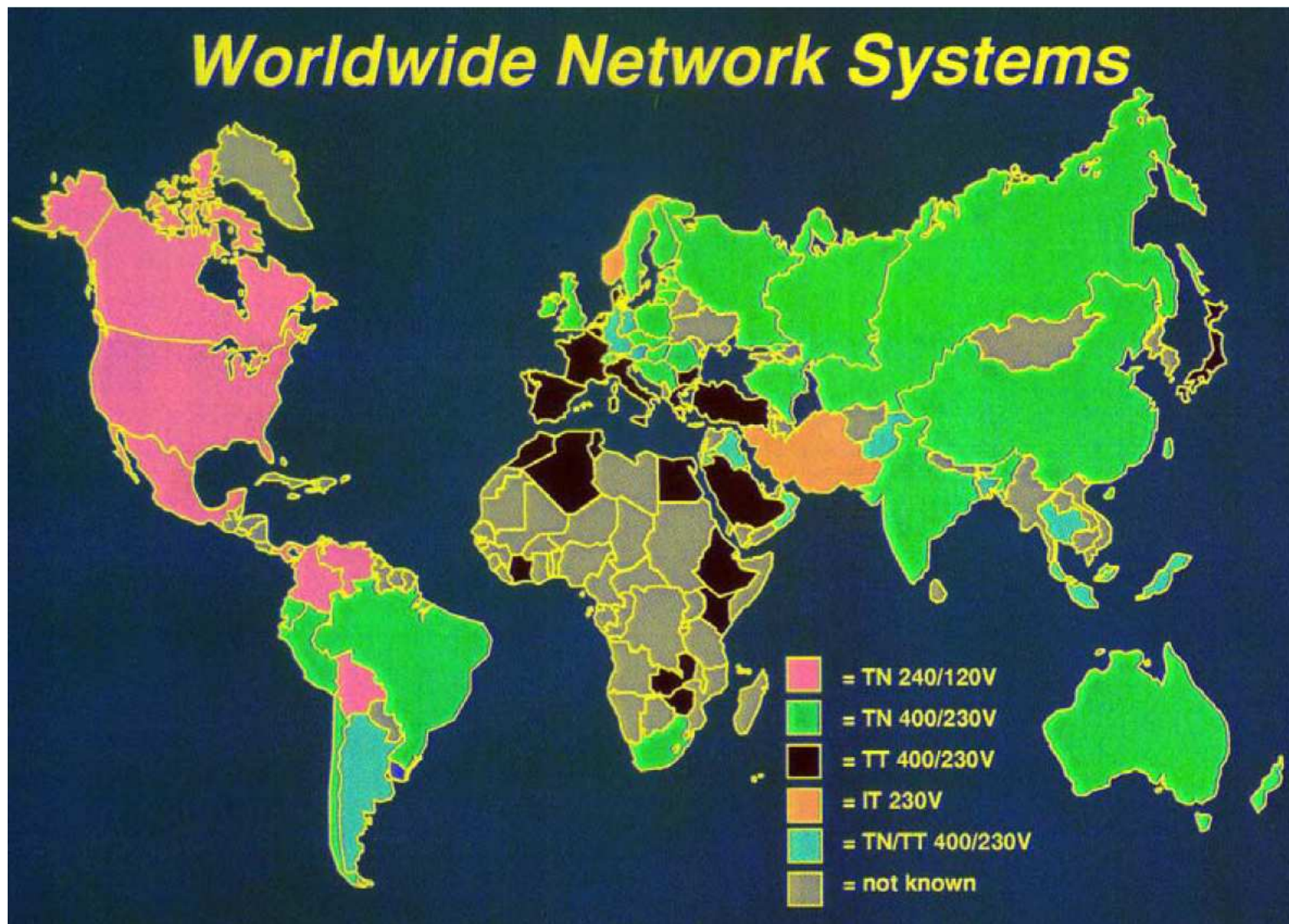




Laden von EV's - Netzsysteme

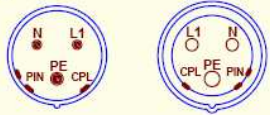




EN 61851-2 ein Teil der NSR

IEC-compatible charging concept

plug connector



IEC 309-2 kompatibel

N : neutral
L1: phase
PE: ground
CP: control pilot
PI: power indicator

domestic socket outlet

without communication



adapter cordset

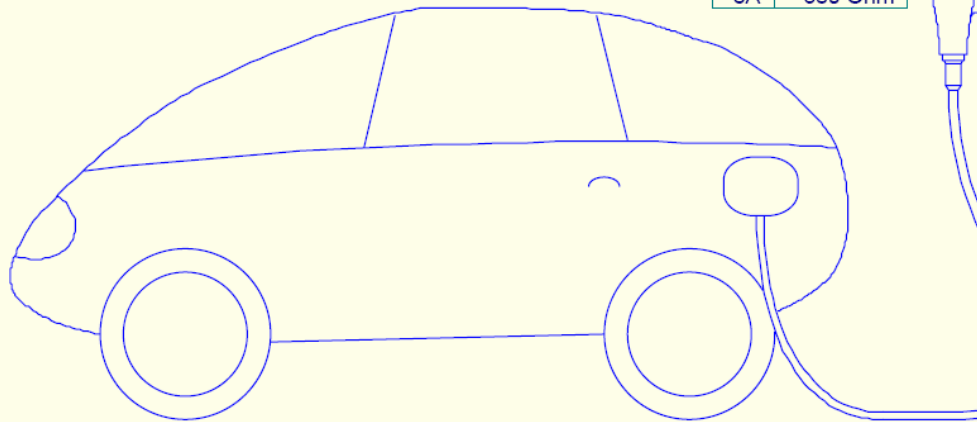
national connector systems



maximum continuous current is set by a resistor between power indicator and ground

instead of utilizing an adapter the resistor could be located at the vehicle connector

I max	resistance
16A	open
13A	1800 Ohm
10A	1000 Ohm
8A	680 Ohm



unspecific IEC-socket outlet (16A blue)



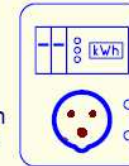
without power indicator the default current is 16A

eg. 6kW@2 ph

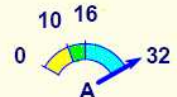
400V/16A



enhanced infrastructure



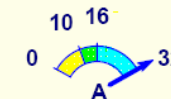
with communication via the control pilot



Wallbox or Home Charge Device

special infrastructure

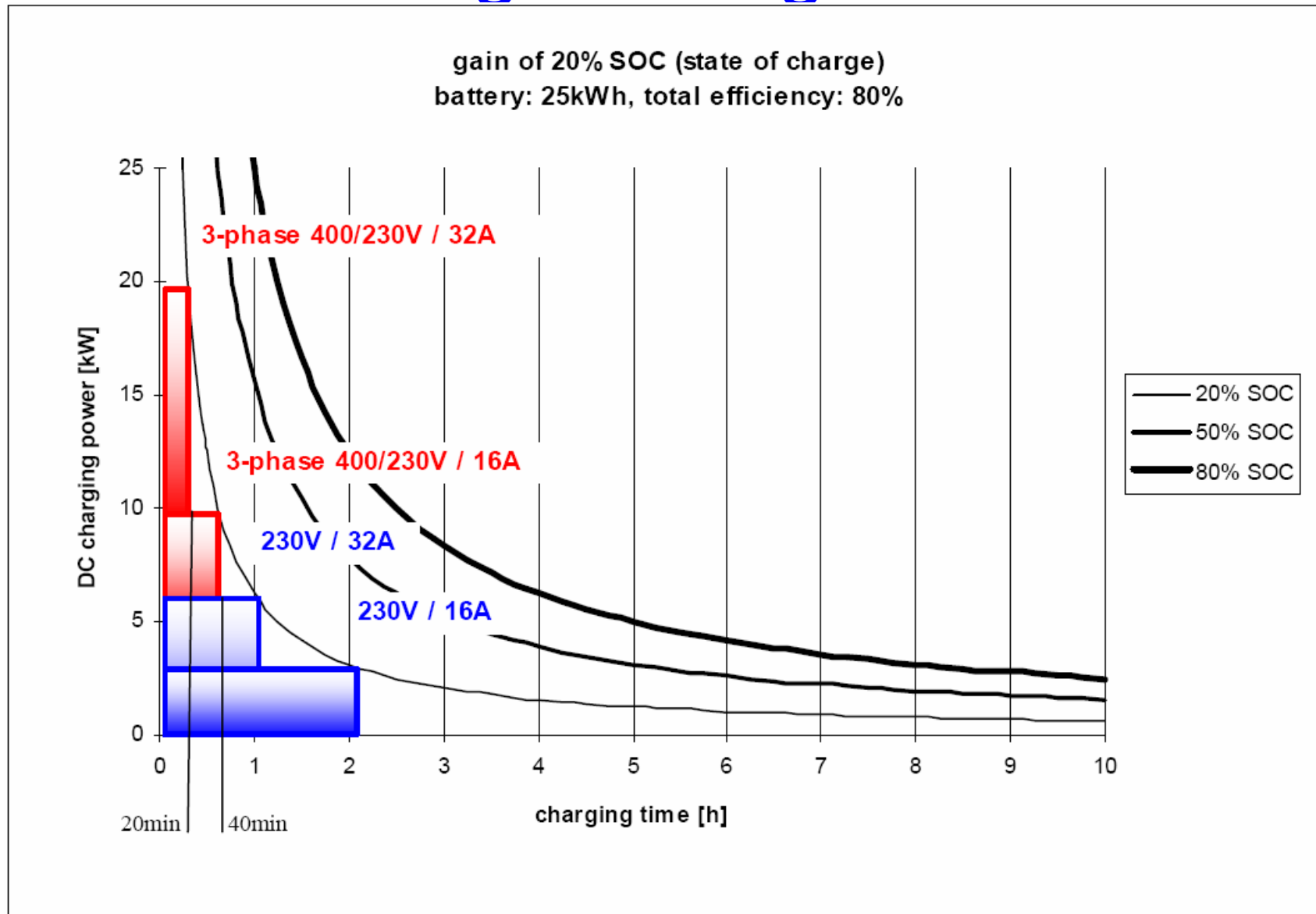
with communication via the control pilot



charging station

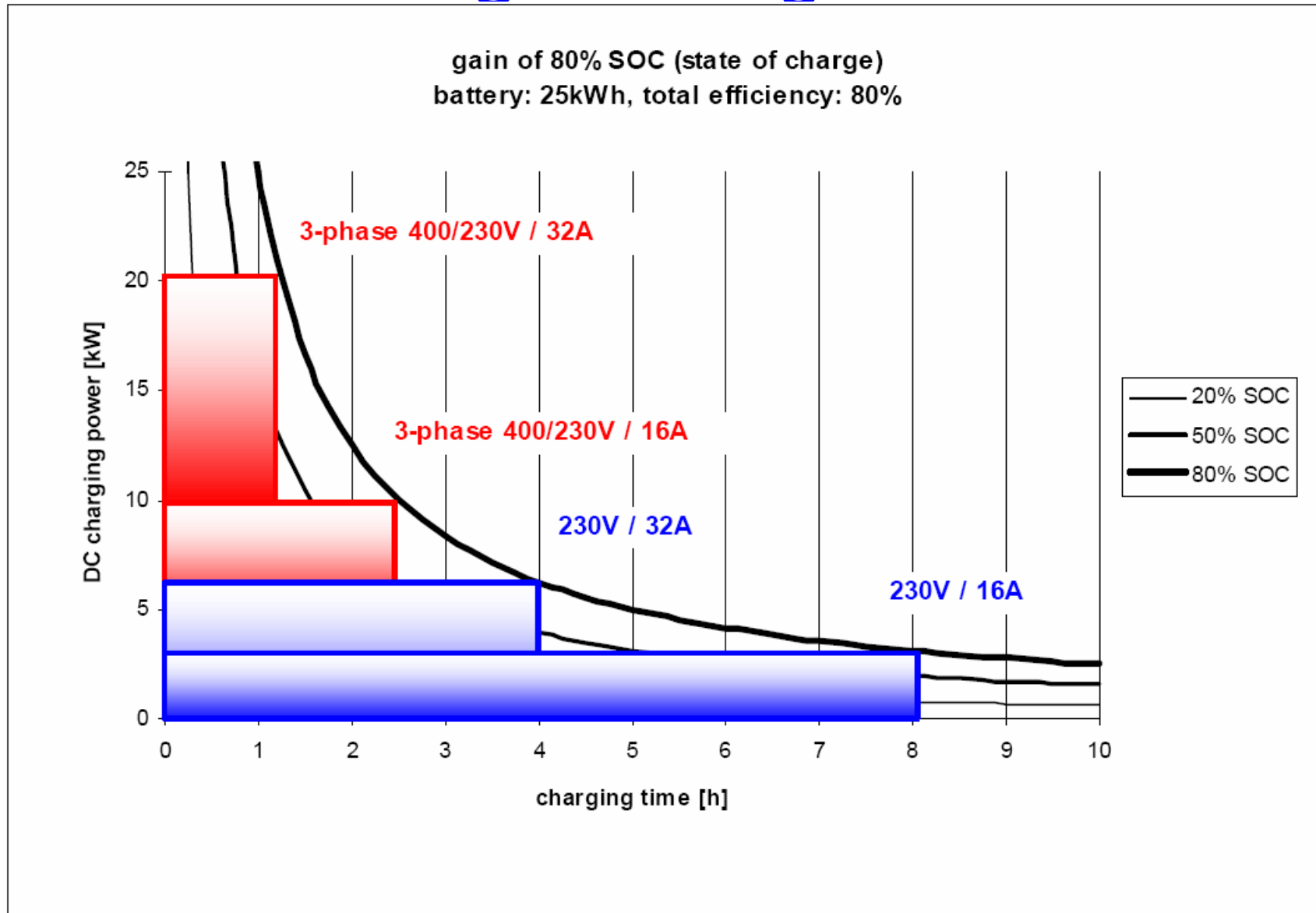


Ladeleistung - Ladegewinn





Ladeleistung - Ladegewinn





normgerechte Anbindungsformen

conductive charging system - compatibility of different modes und cases

CPL	mode	situation / power*	vehicle inlet / connector	cable and wall / infrastructure	CPL	architecture	for mode
no control pilot signal	1	domestic up to 16A 1-phase 3.7kW	none /	resistive coding via Power Indicator national plug and socket systems	no control pilot provided by wall equipment	power contacts 1 DC- /power AC 1 4/5 2 DC+/power AC 2 4/5 3 power AC 3 5 4 mains 1 1-3 5 mains 2 1-3 6 mains 3 1-3 7 mains 4 1-3 8 GND / EARTH 1-5 signal pins 9 Control Pilot 2-5 10 DATA+ 4-5 11 DATA- 4-5 12 DATA GND 4-5 13 Power Indic. 1 1 14 Power Indic. 2 1	
		IEC 309-2 up to 16A 1-phase 3.7kW	none /	IEC 309-2 plug and socket system			
control pilot according SAE 1772	2	unspecific up to 32A 1-phase 7.4kW	none /	in-cable protection device provides control pilot	no control pilot provided by wall equipment	only mains AC 1-3	
		3-phase 22kW	none /	unspecific outlets (IEC 309-2 32A devices included)			
control pilot according SAE 1772	3	dedicated up to 32A 1-phase 7.4kW	none /	case B up to 32A AC, DC or / and high power AC charging station	control pilot provided	mains AC and high power DC 1-4	
		dedicated up to 63A 1-phase 14.5kW	none /				
90% duty cycle	4	DC up to 400A		mains AC DC quick charging high power AC	control pilot provided	mains AC and high power AC 1-3, 5	
	U.C.	high power AC up to 250A					



Systemlayout einer SPVN-Anlage

Schnellladetankstelle kombiniert mit PV-Einspeisung und Netzspitzenausgleichsstation (SPVN-Anlage)

Netz:

Verbund oder Insel
oder temporärerer
Netzverbund (USB)
3 x 400 VAC

Netzumrichter:

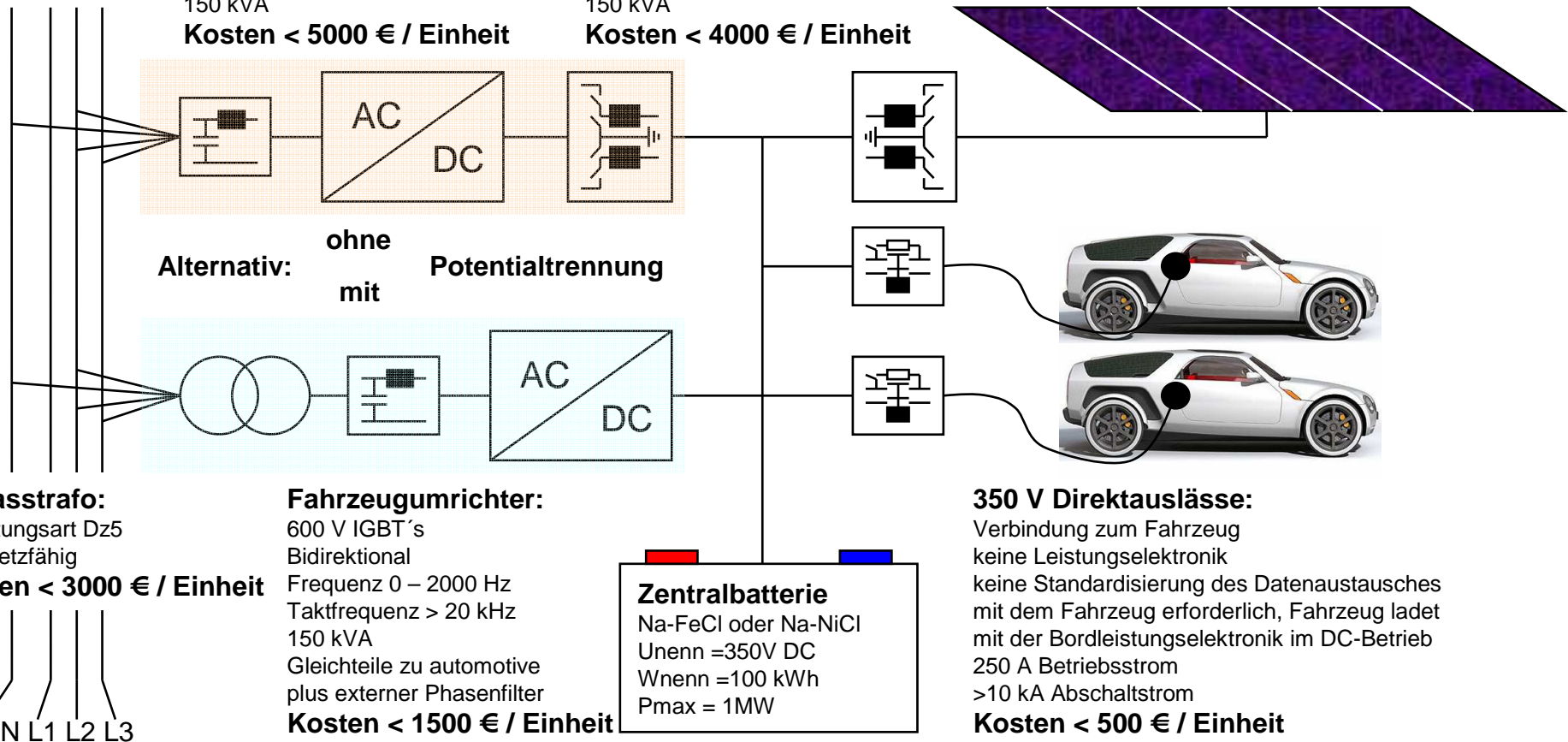
1200 V IGBT's
Bidirektional
Frequenz 0 – 200 Hz
Taktfrequenz > 4 kHz
150 kVA
Kosten < 5000 € / Einheit

Universal DCDC-Wandler :

600 V IGBT's
Bidirektional, erdsymmetrisch
keine Potentialtrennung
Taktfrequenz > 20 kHz
150 kVA
Kosten < 4000 € / Einheit

Solarpanel:

MPP-Spannung um 550V
TN-System (über DCDC-Wandler
1kWp / 10 kWh Batteriekapazität
Kosten < 1000 € / kWp



Alternativ:

ohne
mit

Potentialtrennung

Anpasstrafo:

Schaltungsart Dz5
Inselnetzfähig
Kosten < 3000 € / Einheit

Fahrzeugumrichter:

600 V IGBT's
Bidirektional
Frequenz 0 – 2000 Hz
Taktfrequenz > 20 kHz
150 kVA
Gleichteile zu automotive
plus externer Phasenfilter
Kosten < 1500 € / Einheit

Zentralbatterie

Na-FeCl oder Na-NiCl
Unenn = 350V DC
Wnenn = 100 kWh
Pmax = 1MW

350 V Direktauslässe:

Verbindung zum Fahrzeug
keine Leistungselektronik
keine Standardisierung des Datenaustausches
mit dem Fahrzeug erforderlich, Fahrzeug ladet
mit der Bordleistungselektronik im DC-Betrieb
250 A Betriebsstrom
>10 kA Abschaltstrom
Kosten < 500 € / Einheit