

Trendovi u autoindustriji

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Agenda:

- Značaj autoindustrije u svjetskim tokovima
- Baterije za električna vozila i njihovo zbrinjavanje
- Inovacije i doseg automobila
- Autonomija automobila

Značaj autoindustrije u EU – 13 m. zaposlenih



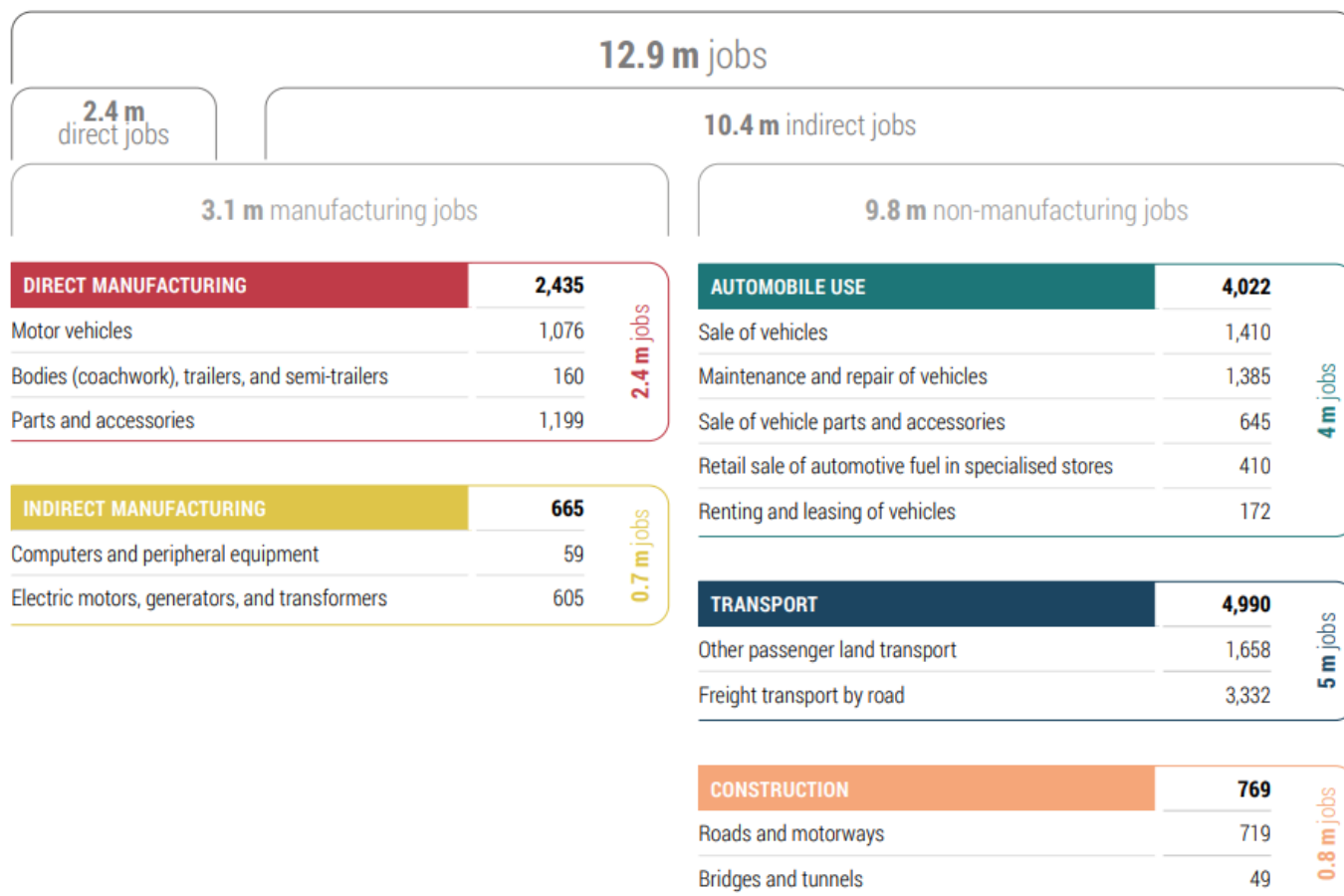
EMPLOYMENT

The EU auto sector employs almost 13 million Europeans directly and indirectly

1. Provisional

EU AUTOMOTIVE SECTOR: DIRECT AND INDIRECT EMPLOYMENT

In thousands / 2021¹



Inovacije i ulaganje u R&D po sektorima - EU

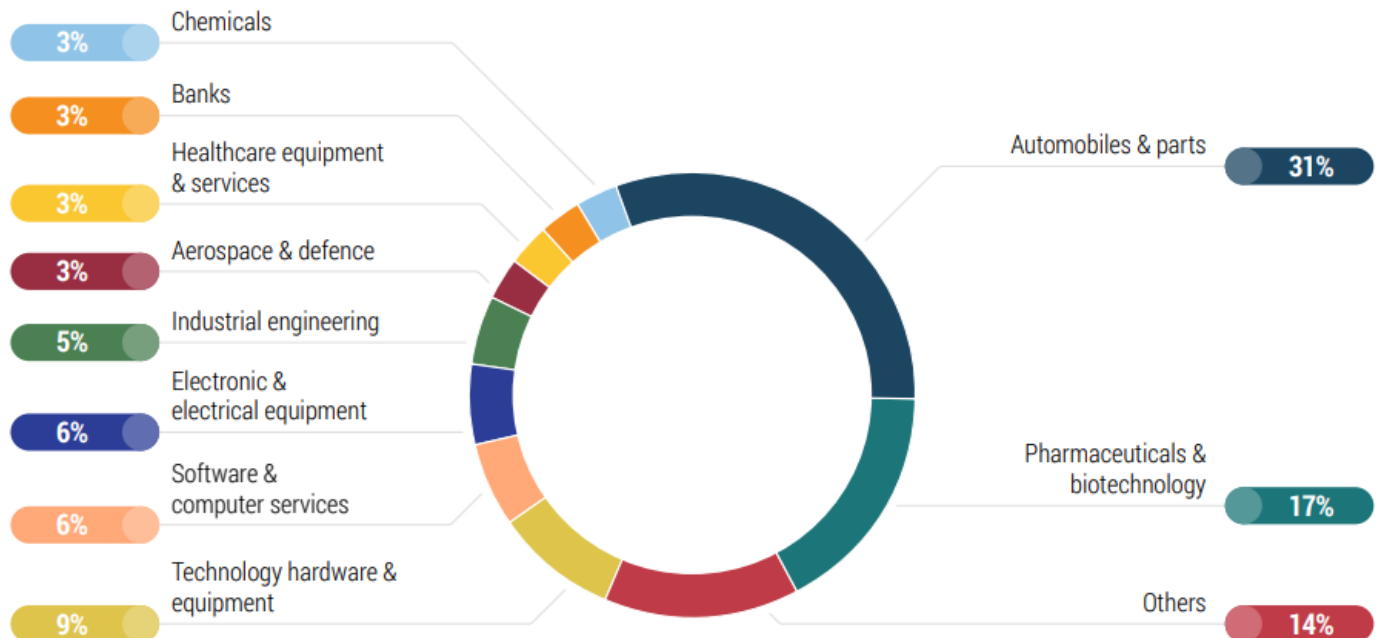


INNOVATION

EU auto makers
invest around a
third of all EU
R&D spending

SECTORAL R&D SHARE IN THE EU

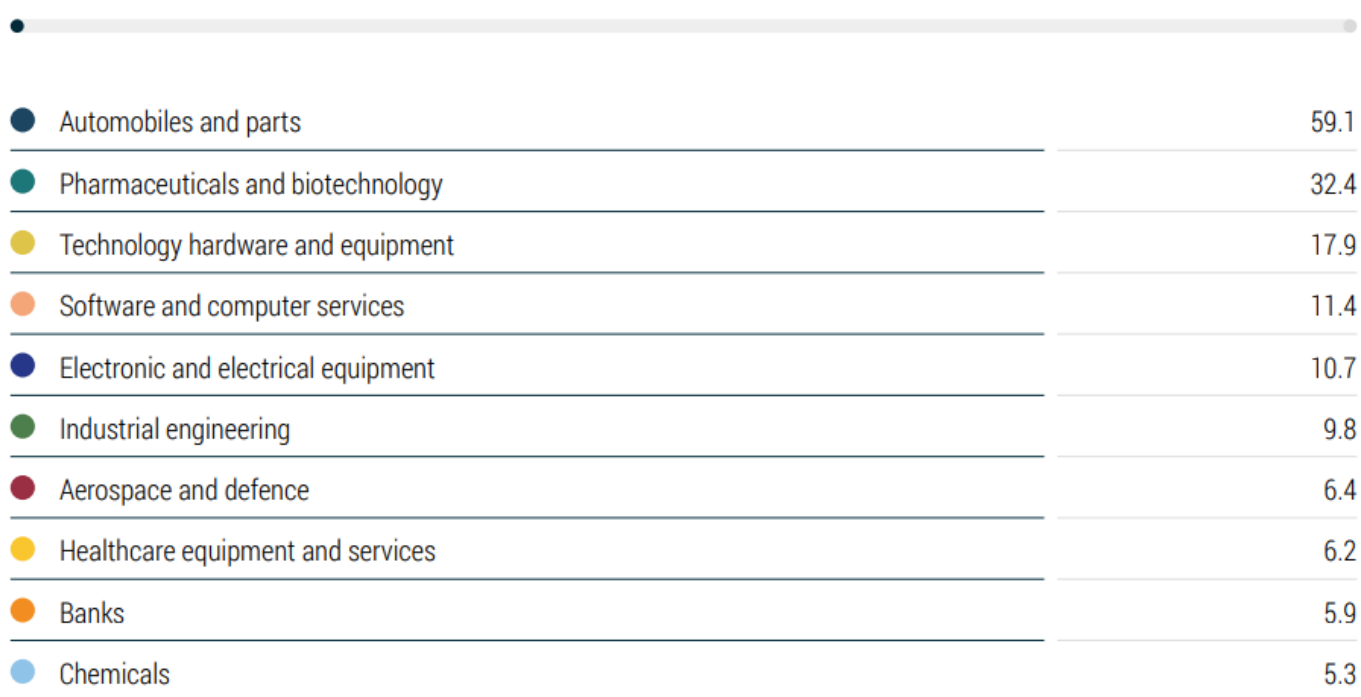
% share / 2021



TOP 10 Investicija po sektorima - EU

R&D INVESTMENT IN THE TOP 10 EU INDUSTRIAL SECTORS

In billion € / 2021



Automobiles and parts	59.1
Pharmaceuticals and biotechnology	32.4
Technology hardware and equipment	17.9
Software and computer services	11.4
Electronic and electrical equipment	10.7
Industrial engineering	9.8
Aerospace and defence	6.4
Healthcare equipment and services	6.2
Banks	5.9
Chemicals	5.3

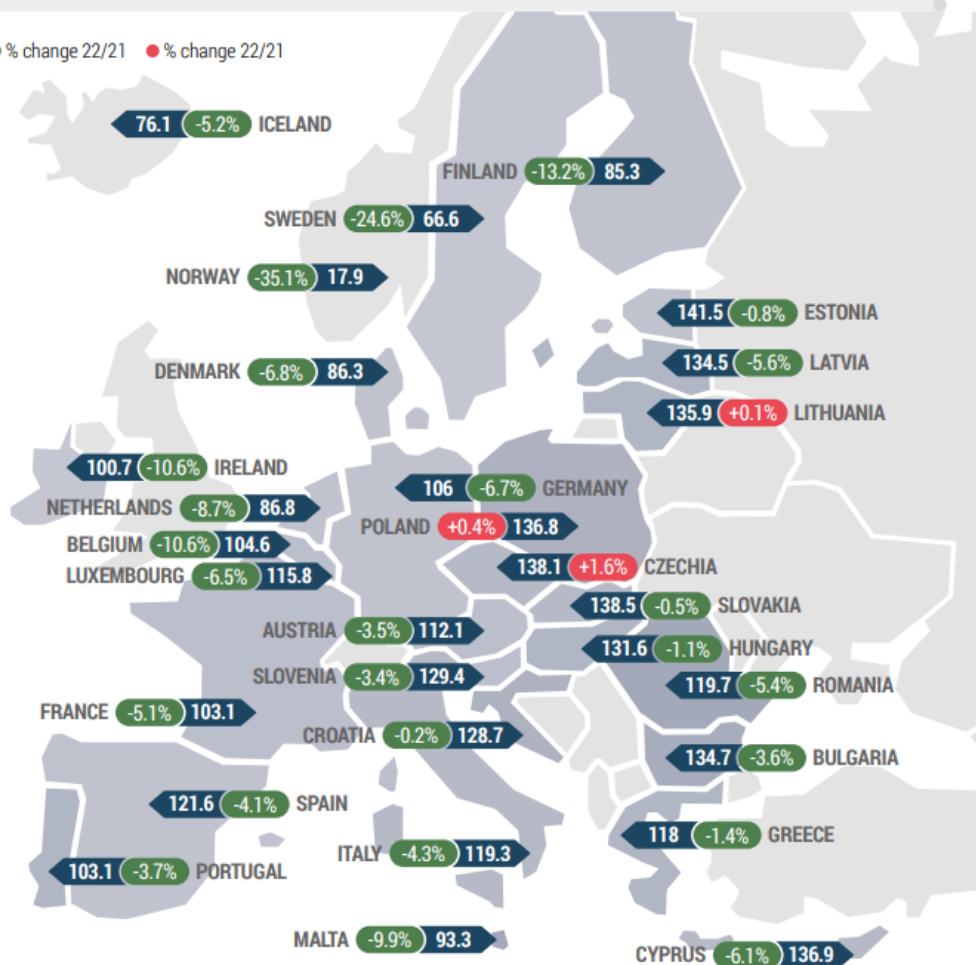
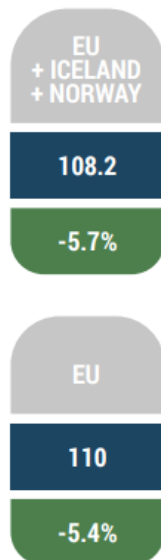
EU auto makers invest around €60 billion annually in R&D, twice the amount as pharmaceuticals and biotech

The average new car in the EU emits 5.4% less CO2/km than in 2021

NEW CAR CO2 EMISSIONS BY COUNTRY

In g CO2/km / 2022¹

● 2022 average emissions (g CO2/km) ● % change 22/21 ● % change 22/21

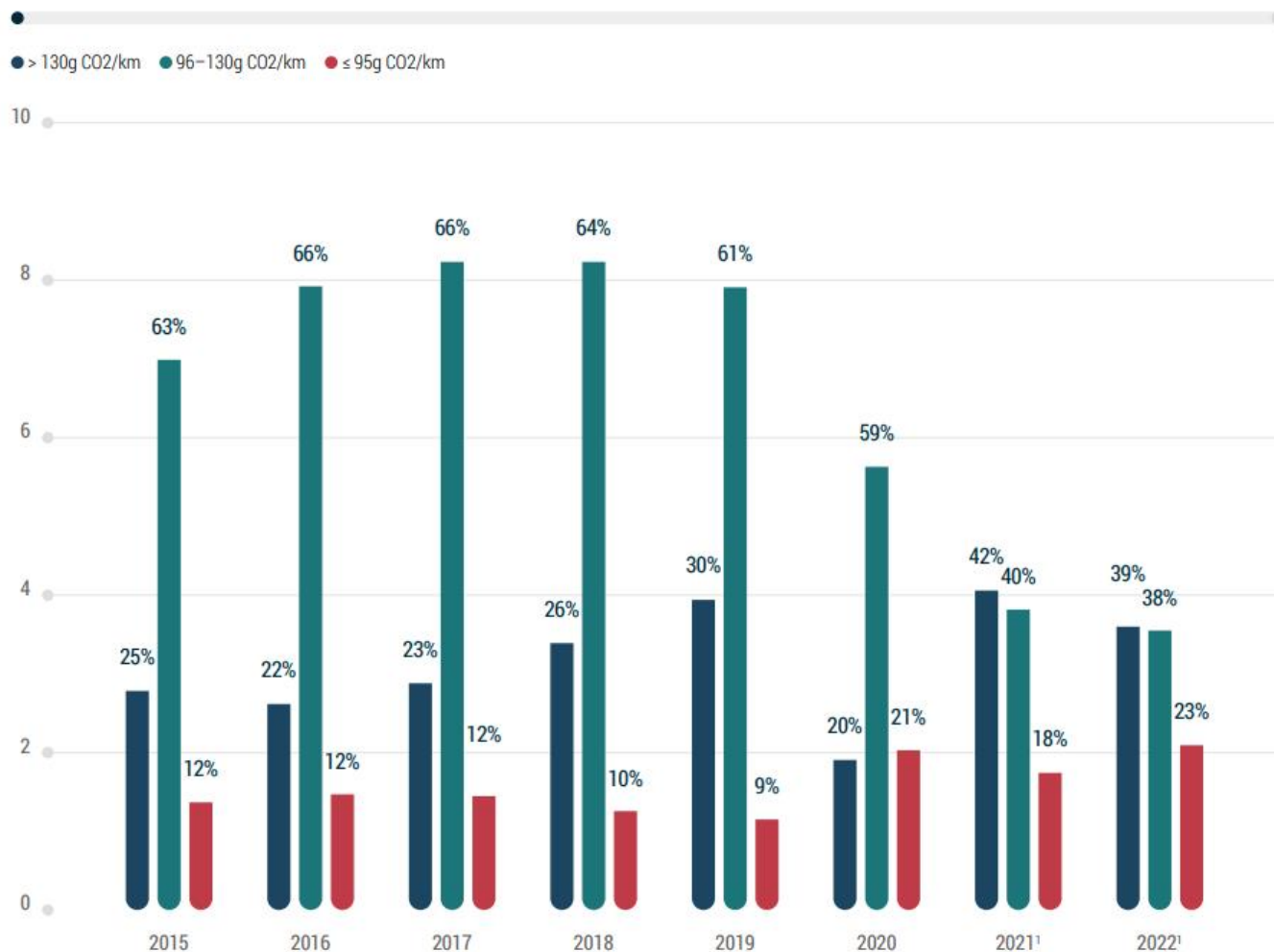


1. Provisional figures; from 2021, the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) will replace the New European Driving Cycle (NEDC) as CO2 emissions standards

SOURCE: EUROPEAN ENVIRONMENT AGENCY (EEA)

NEW EU CARS BY EMISSION CLASS

In million units, % share / 2015 – 2022¹



SOURCE: EUROPEAN ENVIRONMENT AGENCY (EEA)

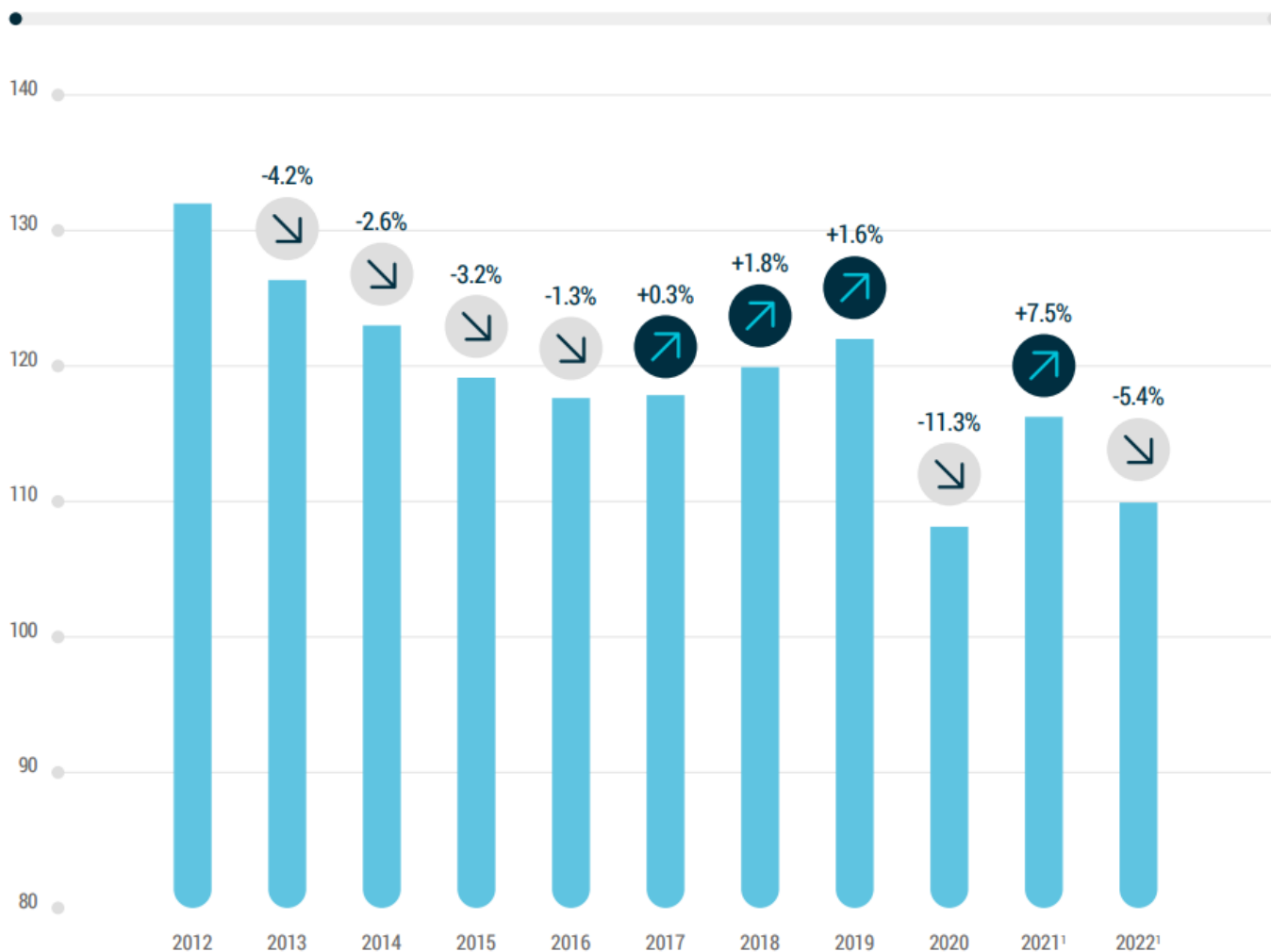
**Almost a quarter
of new cars emit
95g CO₂/km
or less**

1. Provisional; from 2021, the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) will replace the New European Driving Cycle (NEDC) as CO₂ emissions standards

**CO2 emissions
from new cars are
down by almost
17% since 2012**

NEW CAR CO2 EMISSIONS IN THE EU

In g CO2/km, % change / 2012 – 2022¹



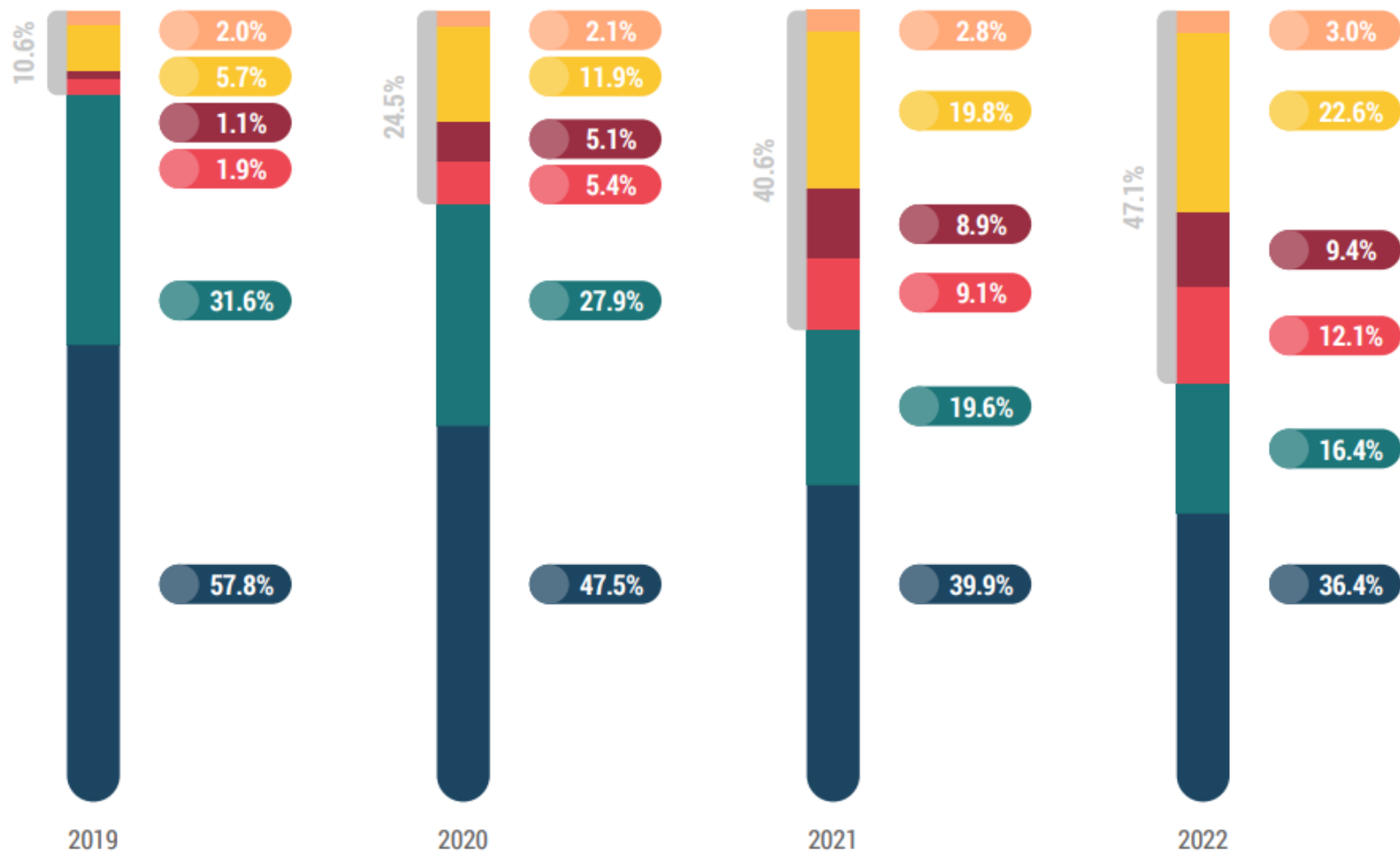
1. Provisional; NECD (2011-2020), WLTP (2021-2022)

SOURCE: EUROPEAN ENVIRONMENT AGENCY (EEA)

NEW EU¹ CAR SALES BY POWER SOURCE

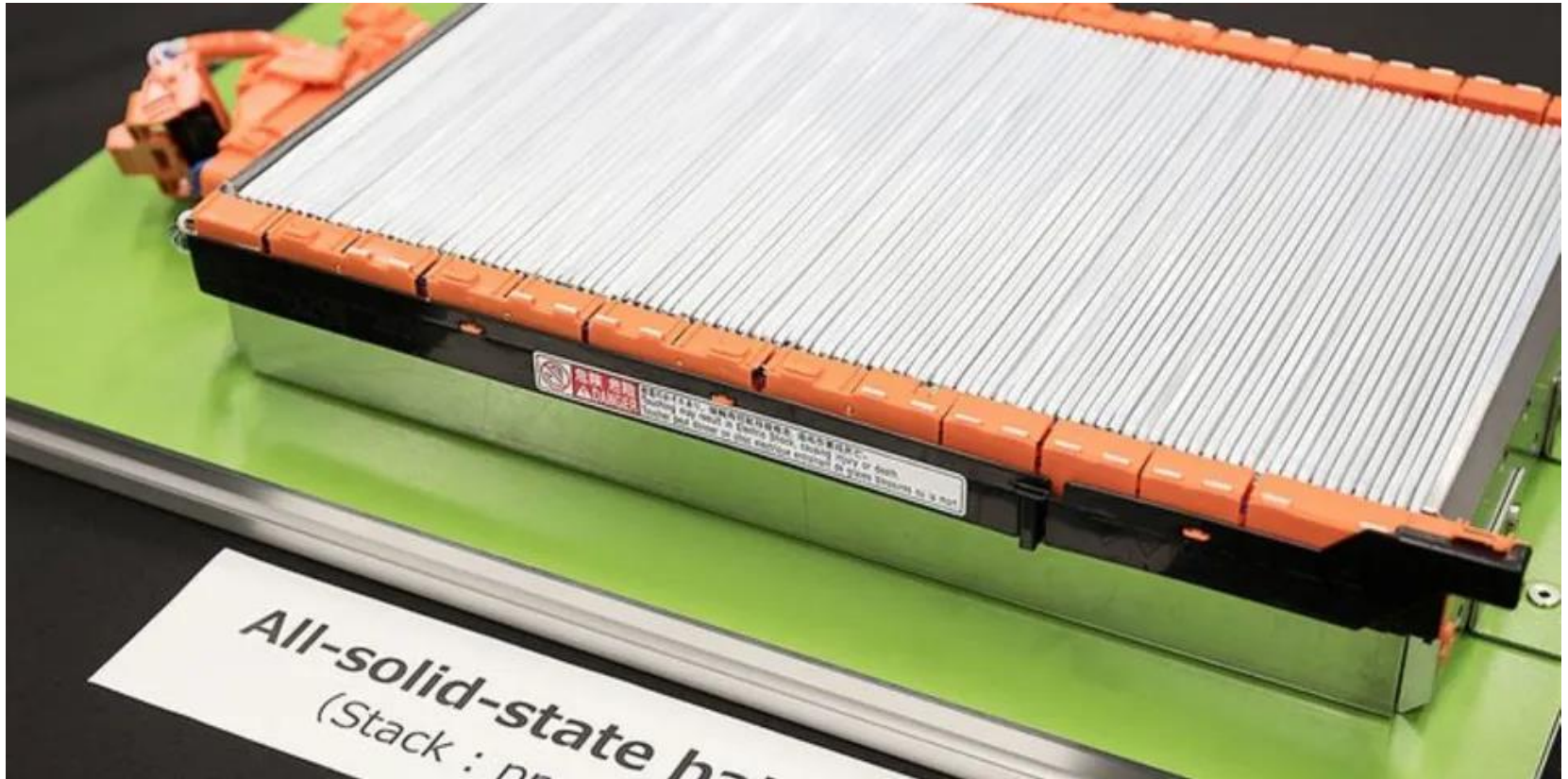
Market share / 2019 – 2022

● Petrol ● Diesel ● Battery electric ² ● Plug-in hybrid ³ ● Hybrid electric ⁴ ● Alternative fuels ⁵ ● Total alternatively powered vehicles



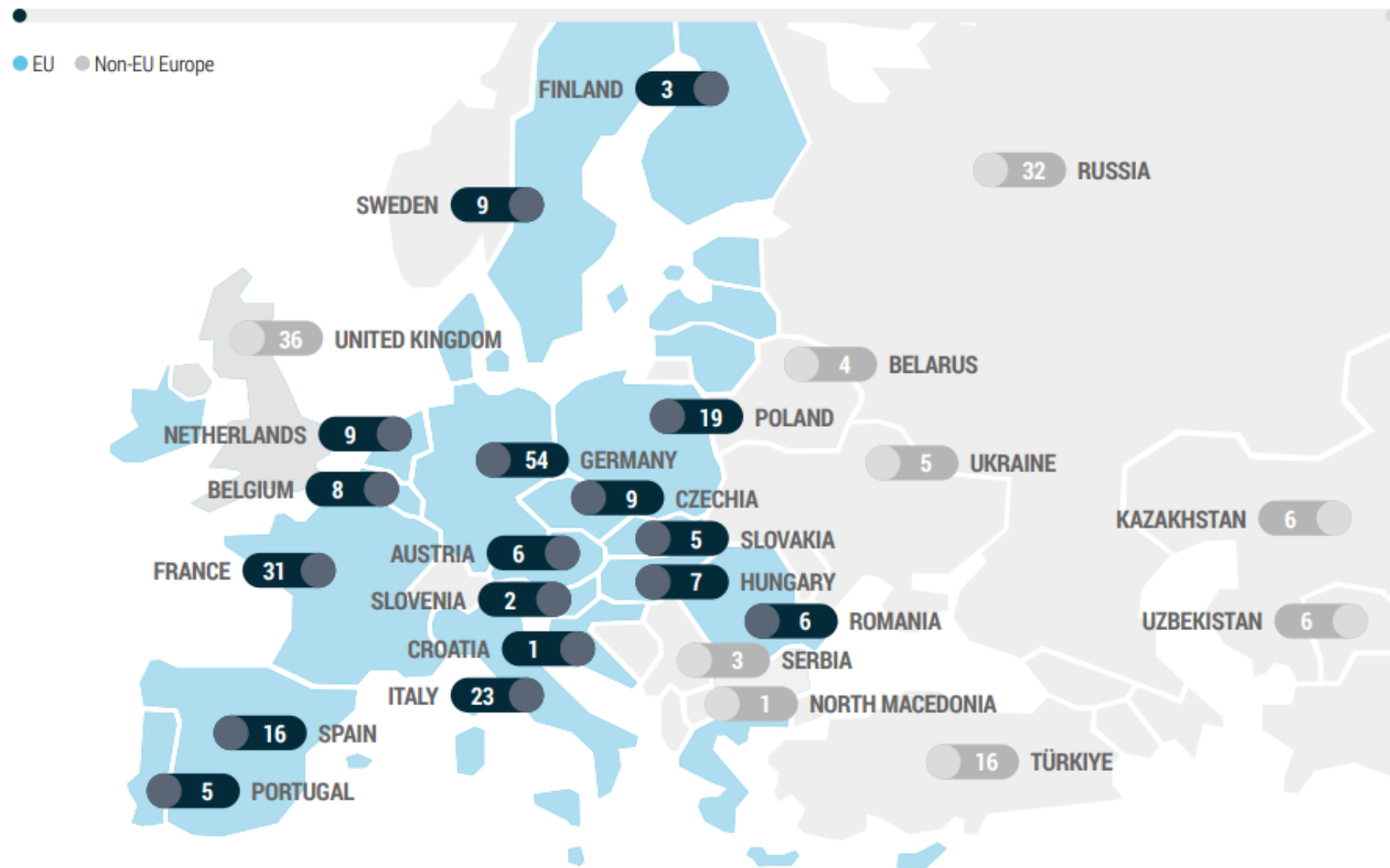
SOURCE: ACEA

Baterije i njihovo zbrinjavanje



AUTOMOBILE ASSEMBLY, BATTERY, AND ENGINE PLANTS

2023



	CARS	VANS	TRUCKS	BUSES	ENGINES	BATTERIES	TOTAL
EU ONLY	80	28	28	38	52	37	213
EUROPE	127	46	56	71	71	41	322

Vječita pitanja

- Garancija na baterije uglavnom 10 g ili 160.000 km
- Rezidualna vrijednost BEV vozila?
- Inovacije u vezi baterija?
- Šta nakon isteka garancije?
- Šta sa baterijom nakon pada kapaciteta?
- Kako reciklirati bateriju?



Zbrinjavanje baterija

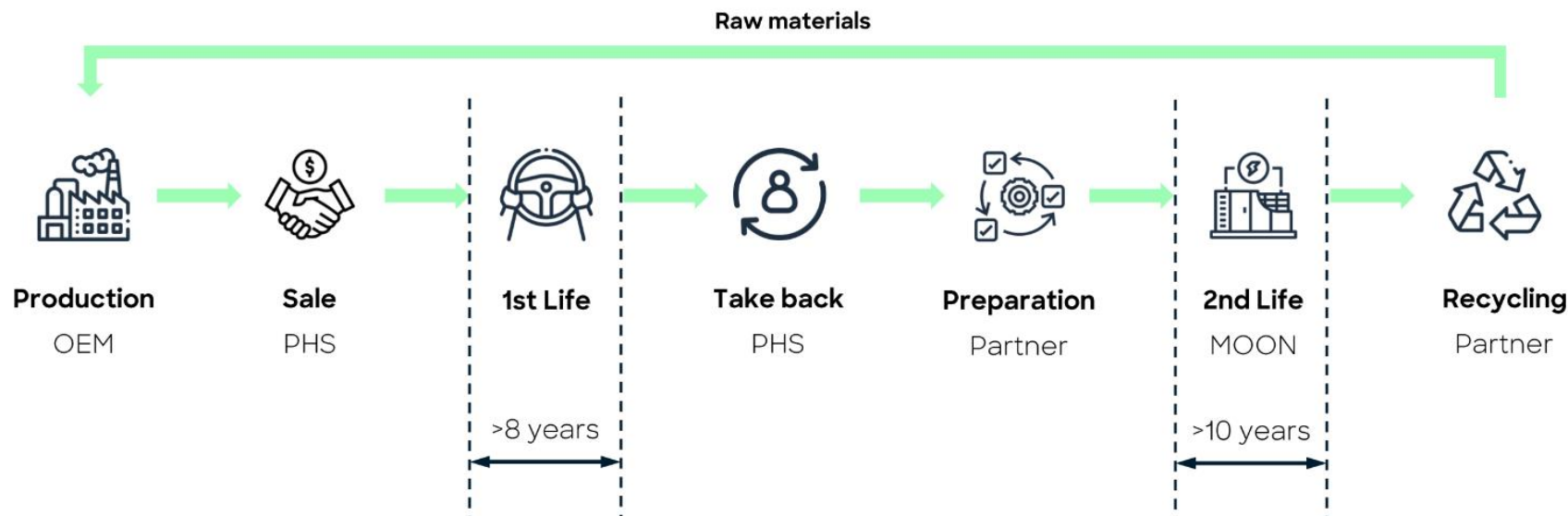


Produženje vijeka trajanja baterije

2nd-Life has an influence on the PHS



Extending the life cycle of a battery

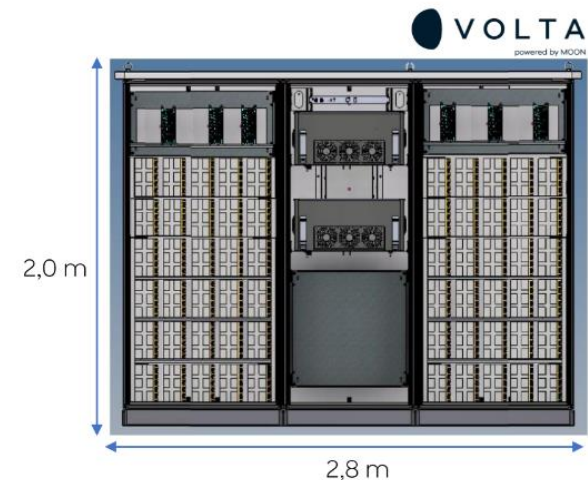
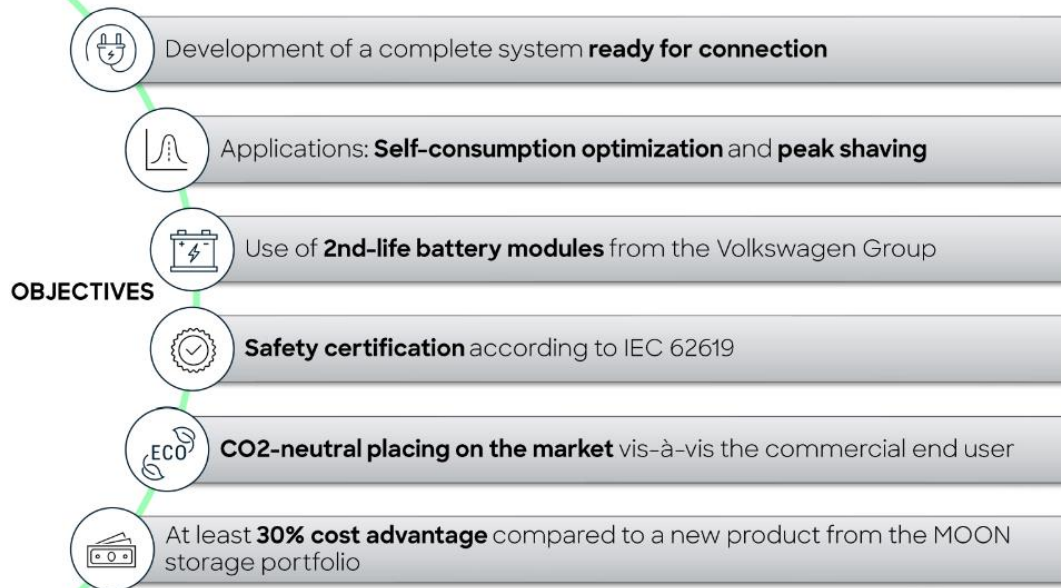


Pametno korištenje resursa za skladištenje energije - Volta

Use resources and energy wisely



The "VOLTA" project: A 2nd-life battery storage system



Inovacije

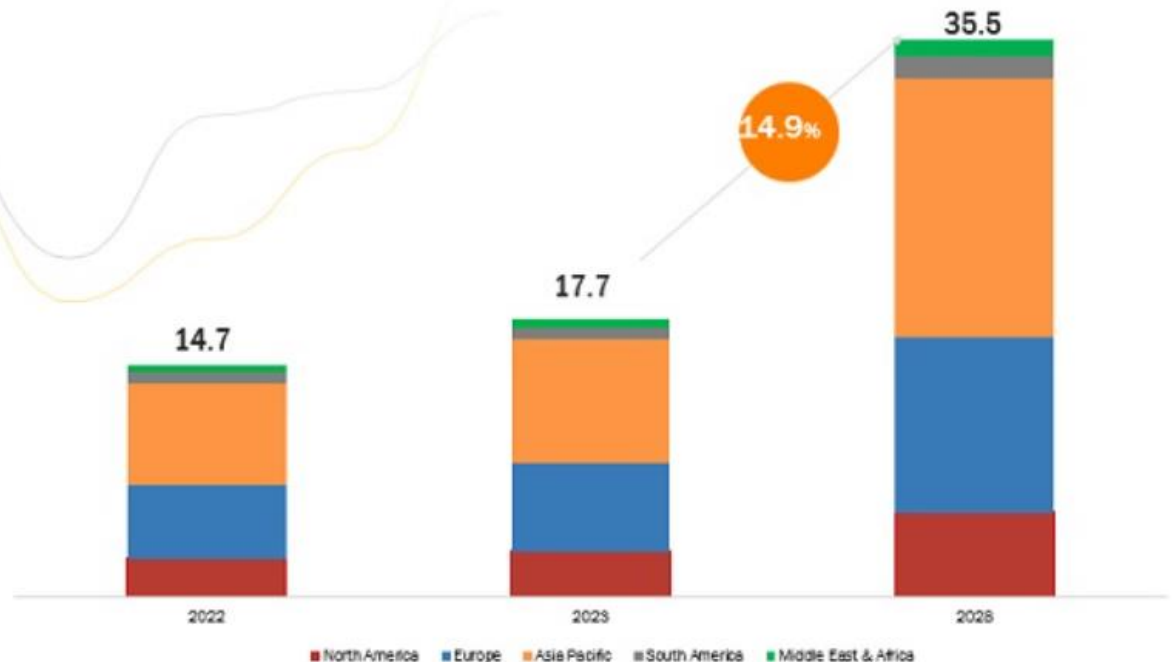
- Solid state battery
- Doseg od 1.000 km počevši od 2026
- Litium iron fosfat
- Duplo manja baterija
- Brzo punjenje za max 20 min.
- Bidirekciono punjenje baterije 2025 +

LITHIUM IRON PHOSPHATE BATTERIES MARKET GLOBAL FORECAST TO 2028 (USD BN)

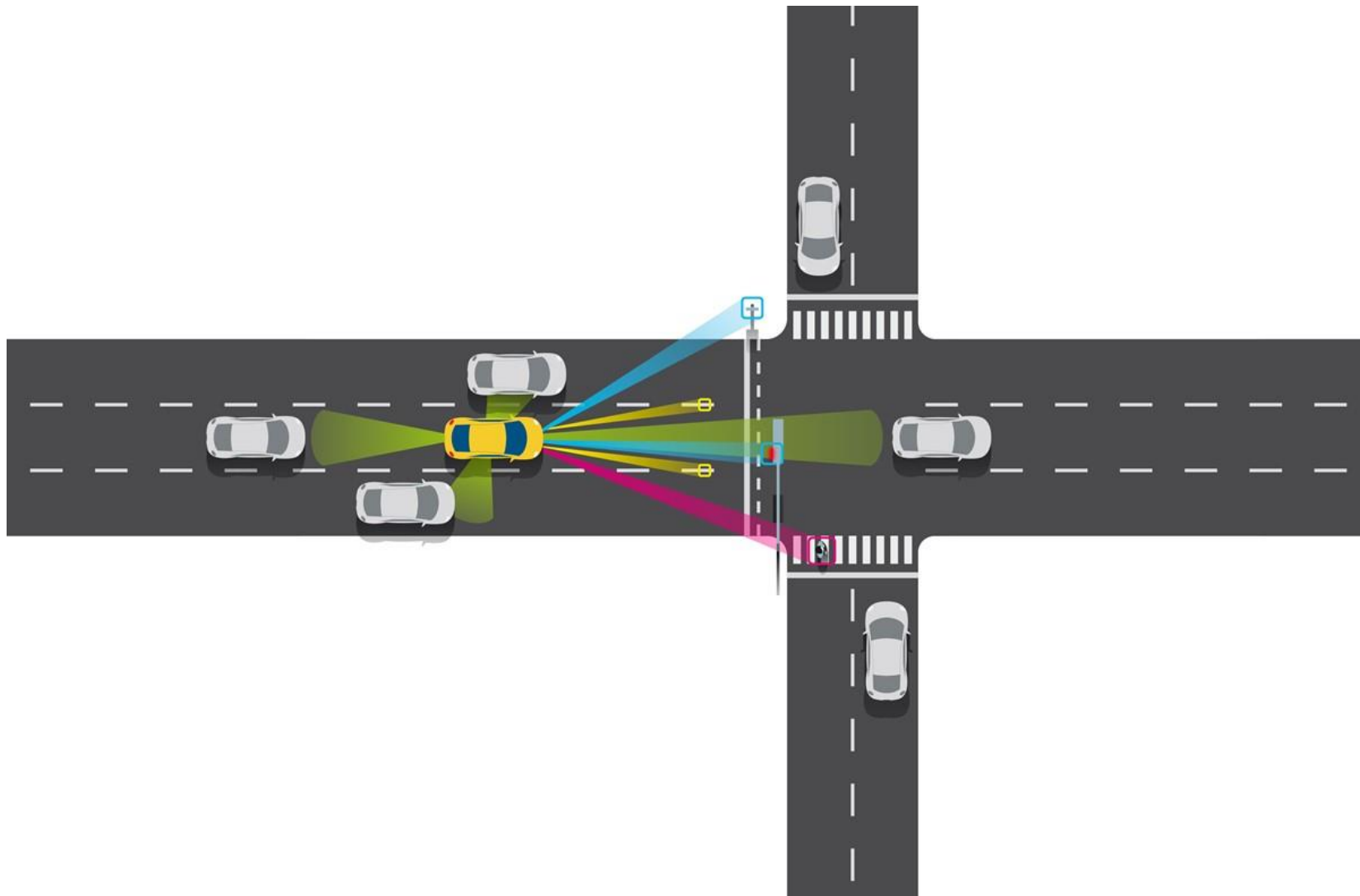


CAGR OF
14.9%

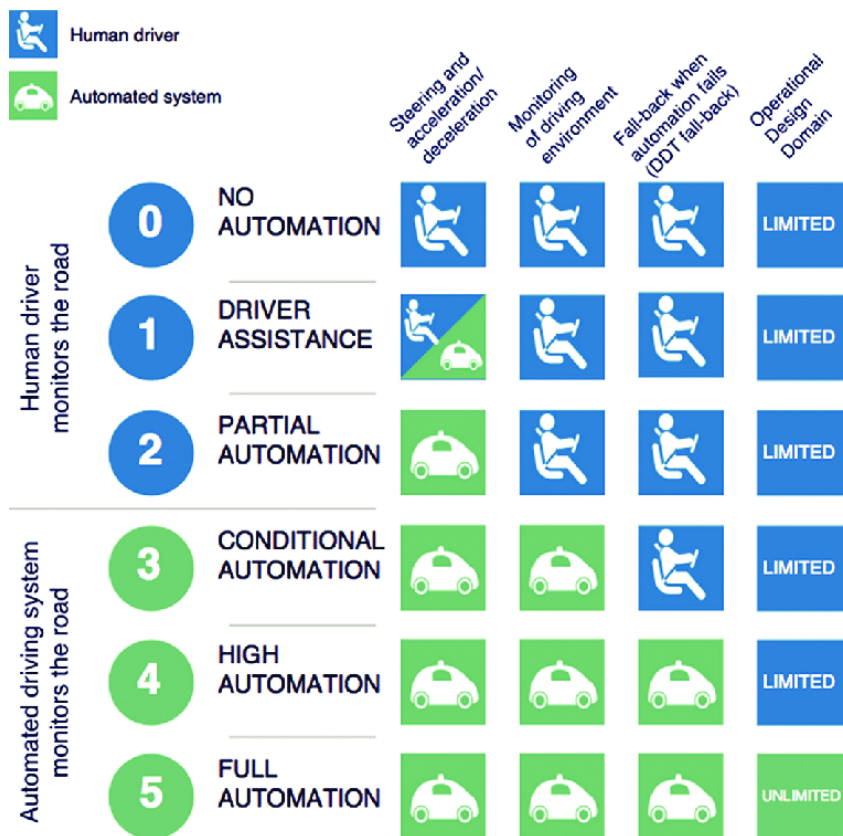
The global lithium iron phosphate batteries market is expected to be worth USD 35.5 billion by 2028, growing at a CAGR of 14.9% during the forecast period.



Autonomna vožnja



Autonomna vožnja - perspektiva

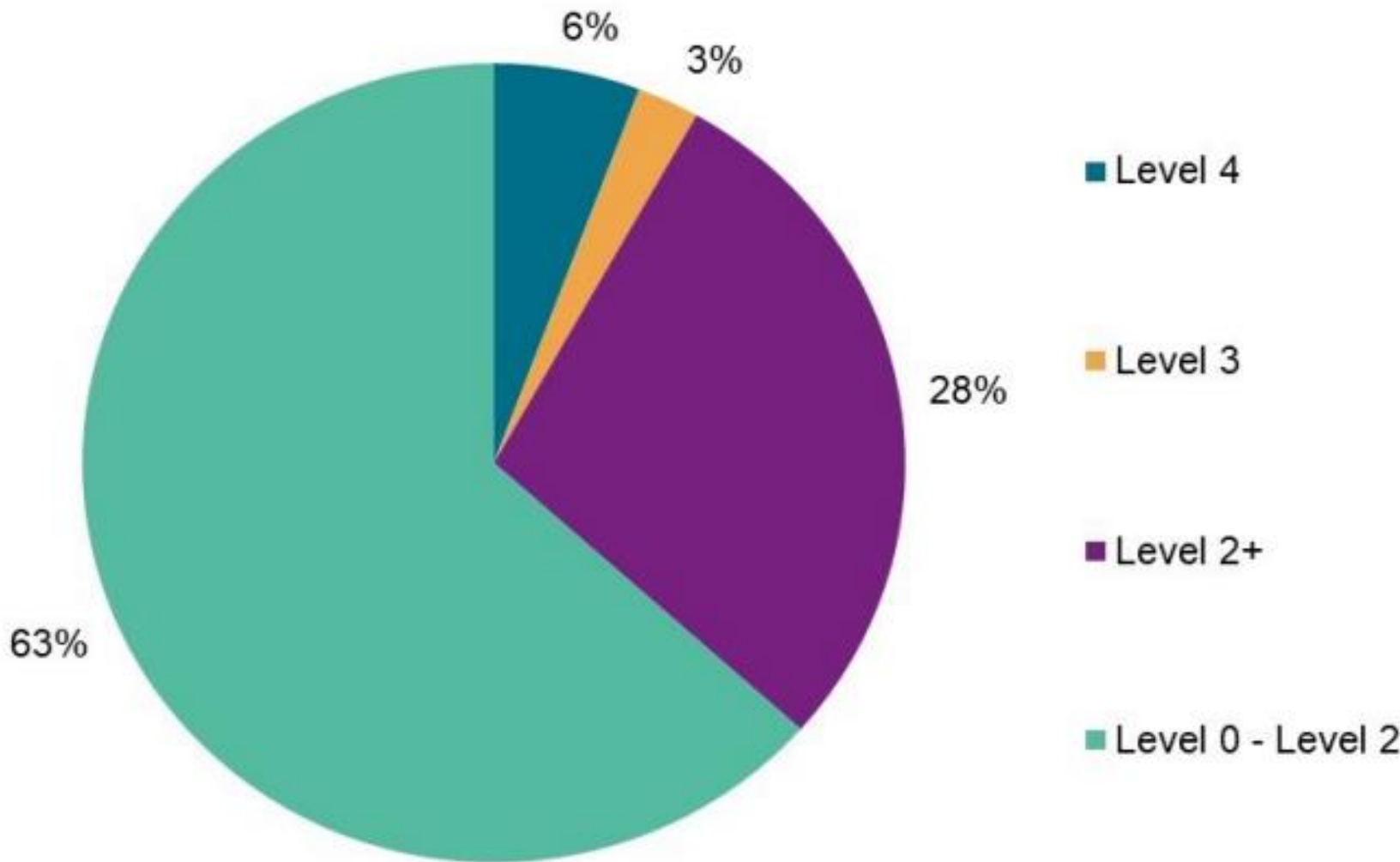


Nivoi autonomne vožnje	Opis / osobine
1. nivo (hands on)	sistem pomoći omogućuje vozilu upravljanje ili ubrzavanje i kočenje, ali uz nadzor vozača. Primjer, tempomat i sistem za održavanje u traci
2. nivo (hands off)	vozilo obavlja prva dva zadatka vožnje iz prethodnih nivoa, a vozač je i dalje odgovoran za nadgledanje vožnje, i mora biti spreman intervenirati u bilo kom trenutku, ako automatizovani sistem ne reaguje pravilno
3. nivo (eyes off)	vozač može sigurno skrenuti pažnju sa zadataka vožnje jer vozilo upravlja svojom putanjom, ali samo kod dobro referencirane putanje, i zbog toga vozač i dalje mora biti spreman za intervenciju
4. nivo (mind off)	nikada ne zahtijeva pozornost vozača, a autonomna vožnja podržana je samo u ograničenim područjima, ili u posebnim okolnostima, a izvan tih područja vozilo mora samo prekinuti autonomnu vožnju. Zadaće vozila uključuju operativne (upravljanje, usporavanje, kočenje, ubrzanje i nadzor) i taktičke aspekte
5. nivo (steering wheel optional)	ne zahtijeva prisutnost vozača. Zadaće vozila uključuju operativne (upravljanje, usporavanje, kočenje, ubrzanje i nadzor) i taktičke aspekte (promjena vozne trake, skretanje, poštivanje prometnih znakova, reakcija na incidentne situacija itd.). Kod 5. nivoa, koji se još naziva i nivoom potpune automatizacije, vozač mora

Izazovi projekta autonomnih vozila

- Nedovoljna informisanost korisnika
- Zabrinutost za posljedice vezane za kvar
- Odgovornost u slučaju nesreće
- Pravna odgovornost vlasnika vozila
- Hakerski napadi
- Privatnost podataka
- Interakcija sa vozilima koja nisu autonomna

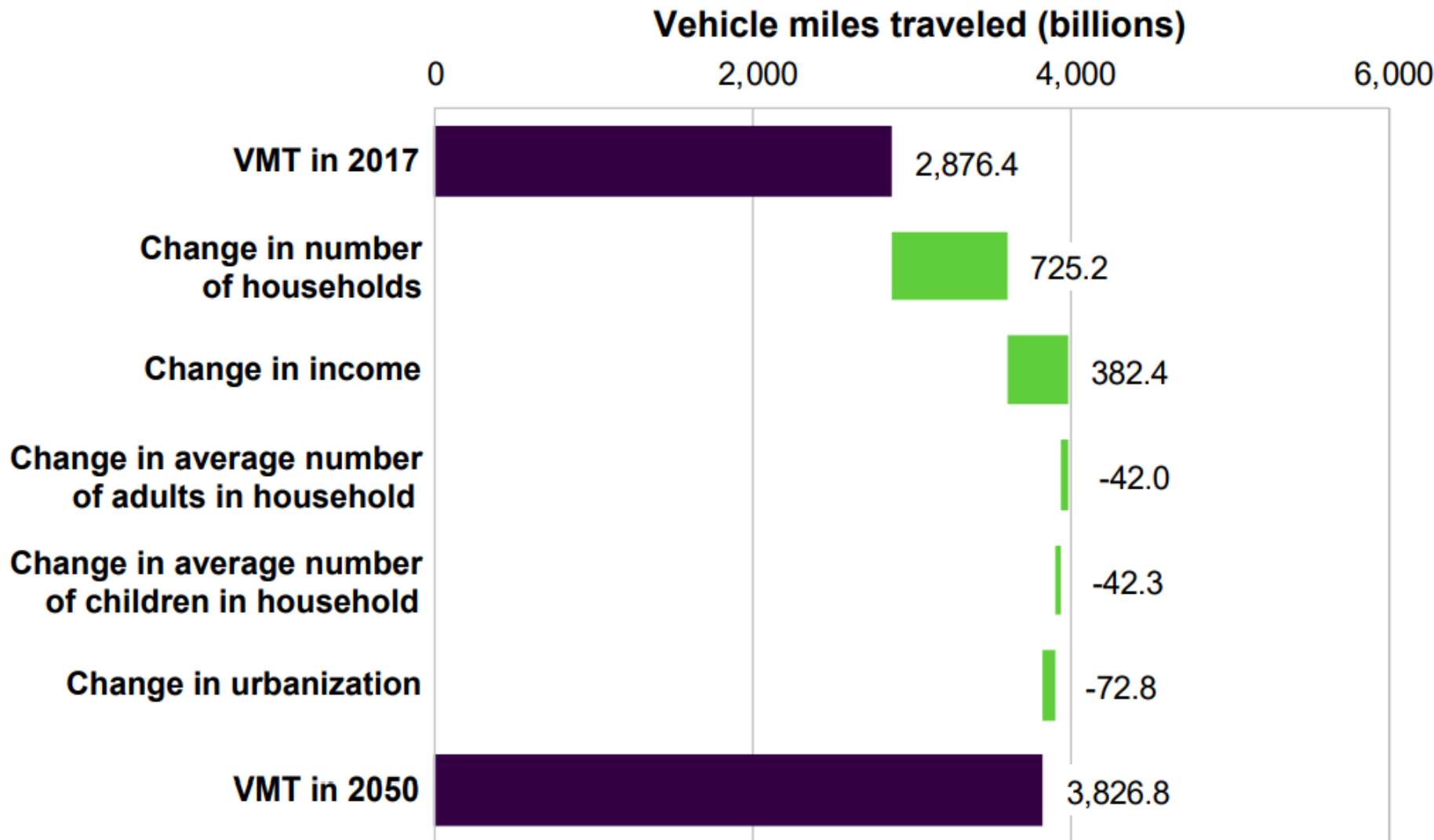
2035 Global Light Vehicle Sales by Autonomy Level



Data compiled Sept 2023
Source: S&P Global Mobility Autonomy Forecasts
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Uticaj na rast potražnje za vozilima

Figure 3.12: Impact of individual factors on VMT demand growth



Korisni linkovi

- www.spglobal.com
- <https://www.bug.hr/transport/autonomna-cestovna-vozila-robote-vozi-polako-20775>
- <https://link.springer.com/article/10.1007/s12398-020-00273-x>