

Protoscar

3D DIGITAL SOLUTIONS

CleanCar

Research
Design & Engineering
PR / Communication



sample project : Rinspeed - ZaZen

find out more:
www.protoscar.com



Protoncar



CleanCars: Vorschau PW Modelljahr 2012-2015 (Fokus auf Batterie-Elektro und Plugins)

Who is Protoscar ?

Protoscar

CLEANCAR SHAPERS

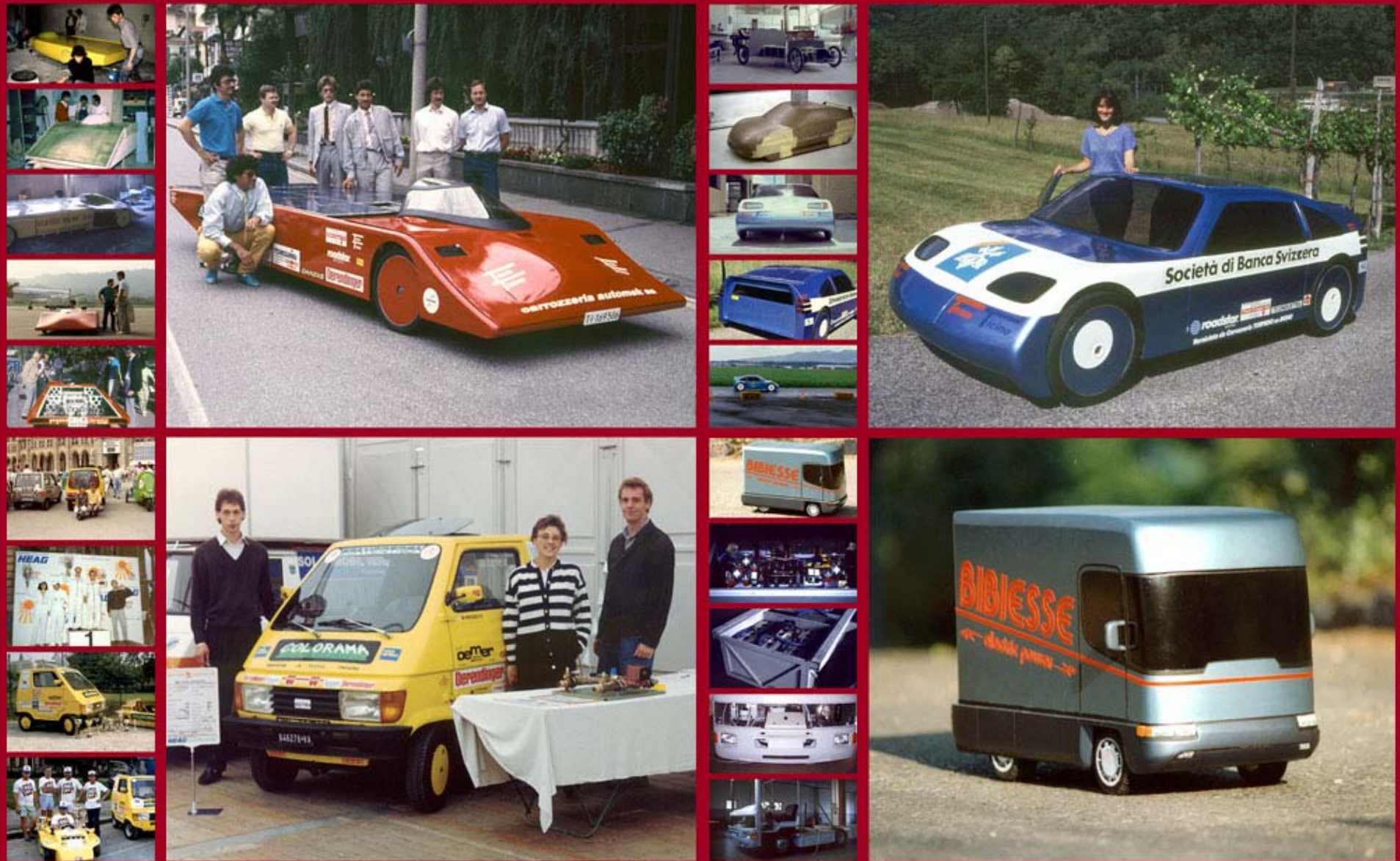
- Protoscar is a privately own Swiss company, established in 1987.
- A dozen specialist develop non conventional vehicles:
 - passenger cars,
 - niche (like neighbour, taxi, ...)
 - bus,
 - truck,
- Focusing on Clean Cars:
 - pure electric & hybrids, powered by:
 - battery,
 - hybrid systems including fuel-cell,
 - using renewable fuels like
 - electricity, hydrogen or natural gas



Where is Protoscar coming from ?

Protoscar

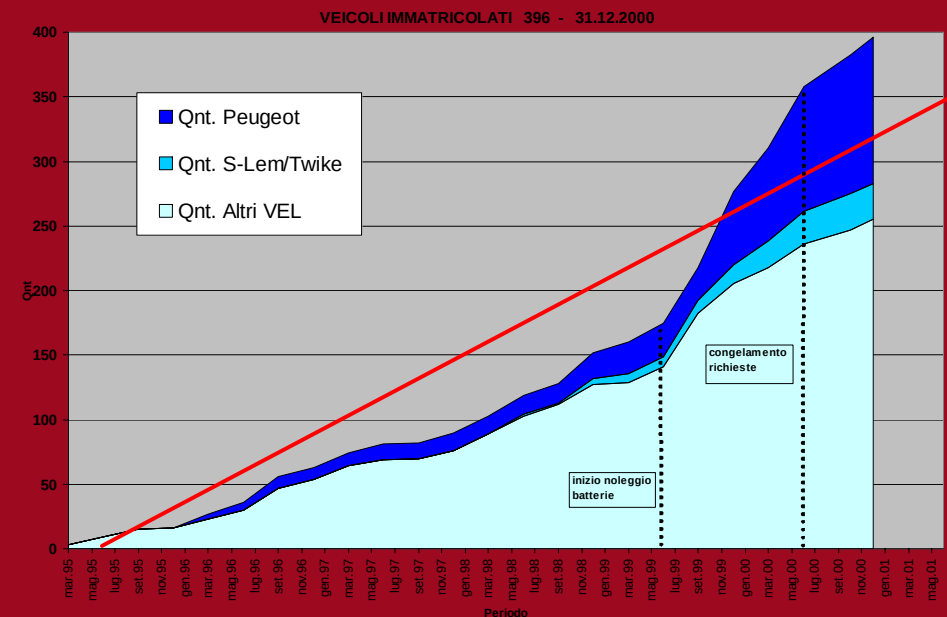
CLEANCAR SHAPERS



- Biggest P&D Project for EV Market introduction in Europe (33 mio CHF).
- 400 electric vehicles introduced into the market
- During 6 years: from 1994 to 2001

Activities done for Mendrisio:

- Contest,
- Preparation and
- Implementation of VEL1



Are OEMs the only EV-killer?

Protoncar

CLEANCAR SHAPERS



Plans for Mercedes to release the ML 450 hybrid in 2009 may very well be canceled. The maker of the nickel metal hydride (NiMH) batteries that was to provide the energy storage component for the SUV, Cobasys, seems to be refusing to begin production of the essential part. It appears the company's parent firms, Chevron (who just posted a \$5.98 billion 2nd quarter profit) and Energy Conversion Devices (ECD) have "pulled funding" from the battery supplier, preventing it from meeting manufacturing commitments agreed upon last year.



2007: over 700 ZEBRA battery packs were delivered to customers knowing that they were unreliable.



GM has problems with the Cobasys batteries in the automaker's mild hybrid vehicles. The hybrid versions of the Chevrolet Malibu, Saturn Vue and Saturn Aura are affected and around 9,000 batteries were recalled and replaced. At least, that's how GM explained it.



EV failures #2: “Seifenkisten”

Protoscar

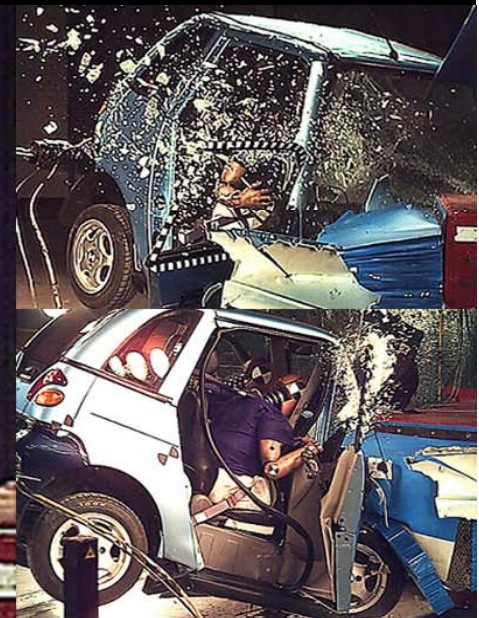
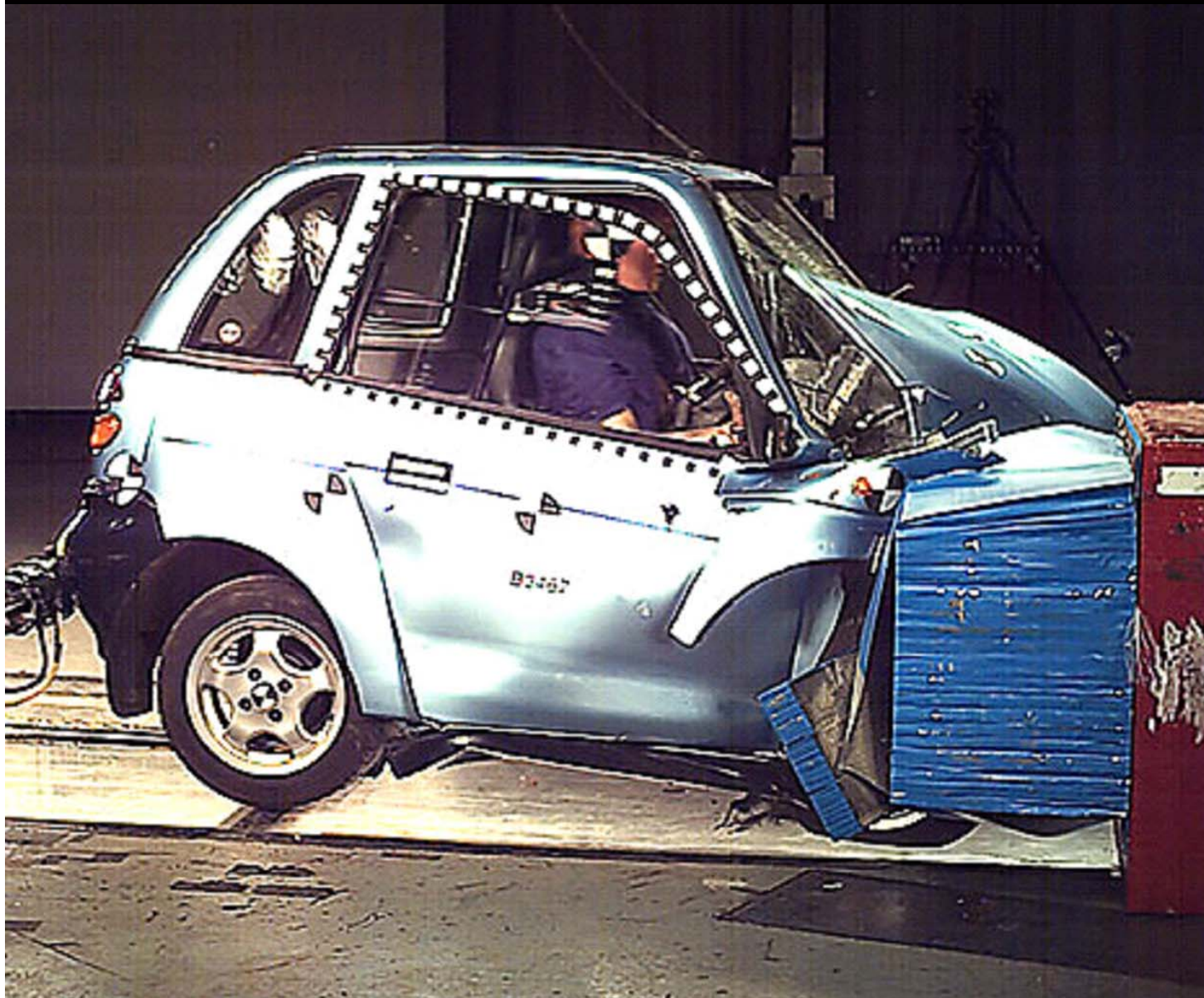
CLEANCAR SHAPERS



EV failures #2: “Seifenkisten”

Protoscar

CLEANCAR SHAPERS



What happens to the G-Wiz 'green' car in a 40mph crash



SALE
FLIP DOWN TV & DVD
FREE
+ HALF PRICE
+ EXTRA 20% OFF
mfi

EV failures #2: “Seifenkisten”

Protoncar

CLEANCAR SHAPERS



EV failures #3: ugly & bottom-up

Protoncar

CLEANCAR SHAPERS



BOTTOM-UP

First/main model is entry level,
later portfolio expands to high level

E.g. Hybrids (from Prius to Lexus)



VS

TOP-DOWN

First/main model is high level (luxury, sport),
later, technology is applied to "normal" car

E.g. Tesla (from Roadster to Family Car)



GLOBAL

Return is potentially big, but it needs
"enormous" critical mass and long time

E.g. Fiat Palio



VS

NICHE

Specific (per-vehicle) return is possible
at low series already, but total "turnover"
is (relatively) limited
E.g. Think City, EV1



CONVERSION

EV-components are "squeezed" into
existing platform: easiest approach
for an OEM with limited objectives

E.g. Smart EV



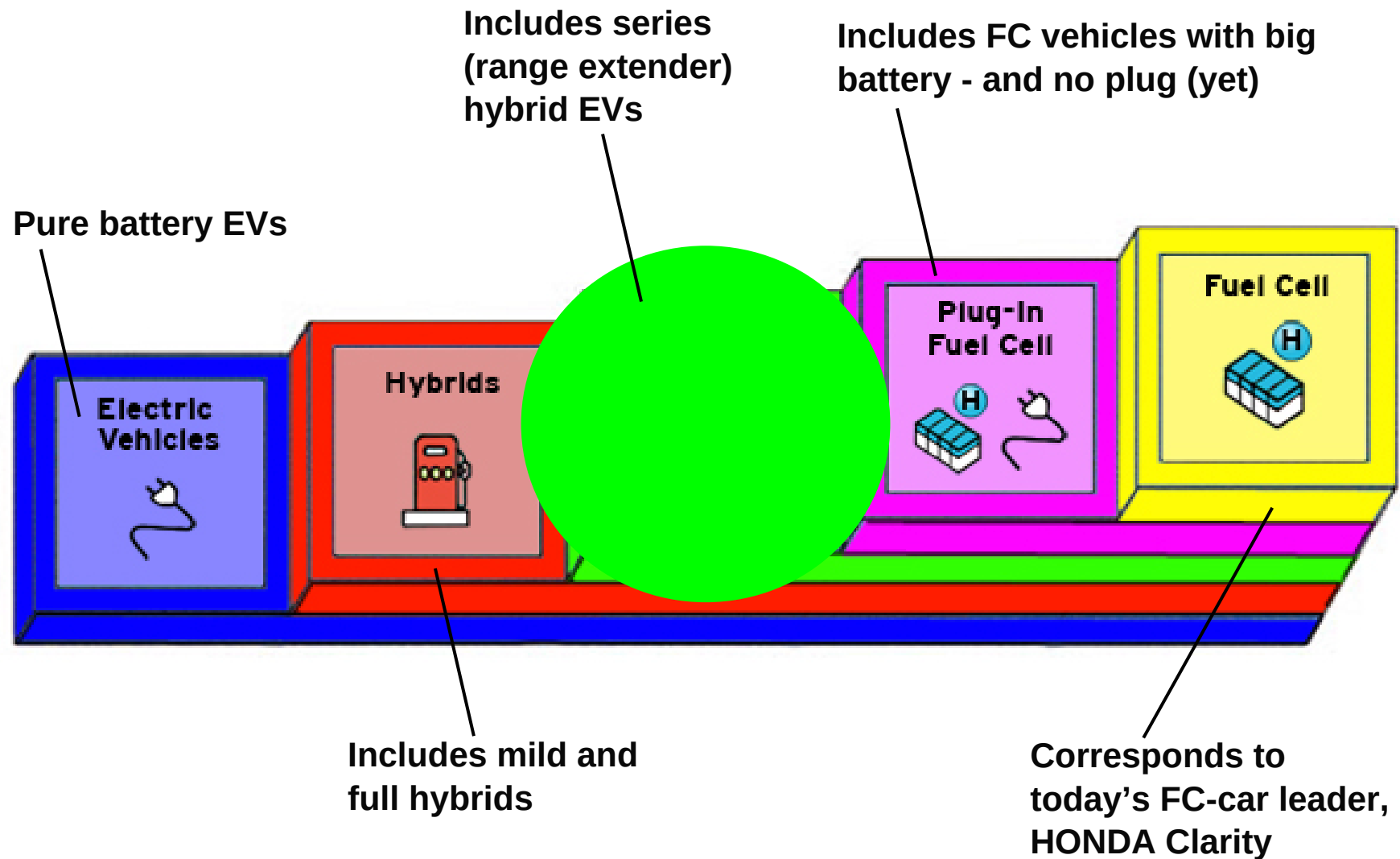
VS

ORIGINAL DESIGN

Bodystructure is designed around EV
components: best approach for uncompromised
results and/or long term goals

E.g. Chevrolet Volt





QuickTime™ e un
decompressore TIFF (LZW)
sono necessari per visualizzare quest'immagine.



QuickTime™ e un
decompressore TIFF (Non compresso)
sono necessari per visualizzare quest'immagine.





Mistubishi (TEPCO) i MIEV

Protoscar

CLEANCAR SHAPERS







BYD F3 Electric (Li-Ion)

Protoncar

CLEANCAR SHAPERS



“Chinese” EV-Smarts...

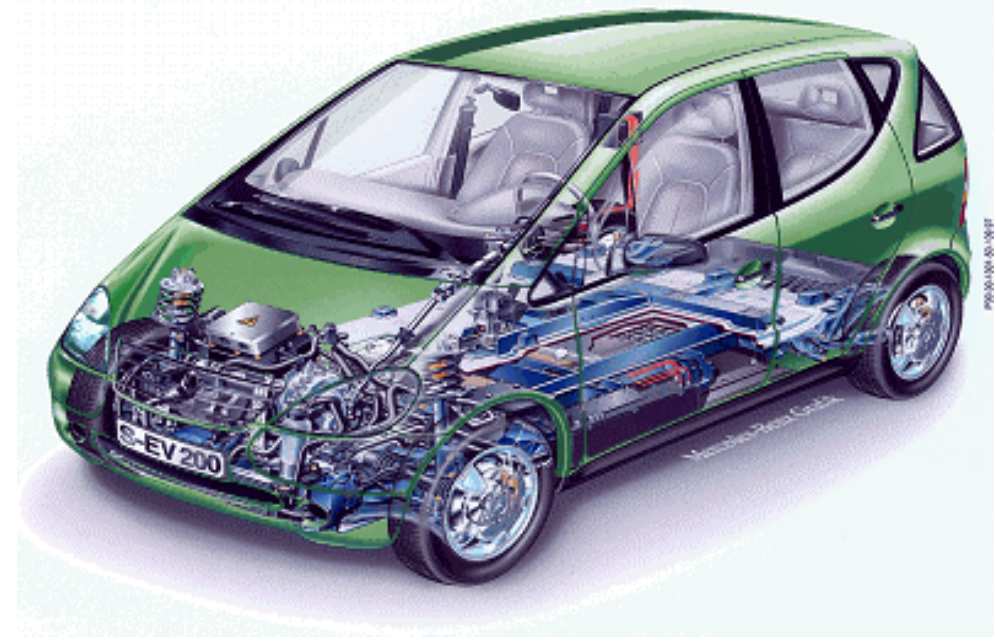
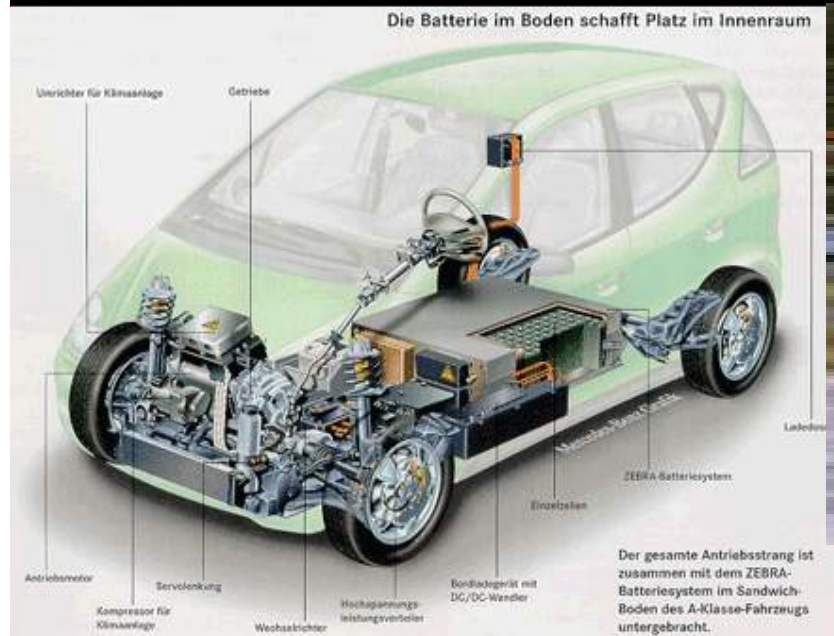
Protoscar

CLEANCAR SHAPERS









BMW-Isetta ... & FIAT Topolino ?

Protoscar

CLEANCAR SHAPERS



... oder FIAT / Microvett ?

Protoncar

CLEANCAR SHAPERS



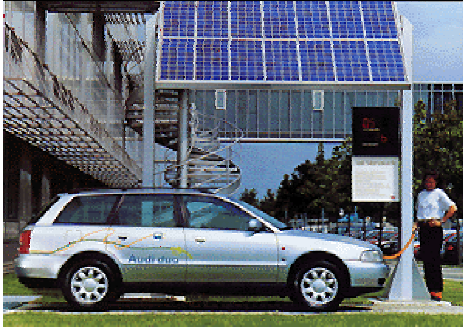


VW Twin-Drive

Protoscar

CLEANCAR SHAPERS





Burn rubber, not gasoline.

Introducing the Tesla Roadster:

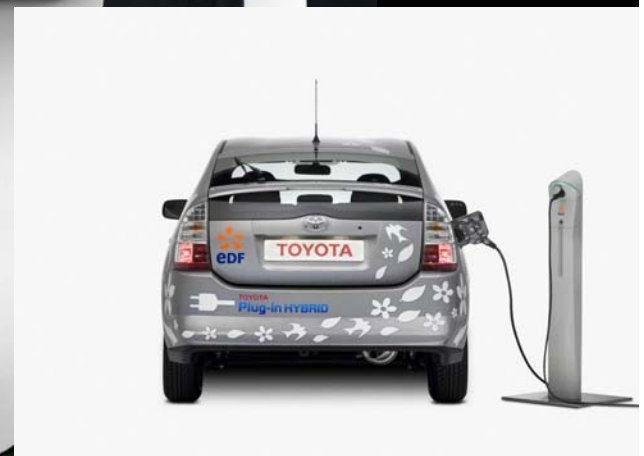
- 100% electric
- 0 to 60 in about 4 seconds
- 135 mpg equivalent
- 250 miles per charge
- about 1¢ per mile*



Toyota PRIUS Plug-In

Protoncar

CLEANCAR SHAPERS

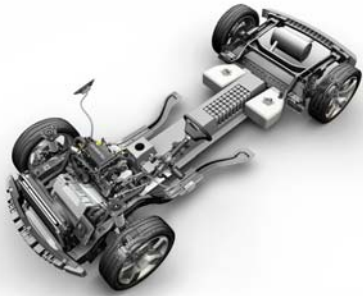


Fisker Automotive Presents

ECO-CHIC

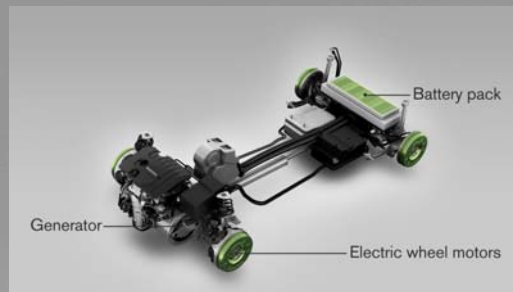
A new category of automobiles







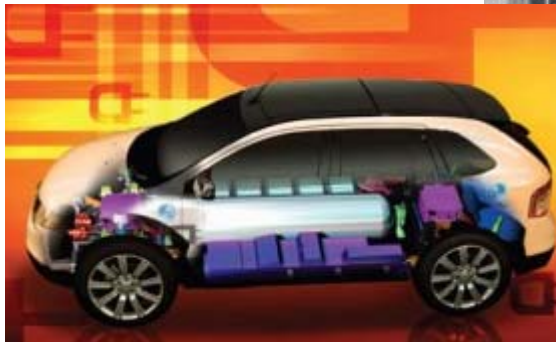




Ford Plug-In Hybrid

Protoncar

CLEANCAR SHAPERS



More Than 250,000 EVs to Be Sold in Europe by 2015

4 July 2008

A new report from Frost & Sullivan forecasts that the market for electric vehicles (EVs) in Europe will rise to more than 250,000 units per year by 2015.

Automakers have little choice but to be part of the EV, market according to the report, *Strategic Assessment of European Passenger Electric Vehicles Market*, if they are to address the escalating energy situation.

The report suggests that there could be sudden movement towards the battery leasing business, although consumer acceptance is still uncertain.

— Anjan Hemanth Kumar, Frost & Sullivan Research Analyst

QuickTime™ e un
decompressore TIFF (LZW)
sono necessari per visualizzare quest'immagine.

Johnson Controls-Saft Officially Opens Nersac Plant for Automotive Lithium-Ion Batteries

1 February 2008

Johnson Controls-Saft Advanced Power Solutions officially opened its new lithium-ion automotive battery manufacturing facility in Nersac, France. The plant will manufacture lithium-ion batteries for hybrid, plug-in hybrid, fuel cell and electric vehicles.

The plant is already slated to produce battery packs for the upcoming Mercedes-Benz S Class 400 mild hybrid, due in production in 2009.

Johnson Controls-Saft initially invested €15 million in the Nersac facility. It has been built to be scaleable, so that as demand increases it can increase production capacity to meet customer and market demands.



New battery plant in Nersac, France

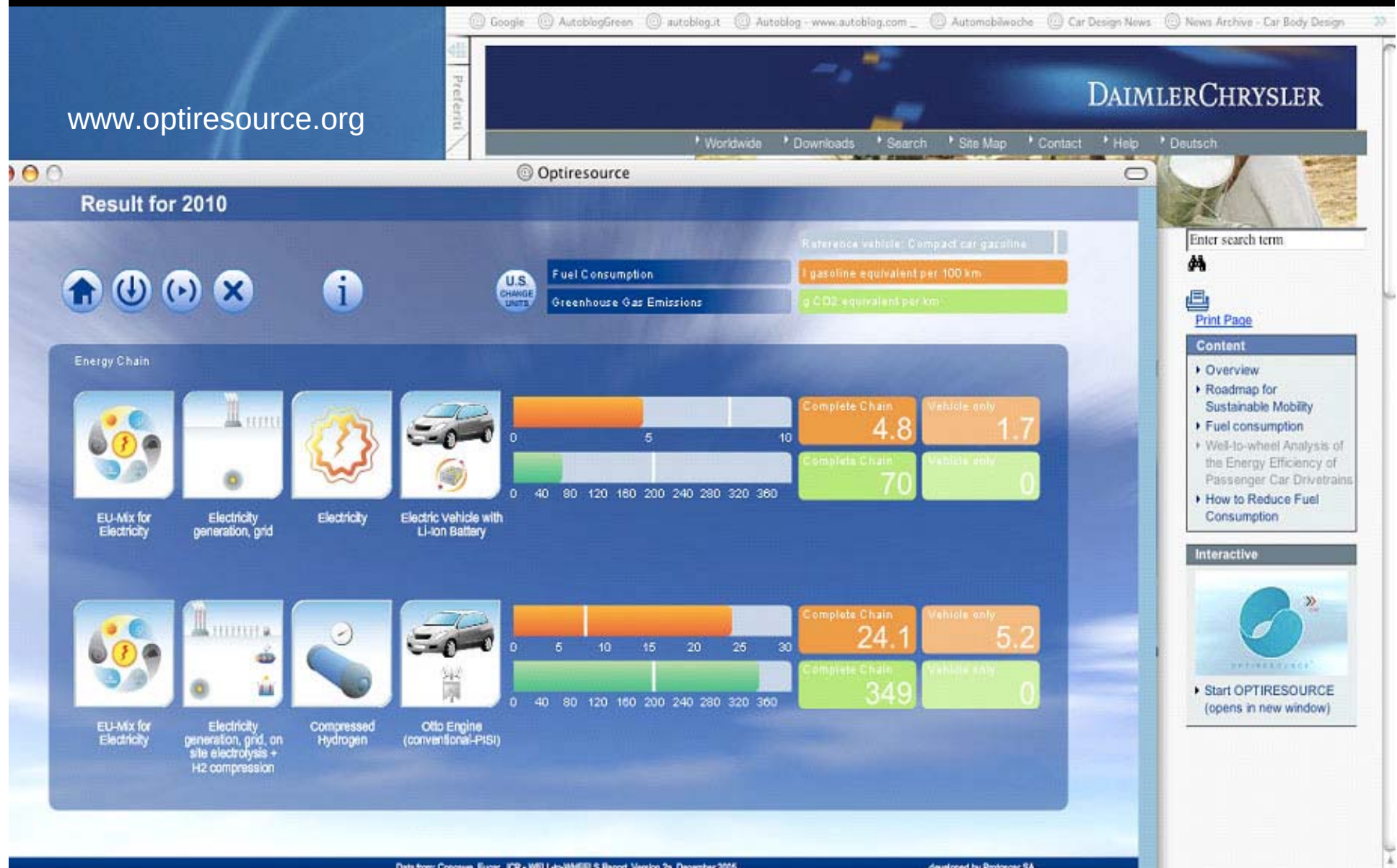
SCHWEIZER PKW-ERSTZULASSUNGEN

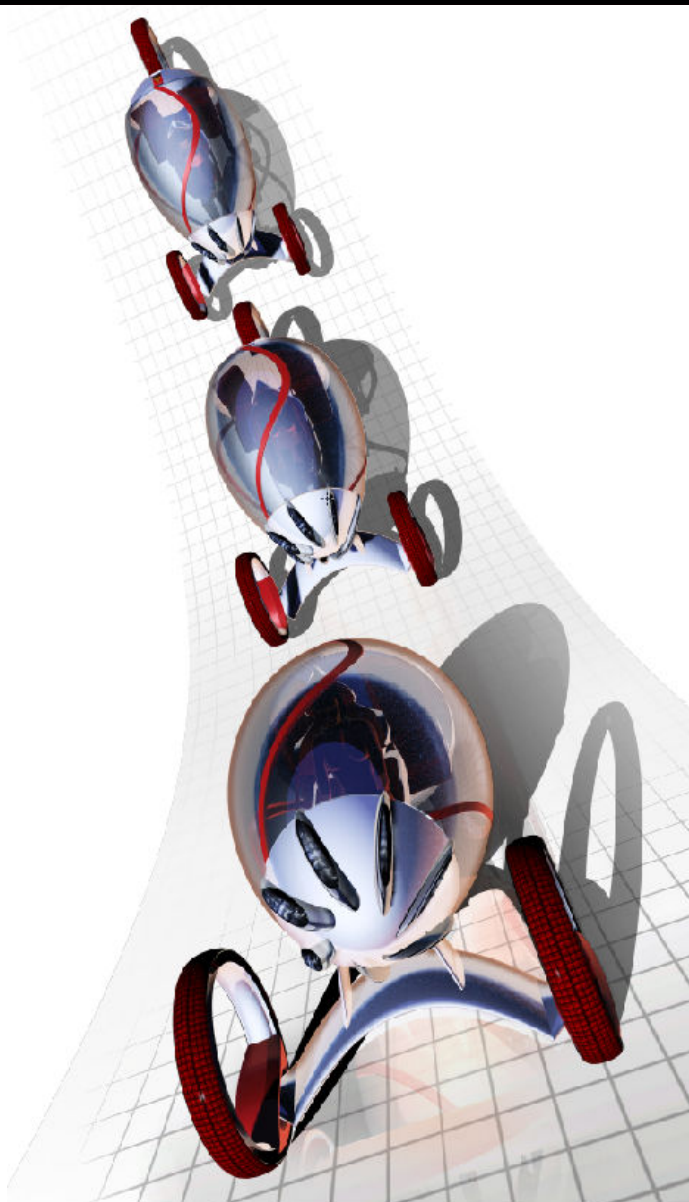
		2004	2007	2010	2015	2020
BEV	SMART EV	50	20	200	5'000	15'000
Hybrids	PRIUS	100	3'221	10'800	40'000	88'000
Plug-In Hybrids	VOLT	0	0	5'400	25'000	60'000
FC&battery (ev. plug-In)	B-Klasse	0	2	0	1'200	15'000
FC	CLARITY	1	1	0	600	5'000
Gesamt E-CleanCars		151	3'244	16'400	71'800	183'000
Erst-Zulassungen CH	Gesamt PKW	269'211	284'674	270'000	270'000	270'000
E-CleanCars %	Anteil CC	0.1%	1.1%	5.8%	30.5%	64.3%

Wenn CH-Bund/Kantone/Gemeinde weiterhin nichts besonders tun, wird man:

1. Erst im 2010 - im Nachzug zu Deutschland- auf eine minimale Nische von 5% E-CleanCars hoffen können.
2. Im 2015, wenn alle OEMs ihre E-Produkte bereits auf dem Markt haben werden, wird sich der Anteil immer noch „nur“ auf 1/3 der Erstzulassungen beschränken (und das werden insbesondere Premium-Fahrzeuge sein).
3. Erst zwischen 2015 und 2020 wird sich in der Schweiz die Mehrheit der Neu-PKW-Käufer mindestens für eine minimale Elektrifizierung entscheiden (insbesondere mild- und full Hybrids).

www.optiresource.org

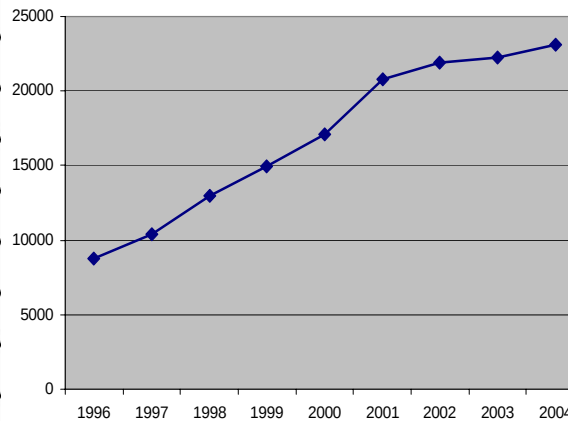




Thanks for
your attention !

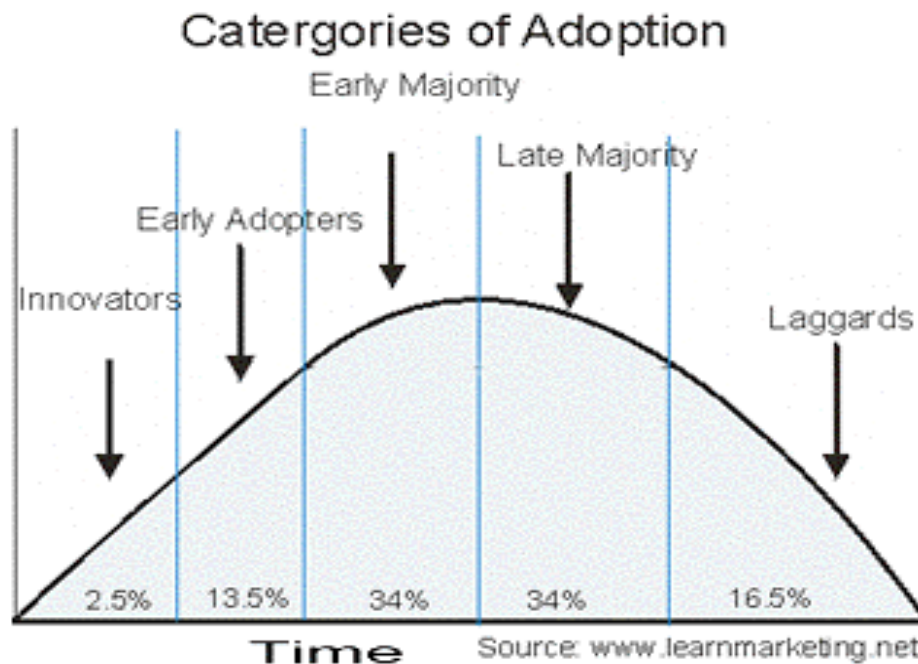
protoscar.com

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	440	480	520	500	460	460	485	520	540
Belgium	60	60	120	130	145	145	153	155	165
Denmark	300	330	298	305	320	320	320	354	360
Finland	120	130	150	148	130	130	138	160	166
France	2160	2887	4248	5608	6835	7592	7721	7985	8298
Germany	2000	2200	2250	2275	2300	2300	2300	2300	2340
Greece						44	74	44	62
Italy	850					5750	6215	6254	6352
Netherlands	60					110	110	135	142
Monaco						75	83	92	105
Norway	100					773	801	845	892
Poland								54	68
Portugal						35	35	68	75
Spain	135					178	254	178	185
Sweden	300					520	652	541	587
Switzerland	2100	2500	3173	3447	3580	2100	2251	2251	2483
United Kingdom	100	100	250	320	280	280	280	280	280
total	8725	10391	12970	14959	17112	20812	21872	22216	23100





1. D-Nachfrage im 2010: mindestens 87'000 BEV
2. D-Nachfrage im 2020: 263'000 bis 525'000 BEV

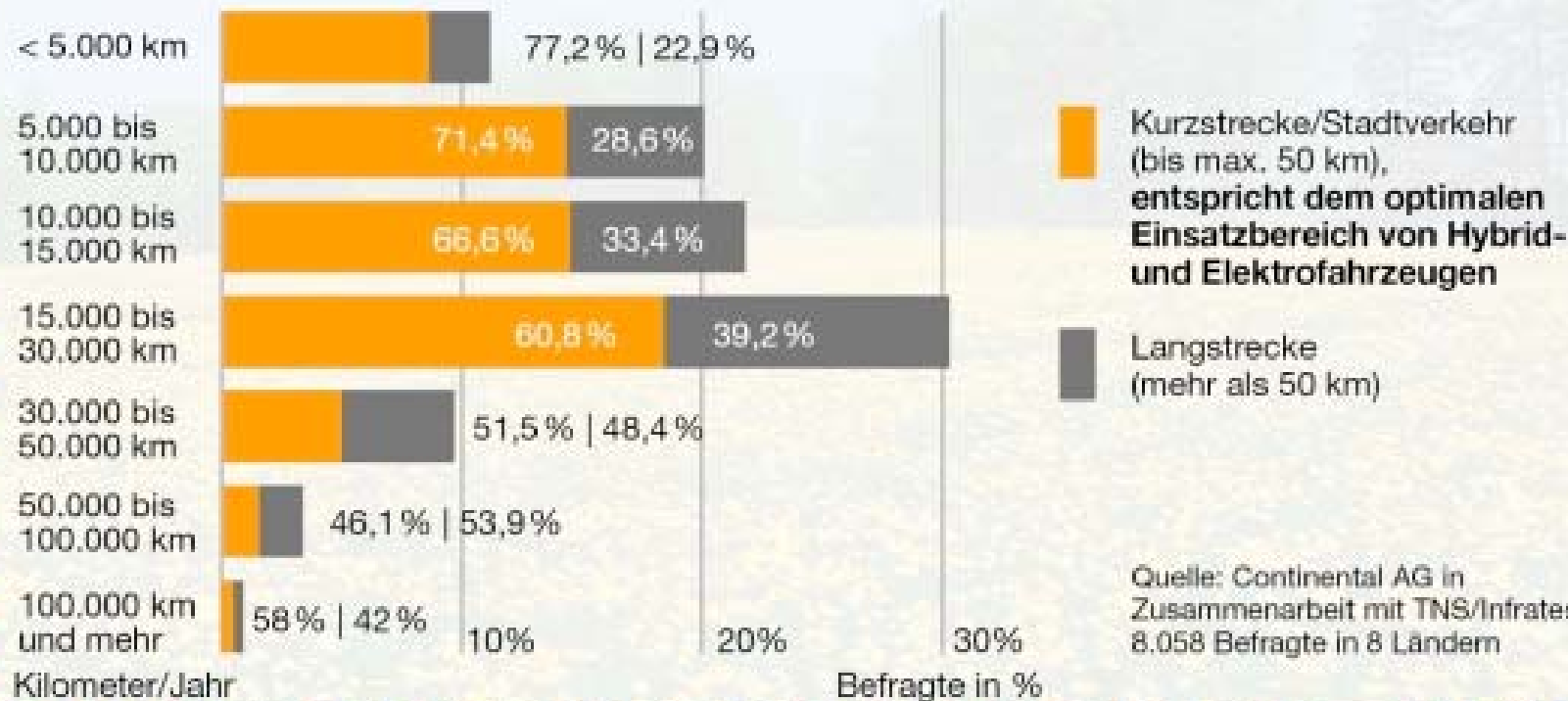


3. D-Angebot im 2020: 110'000 bis 320'000 BEV
4. D-Zulassungen erstmals über 10'000 BEV: 2012 oder 2013



1. Internationale Continental-Hybridumfrage

Wie viele Kilometer fahren Sie jährlich – Kurzstrecke/Langstrecke?



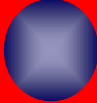
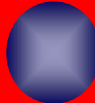
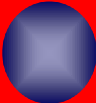
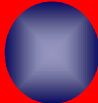
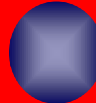
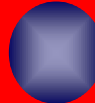
France: fee-bate (bonus-malus)

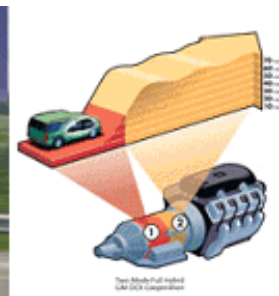
Malus	Emissions (g CO ₂ /km)	Bonus
	< 60	€ 5,000
	< 100	€ 1,000
	101-120	€ 700
	121-130	€ 200
€ 0	131-160	€ 0
€ 200	161-165	
€ 750	166-200	
€ 1,600	201-250	
€ 2,600	> 250	

Two-Mode Hybrid

Protoncar

CLEANCAR SHAPERS

hybrid type			stop-start	decel regen	brake regen	boost	engine load shift	e-drive	plug-in
	FWD	RWD							
full	plug-in								
	AHS-F	AHS-R							
medium	BSG+ plus ERDM	P2							
mild	BSG+	HV-ISG							
	BSG	LV-ISG							
micro	smart starter, RSG								



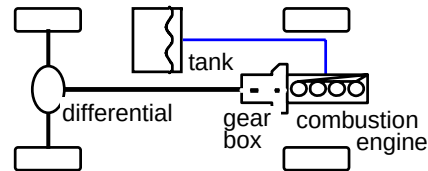
Plug-In Hybride: zwischen HEV und BEV

Protoncar

CLEANCAR SHAPERS

ICE only

Conventional Vehicle



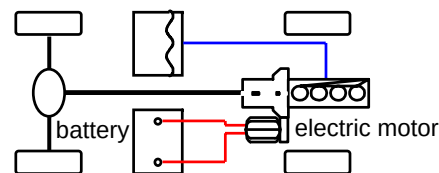
Conventional Vehicle

Conv. Vehicle	Internal Combustion Engine Vehicle
HEV	Hybrid Electric Vehicle
PHEV	Plug-In-Hybrid Electric Vehicle
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle

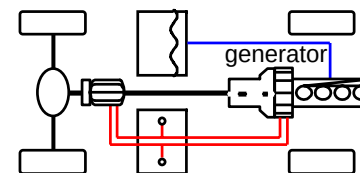
Increasing Electric Range

HEV

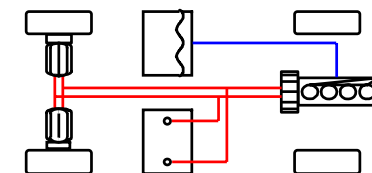
High-power battery



Parallel-Hybrid



Power Split-Hybrid

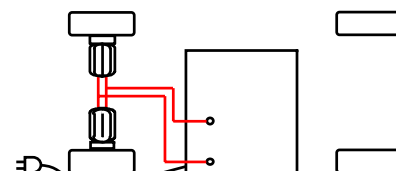


Series-Hybrid

- EV and HEV drive-mode
- Larger battery (power and energy)
- Plug-In-Charger

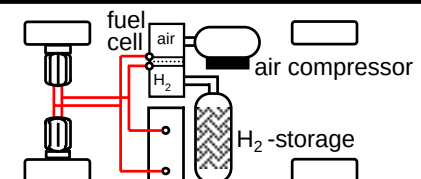
BEV

High-energy battery



Electric Vehicle

FCEV



Fuel Cell Vehicle

Vision of Future Sustainable Mobility

HONDA
The Power of Dreams

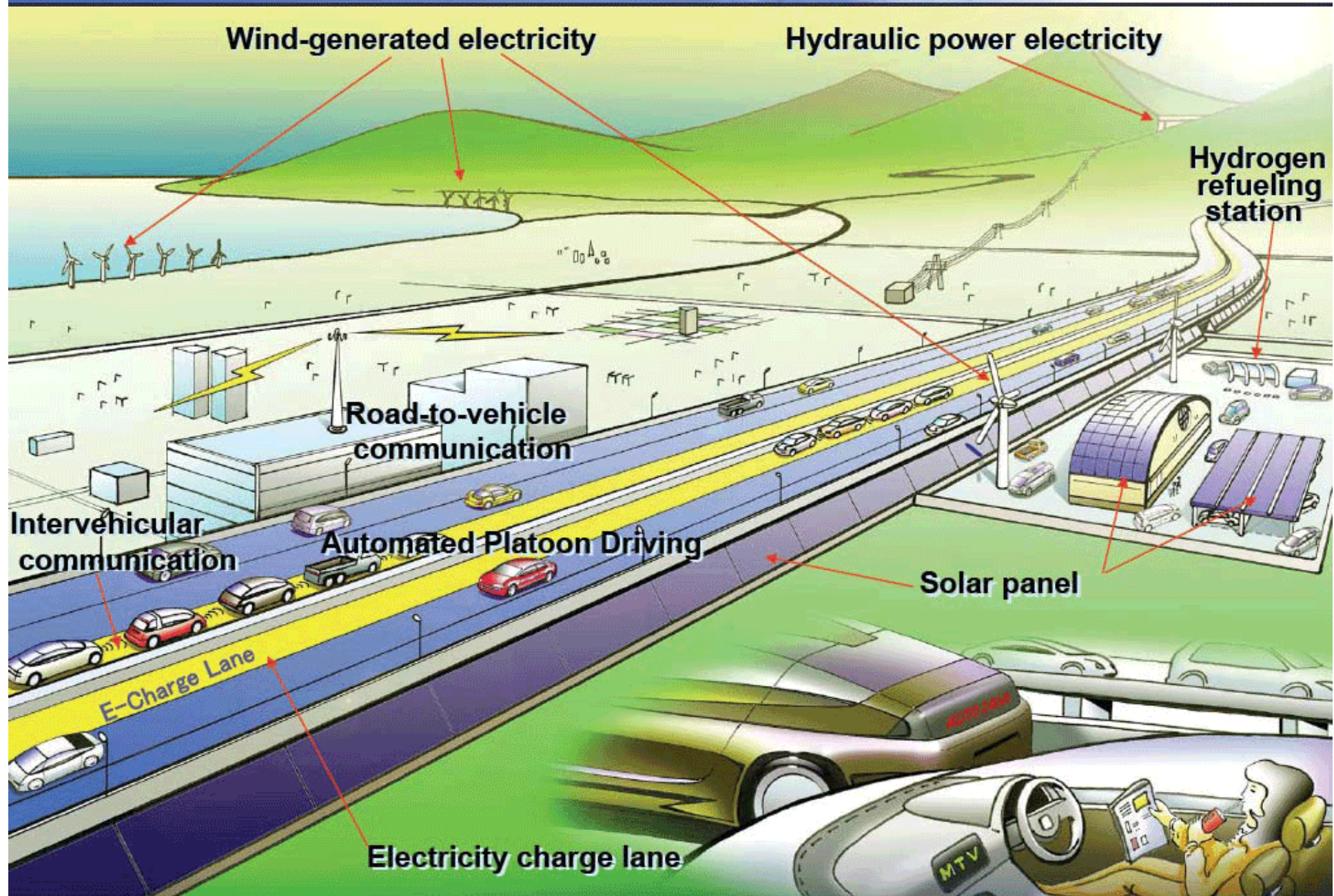


Figure 22: Li-Ion HEV key developers cell matrix

Li-Ion HEV Key Developers Cell Design Matrix

Company	Cathode	Anode	Electrolyte	Packaging	Structure	Shape
Toyota	NCA	Graphite	liquid	Metal	Spiral	Elliptic
Panasonic	NMC	Blend	liquid	Metal	Spiral	Elliptic
JCS	NCA	Graphite	liquid	Metal	Spiral	Cylindrical
Hitachi	LMO/NMC	Hard Carbon	liquid	Metal	Spiral	Cylindrical / Elliptic
AESC	LMO/NMC	Hard Carbon	liquid	Pouch	Stacked	Prismatic
Sanyo	LMO/NMC	Blend	liquid	Metal	Spiral	Cylindrical
GS Yuasa	LMO/NCA	Hard Carbon	liquid	Metal	Spiral	Elliptic
A123 Systems	LFP	Graphite	liquid	Metal	Spiral	Cylindrical / Elliptic
LG Chem	LMO	Blend Carbon	Gel	Pouch	Stacked	Prismatic
Samsung	LMO/NMC	Graphite	liquid	Metal	Spiral	Cylindrical
SK Corp	LMO	Graphite	liquid	Pouch	Spiral	Prismatic
Toshiba & EnerDel	LMO	LTO	liquid	Pouch/metal	Spiral	Prismatic
AltairNano	LMO	LTO	liquid	Pouch	Stacked	Prismatic
BYD	LFP	NA	liquid	Metal	Spiral	Cylindrical / Elliptic
Electrovaya	LMP	NA	NA	NA	NA	NA
Valence	LFP	NA	polymer	Pouch	Stacked	Prismatic

Source: Deutsche Bank, Advanced Automotive Batteries

Protoncar

CLEANCAR SHAPERS



Where is Protoscar coming from?

Protoscar

CLEANCAR SHAPERS



