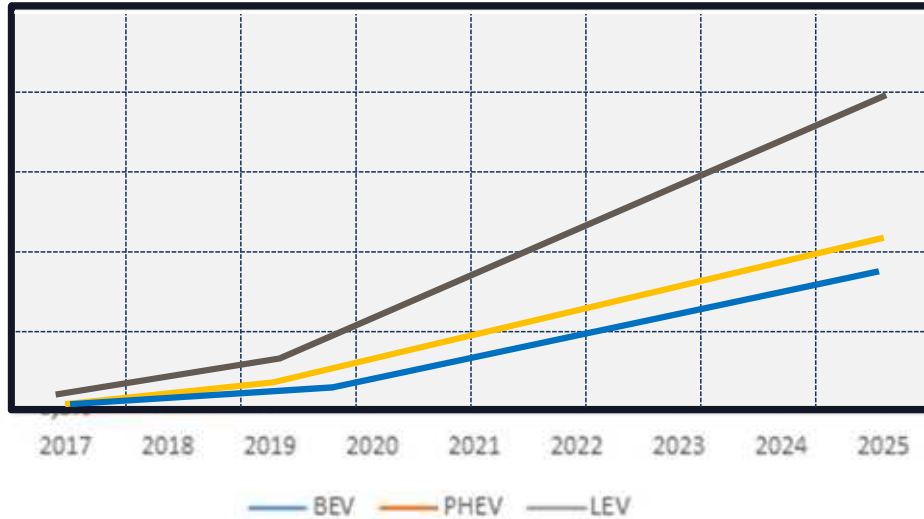
- Tax incentives for buying an electric vehicle in several European countries
- Extension of “low emission” areas (190 in 2015)



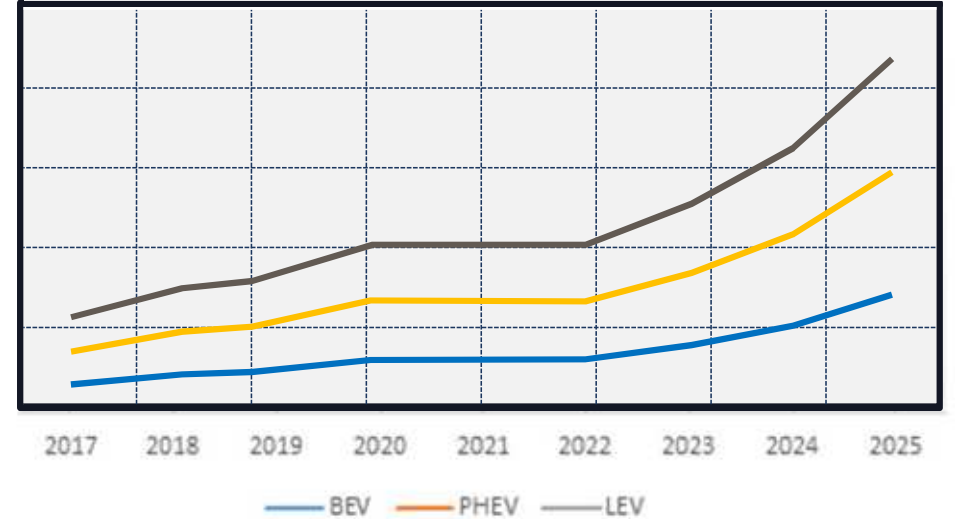


## A GROWING ELECTRIC VEHICLE MARKET, WHICH WILL COVER NEW SEGMENTS BY 2020

### EV Market Forecast for Europe: 7 to 10% in 2025



### EV Market Forecast for China: 5% to 7% in 2025



**Mainstream BEV in Europe = A-B & C hatchback  
+  
Premium brands = CUV & Sporty EV for D-E-F**

**FROM A segment >55% in 2014  
TO  
20% in B segment & 60% in C segment in 2020**



## A SHIFT IN MOBILITY AND ELECTRIC VEHICLE NEEDS TOWARDS GREATER FLEXIBILITY

### 2016 : BEV as an object

- A 2<sup>nd</sup> or 3<sup>rd</sup> car, with constraints in term of use
- Expensive offers
- Customers very involved



### 2020 : ElectroMobility System

- A « real car », urban, environnemental friendly
  - Improved driving range
- A car with strong pilars : safety, reliability, durability and a optimized TCO
  - A shared vehicle
- High customers expectations

# OUR TECHNOLOGICAL SOLUTION



## A GLOBAL MODULAR PLATFORM COMPATIBLE WITH MULTIPLE ENERGY SOURCES

**GASOLINE TURBO  
PURETECH**

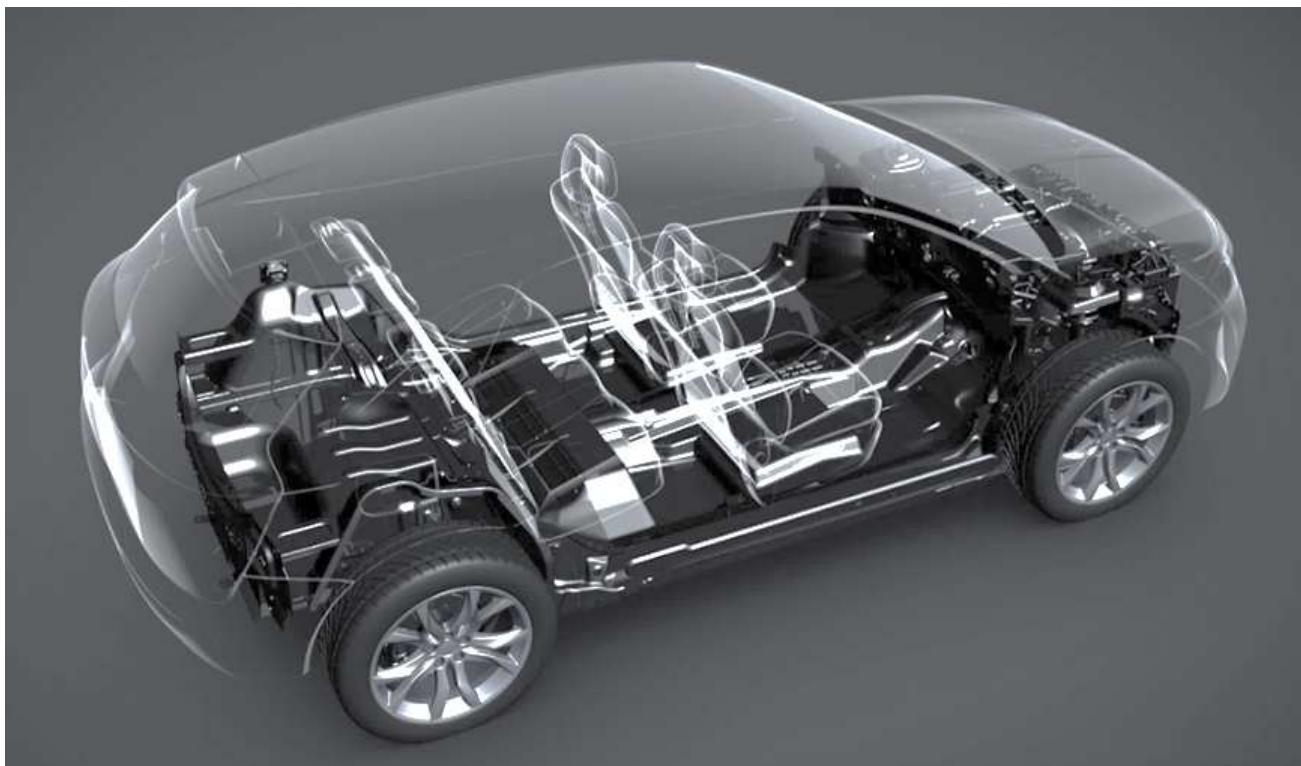
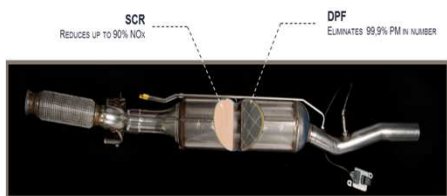


INTERNATIONAL  
**engine**  
of the year  
awards

**BATTERY  
ELECTRIC  
VEHICLE**



**DIESEL  
BLUE HDI**





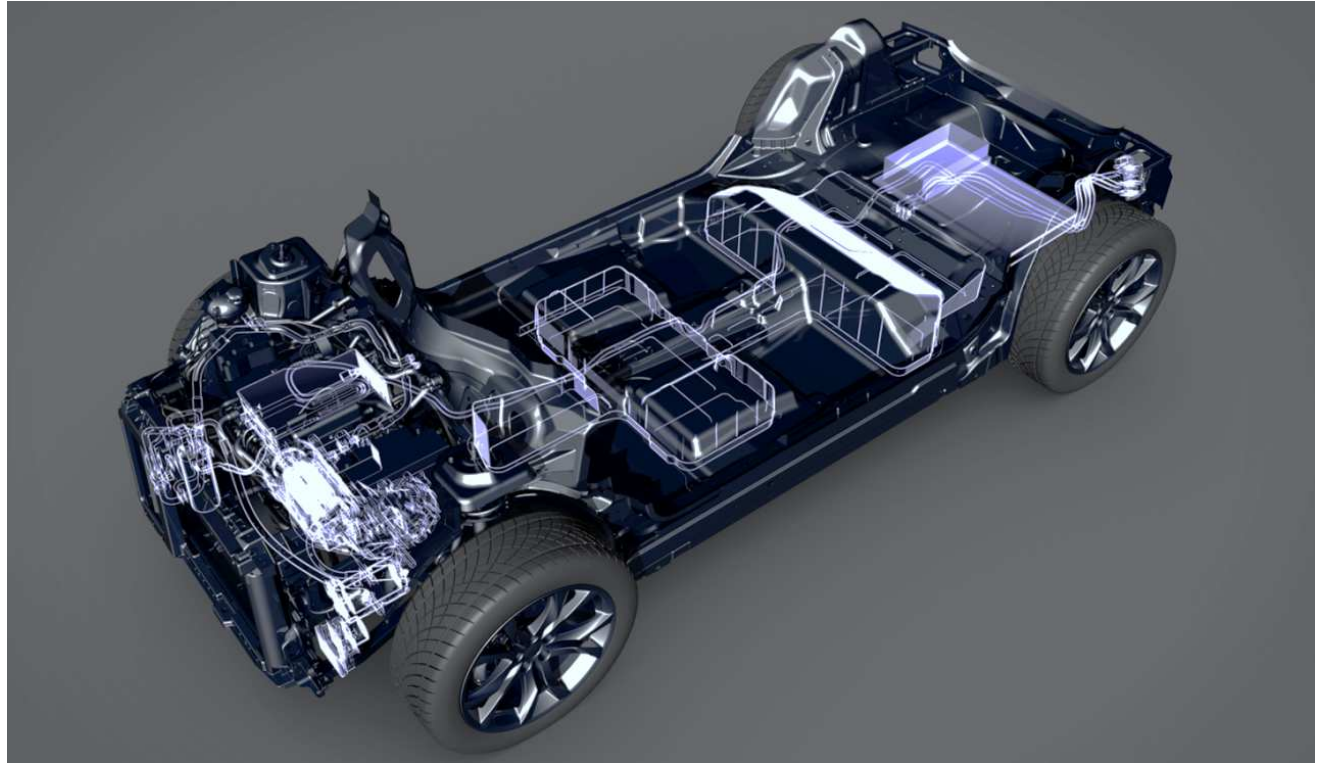
## A CLEVER DESIGN OF THE VEHICLE'S FUNCTIONAL AND PHYSICAL ARCHITECTURE

### Intelligent Integration

- “Invisible” battery integration
- Under-hood electric powertrain
- 5 stars EuroNCAP security

### High Performance

- 115 hp Electric Motor
- Regenerative braking





INCREASED RANGE IN ALL CONDITIONS, UP TO 450KM\*

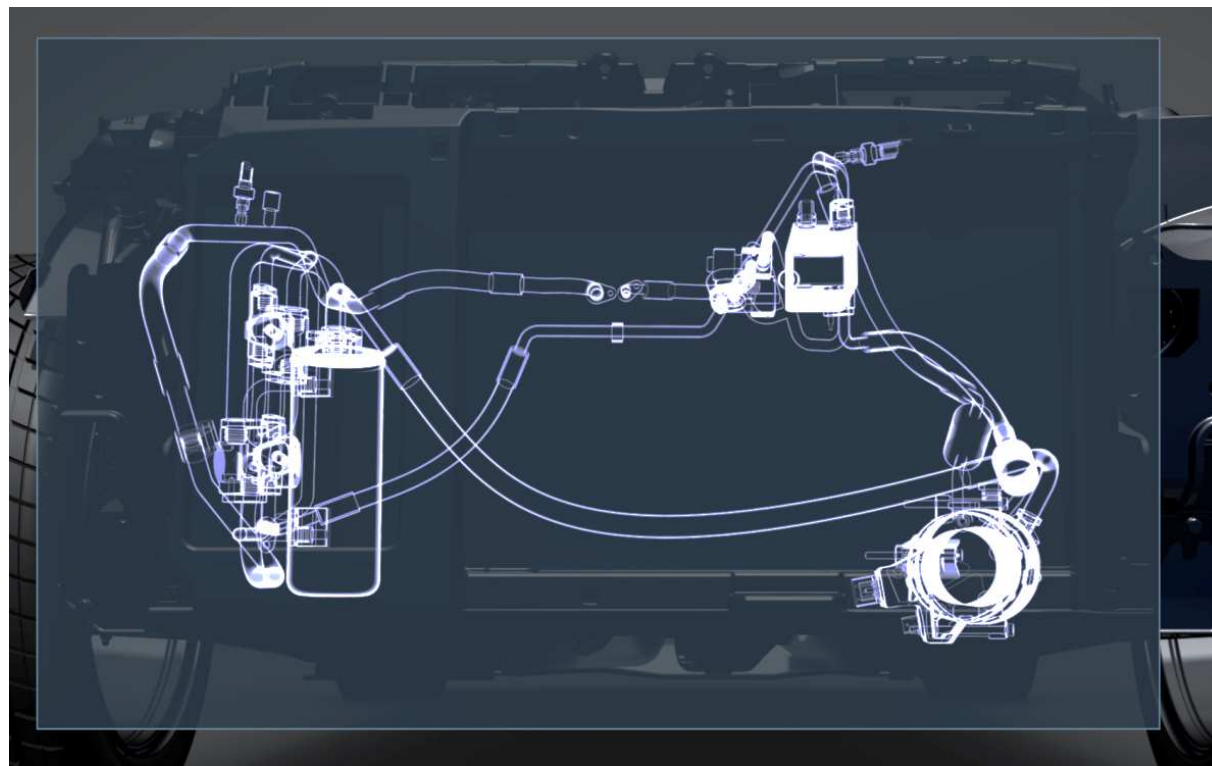
*\* following NEDC cycle*

## State-of-the-art lithium-ion battery pack

- 50kWh total energy capacity
- 200 Liters
- 300kg

## High efficiency heat pump (Cabin Heating)

- Wider range of operating temperatures
- Reduced energy consumption
- 50km higher range in cold temperatures







## EASY AND ULTRA-FAST CHARGE

### Fast home charging

- New generation On-board charger (6,6kW)
- Charging rate up to 100km in 1h30min
- Complete charge during the night (8h)

### Ultra-quick charging for intensive use

- 100kW ultra-quick charge capabilities
- Charging rate up to 12km per minute
- 80% of the battery in 30 minutes








## A/C CHARGING: ON-BOARD CHARGER REQUIRED FOR PUBLIC AND HOME CHARGING

- Mode 2 : Allows to charge everywhere
- Mode 3 : Allows increased charging power

Charging Mode	Power Source	Recharge Power	Energy Charged Overnight*
Mode 2	Standard wall socket (8 A)	1,7 kW	13 kWh
	 Green-up socket (14 A)	2,9 kW	23 kWh
Mode 3 (Single Phase)	Wallbox - 3,7 kW (16 A)	3,3 kW	26 kWh
	Wallbox - 7,4 kW (32 A)	6,6 kW	53 kWh
Mode 3 (Three Phases)	Wallbox - 11 kW (16 A)	10 kW	80 kWh
	Wallbox - 22 kW (32 A)	20 kW	160 kWh

Was suitable for battery capacities until 2017

Suitable for battery capacities forecast on 2020 and after

## DC CHARGING: EXTERNAL CHARGING STATION – MAINLY PUBLIC CHARGING

- Mode 4 : Allows quick charge and ultra quick charge (50 kW today, 100 kW in 2020, up to 350kW after)

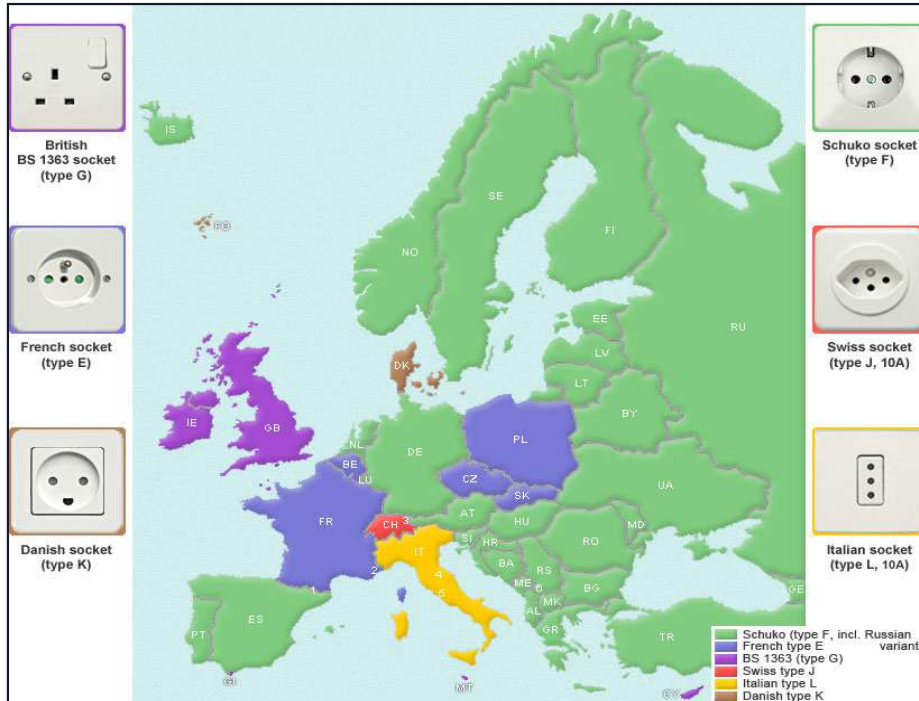
\* Assuming 8h hours of continuous charging



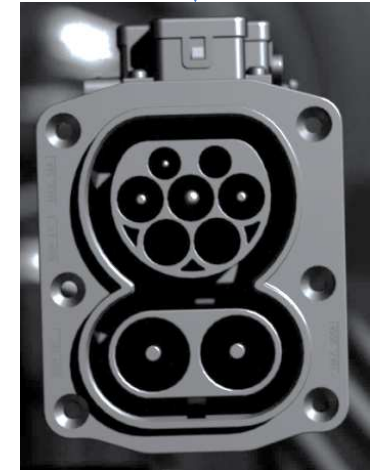
# CHARGING SOLUTIONS: A/C Mode 2 Across Europe

## IMPORTANT DIVERSITY OF CHARGING CABLES IN EUROPE

- Different wall sockets available in Europe (Country dependant)
- European standard plug on vehicle side (CCS T2)



Country	Socket
UK	G
Ireland	
Malta	
Switzerland	J
Denmark	K
Italy	L
Belgium	E
France	
Poland	
Czech Republic	
Slovakia	
Rest of Europe	F



CCS T2 PLUG



# CHARGING SOLUTIONS: A/C Mode 3 Across Europe

## TWO MAIN ELECTRIC GRID CONFIGURATIONS (PUBLIC AND HOME)

- Group A: Mainly single phase sources (up to 32 A)
- Group B: Mainly three phase sources (Single phase current  $\leq 20$  A\*)

## EV + PHEV MARKET SHARES

Source : Frost & Sullivan

	2013 - 2016	2013	2014	2015	2016
	<b>545k VH</b>	65k VH	95k VH	185k VH	200k VH
<b>Group A</b>	<b>58%</b>	50%	60%	55%	65%
<b>Group B</b>	<b>42%</b>	50%	40%	45%	35%

## PUBLIC CHARGING STATIONS TOPOLOGY

	AC < 15kW	AC > 15kW	DC > 20kW CHAdeMO	DC > 20kW CCS_T2	DC > 20 kW TESLA
	<b>88%</b>	<b>3%</b>	<b>4%</b>	<b>3%</b>	<b>2%</b>
<b>Group A</b>	42%	55%		55%	
<b>Group B</b>	58%	45%		45%	

Group A	Group B
France	Switzerland (16A)
UK	Austria (16A)
Norway	Germany
Italy	Netherlands
Spain	Denmark
Belgium	Sweden (tbc)
Bulgaria (tbc)	Croatia (tbc)
Cyprus	Czech Republic (tbc)
Greece	Estonia (tbc)
Hungary	Finland (tbc)
Ireland	Latvia (tbc)
Poland (tbc)	Luxembourg
Portugal	Slovakia (tbc)
Romania (tbc)	Slovenia (tbc)

\* Max 20 A today, Possible limit to 16 A from 2018



# CHARGING SOLUTIONS: On-board Charger Solutions

## ON-BOARD CHARGER TECHNOLOGIES

- Single phase or Three phase topology
- 16 A or 32 A limitation per phase

## REGIONAL DIVERSITY IMPACTS FOR OEM

- Different vehicle configurations may be required
- Increased costs for vehicle (On-board chargers)

ENERGY CHARGED OVERNIGHT*							On-Board Charger
POWER SOURCE (Wallbox)		Application Region	Single Phase (16 A) 3,3 kW	Single Phase (32 A) 6,6 kW	Three Phase (16 A) 10 kW	Three Phase (32 A) 20 kW	
Single Phase	3,7 kW (16 A)	All Europe	26 kWh	26 kWh	26 kWh	26 kWh	
	7,4 kW (32 A)	Group A Only	26 kWh	53 kWh	26 kWh	53 kWh	
Three Phases	11 kW (16 A)	Group B Only**	26 kWh	26 kWh	80 kWh	80 kWh	
	22 kW (32 A) No home stations Few public stations OK for industrial	Group A	26 kWh	53 kWh	80 kWh	160 kWh	
		Group B (20 A / phase)	26 kWh	33 kWh	80 kWh	160 kWh	

\* Assuming 8h hours of continuous charging

\*\*Three phases grids very unusual on group A homes

THANK YOU

