



Electric cars and the Sustainable Future

23.06.2010



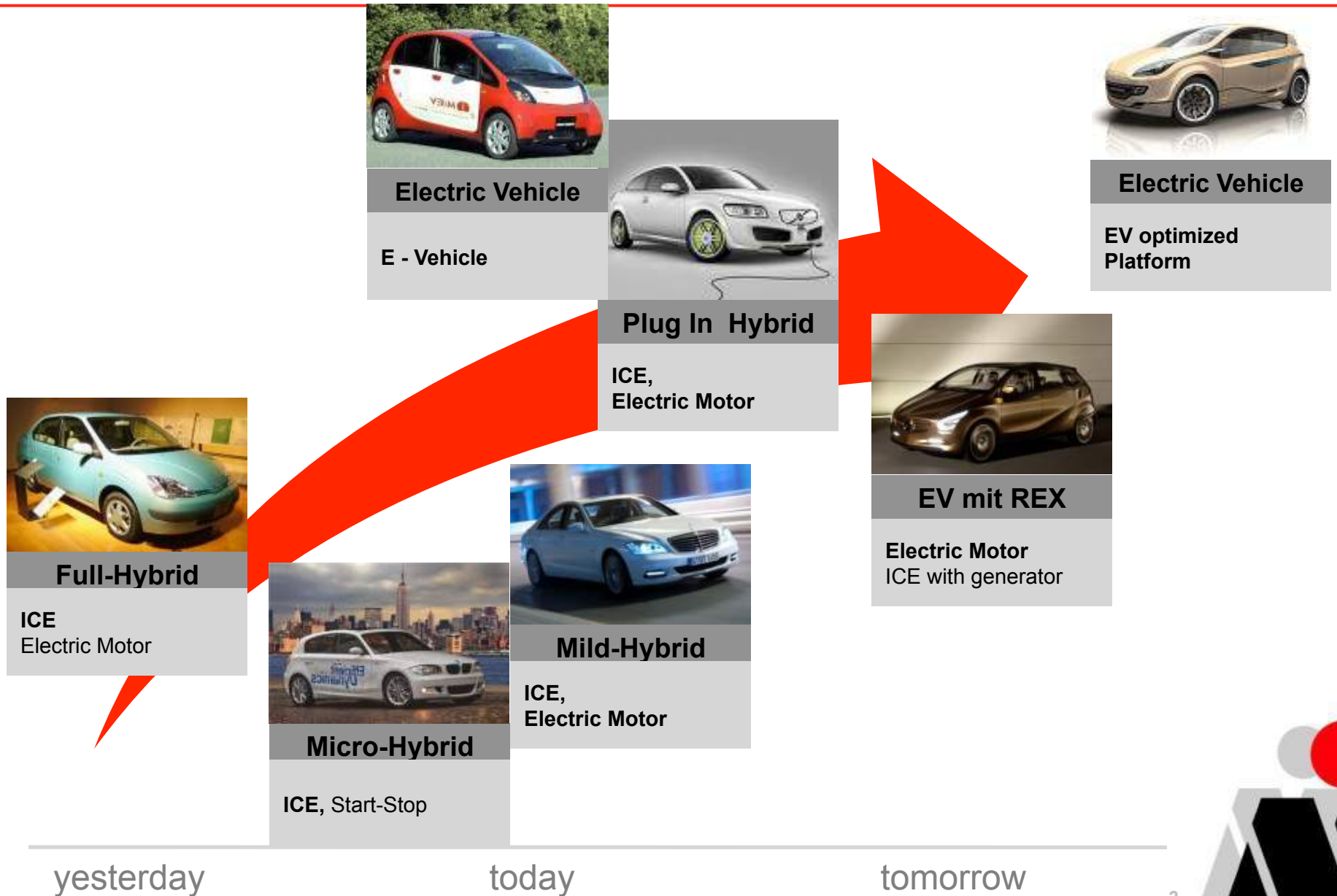
The coincidence of four factors put tremendous pressure on the auto industry



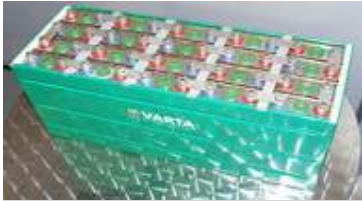
Source: Cisco IBSG Auto Analysis



Development Electrification



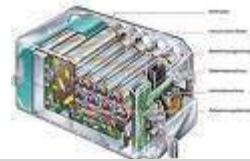
Components for Electrification



Ni-Metal Battery



Electric Power Steering



Li-Ionen Battery



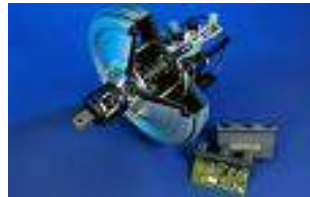
Inverter 1st Generation



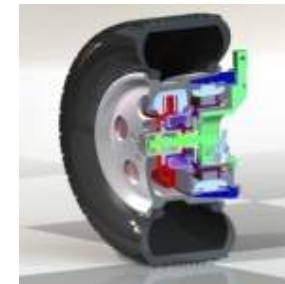
E-Motor



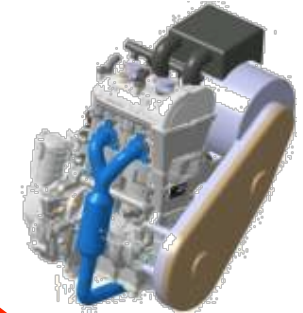
Start Stop Automatic



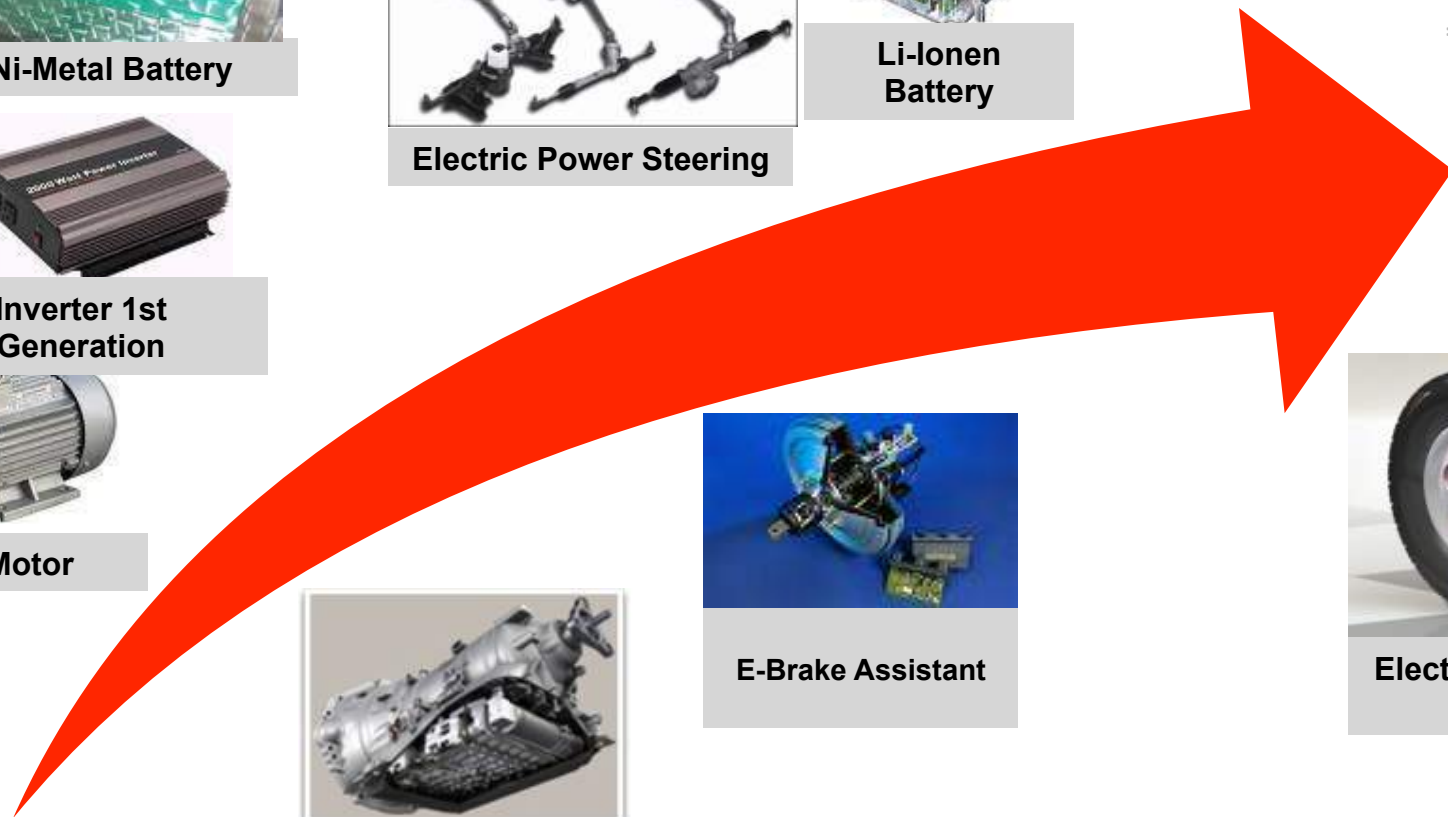
E-Brake Assistant



Electric Wheel Hub



Range Extender



yesterday

today

tomorrow



Experiences of customers

What can customers experience with 1000 Wh?



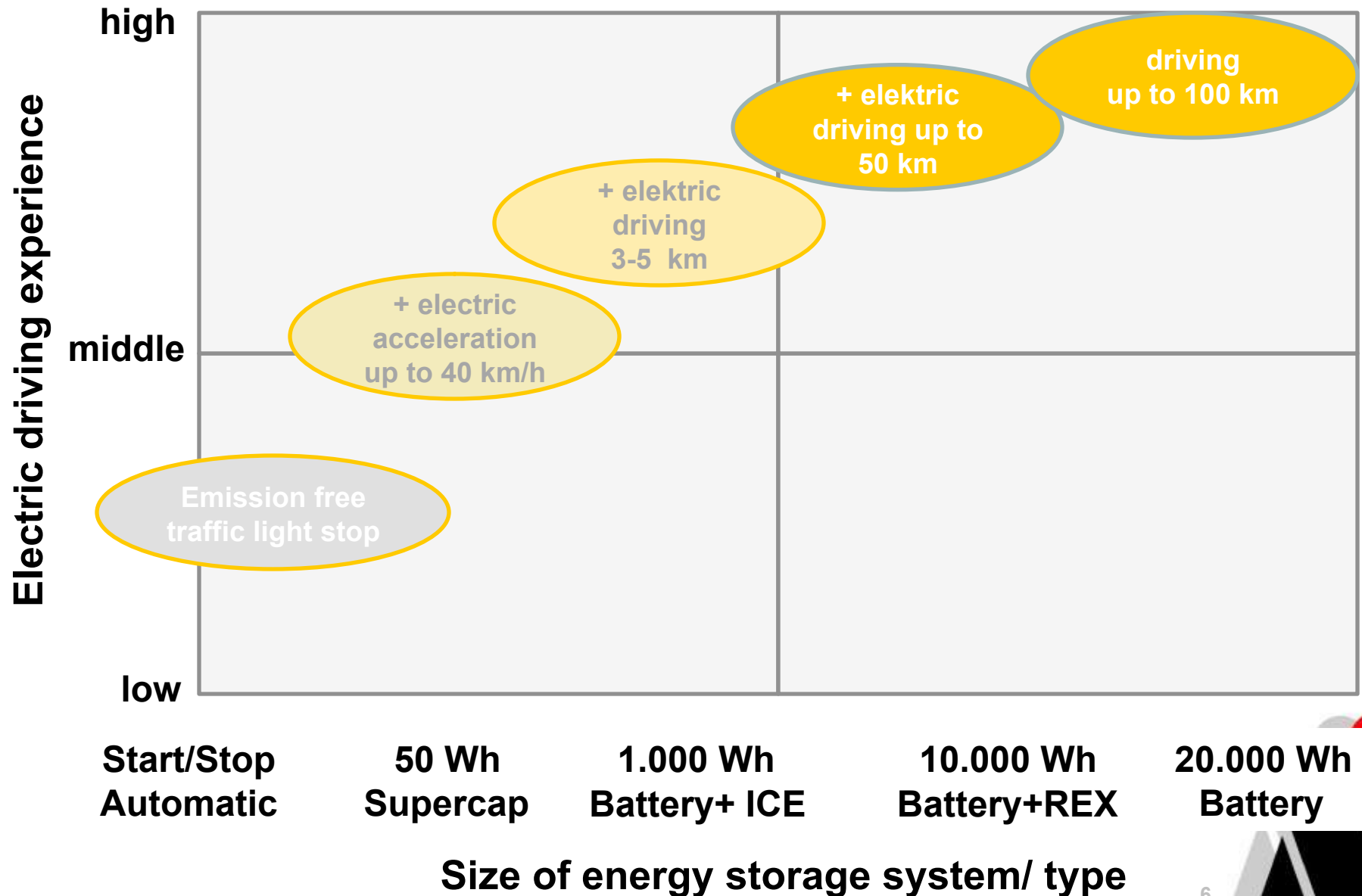
B- Segment Vehicle

Body weight: 70 kg

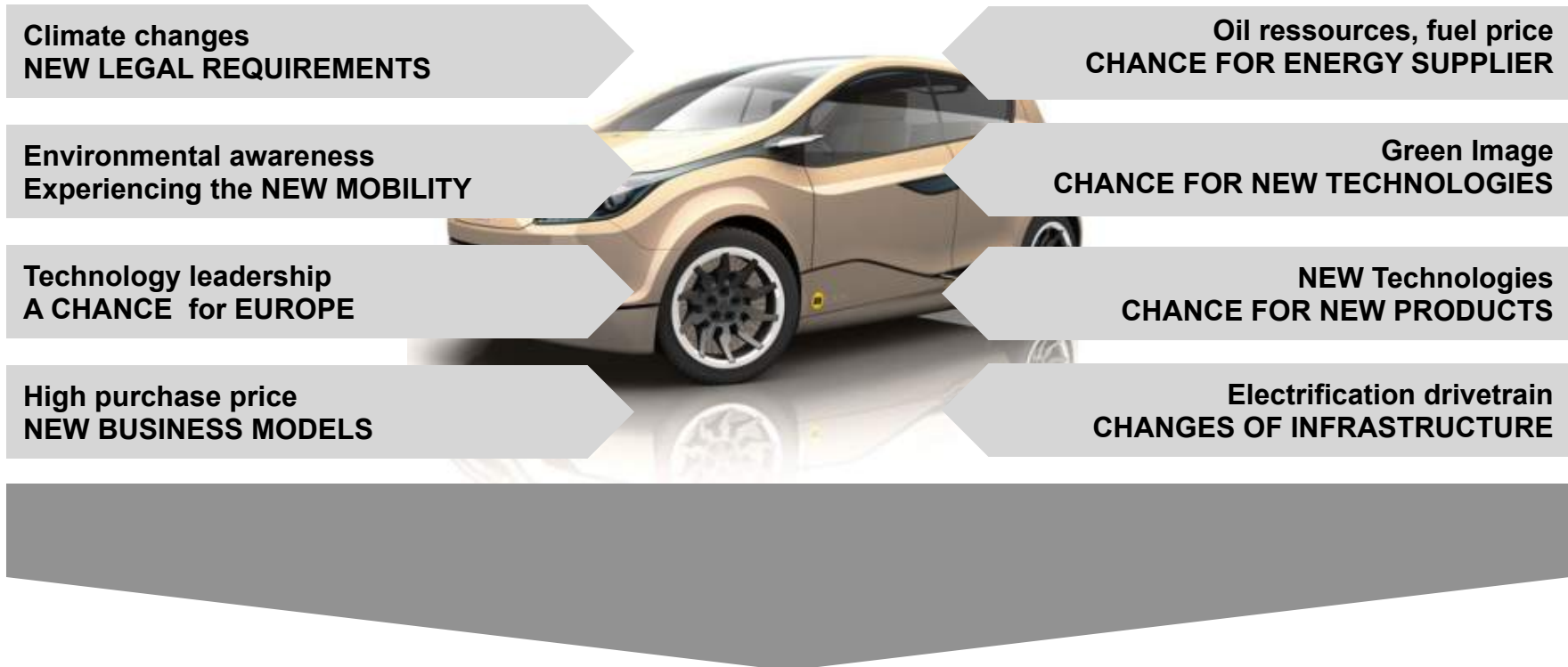


Experience Electrification

What can customers experience with Electrification?



Drivers for sustainable Mobility

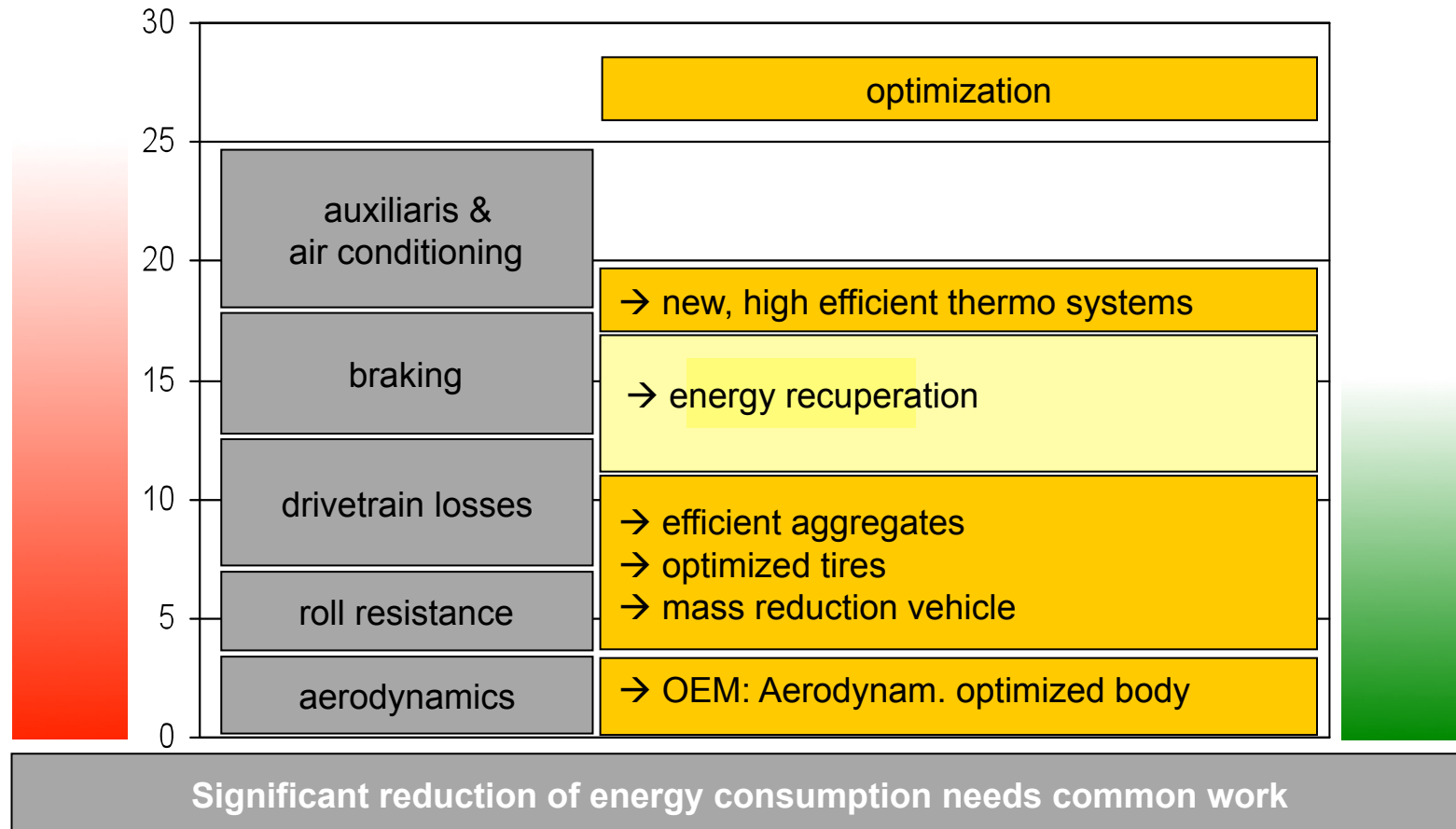


**new consumer behavior- new technologies- new vehicles,
new laws- new infrastructure – new business models
the NEW as a CHANCE**

Energy concept of complete vehicle



Energy consumption [kWh/ 100km] city cycle incl. real – life conditions



Current energy consumption
20-25kWh/ 100km

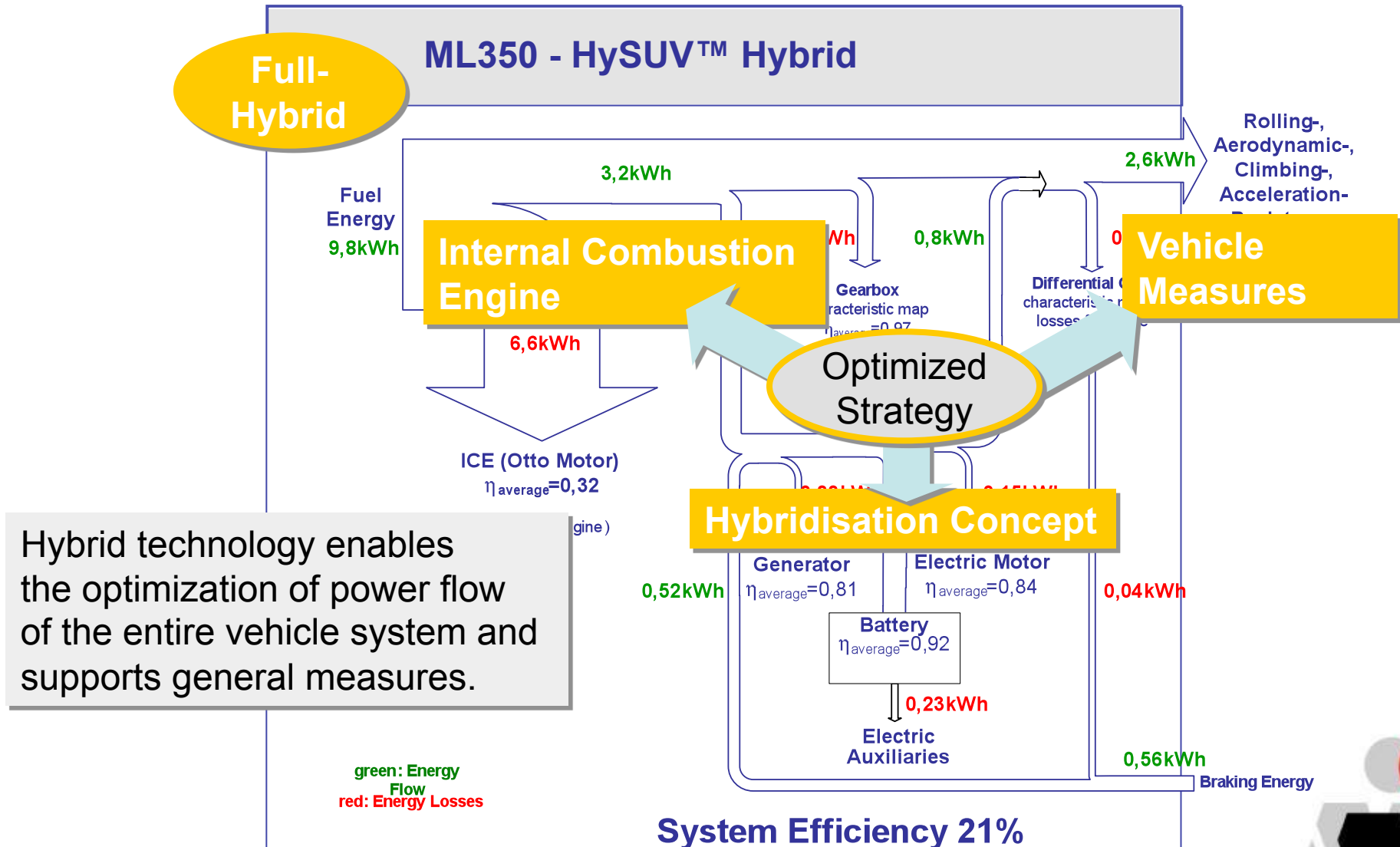
Source: R. Bosch GmbH

Target energy consumption
8-15kWh/ 100km

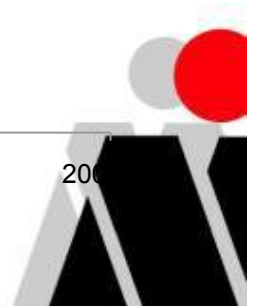
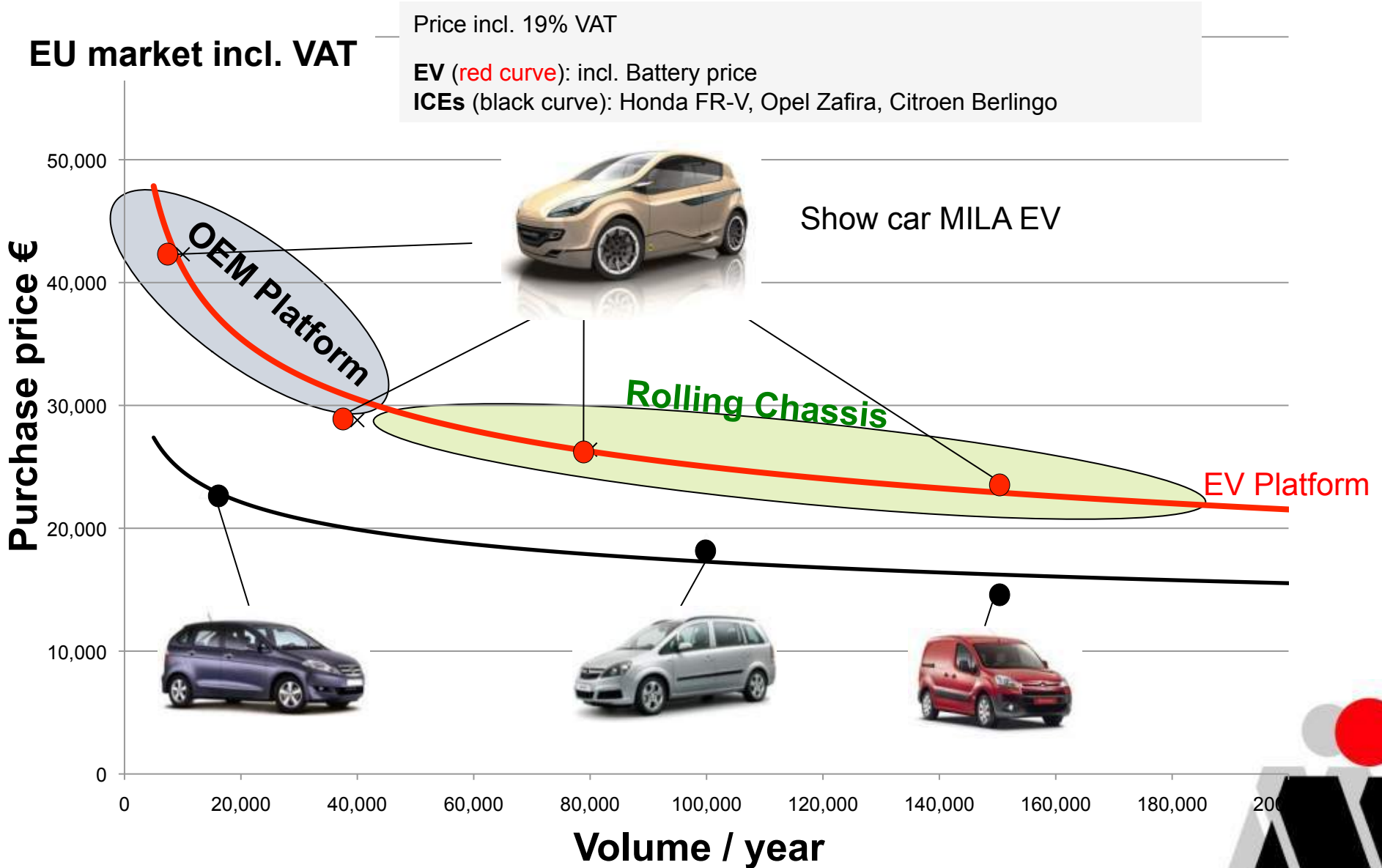


Technical Potential Analysis

Power and Energy Flow – NEDC Cycle



What does energy efficiency cost (2013)?

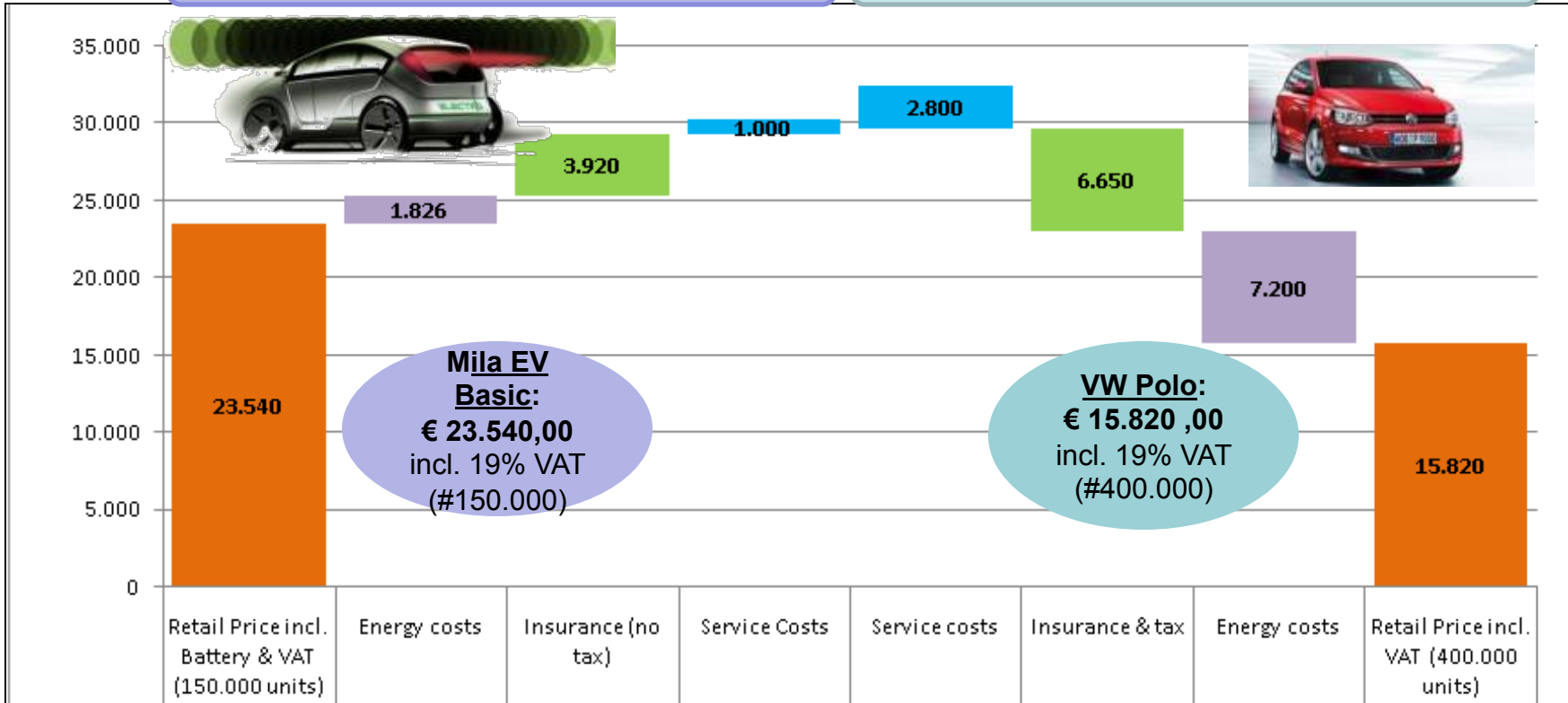


Total Cost of Ownership Comparison to VW Polo 1.4



Mila EV Basic: € 30.285

VW Polo 1.4: € 32.470



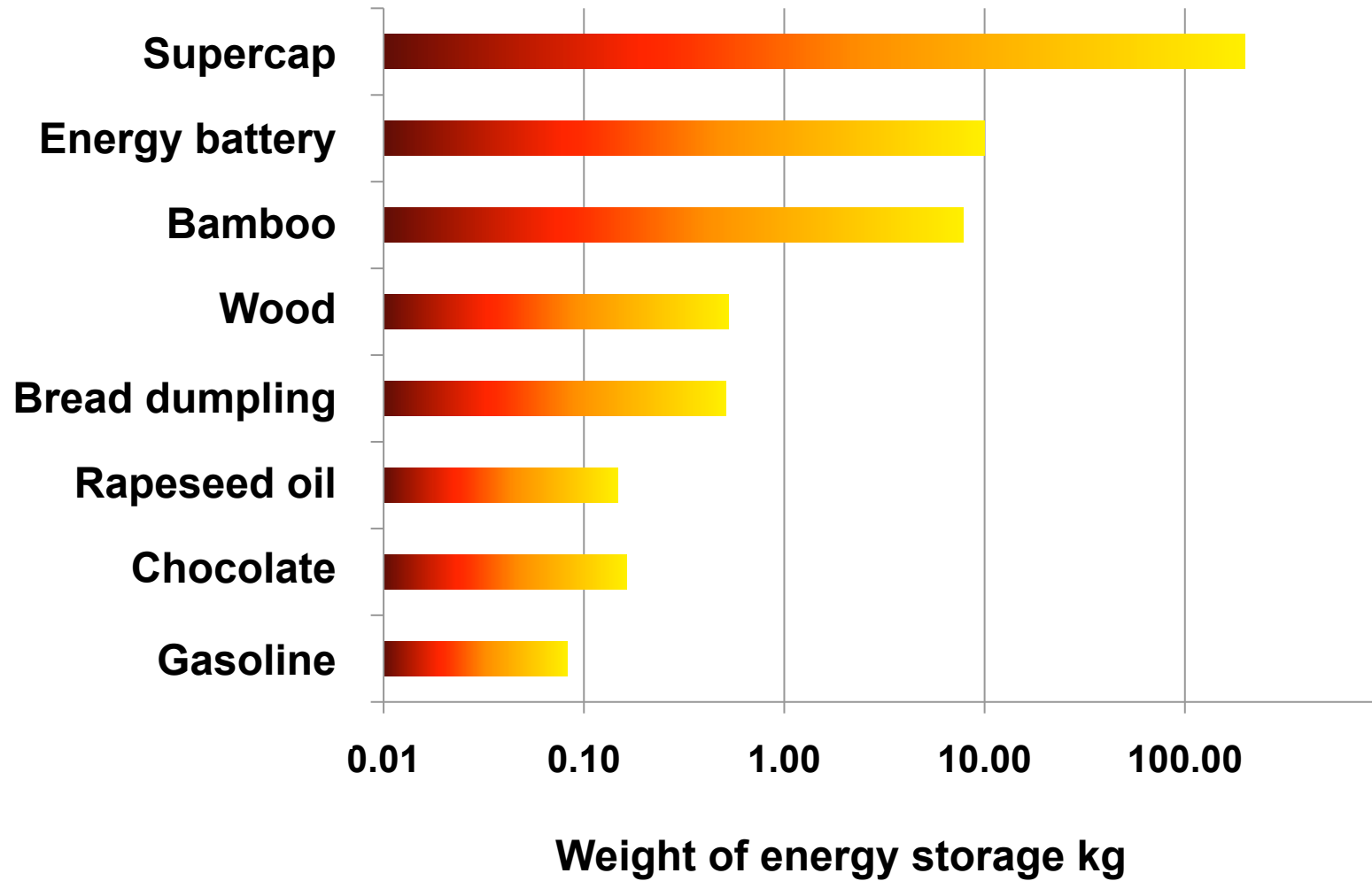
Car life time (EV & ICEV) 7 years, 100.000km, Battery life time 7 years, not considered: residual value

Mila EV EVO Basic:
 Fixed electricity price: 0,126 EUR/kWh (80% night, 20% day tariff)
 Consumption: 13,8kWh/100km
 Insurance + no tax, service: assumptions MS

VW Polo 1.4
 Fixed fuel price,: 1,2 EUR/l
 City consumption: 6,0 l/100km
 Insurance + tax, service : according Auto Test 08/2008

Energy Storage

1.000 Wh are stored in...



Batteries: Portfolio Electric Energy Storage

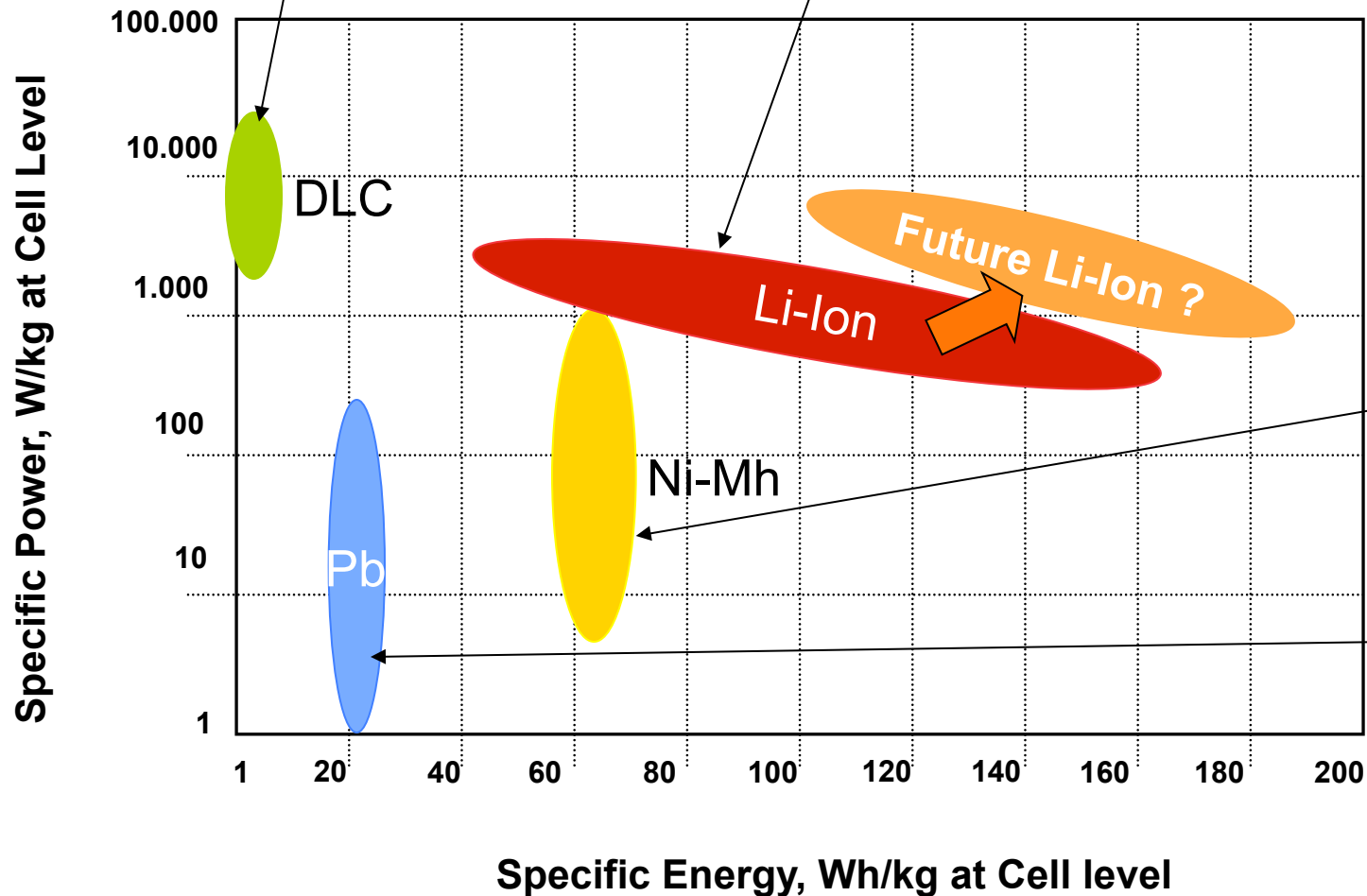


SuperCaps:

highest specific power; limited for applications due to poor energy density

Li-Ion:

high power and energy density; preferred technology at some point in the future



NiMH:

state of the art; up to 70% less energy and power density on system level

Pb Technology

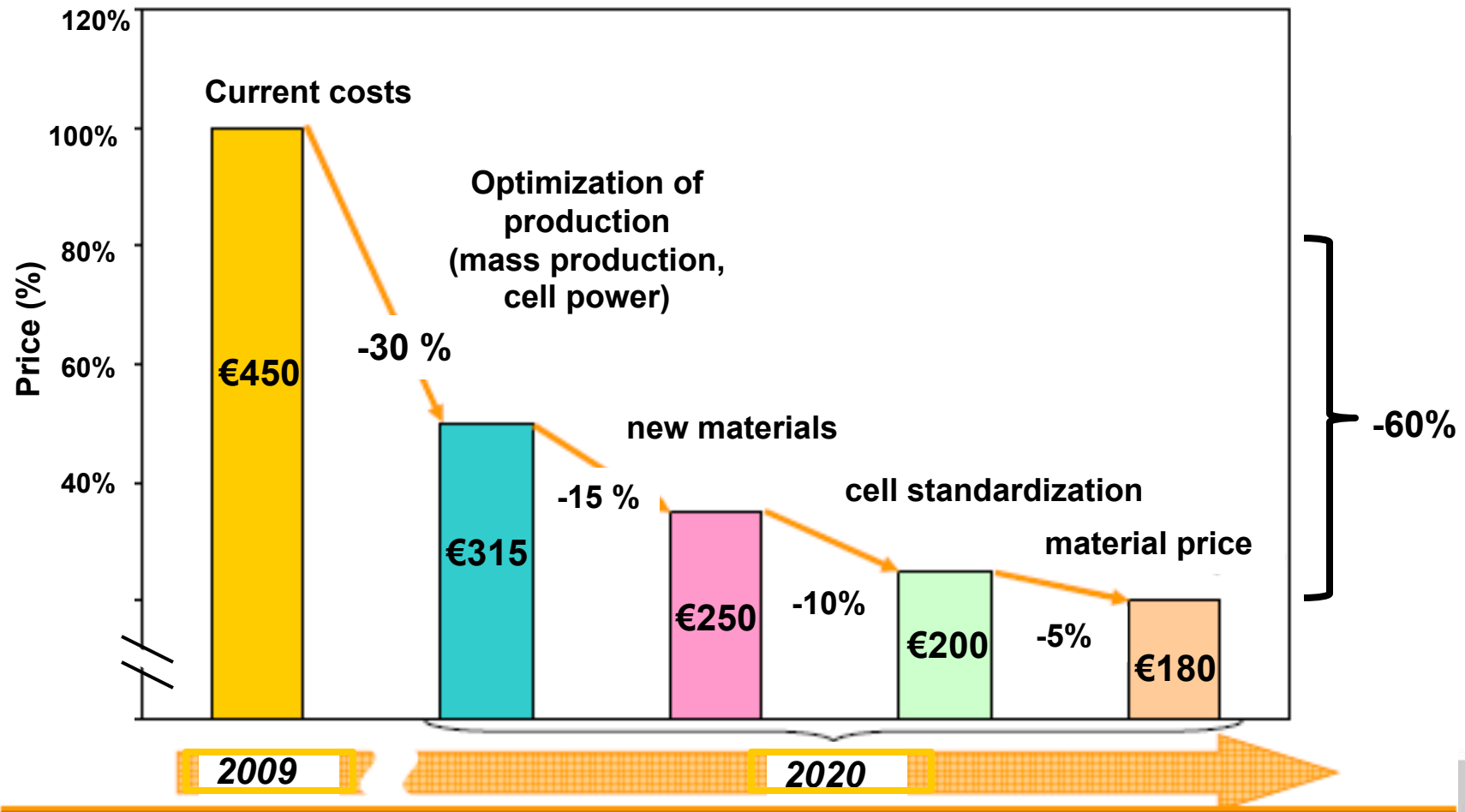
for Micro Hybrid applications only



Cell Price Development



Lithium Ionen Battery: Cell costs



Source: Continental AG



Apple – an interesting inspiration for the Automotive Industry



patent aluminium housing



Apple operating system



standard components

size difference

FOCUS

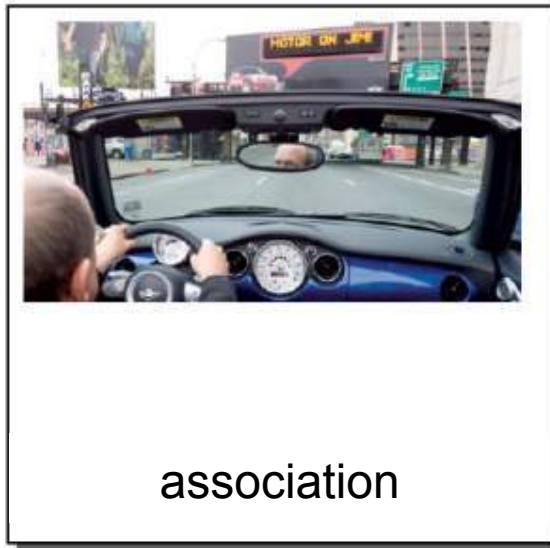
speed difference

no difference

Source: Cisco Systems



Mini uses this model currently



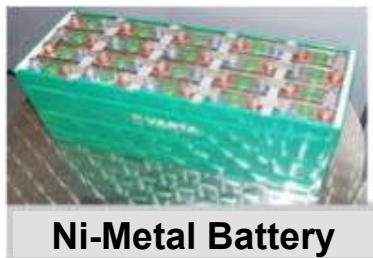
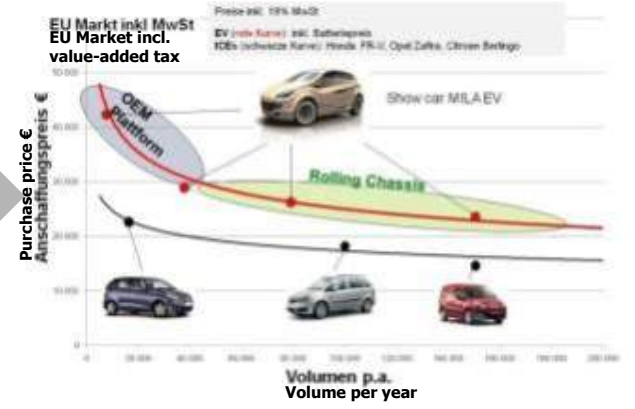
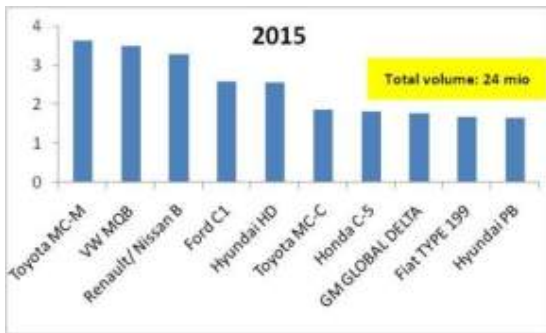
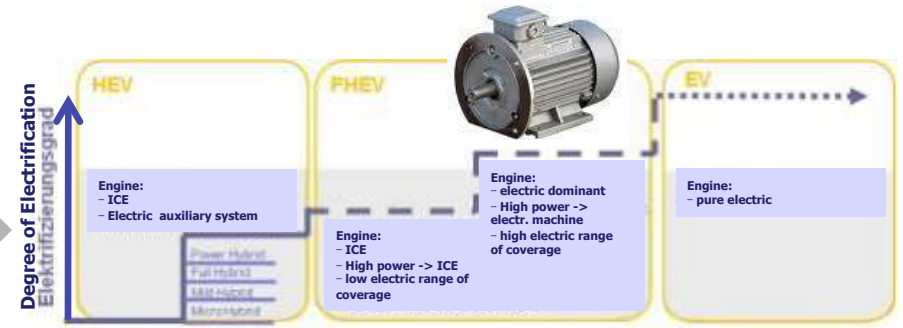
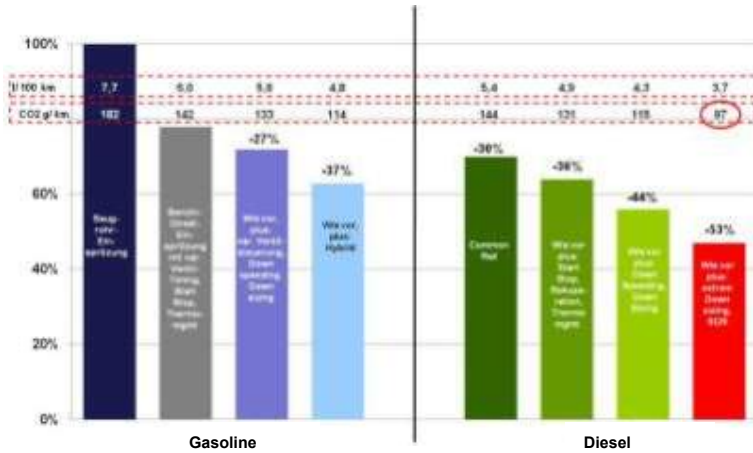
product difference **FOCUS** association difference

no difference

Source: Cisco Systems



Conclusion



Many things started

Still many possibilities and chances



NEW LEGAL REQUIREMENTS
Everyone on ist own or common?

CHANCE FOR ENERGY SUPPLIER
What is the role?

EXPERIENCE THE NEW MOBILITY
Energy efficiency – a rate for premium?

CHANCE FOR NEW TECHNOLOGIES
Who has the potential to finance?

A CHANCE FOR EUROPE
How do we keep that chance?

CHANCE FOR NEW PRODUCTS
Who can handle the complexity?

NEW BUSINESS MODELS
Which one will accomplish?

CHANGE OF INFRASTRUCTURE
What are the new possibilities?

It is not a question of IF and WHEN
It is a question of HOW and WHO

World is changing
Let US change the world