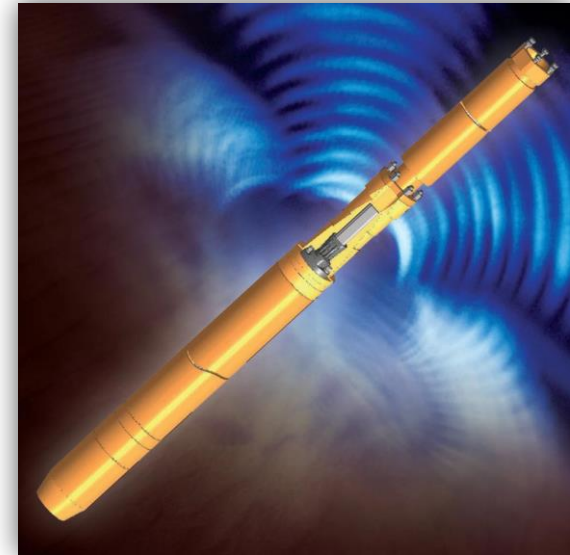
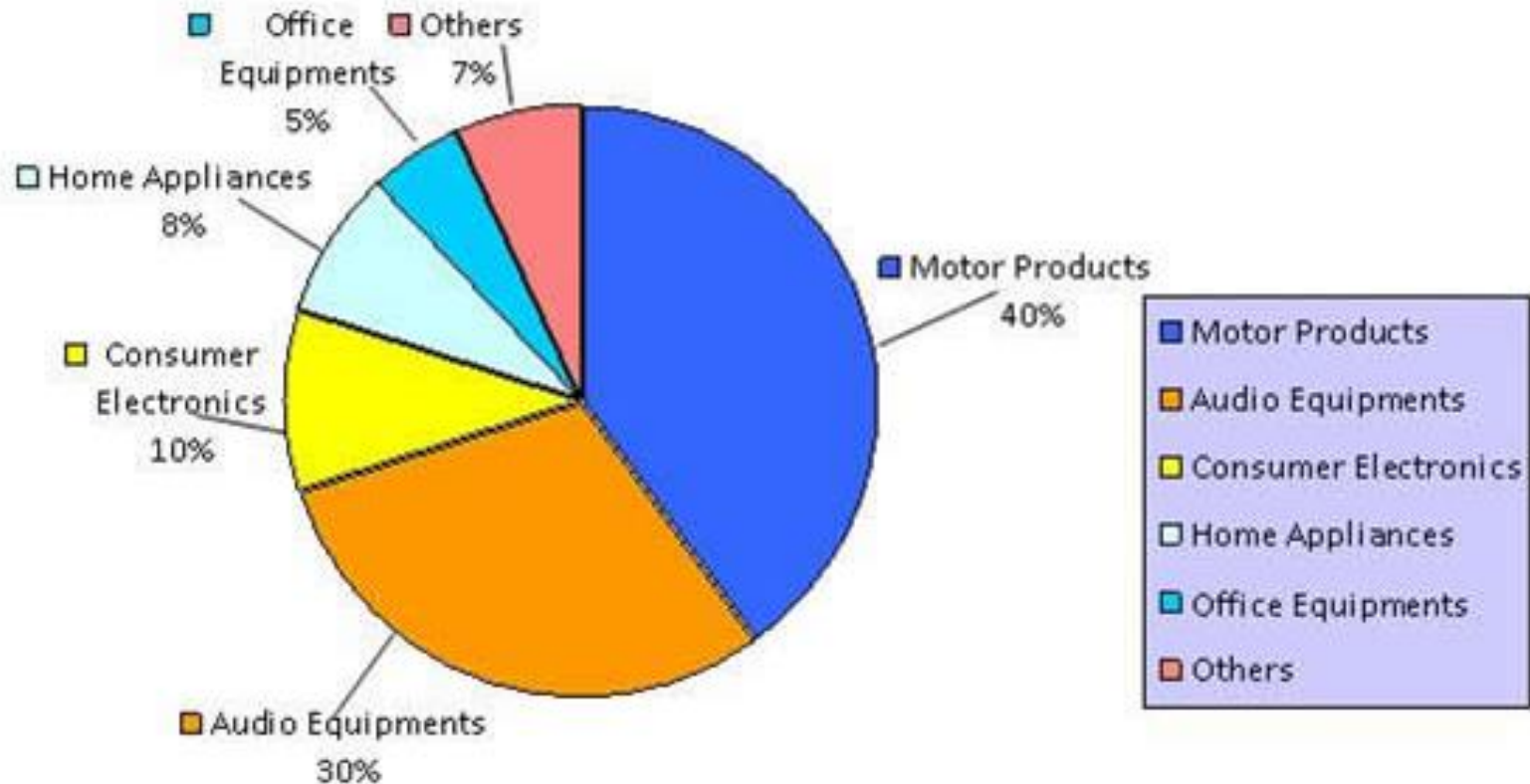


Permanent Magnet Based Applications



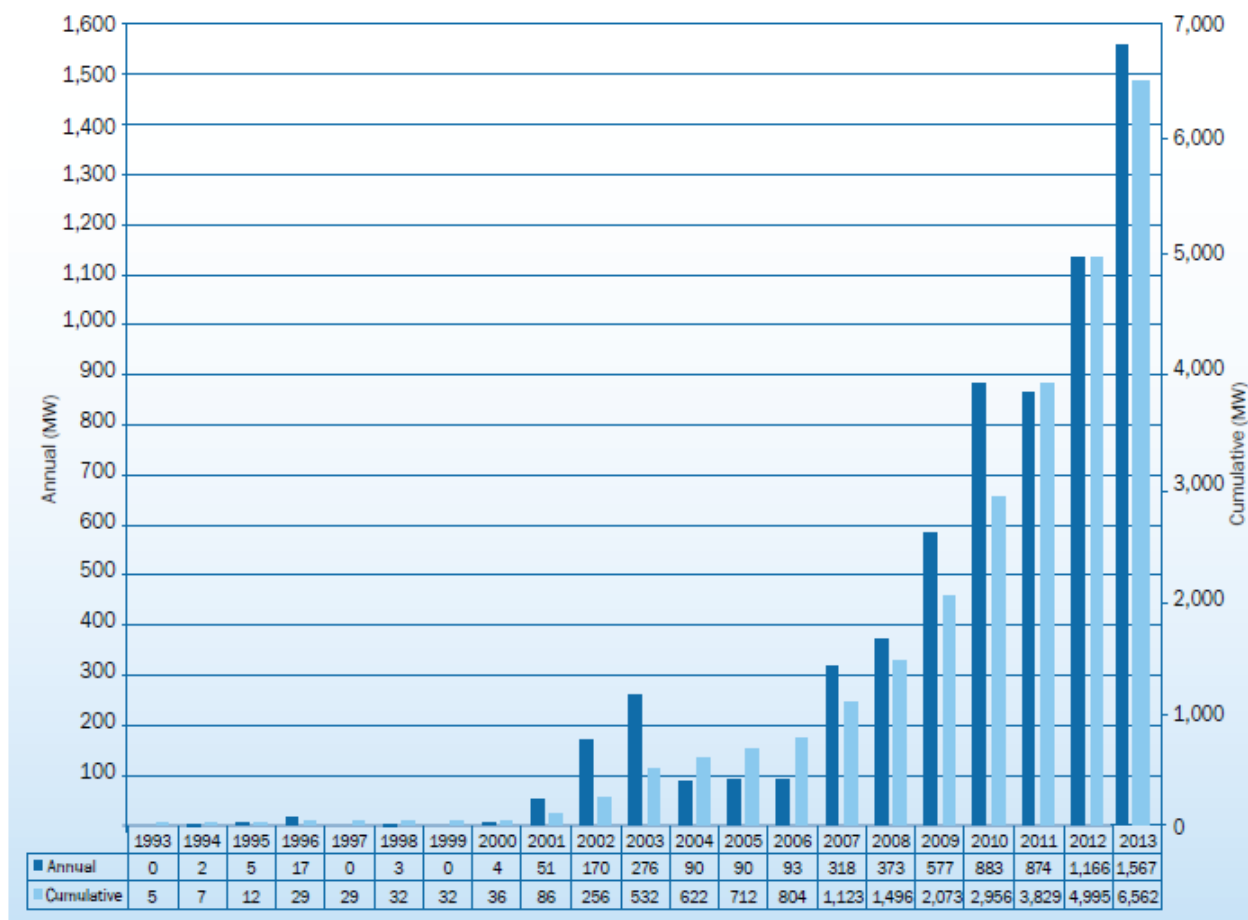
Uses of NdFeB permanent magnets



The proportion of NdFeB material used in the electric bicycle motors, industrial motors, car motors and other electrical products is more than of 40%

Source: Helimagnet.com

Annual and accumulated installed offshore capacity



Source: [EWEA 2014](#)

Driver in industrial motors – energy efficiency (IE4)

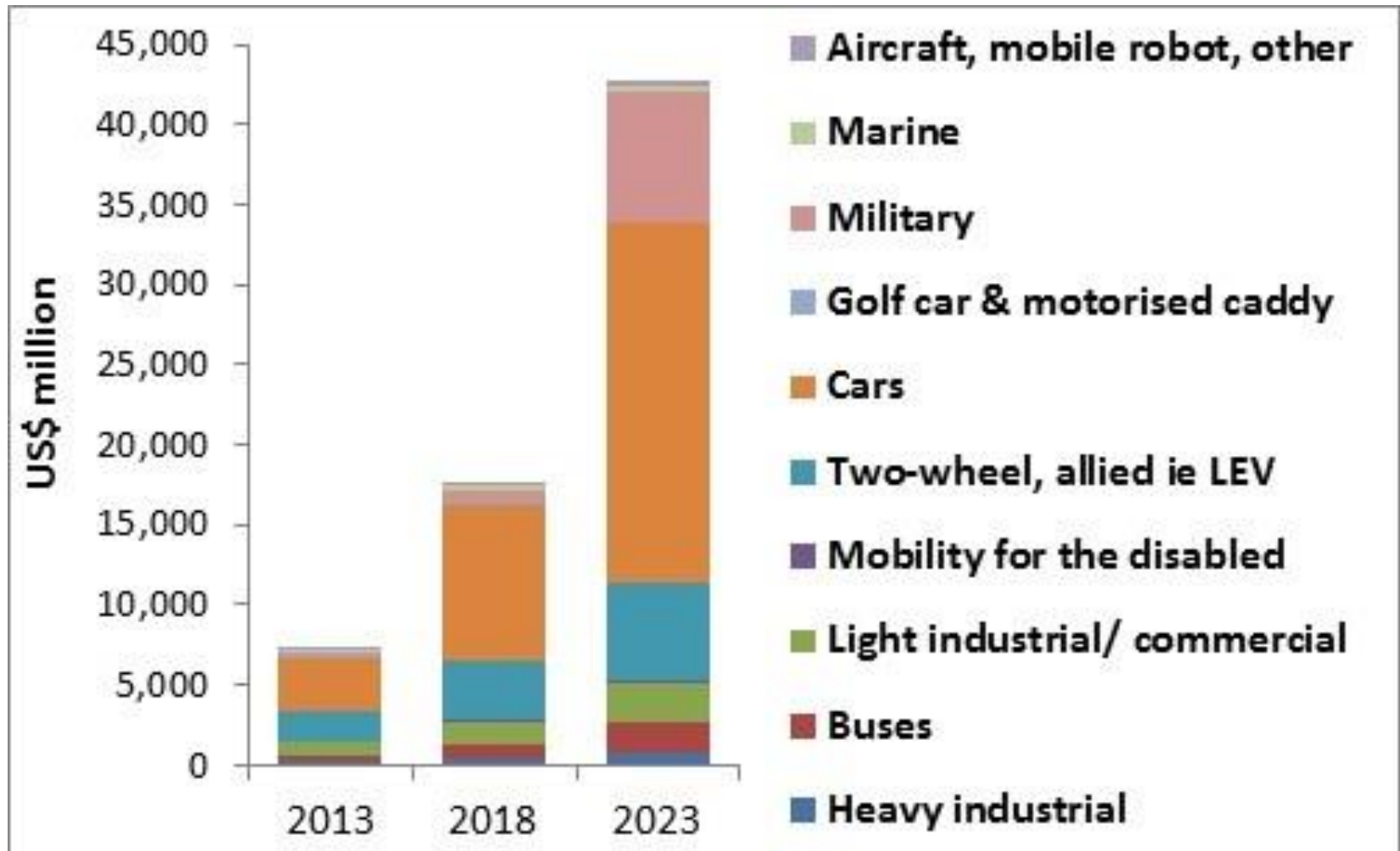
Low Voltage Motors - World Market Size (\$M) and Growth IE4 Super Premium



Source: IHS

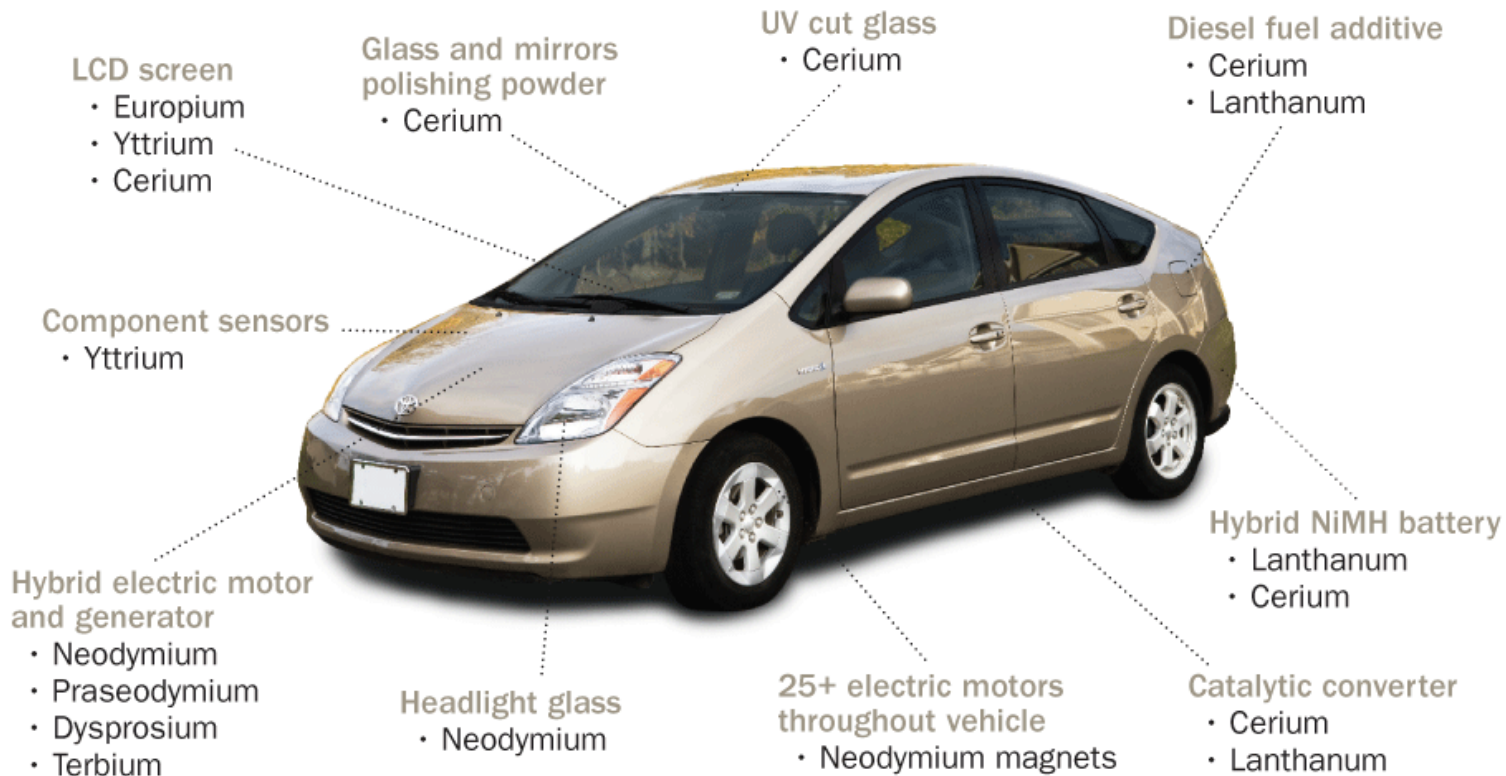
Source: [Scouras 2013](#)

Electric traction forecast by application



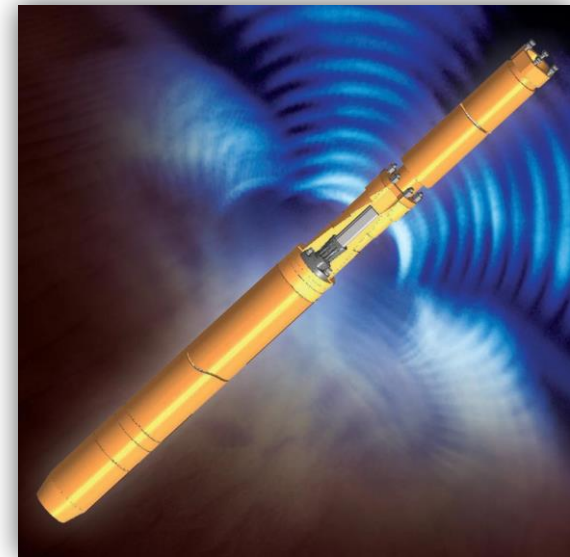
Source: IdTechEx

CRM uses in hybrid cars



Source: [Owaki/Kulla/Corbis](#)

Permanent Magnet Based Applications – Results of Vision Workshop



Major trends on landscape level

- Three main fields of applications expected to continue to grow:
 - Green technologies
 - Especially wind power generators... but perhaps not for very large generators > 10 MW
 - Traction and industrial motors
 - Not only cars but also trams, bikes, elevators or working machines
 - Consumer electronics
 - White goods (efficiency), consumer electronics

Major trends on regime level

Impact of landscape developments on specific applications and for Europe

Technical constraints
(size/weight)

High price &
price volatility

Reluctance
to change
(risk)

Geopolitics –
EU dependency

Pressure
from policy
(efficiency)

RE are not
„green“

Major trends on regime level

Policy interventions

Push for
green energy

Establishing
networks at
EU level

National
initiatives

Research
funding (FP7,
H2020, KIC)

Vehicle
emission
standards

Wishlist

Continue funding
material
development

Funding needed for
the combination of
substitution and
recycling

More funding for
close-to-market
projects

Major trends on regime level

Market initiatives

Alternative designs & technologies – already in development or implemented

Recycling-technologies

Invest in more research

Cooperation between Industry and Research is increasing in this field

Major trends on regime level

Research activities

More material
flow analysis
needed

Development of
new business
models

Long term
funding
necessary

Bring designers
and material
scientists together

Projects aimed to
substitute REE
completely

Cooperation between
research centers and
industry

Recycling /
Downcycling has to be
researched together
with substitution

Permanent Magnet Based Applications

