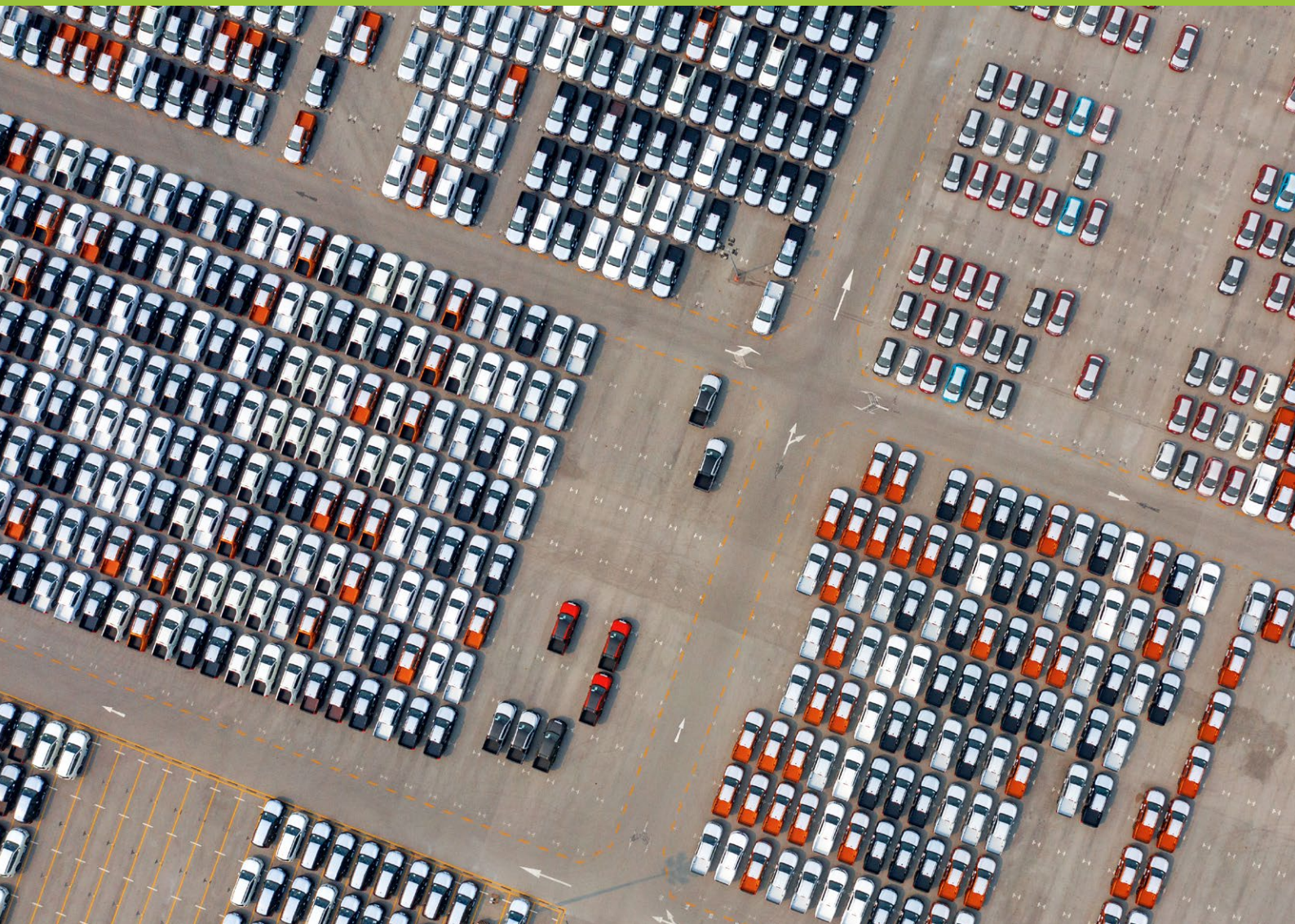


# Slovakia: An Automotive Industry Perspective



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# Introduction

## The AutoFocus Slovakia project

This first phase final report provides a mostly qualitative assessment of Slovakia's automotive industry from publicly available data sources and automotive industry studies and surveys. It serves as a foundation for the second phase of the project involving an industry consultation, scenario development and modelling analysis measuring the impact of the global transition from internal combustion engine (ICE) vehicles to electric vehicles (EVs) on Slovakia's automotive industry in terms of economic output and labour market. The quantitative analysis will be carried out by Cambridge Econometrics.

This will test how well Slovakia can transition from ICE vehicles and parts to EV production and the e-mobility value chain by testing extremes and sensitivities representative of best and worst case scenarios for a 2030 horizon, including informed assumptions about global and European EV sales shares, especially the evolution of major export markets.

The stakeholder consultation process will feed into the industry data collection and scenario development leading to modelled outcomes. This process will be supported by an informal coordination committee of representatives from Zväz automobilového priemyslu Slovenskej republiky (ZAP SR, Slovakia's automotive association), the Slovak Electric Vehicle Association (SEVA), the Slovak Battery Alliance (SBaA), the German-Slovak Chamber of Commerce and the French-Slovak Chamber of Commerce, who share a common interest in supporting Slovakia's automotive transformation into the e-mobility value chain to retain its relevance and competitiveness in 2030 and beyond.

## The challenge

EVs will continue to gain market share on the back of global technology and climate policy megatrends. With some 70% less parts than ICE vehicles on top of manufacturing robotization and Industry 4.0, the transformation of the automotive industry will significantly impact the current workforce, creating distributional employment effects on regions and communities depending on the car component and willingness and ability of the company to adapt.

Slovakia will need to refocus and specialize in e-mobility in order to realize substitution potential for new automotive growth sub-sectors by 2030, primarily through electric vehicle and battery production and the construction of charging stations. New and specific skills will be needed across the e-mobility value chain, specializing in areas such as high voltage operating systems, data network risk management, and AI, among others, requiring not only reskilling and upskilling where applicable but a wholesale reform of the university education system.

# Slovakia's automotive industry landscape

## Background

Slovakia deeply identifies with its automotive tradition as the industry that has grown to become the most important sector and driving force of the economy. Today Slovakia is the leading car producer per capita in the world, owing to four world-class automotive companies (Big 4) opening their factories: Volkswagen Slovakia in Bratislava (since 1991), PSA Peugeot Citroën Slovakia in Trnava (since 2003), Kia Motors Slovakia in Žilina (since 2004) and Jaguar Land Rover in Nitra (since 2016).

Car manufacturing is the largest industry in Slovakia, constituting 13% of GDP, 54% of industrial production (compared to 33% in Hungary 31% in Czechia) and 33% of industrial exports. It is also one of the most integrated into global value chains, with the highest share of regional value chain trade in manufacturing and the second highest share in the total economy. The Visegrad 4 countries represent the top four places in the EU-28.<sup>1</sup>

Among the Visegrad 4, Slovakia is easily the least diversified in terms of its production portfolio with only one plant producing engines and all four factories dedicated to passenger vehicles. Comparatively, Polish manufacturing focuses on buses and engines with two of its 16 plants producing passenger vehicles. Czechia mainly produces passenger cars and engines, but some companies are involved in buses and heavy duty vehicles. Hungary also produces passenger cars, engines and buses.<sup>2</sup> Nonetheless, Slovakia is currently among the top European producers of electric cars (75,575) behind only Germany and France.

The map below illustrates the highly integrated automotive supply chain in western Slovakia and lack of development in the east of Slovakia. The Big 4 car producers are all located in the west and surrounded by large suppliers. In the map below, dots mark the Big 4 and the largest 27 suppliers in Slovakia and the size corresponds to the number of employed.

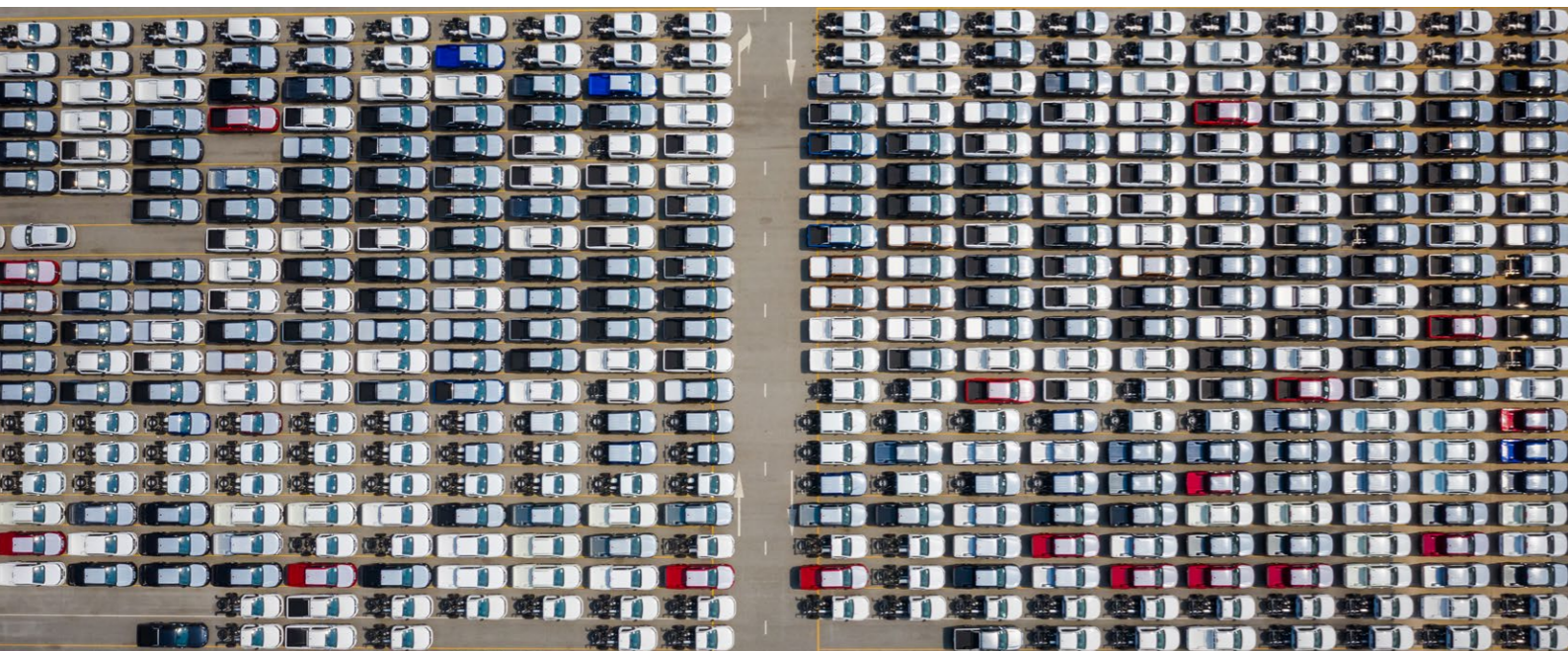
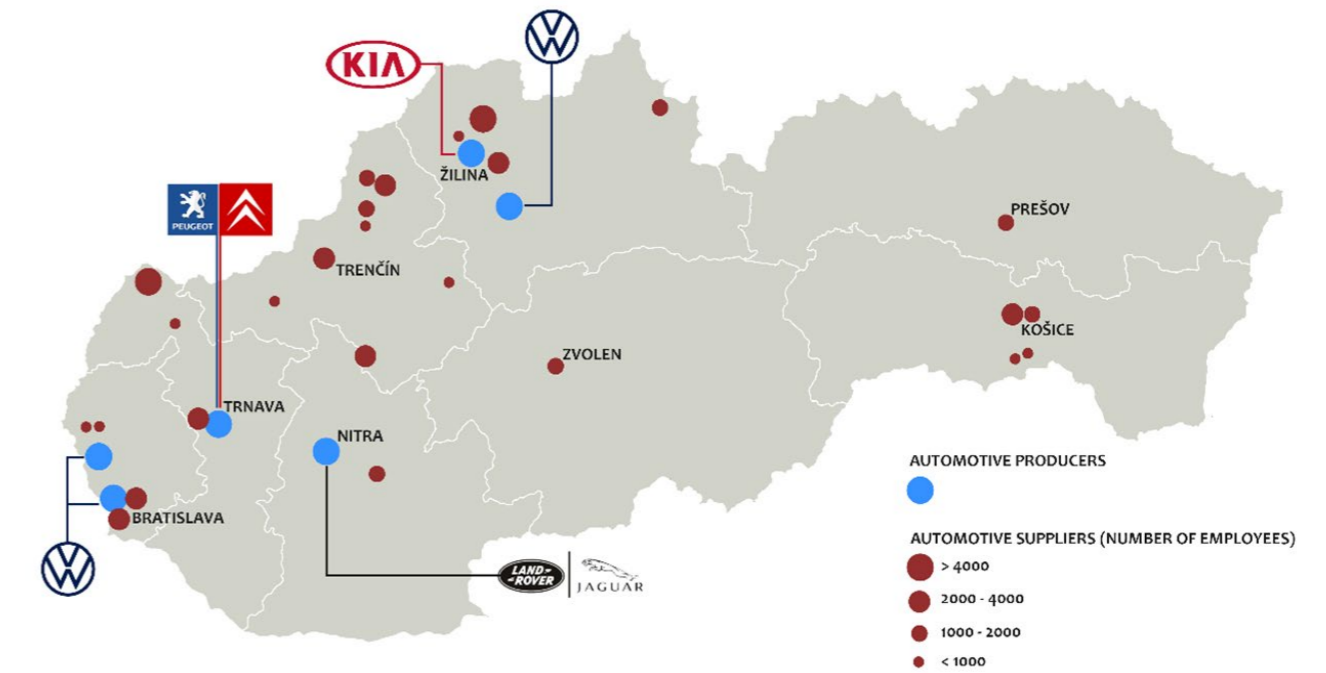


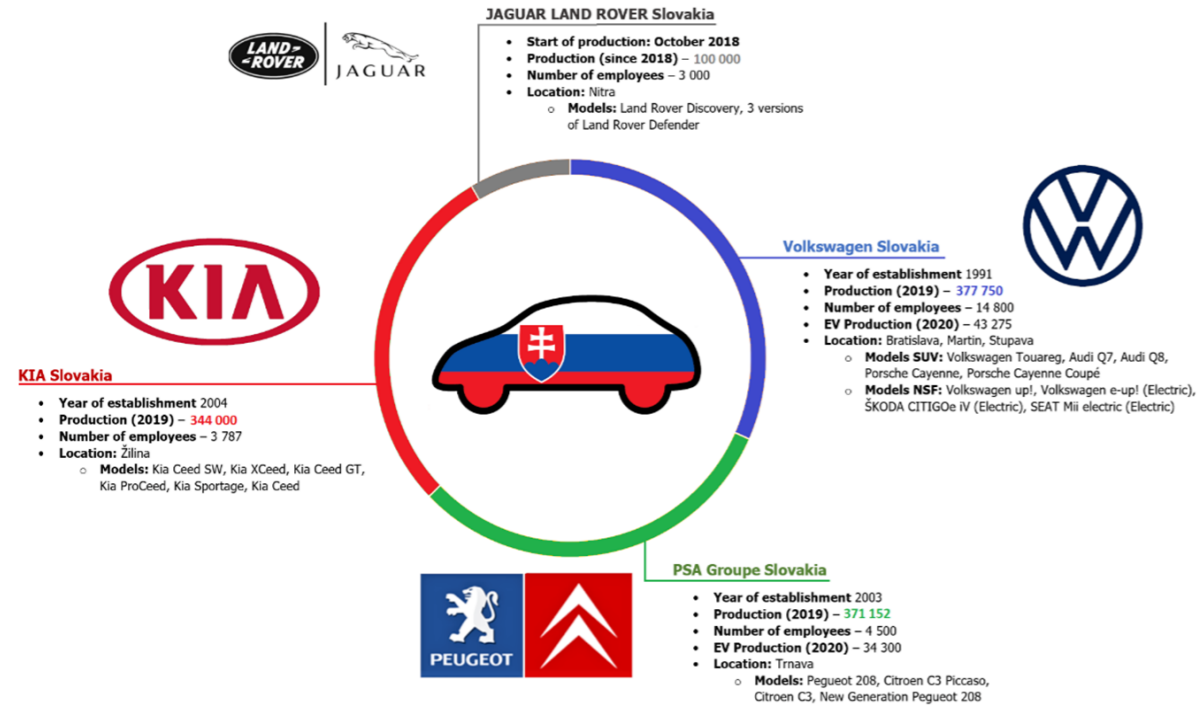
Illustration 1: Slovakia's automotive industry landscape



Data source: Sario<sup>3</sup>

## Big 4 OEMs

### Illustration 2: Big 4 Summary



Data source: Sario

The Volkswagen (VW) Group has committed to be carbon neutrality by 2050 as part of its Zero Impact Factory Strategy, including zero emission products, production processes and logistics. In 2020, VW Slovakia committed to improving plant efficiency by 30% and already more than 80% of manufactured vehicles are exported by train.

To date, VW has invested some EUR 4.5 billion into Slovakia and now employs 14,800 workers. Production of its subcompact group triplets (VW e-up, Škoda Citigoe iV and Seat Mii Electric) make the VW Bratislava plant the 3rd largest producer of EVs (43,275 units) in Europe. However, production is only committed to 2025, and it is reported that Spain and Germany are in the running for the next contract.<sup>4</sup>

Kia Motors Slovakia is the only plant in Slovakia producing engines, shifting from away from diesel to predominately petrol in 2018, accounting for 63% of engines produced. In 2020, demand for petrol engines grew by 68% year-on-year. Compared to VW, Kia is more focused on plug-in hybrid cars than battery electric models, continuing to build small-capacity, high-efficiency, hybrid-compatible gasoline engines at three engine production lines.

At the same time, Kia recently announced plans to start production of a new model electric car at its Žilina plant in 2024 as part of the company's new strategic plan to strengthen the electric car segment. This plan includes 11 new EV models 2025 with a targets of 500,000 sales per year.<sup>5</sup>

In 2019 PSA Group started its first battery production hall in Slovakia, producing 10,250 battery packs and roughly 1 in 5 of its new 208 model are EVs. The majority of cars are petrol (78%) and diesel (20%). The Trnava plant was the eighth largest electric vehicle producer in 2020 (34,300 units) and representatives have hinted at a possible increase in the production of the Peugeot e-208 model.

Jaguar Land Rover (JLR) signed a EUR 1.4 billion investment agreement with the Slovak government in December 2015 supplemented by EUR 129 million in state aid that launched the construction of the Nitra plant in October 2018. The company has committed to eliminate all combustion vehicle models by 2025 with a goal of achieving zero carbon emissions across the supply chain, products and operations by 2039.

## Top suppliers Vulnerability Index

There are more than 350 automotive suppliers in Slovakia accounting for the vast majority (89%) of direct jobs across the industry. The Slovak economy is divided between Tier 1 affiliates of major carmakers with higher value added and Tier 2 comprised of several large Slovak companies and small and medium-sized enterprises (SMEs), which characterize the majority of firms. Nevertheless, their value added is generally lower than that of foreign affiliates.

Chart 1 below lists the top 27 suppliers in Slovakia according to sales with Tier 1 affiliation and employment

Chart 1: Top suppliers Vulnerability Index

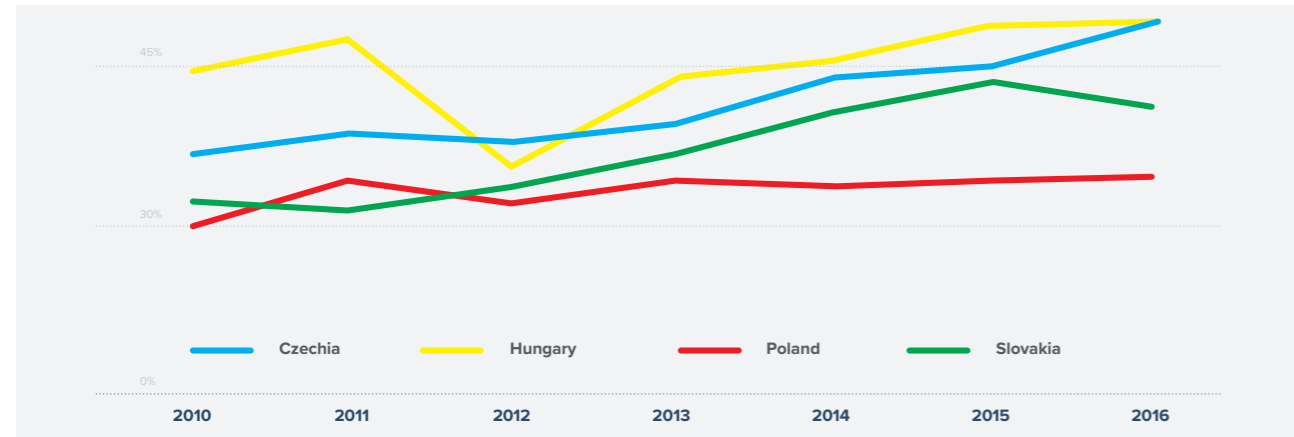
1. Dependent on a large automakers (innovative)
2. Dependent on a large automakers (passive)
3. Potentially endangered

RANK	COMPANY NAME	TIER 1 SUPPLIERS	EMPLOYEES 2018	SALES (2017-2019)			SALES TREND (2017-2019)	2020	VULNERABILITY INDEX
				2017	2018	2019			
1.	MOBIS SLOVAKIA	HYUNDAI-KIA	2.047	1 421 934 000€	1 479 930 000€	1 551 133 000€	RISING	-	1.
2.	SCHAEFFLER SLOVENSKO	VOLKSWAGEN	10.096	1 090 150 000€	1 141 689 000€	1 072 288 000€	STABLE	898 847 000€	1.
3.	CONTINENTAL MATADOR RUBER	„MUTUAL“	3,205	1 007 797 000€	1 089 290 000€	1 042 214 000€	STABLE	-	2.
4.	SAS AUTOMOTIVE	VOLKSWAGEN	596	644 122 235€	909 870 425€	957 648 007€	RISING	835 589 768€	1.
5.	FAURECIA AUTOMOTIVE SLOVAKIA	„MUTUAL“	2,504	577 282 000€	863 543 000€	864 312 000€	RISING	-	2.
6.	CONTINENTAL MATADOR TRUCK TIRES	„MUTUAL“	1,518	559 163 000€	585 016 000€	612 932 000€	RISING	-	2.
7.	ZF SLOVAKIA	VOLKSWAGEN	3,215	468 391 000€	473 227 000€	495 777 000€	RISING	446 545 000€	1.
8.	HANON SYSTEMS SLOVAKIA	„MUTUAL“	734	336 907 000€	364 053 000€	403 218 000€	RISING	-	1.
9.	YURA CORPORATION SLOVAKIA	HYUNDAI-KIA	1,630	362 951 742€	381 053 376€	378 289 264€	STABLE	-	2.
10.	ADIENT SLOVAKIA	„MUTUAL“	2,578	454 579 111€	345 639 419€	345 656 142€	DECLINING	299 700 000€	2.
11.	CONTINENTAL AUTOMOTIVE SYSTEMS SLOVAKIA	PSA GROUP	1,236	313 095 000€	324 593 000€	314 376 000€	STABLE	-	1.
12.	ZKW SLOVAKIA	„MUTUAL“	2,398	355 037 000€	336 018 000€	291 381 000€	DECLINING	226 262 000€	2.
13.	LEAR CORPORATION SEATING SLOVAKIA	„MUTUAL“	1,602	268 670 856€	333 564 519€	384 191 931€	RISING	-	2.
14.	MAGNETI MARELLI SLOVAKIA	PSA GROUP	681	356 558 000€	298 192 000€	-	DECLINING	-	3.
15.	ARCELORMITTAL GONVARRI SSC SLOVAKIA	VOLKSWAGEN	134	248 317 186€	264 514 843€	241 554 823€	STABLE	212 443 068€	2.
16.	ZF ACTIVE SAFETY (TRW AUTOMOTIVE)	VOLKSWAGEN	633	290 192 582€	256 675 827€	157 576 870€	DECLINING	-	1.
17.	HBPO SLOVAKIA	VOLKSWAGEN	215	191 271 844€	244 407 663€	231 943 452€	STABLE	194 709 201€	2.
18.	SUNGWOO HITECH SLOVAKIA	HYUNDAI-KIA	651	205 687 154€	211 985 218€	235 049 241€	RISING	196 564 853€	2.
19.	VISTEON ELECTRONICS SLOVAKIA	PSA GROUP	504	262 935 083€	200 338 766€	211 817 461€	DECLINING	221 400 718€	1.
20.	PANASONIC INDUSTRIAL DEVICES SLOVAKIA	„MUTUAL“	1,712	206 281 258€	198 866 724€	244 922 214€	RISING	-	1.
21.	HYUNDAI TRANSYS SLOVAKIA	HYUNDAI-KIA	380	187 753 843€	197 258 820€	170 122 096€	DECLINING	-	2.
22.	LEONI SLOVAKIA	„MUTUAL“	2,348	184 543 015€	191 977 890€	186 914 483€	STABLE	-	1.
23.	INTEVA PRODUCTS SLOVAKIA	VOLKSWAGEN	765	201 293 133€	190 789 561€	150 690 973€	DECLINING	-	2.
24.	MAGNA PT	PSA GROUP	705	318 798 000€	188 324 976€	154 605 448€	DECLINING	-	3.
25.	MATADOR AUTOMOTIVE VRABLE	„MUTUAL“	1,181	152 411 459€	176 733 563€	165 130 292€	STABLE	-	1.
26.	U-SHIN SLOVAKIA	„MUTUAL“	1,334	203 564 248€	175 069 994€	152 406 314€	DECLINING	-	2.
27.	ILJIN SLOVAKIA	HYUNDAI-KIA	274	164 299 510€	160 733 826€	156 655 585€	DECLINING	123 280 973€	2.

Data Source: Sario

# R&D and labour market

Chart 2: V4 Labour Productivity in the Manufacturing of Motor, Vehicles, Trailers and Semi-trailers, gross value added per employee (thousands of Euro) 2010-2017



Data Source: Polish Economic Institute<sup>6</sup>

## Labour

Big 4 and Tier 1 suppliers together account for 177,000 jobs.<sup>7</sup> Adding 98,000 from Tier 2 suppliers and indirect employment, the sector reaches 275,000 or nearly 10% of the employed population.<sup>8</sup>

The initial automotive investments into Central and Eastern Europe (CEE) are attributable to a relatively low-cost but skilled labour force and a gradually built centrally located supply chain. Now, as the global automotive industry pivots to EVs, Slovakia is facing a skilled labour shortage for new mobility segments related to batteries and electrification. Stakeholders in Slovakia's energy storage and EV ecosystem have voiced concerns over the slow pace of education and labour reforms in the country, which could force them to turn to foreign workers or even relocate.

Traditionally cars are manufactured in Slovakia while development of new concepts and innovative products mostly happens in the parent company headquarters, so it is a good sign that investments are no longer aimed only at the assembly line but seek R&D and technical training that Slovakia needs to develop. A Polish Economic Institute study mapped the labour productivity of the EU-28, finding the Visegrad 4 average to be about roughly half the EU average. As illustrated in Chart 3, Hungary and Czechia are highest, Poland the lowest, and Slovakia in the middle.

The Boston Consulting Group has done extensive research into the labour effects of the EU automotive transformation, finding tremendous job creation potential in a number of sub-sections of electromobility that net out fairly evenly to replace the traditional automotive jobs that are lost.<sup>9</sup> Similarly, Transport & Environment (T&E) expects significant job creation in the electromobility value chain segments by 2030, over half of which will be related to charging points.<sup>10</sup> The challenge then is how to manage the regional distributional effects in a socially just way to provide new

opportunities for the most vulnerable segments and communities.

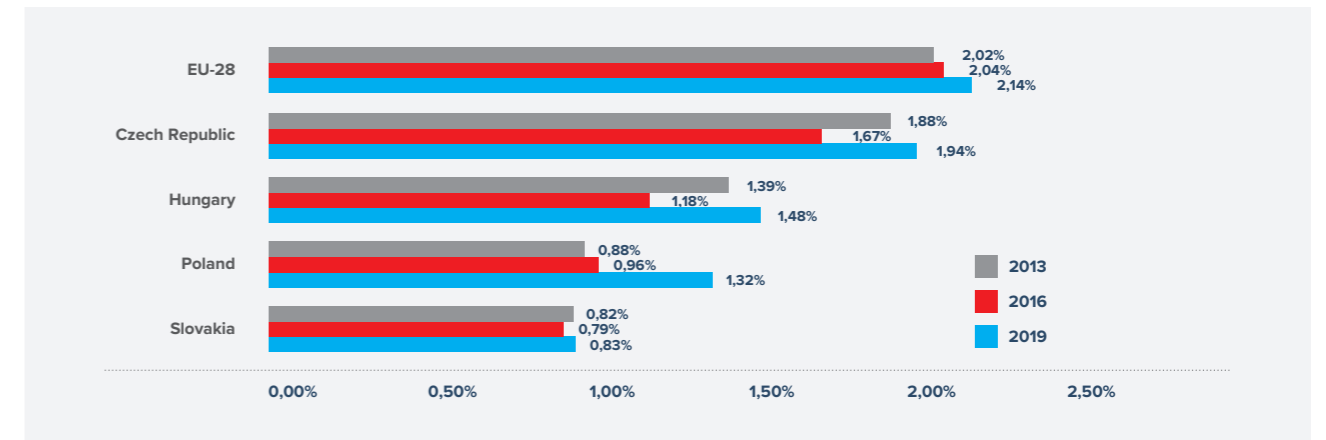
The distributional challenges of the automotive transformation are also investigated by Bruegel, concluding that while the net employment effect can be positive, some regions will be more adversely affected than others depending on the position of local suppliers in the value chain.<sup>11</sup> This builds from an earlier T&E report warning of job losses for traditional suppliers unable to switch technologies and more narrowly suppliers of engine related component manufacturers that continue investing into power train technologies.<sup>12</sup>

A Center Automotive Research at the University of Duisburg-Essen report estimates that the shift to EV's will result in only a 1.9% net loss in direct jobs between the EU's five main car producing countries including Slovakia, and this is before accounting for the positive impact of job creation in battery manufacturing and charging infrastructure construction.<sup>13</sup> Meanwhile the German Association of the Automotive Industry (VDA) has expressed trepidation with the sheer scale of change ahead, i.e. transforming 100,000 jobs by 2025.<sup>14</sup>

New technologies might create new jobs, but they also require new skillsets. Recent investments in Slovakia's automotive are largely compliant with the Industry 4.0 standards, which by definition leads to higher levels of automatization, greater efficiency and lower labour intensity. Even though the fourth industrial revolution creates new jobs, the gap in skills between an assembly worker and a data scientist is so vast that retraining might not be practical. Similarly, with the complexity of modern automotive global value chains, the extensive network of subcontractors that have migrated to Slovakia for its central geographic and strategic supply chain location will be under pressure to adapt their product portfolios to include new parts for EVs.

## R&D

Chart 3: Gross Domestic Expenditure on R&D as percentage of GDP, V4 and EU-28



Data source: Eurostat<sup>15</sup>

In Slovakia R&D has not been prioritized over the past decade as evidenced by R&D spending and patent applications. As shown in Chart 3, outside of Czechia, the Visegrad 4 countries are well below the EU-28 average R&D spending. Slovakia is at the bottom of the group and the only not to see a significant boost in recent years.

In 2019, public and private R&D investment amounted to 0.83% of GDP and only 0.01% of GDP to energy and environmental R&D. Of the 39% of R&D investments financed outside the state budget, 89% were sourced from EU funds. In 2019, 0.8% of employed people were in R&D compared to 1.48% EU average.<sup>16</sup>

Similarly, Slovakia is last among the Visegrad 4 in patents per million inhabitants, and there is a much wider disparity between EU-28 average as depicted in Chart 4.

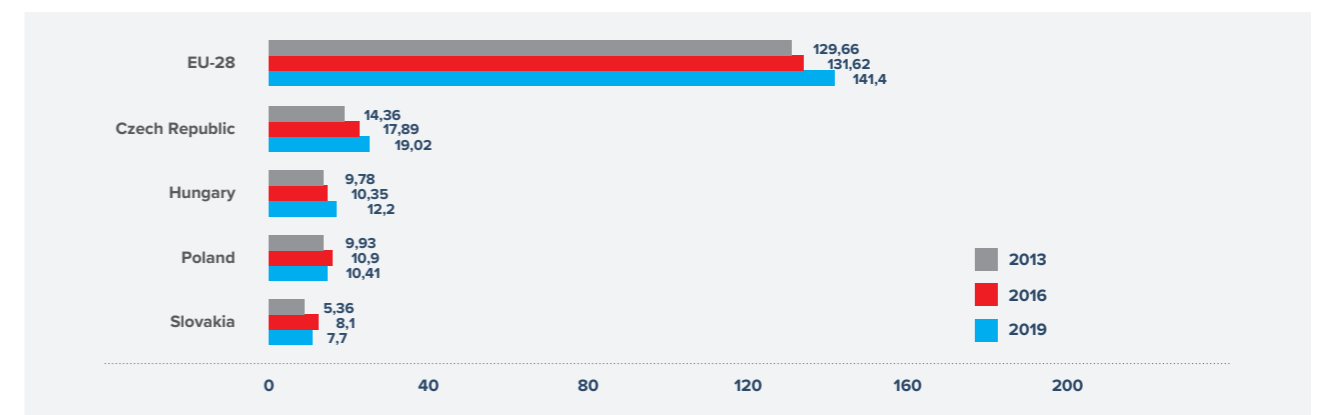
Nonetheless, following the ambition of the EU for technological leadership in the automotive sector, Germany, France, Czech Republic, Poland, and Slovakia more than doubled the share of R&D in structural funds for the automotive sector in the last Multi-annual Financial

Framework (MFF) period from 2014 to 2020.<sup>17</sup> The funding was used for green vehicles, decarbonisation of conventional engines, safety, and information technology infrastructure.

As a consequence of Slovakia's low prioritization of R&D, the European Commission identified a vicious circle between the low quality of the R&D system and the inability to attract students and researchers, reinforcing the brain-drain trend that continues to define Slovakia and the region.<sup>18</sup>

One of the main challenges for Slovakia is the decentralization of the R&D and innovation landscape. With decision-making and implementation competencies distributed across several government agencies, pervasive lack coordination leads to redundant spending and inefficient outcomes. This has manifested itself in the national eco-innovation agenda which will be revisited in the last section. While Slovakia was one of the least successful applicants of the Horizon 2020 program 2014-2020, the country has been awarded four IPCEIs which is a positive step forward.

Chart 4: Patent Applications to the European Patent Office, per million inhabitants, V4 and EU-28



Data source: Eurostat<sup>19</sup>

# ICE trends in export markets

The transport sector is responsible for nearly a quarter of emissions in the EU with the dubious distinction as the only sector with increasing emissions since 1990 (growth of 20% compared to fall in overall emissions by 22% in all other sectors). As part of the effort to meet the EU's more ambitious 2030 climate targets for transportation, car regulations continue to tighten. Between 2021 to 2025 new cars will need to reduce emissions by 15% on average and 37.5% by 2030.<sup>20</sup> The targets are not as strict for carmakers that realize a share of zero and low-emission vehicles higher than 15% in 2025 and 30% in 2030. The new EU regulation sets EU-wide passenger car emissions standards at 95g CO2/km. In 2021 the European Commission is expected to raise 2030 emission reduction targets for cars and vans again and propose higher standards for the Euro 7 label.

In March 2021, a nine country coalition led by the Netherlands and Denmark signed a letter to the Commission calling for an ICE phaseout date and it responded in July as part of the Fit for 55 package by proposing a ban of new ICE sales from 2035. Assuming the average vehicle road lifetime of 15 years, 2035 is roughly in line with 2050 carbon neutrality.

At the same time, average CO2 emissions of new cars sold in Europe increased in 2018 for the second straight year, largely due to strong demand for larger SUVs, which alone are the second largest contributor to emissions growth since 2010 after the power sector and before heavy industry.<sup>21</sup> Yet most incumbent car companies are embracing the push for electric vehicles and announcing end dates to the production of fossil based vehicles over the next 10-15 years, including Volvo and Ford by 2030 and JLR by 2025.

Still many European countries employ stricter national environmental legislation than at the European level. Germany, France and the UK, make up almost 50% of Slovakia's car exports, and the UK recently moved its ICE phaseout date forward by ten years to 2030 while France is committed to 2040. German leadership has so far resisted this phaseout trend which will payout in the September election. At the time of this writing, Germany's conservative bloc (CDU and CSU) manifesto rules out a diesel ban.

Chart 5: Slovakia automotive exports, 2019

Slovakia Export 2019 (EUR 90,3 billion)		Vehicles and thier parts (33,40% = EUR 30,2 billion)		Vehicle Export (26,40% = EUR 23,8 billion)	
Vehicles and thier parts	33,40%	Vehicles	26,40% (\$23,8B)	Germany	24,1%
Electrical machinery and equipment	17,10%	Vehicle Parts	5,78% (\$5,22B)	France	13%
Machinery and appliances	12,30%			United States	9,54%
Iron, steel and other metals	9,95%			United Kingdom	7,99%
Plastic and rubber	5,45%			China	6,55%
Mineral fuels, mineral oils and products of thier destillation	2,91%			Other	38,82%
Other	18,89%				

Data source: OEC World<sup>23</sup>

China, the largest car market in the world and rounding out the top five for Slovakia, is setting aggressive targets for EV sales which are expected to increase dramatically even over the next five years. In the US, Slovakia's third largest market, California is the first mover, announcing that all new cars and passenger trucks sold by 2035 will have to be zero emission vehicles. New York followed shortly after with a similar announcement, and more states are expected to follow suit.

Sustainable urban mobility plans and embedded environmental ordinances in municipalities of Slovakia's export markets will continue to work against ICE vehicles sales. At the heart of these plans are low emission zones (LEZ) that limit highly polluting vehicles in specific areas prone to high air pollution, which have been adopted by more than 250 cities in the EU. Cities like London and Paris are among those already moving to zero emission zones (ZEZs), pockets which effectively ban ICE vehicles. In recent years the German government and interest groups have opposed LEZs and disputed the scientific foundation of public health evidence. Recent surveys commissioned by T&E found that 67% of urban residents either strongly or somewhat support LEZs and 63% of Europeans supported the idea that after 2030 only emission-free cars should be sold in Europe.<sup>22</sup>

# Substitution 2030

## Seeds of battery innovation and production

At present the lithium-ion battery pack makes up about 35% of the cost of an electric vehicle, even after prices have declined nearly 90% over the past ten years. The EU battery market is projected to be worth EUR 250 billion in 2025 and there is continued pressure for higher efficiency, performance, circular economy and affordability of batteries.

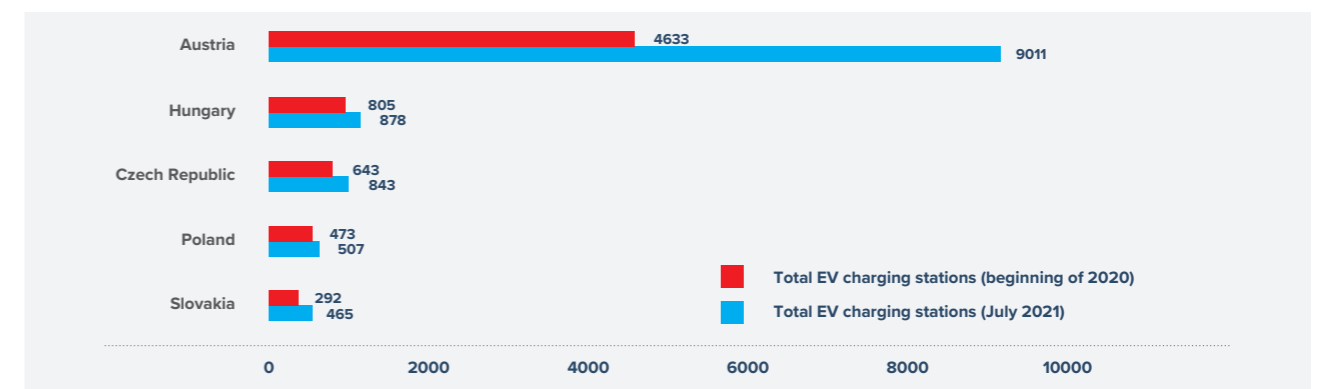
Following the European Battery Alliance model, the Slovak Battery Alliance (SBaA) created in 2018 established an ecosystem of Slovak industry, science and research. According to SBaA, the vision for the Slovak battery industry is a 10 GWh battery gigafactory for the production of batteries for electric vehicles.<sup>24</sup> To reach this goal, Slovakia will first need to develop top research centers and scientific laboratories, especially projects focused on improving the re-use and recycling of batteries. This can also extend to the purchase and installation of large energy storage to support network stability and electric buses for cities and municipalities.

With Kia poised to join VW Group and PSA Group as electric car producers in Slovakia in 2024, it is evident that the potential of the automotive segment can create a lucrative space for the battery industry in Slovakia. At the time of this writing, VW Group is still in the process of choosing the location for its fifth planned EU gigafactory pegged for CEE which Slovakia hopes to be awarded.

## Slovak charging network

Slovakia and the wider CEE are lagging far behind Western Europe in the rollout of electric charging infrastructure. Chart 6 shows the wide gap between Austria and neighboring Visegrad 4 countries. Although electric charging stations grew by an impressive rate of almost 50% in Slovakia from early 2020 to now, Hungary and Czechia still have nearly twice as many.

Chart 6: Total EV Charging Station, beginning 2020 and July 2021



Data source: Chargemap<sup>25</sup>

Between OEMs and Slovakia's Recovery and Resilience Facility (RRF), electric charging infrastructure is coming into focus. OEMs have communicated a strong interest in developing and building charging stations across the CEE region to bolster lagging EV sales and Slovakia's recovery fund includes a formidable EUR 50 million to develop the charging infrastructure and another EUR 20 million for grid modernization.

Despite the slow initial rollout, EVs sales will continue to gain market share and require new grid investments to ensure balancing and stability of the distribution system. The additional load requirements will need to be planned for and managed, especially with the national coal phase-out plan set to decommission Nováky and Vojany local power plants by 2023. This will present new challenges and opportunities for the integration of clean energy sources and sector coupling.

## Hydrogen

The EU hydrogen market is also charging ahead with countries like Spain, Germany and Sweden setting ambitious national strategies and vying to secure technological leadership and early market share. Hydrogen has strong support from Slovakia's Ministry of Economy, and its in-house Slovak Innovation and Energy Agency (SIEA) has been tasked with outlining the concrete steps and milestones that will define Slovakia's national hydrogen strategy. This will support all types of hydrogen (green, gray and blue) covering integration in mobility, industry and heating/energy sectors. The government has announced a public procurement for two mobile hydrogen refueling stations that will increase to eight in coming years. While hydrogen production and utilization is not incorporated into this project for substitution over the next decade, it is likely to be a factor after 2030.

# Conclusion: A Circular Economy Innovation Pathway

To remain globally competitive towards the end of this decade and beyond, eco-innovation should be a top priority for Slovakia's automotive industry. As mentioned above, global carmakers are setting targets for carbon neutral processes that trickle down to affiliated suppliers and the material used for their products. This trend to zero carbon energy inputs should favour Slovakia's low carbon intensity electricity system anchored by nuclear power, but the challenge extends to the decarbonization of industrial processes for inputs like rubber and steel.

Suppliers in all Visegrad countries are highly integrated with international supply chains, putting them at risk of losing out if they are not able to provide zero-emissions products to meet the new OEM standards and targets.<sup>26</sup> There is growing awareness of this dependence and risk among businesses in the region but, like the wider industrial transition, this does not receive enough attention next to Just Transition debates and the coal sector despite being far more significant to employment and economic value.

Here it is worth highlighting the European Commission's Science for Environmental Policy finding that the total vehicle supply chain carbon footprint for ICE vehicles is 5% compared to 73% for battery EVs.<sup>27</sup> By eliminating tail pipe emissions from the equation, the focus lands squarely in the car manufacturing process.

The fragmented and weak institutional framework for eco-innovation in Slovakia combined with the persistently small share of both public and private support for R&D activities is also reflected in the low number of patents and share of exports from eco-innovative industries. Whereas Slovakia is amongst the EU leaders in the export of medium and high tech products, in 2018 eco-innovation industry exports accounted for only 0.36% of total exports, which is around half the EU average and down from the previous reporting period.<sup>28</sup>

In recent years Slovakia has strengthened its focus on the circular economy with two strategic policy documents. In 2019, the Slovak government took a decisive step by approving the Strategy of the Environmental Policy of the Slovak Republic for 2030, updating the previous strategy adopted in 1993. It identifies fundamental systemic challenges and sets specific objectives for a resource-efficient, low-carbon, and circular economy by 2030, emphasizing environmental protection, minimal use of fossil resources and hazardous substances, and improved public health.<sup>29</sup>

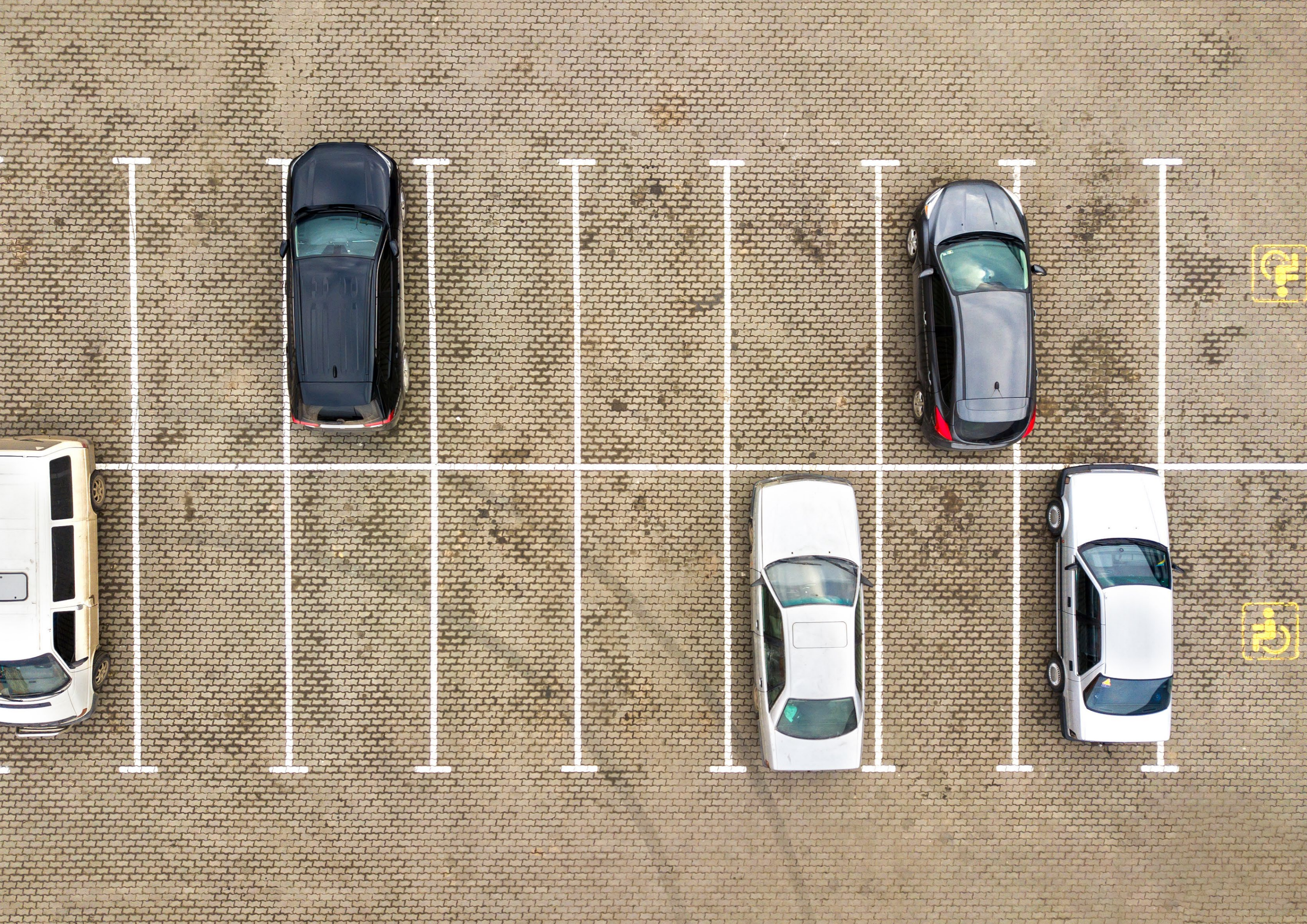
The strategy aims to provide public support for green innovations, science, and research at a level commensurate with the EU average by 2030. One key economic lever is the green public procurement (GPP) scheme that should cover 70% of all public procurements by 2030. As defined, GPP would account for only 7.58% of Slovakia's public procurement in 2018.<sup>30</sup> The overall improvement of Slovakia's eco-innovation performance in the next decade will depend on the effective implementation of this ambitious strategy.

## Recommendations:

- ▶ Slovakia's government needs to create favourable conditions for companies to go green, which is in its own interest to attract foreign investment that will secure economic growth and employment;
- ▶ Businesses in Slovakia need to pressure the government to create the right regulatory framework for going green;
- ▶ Car company headquarters need to work with their suppliers in Slovakia to help them adapt to new technologies and production processes through reskilling and upskilling;
- ▶ The EU needs to prioritize the industrial transition in Slovakia and wider CEE to avoid leaving them behind with outdated technologies, supporting pilot projects and green tech R&D centres in cooperation with companies;
- ▶ Reskilling and upskilling to match the labour demands of emerging e-mobility sub-sectors requires new education programmes and cross-cutting cooperation between public and private sectors and academia.

# Endnotes

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