TRiREME

DIGITAL & GREEN SKILLS TOWARDS FUTURE OF THE MOBILITY ECOSYSTEM

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DESK RESEARCH REPORT

TRIREME D6.1

WP6 - SOCIAL IMPACT OF THE CONTINUOUS TRANSFORMATION IN THE ECOSYSTEM

DOCUMENT INFORMATION

Report title	Desk Research Report		
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Document data:	**File Name:**	TRIREME D6.1 Desk Research Report			
	No. of Pages:	43	**No. of Annexes:**	0	
	Status:	FINAL	**Dissemination Level:**	PUBLIC	
Project Title:	Digital & Green Skills Towards Future of the Mobility Ecosystem	**Grant Agreement ID/ Project No.:**	101140001		
WP Title	WP6 Social Impact of The Continuous Transformation in the Ecosystem	**Deliverable No.:**	D6.1		
Due Date:	31/05/2024	**Submission Date:**	31/05/2024		
Keywords: desk research, automotive, mobility, social impact, transformation					
Reviewed by:	Marek Spanyík, ASA	**Review Date:**	30/05/2024		
Approved by:	Jakub Stolfa, ASA	**Approval Date:**	31/05/2024		

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EXECUTIVE SUMMARY

This report sets out the context in which partners in the TRIREME project's work package on the social management of the transition are engaged in the anticipation and management of the transformation underway. It draws on work undertaken in the context of the EU transition pathway for the mobility ecosystem as well as sectoral social dialogue initiatives and social partner projects on the transition in the wider automotive industry. It starts to collect good practice examples which will be built on through the course of the TRIREME project.

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INTRODUCTION

Workers and companies in the mobility production and transport industries are at the proverbial coal-face of the fight against climate change. The shift to carbon-neutral mobility is going hand-in-hand with the further digitalisation of the whole transport system. For instance, the European Commission forecasts that automated mobility will be deployed on a large scale as of 2030. What is more, expected changes in consumer behaviour and industrial production in Europe are likely to have an impact on transportation needs. At present, there is a clear lack of data on the impacts of modal shift both in terms of industrial production, transport use and the employment effects.

Alongside the 2019 European Green Deal and Climate Law, in December 2020 the European Commission published its Sustainable and Smart Mobility Strategy. Accordingly, the transport sector must deliver a 90% reduction of transport greenhouse gas emissions by 2050, with a just transition for workers and their communities[1]. Emissions related to transport are responsible for 27% of the total greenhouse gas emissions of the EU-27+UK and road transport represents more than 70% of transport emissions within the EU-27+UK. According to official data, emissions from road transport were 26.8 % higher in 2018 than they were in 1990[2]. At the same time, demand for different transport modes is growing. This steadily growing demand for mobility must be met in the future without burning fossil fuels such as petrol and diesel.

According to the European Commission strategy, by 2030, at least 30 million zero-emission cars will be in operation on European roads, 100 European cities will be climate neutral, high-speed rail traffic will double across Europe, the level of sustainable aviation fuel usage will increase, scheduled collective travel for journeys under 500 km should be carbon neutral and zero-emission marine vessels will be market-ready. By 2035, zero-emission large aircraft will be market-ready and by 2050 nearly all cars, vans, buses, as well as new heavy-duty vehicles will be zero-emission.

[1] See the EU Green Deal Communication https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF
[2] https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment

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The EU has recently completed the revision of the Regulation setting CO2 emission standards for cars and vans as well as the revision of its legislation aiming at boosting its charging infrastructure. The European Commission has also launched two other important legislative processes, one tackling CO2 emissions of Heavy Duty Vehicles and the other one establishing new rules to reduce pollution from road transport (i.e. Euro 7). These pieces of legislation, part of the European Green Deal agenda, will accelerate the ongoing transformation of the automotive sector in Europe.

The automotive industry and its 13 million workers are at the forefront of the twin transitions, with consequences that are already visible. On the one hand, new investments are taking place to transform the assembly lines, to develop new products and to build new supply chains in Europe, such as for battery manufacturing. The flip side is that this unprecedented transformation is becoming a reality on shopfloors across Europe. Manufacturers are rationalising their fleets, which has an impact on many sites as well as on workers, with job losses and cost-cutting plans. Suppliers are also announcing job losses that they ascribe to the consequences of electrification. All of this is happening in a context of supply disruptions, logistical problems related to transport, high energy prices and fierce competition with third countries to attract investments and capture global market shares. Sales volumes have been shrinking, but without hampering OEMs' profits.

Recognising the scale and pace of the transition underway in the automotive and wider mobility ecosystem, together we established a Coalition for Just Transition for the industry in 2021 – as social partners in the sector, we undertook to ensure that workers should not be left to manage the changes underway without the rights, tools or resources needed.

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1 Economic Context of the Wider Automotive Industry

Following the impact of the pandemic and subsequent energy crisis and supply chain disruptions, in 2023 automotive registrations rebounded but remain below pre-pandemic levels.

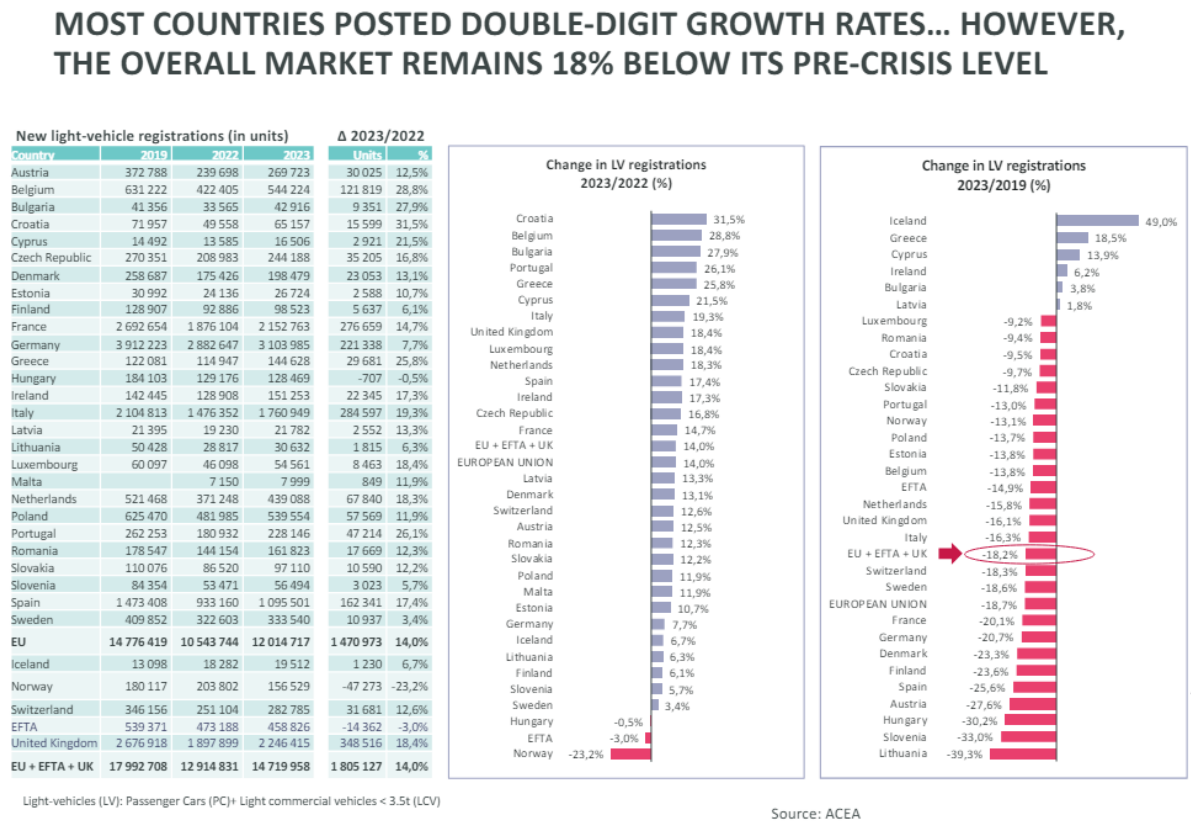

Figure 1: Growth of EV Registrations

Furthermore, the green transformation brings with it whole new value chains, which Europe has not yet fully developed. The transition to the digital age has also brought about profound changes too. At the same time, the automotive industry is faced with fierce global competition, and a radically changing geopolitical landscape.

The market shares of European brands and the emergence of new players, notably in the electric vehicles poses major strategic challenges for industry, social partners and public policy makers.

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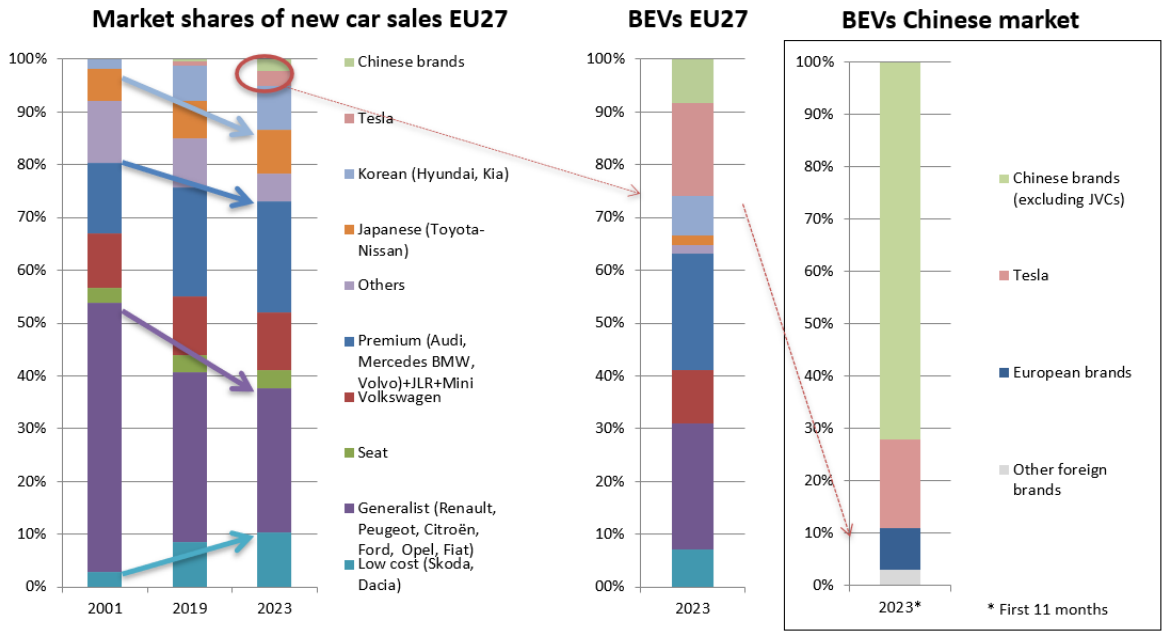

Figure 2: Market Shares of New Car Sales (Source: ETUI research (forthcoming))

As recent analysis of the transition from the ETUI has shown, while Europe is certainly on way towards zero-carbon mobility, this is not a linear process, as we constantly witness ups and downs and several new concerns emerge. The initial fear was that due to the technology, electric vehicles need lower labour inputs than combustion engine driven vehicles had and even if all other factors (market share, number of cars sold) remain constant, labour demand will fall. The greater concern however is how the EU can position itself in the completely new economic geography of electromobility, whether it can maintain its core competence and market share.

There is a broad consensus amongst industry and social partners on the need for a proactive industrial strategy for the transformation of the automotive industry. Both OEMs and suppliers have set out their industrial policy proposals, including the ACEA Future Driven Manifesto. Equally, industriAll Europe has set out its call for an ambitious industrial plan to implement the objectives of the Green Deal and the maintenance and creation of good industrial jobs.

In May 2024, the key players in the automotive industry joined a joint statement building on the Antwerp Declaration adopted in February 2024 and co-signed by over 1000 industrial

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leaders from industry and the unions. On 15 May, European sectoral social partners and industrial associations representing European manufacturing workers and industries have sent a joint call to the European Commission, European Parliament and Belgian European Council Presidency for a European Industrial Deal focused on ensuring quality industrial jobs in Europe. The organisations jointly called for a European Industrial Deal which:

1. Ensures a Just Transition for our industries and workforce
2. Develops a re-skilling and up-skilling agenda
3. Promotes social dialogue and social partners' involvement
4. Ensures a stable and coherent regulatory environment for our industries

Some initiatives have already been taken (notably in relation to the growth of the battery sector – through regulation and state aid/IPCEI frameworks).

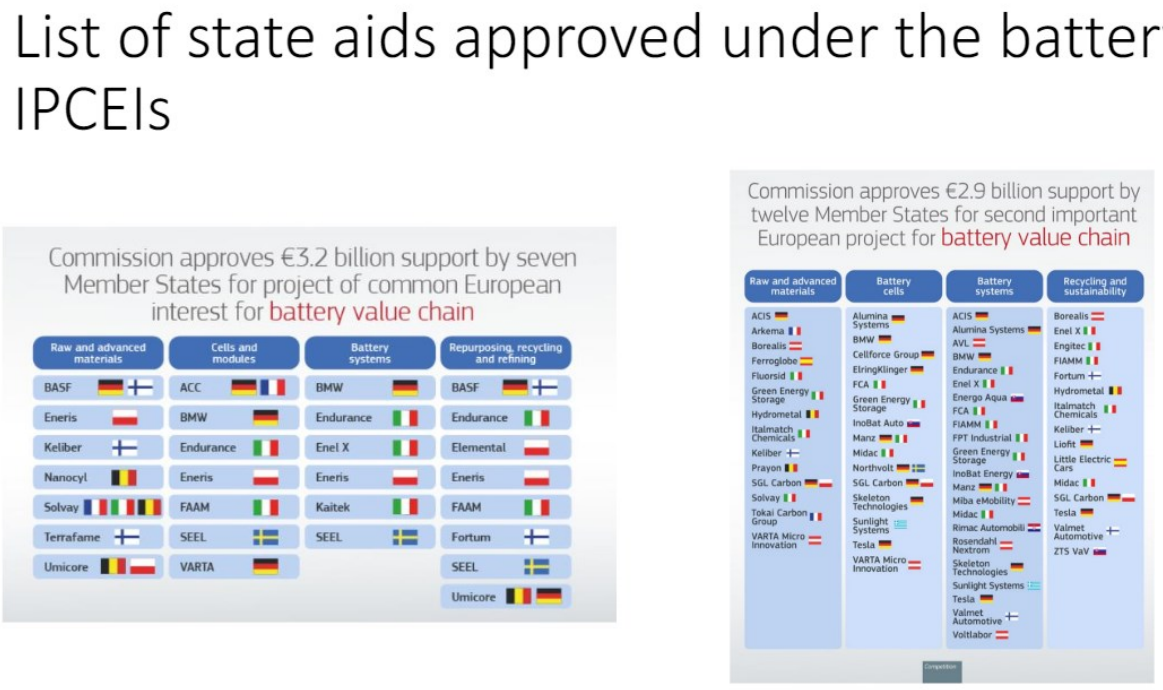

Figure 3: IPCEIs List

The Net-Zero Industry Act is part of the Green Deal Industrial Plan's pillar for a predictable and simplified regulatory environment, which aims at promoting investments in the production capacity of products that are key in meeting the EU's climate neutrality goals. The

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proposal sets a benchmark for the manufacturing capacity of strategic net-zero technologies to meet at least 40% of the EU's annual deployment needs by 2030.

1.1 A Key European and Regional Employer: the Wider Automotive-mobility Industry

The 2021 European industry strategy set out 14 industrial ecosystems. The automotive industry is a central pillar in the European mobility ecosystem, which as a whole employs around 16 million workers directly and indirectly, including:

- 2.5 million direct jobs in automotive manufacturing (OEMs+ suppliers). Around 13 million people are employed in full automotive industry (manufacturing, services and construction). Which is 7% of total EU employment (ACEA 2022).
- Shipbuilding and maritime equipment manufacturing accounts for 576.000 direct jobs and additional 500.000 indirect jobs across Europe (SEA Europe)
- 400k direct & indirect jobs in rail supply industry – stable employment figures (1% change last decade). The railway sector overall – including operators and infrastructure – accounts for more than 1 million direct and 1.2 million indirect jobs in the EU (UNIFE).
- in the EU and UK, bicycle manufacturing directly employs 87,400 workers, and another 90,000 indirectly (Confederation of the European Bicycle Industry).

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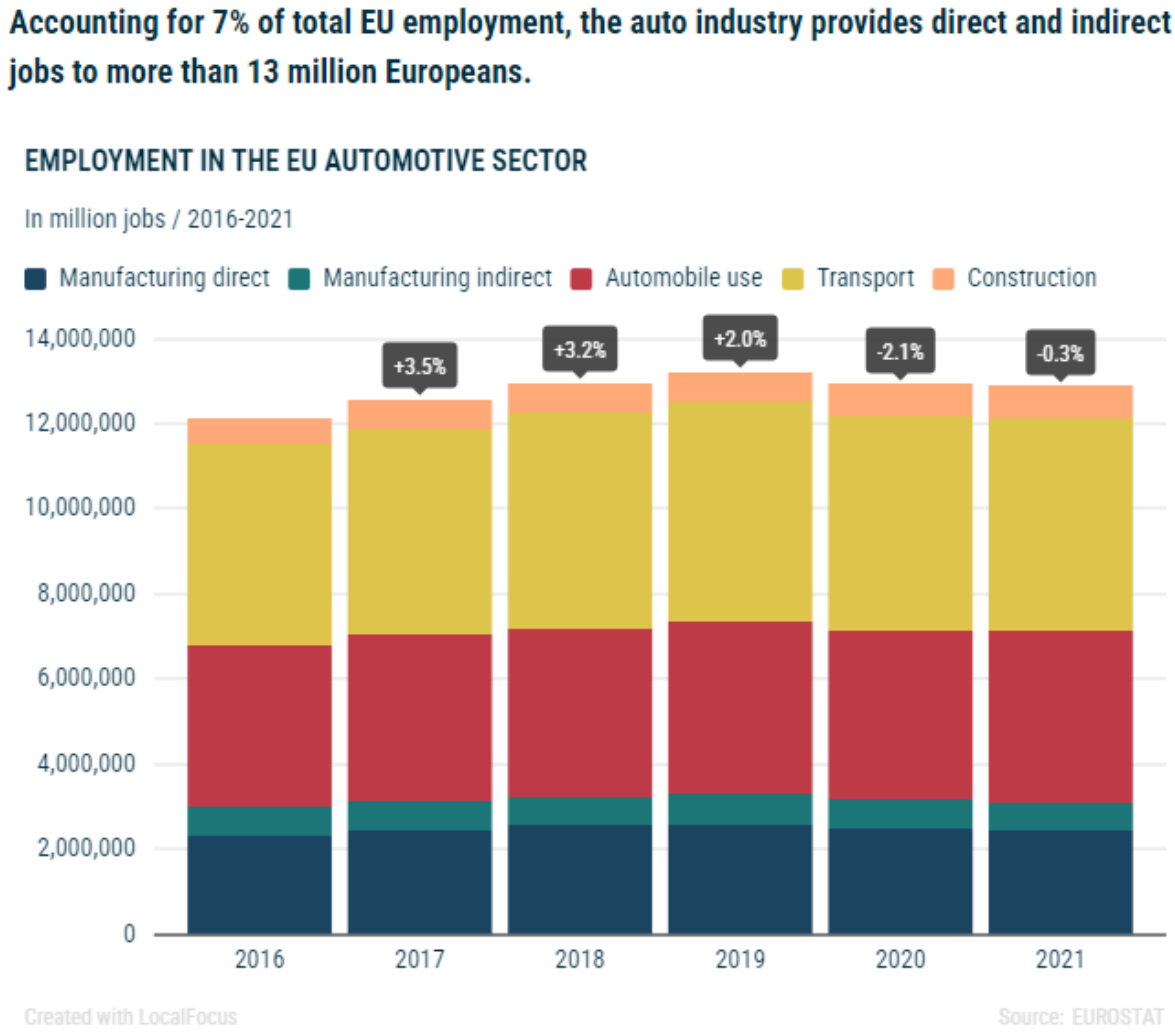

Figure 4: Employment in the Automotive Sector

Considering that 30 million Europeans are employed in manufacturing, energy and mining in general, the size of the sector in Europe makes the automotive industry a backbone of European manufacturing employment in general. However, the industry is also a strong regional employer, as the ecosystem has high geographical concentration.

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EUROPEAN AUTOMOTIVE INDUSTRY EMPLOYMENT: STOP GROWTH

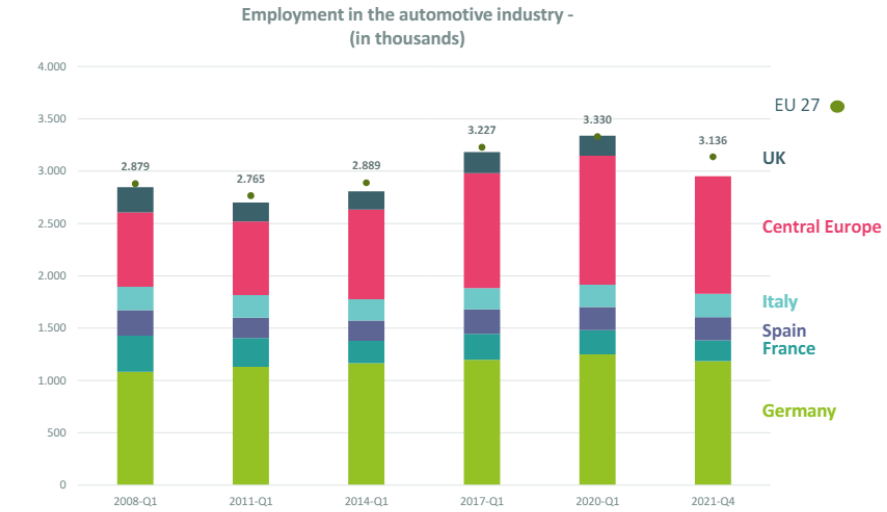

Figure 5: European Automotive Industry Employment

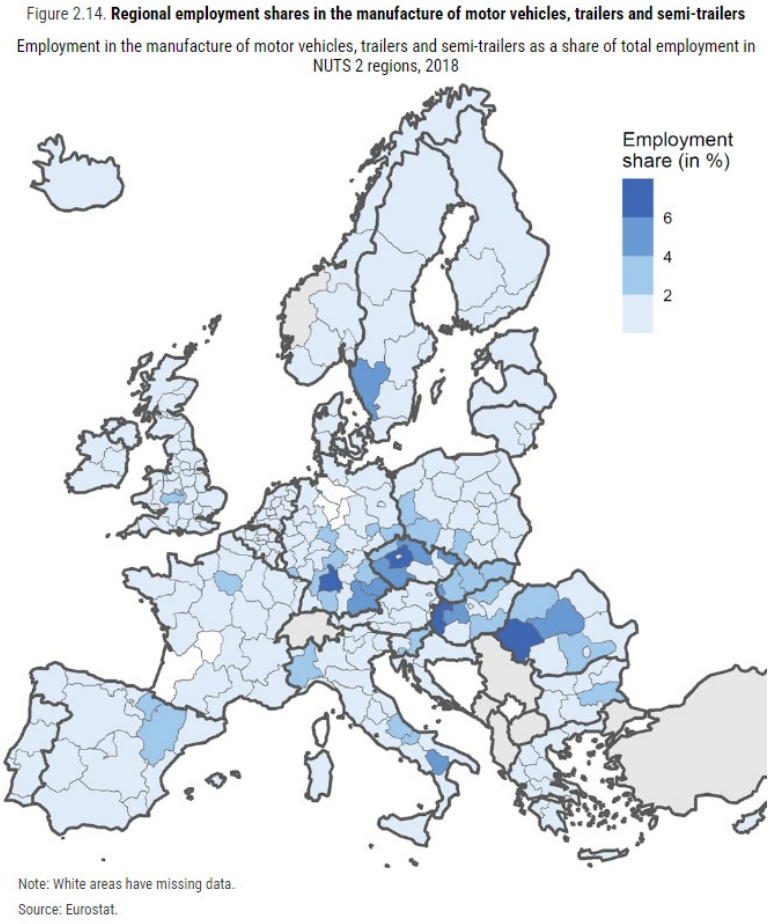

Figure 6: Regional Employment Shares in the Manufacture of Motor Vehicles, Trailesrs and Semi-trailers

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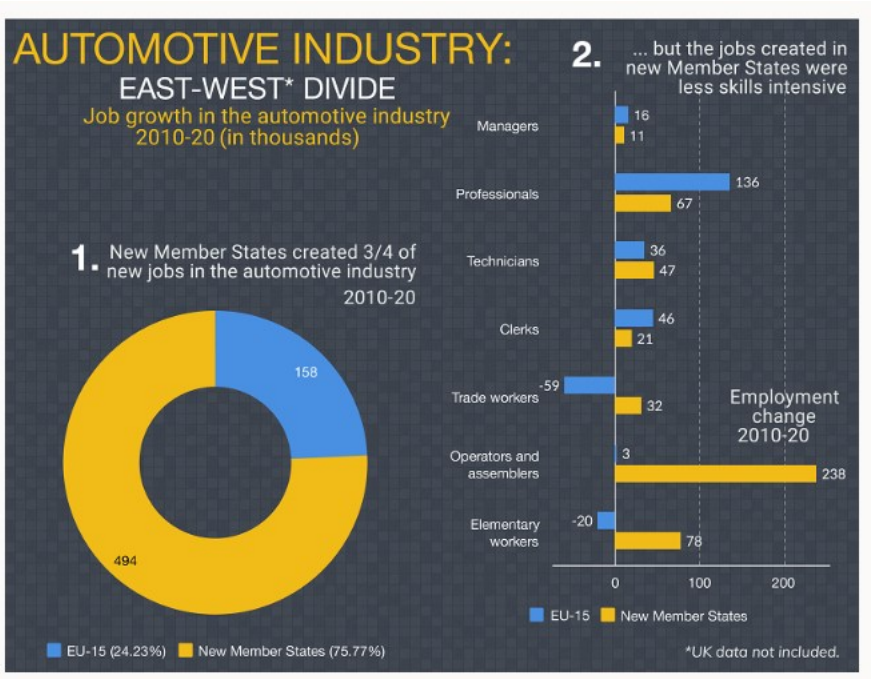
The automotive industry represents a major national employer in several member states (in SK,RO,CZ the sector is responsible for around 15% of industrial jobs). The regional concentration is even more stark. Four large regions, employing over 300 000 workers combined, in Czechia, Germany, Hungary and Romania have regional employment shares greater than 7 %.

The pandemic ended a successful decade, in which the EU car industry created some 700 000 new jobs, mostly in central and eastern Europe. Economic growth and increasing purchasing power of Europeans were the main drivers of a rising demand for cars, leading to investment in production facilities. While western EU-based car manufacturers focused on the R&D, sales, marketing and logistics parts of the value chain, EU countries in eastern Europe contributed to the industry success with their skilled workforce, superb technical/vocational skills and lower labour costs[3].



Source: Cedefop skills forecast database. Own calculations.

Figure 7: Employment Growth in the Automotive Industry

According to existing Eurostat data, almost a third of EU NUTS 2 regions, those whose populations are between 800 000 and 3 million, have a regional employment share greater

[3] https://www.cedefop.europa.eu/en/news/sectors-transition-automotive-industry

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than 1% in the motor vehicle, trailer and semi-trailer manufacturing sector, indicating that a great number of these regions and their workers will be at risk[4]. The European Commission has been encouraged to collate and present employment mapping in accessible geographical maps to allow a visualisation of the challenge of the twin transition. More data is necessary to have a clearer picture. In the absence of data and local information on actual employment figures and skills intelligence, planning the transition is very difficult creating uncertainty and pushback. Good data can allow for effective mapping to support decision-making at local, regional, national or European levels. However, improvements in data collection also depend on national legislation and are challenged by overall data limitations.

Ideally, this regional employment data should be overlaid with regional GDP data as an indication of the economic scale of challenges different regions face. As recent OECD research indicates that there is a high correlation between transitioning industry and economic vulnerability, with the consequent risks of development traps.

[4] https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754612/EPRS_BRI(2023)754612_EN.pdf

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Relative difference between the regional and national indicator values, percentage of the national average,[1] large (NUTS 2) regions

Region		GDP per Capita	Wage	Poverty Risk	Unemployment Rate	Educational Attainment	Download Speed	Net Migration
AT22	Styria	-8.93	-5.84	0.57	-28.89	2.10	-20.42	0.35
AT31	Upper Austria	2.68	1.32	-33.71	-35.56	0.93	-14.96	0.47
BE21	Antwerp	19.08	5.25	..	-33.33	0.51	18.34	0.46
BE32	Hainaut	-37.20	-12.56	..	59.26	-8.26	-24.06	0.30
BE34	Luxembourg (BE)	-38.41	-19.17	..	0.00	1.78	-46.08	0.52
CZ02	Central Bohemian Region	-10.00	-10.02	-23.20	-35.00	1.60	-16.99	1.13
CZ05	Northeast	-18.57	-9.72	3.20	-15.00	0.00	-27.85	0.22
CZ08	Moravia-Silesia	-20.00	-8.50	19.20	85.00	-1.39	-12.40	-0.11
CZ04	Northwest	-30.48	-19.66	72.00	50.00	-7.57	3.89	0.08
DE11	Stuttgart	30.12	20.30	-23.56	-22.58	-1.04	9.12	0.38
DE91	Braunschweig	20.96	10.31	4.02	6.45	-0.58	-5.12	0.41
DEA1	Düsseldorf	2.41	5.01	17.82	22.58	-5.77	19.51	0.32
DEA3	Münster	-17.83	-8.80	5.75	9.68	-2.66	16.25	0.26
DE22	Niederbayern	-4.10	-8.41	11.76	-35.48	2.31	-17.52	0.88
DEB3	Rheinhessen-Pfalz	-9.16	-1.20	-5.17	6.45	-3.70	4.16	0.53
DEC0	Saarland	-11.33	-5.83	24.14	19.35	-2.89	-0.35	0.21
DEE0	Sachsen-Anhalt	-30.36	-16.91	6.90	48.39	5.77	-31.97	0.06
DK05	Northern Jutland	-16.36	-8.67	8.59	16.00	-4.41	-6.07	0.17
EL65	Peloponnese	-15.79	-20.75	21.33	-30.64	-8.20	-22.35	0.16
ES12	Asturias	-11.74	-3.48	-2.77	0.71	9.14	-15.32	0.20
FI1B	Helsinki-Uusimaa	29.59	13.18	-35.26	-4.48	-0.55	6.56	0.69
FI1C	Southern Finland	-10.78	-7.11	4.49	-5.97	-0.78	-5.40	0.02
FI19	Western Finland	-11.93	-5.85	..	-4.48	0.55	-12.73	0.16
FI1D	Eastern and Northern Finland	-16.97	-8.69	21.79	16.42	0.89	7.74	-0.19
HU22	Western Transdanubia	-2.68	-3.30	-13.76	-47.06	2.35	-16.19	0.80
HU21	Central Transdanubia	-7.38	0.42	-28.57	-41.18	-1.06	-6.90	0.71
HU31	Northern Hungary	-32.89	-2.28	26.46	32.35	-6.94	-7.45	-0.31
ITH4	Friuli-Venezia Giulia	7.74	6.86	-46.09	-39.00	12.70	-23.41	0.52
ITI2	Umbria	-11.11	-12.60	-48.05	-15.00	14.63	-11.87	0.19
NL33	South Holland	-1.93	5.26	17.58	20.59	-0.75	2.09	0.55
NL34	Zeeland	-19.49	-14.71	-13.33	-23.53	-4.40	-9.10	0.36
PL22	Silesia	2.16	12.49	-24.18	-27.27	2.70	8.26	-0.05
PL52	Opole region	-21.58	-12.19	-6.59	-3.03	1.08	-25.86	-0.07
PL72	Swietokrzyskie	-28.78	-27.62	13.74	27.27	-0.54	-24.75	-0.15
RO42	West	1.74	17.48	-29.81	-12.82	6.33	3.31	-0.06
SE33	Upper Norrland	-3.25	-5.04	-11.70	-10.29	5.46	-24.66	0.23
SE32	Central Norrland	-14.50	-9.14	25.53	-1.47	1.63	-23.11	0.07
SK01	Bratislava Region	130.81	48.53	-51.83	-58.62	5.03	53.63	0.99
SK04	East Slovakia	-29.07	-15.22	29.27	56.90	-3.94	-0.26	-0.12
UKD6	Cheshire	20.37	29.71	..	-13.16	2.96	-29.33	0.42
UKE1	East Yorkshire and Northern Lincolnshire	-21.45	-20.25	..	23.68	-9.12	-29.50	0.23

Figure 8: Relative Difference - Regional and National Indicators (NUTS 2) (Source: https://www.oecd-ilibrary.org/docserver/35247cc7-en.pdf?expires=1716489309&id=id&accname=guest&checksum=DBB5572A2D26D16EC90C7B9E61A88E5C)

Vulnerable regions tend to have lower GDP per capita, lower wages, and less productive firms, making workers and local economies susceptible to job and income loss during the transition. The regions that have high employment shares are mainly concentrated in central and eastern Europe. Addressing skills gaps and supporting low-skilled workers as well as SMEs in these sectors is crucial for a just transition.

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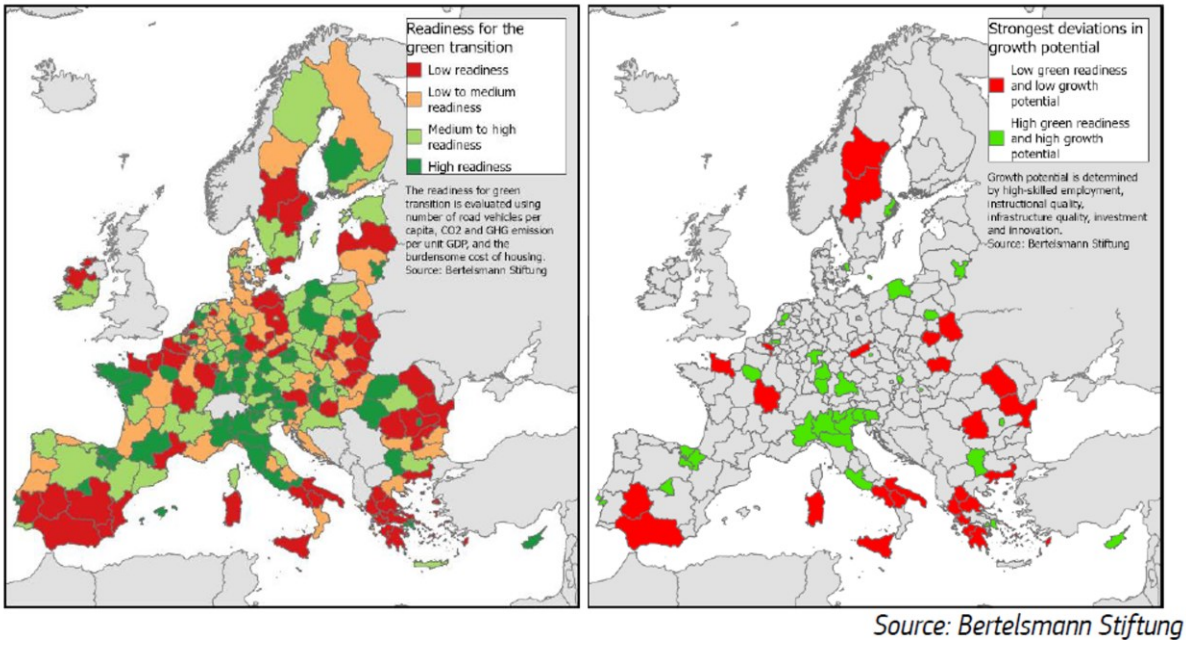

Figure 9: Readiness for the Green Transition

Recent research by CFDT and the Nicolas Hulot Foundation has given an insight into the intra-regional differences within the same member state (France) as a result of the industrial opportunities for relocation of automotive workers impacted by the transition (as seen in the graph below).

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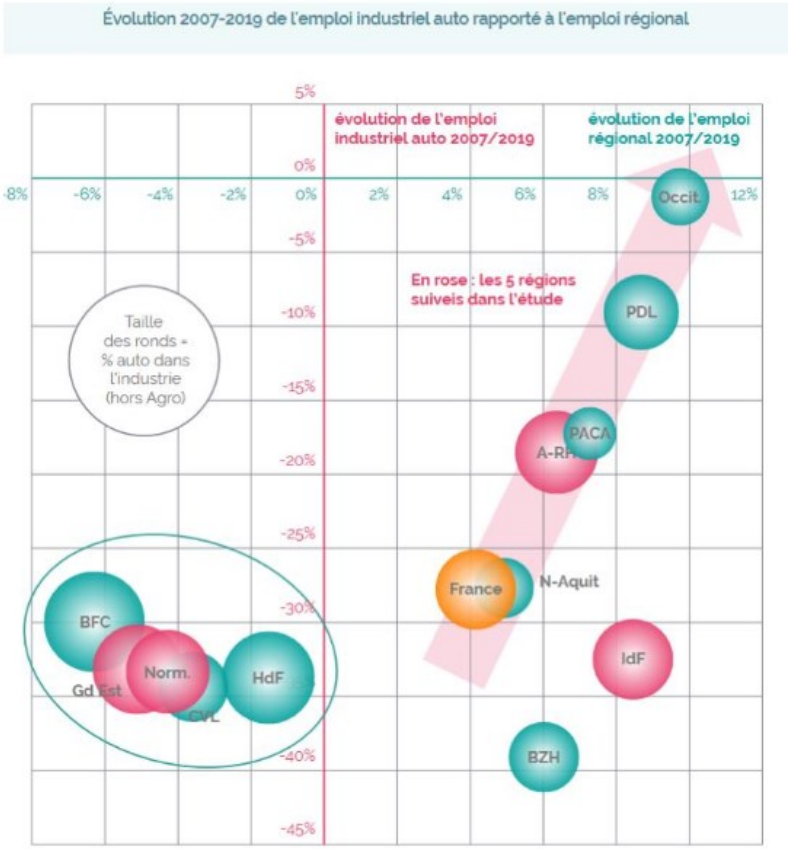

Figure 10: Regional Growth of Automotive Industry Employment

In 2022, the Automotive Regions Alliance was launched and is a political network of regions committed to the successful transition of the European automotive and supply industry. The Alliance is an initiative of the European Committee of the Regions. Many stakeholders and regional governments have raised the need for Europe-wide granular employment mapping at least at NUTS 2 but ideally NUTS 3 levels.

The ecosystem is marked by an ageing workforce. In automotive, ¼ workforce are over 50 years old. This is marginally younger than the rest of the ecosystem as in rail equipment, around 30% of the workforce is expected to retire in the next 10 years, while 40% of the current shipbuilding workers will be retiring in the next 10 years.

In several countries (Sweden, Denmark, the Netherlands, Bulgaria, Italy), workers in the manufacturing sectors are reported as considerably older than the average workforce. In these cases, the replacement of older workers with younger ones through attractive apprenticeships with retention and adequate retirement schemes are key. Adequate

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replacement relies heavily on offering attractive jobs in terms of pay and working conditions, with good mentoring at the start. There are many good examples of collective agreements that ensure this, like in France (Stellantis) or Italy (metal sector).

Attractiveness of jobs in the ecosystem is a shared concern. In some cases, questions around the social status jobs in the industries have been identified by CEDEFOP research, this is often linked to quality of jobs, career development and opportunities for training. Having said that today the MET industries continue to offer overall good wages and working conditions. Young workers have different expectations of their future jobs – the importance of meaning to work has been identified by many studies. There are still too many barriers to women entering industry and perceptions of female roles in industry. Stereotypes start at a very young age.

- In Sweden, employers organization Teknikföretagen has developed and launched Bredda Bilden, a free image bank with real women who work and study in STEM

Perversely, in this context of tight labour markets, the number of companies engaging apprentices and engaged in the VET system shrank in many countries during the pandemic and has not rebound, even in those countries with strong dual systems. However, the opposite phenomenon also occurs in other countries with strong dual systems were companies are unable to fill-in their apprentices vacancies. There are also skills gaps in VET providers.

In this context, the ecosystem urgently needs to attract more workers of all ages and from all backgrounds, especially women. Women are underrepresented throughout the ecosystem. According to data from the European Commission, in 2019, women made up 16% of the automotive workforce. In 2021 the percentage increased up to 20%. Social partners have a key role to play in promoting women in industry. An international commission (led by the Basque regional government) on Women in Industry within the World Manufacturing Forum has developed a series of recommendations to analyse the barriers and recommend measures to take.

Generally, precarious work in contractual terms has been proportionally less prevalent than elsewhere. There is little platform work, therefore fixed term and temporary agency contracts are the main sources of risks of contractual precarity. Digitalisation and automation have had

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an impact on working conditions, with workers in some parts of Europe reporting issues with work intensification.

Migrant workers make up an increasing proportion of the workforce in these industries. The integration of Ukrainian refugees into the sectors has been a key development, particularly in central and eastern Europe.

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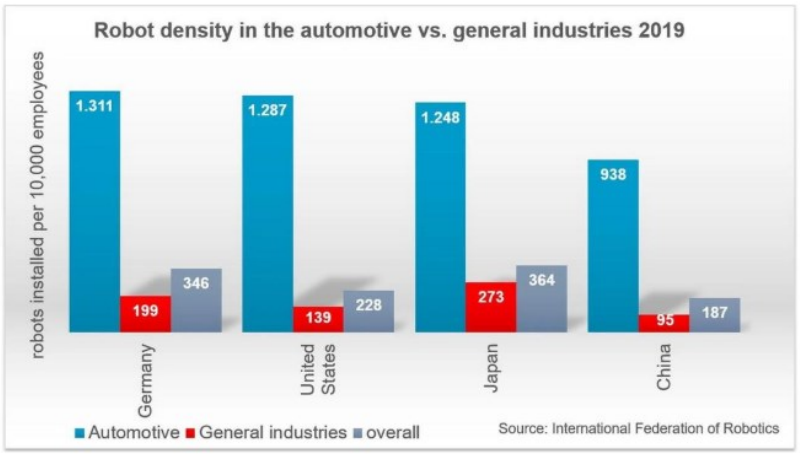
2 Change is Already a Reality in the Industry

Change is not a new reality across the eco-system. Employment in the automotive industry has been impacted over several years regardless of the twin transition, as a result of global competition and automation.

Production and employment expansion goes hand in hand with technological innovation. As a result, medium-skilled technical trade jobs (metalworkers, electro-engineering workers) have become less dominant, while employment in highly skilled technical jobs (such as researchers, engineers, ICT professionals) is on the rise.

The automotive industry is a leader in robotisation, accounting for almost one third of all new industrial robot installations yearly. Cedefop research shows that half of EU automotive companies use robots: more than twice the average of the manufacturing industry as a whole[5].



https://ifr.org/ifr-press-releases/news/us-robot-density-in-car-industry-ranks-7th-worldwide

Figure 11: Robot Density Comparison

The twin transformation is already underway and having impacts on workers, companies and sites, notably in the internal combustion suppliers. The pace of structural change, which is accelerating along with important job losses announced in the whole sector, hitting suppliers in particular has raised the stakes in the sector. Recent cases of restructuring in the industry show the combination of change driving factors.

[5] https://www.cedefop.europa.eu/en/news/sectors-transition-automotive-industry

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RECENT RESTRUCTURING ANNOUNCEMENTS :
IN MANY CASES, "CAPACITY ADJUSTMENT" AS THE MAIN NARRATIVE
GERMANY AND FRANCE ARE SEVERELY IMPACTED. WHITE COLLARS ALSO AFFECTED (INCL. R&D)

Date	OEM/Supplier	Company	Jobs concerned	Justification	Plan	Country
sept.-23	Supplier	Lear	831	Decreasing orders	Closure, reloc.	Hungary
sept.-23	Supplier	Yasaki	400	Restructuring plan	Closure	Romania
sept.-23	OEM	Volkswagen	269	Decreasing orders		Germany
oct.-23	Supplier	Marelli	300	Decreasing market	Closure	France
sept.-23	Supplier	Yazaki	400	Decreasing orders	Closure	Romania
sept.-23	Supplier	Marelli	230	Decreasing orders	Closure, reloc.	Italy
sept.-23	OEM	MAN	260 + 100 tempo.	Savings plan	Layoffs	Austria
oct.-23	Supplier	Kongsberg	150 to 200	Savings plan	Layoffs	Germany
nov.-23	Supplier	Autoliv	178	Savings plan		France
nov.-23	Supplier	Holophane	200	Decreasing orders		France
nov.-23	OEM	Volvo	1,100 (700 white collars) + 400 tempo.	Savings plan	Layoffs	Sweden
nov.-23	Supplier	Goodyear	700	Savings plan	Closure	Germany
nov.-23	Supplier	Michelin	1,532	Savings plan	Closure, reloc.	Germany
nov.-23	OEM	VDL	2000	Decreasing orders	Layoffs	Netherlands
dec.-23	OEM	Pierer Mobility	300	Savings plan	Reloc.	Austria
dec.-23	OEM	Volkswagen	4000 to 6000	Savings plan		Germany
dec.-23	Supplier	Bosch	1500 by 2025	Savings plan		Germany
dec.-23	Supplier	ZF	7,000 by 2030	Financial difficulties		Germany
jan.-24	Supplier	Bosch	1,200 by 2026	Savings plan		Europe (mainly Germany)
jan.-24	Supplier	Valeo	1,150 (support functions)	Merger of 2 businesses		WW (mainly France & Germany)
jan.-24	Supplier	Stellantis	463	Decreasing orders	Closure, layoffs	Poland
jan.-24	OEM	Stellantis	200 tempo.	Savings plan	Tempo.	France
jan.-24	OEM	Stellantis	600 tempo.	Decreasing orders	Tempo.	France
jan.-24	OEM	Mercedes Benz	8000	Savings plan		Germany
jan.-24	OEM	FCA Poland	468	ICE engines phase out	Closure	Poland
Feb. -24	Supplier	Forvia	10,000 by 2028	Restructuring plan		Europe
Feb. -24	Supplier	Continental	7,150 by 2025 (5,440 admin, 1.750 R&D)	Savings plan		WW (mainly Germany)
	OEM	Stellantis				

Source: Syndex (non-exhaustive list)

Figure 12: Employment Changes within the Automotive Industry

The challenges posed by industrial change and transformation are substantially different in character region to region, but also within the different sections of the automotive value chain. The impact on jobs locally might have negative impact in some places, maybe not in others. Regions in which there is no OEM or tier 1 suppliers is markedly different, as there may be a fabric of technology-intensive SMEs.

A 2021 study by Boston Consulting Group set out a detailed forecast of employment changes within the automotive industry.

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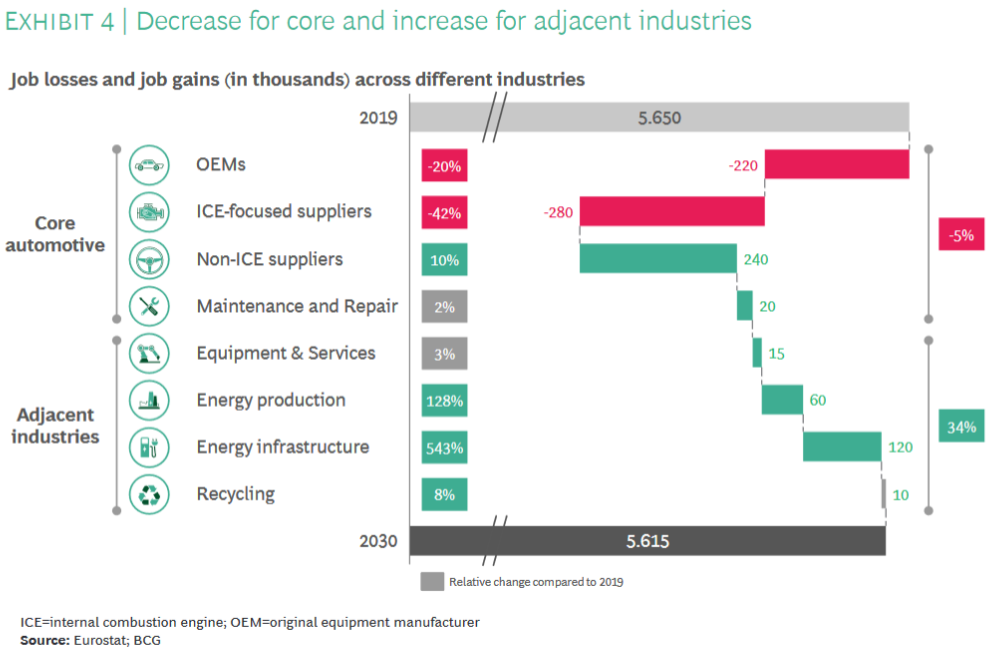

Figure 13: Development of Automotive-related Industries

The 2018 German study into the impacts of electrification on the industrial workforce set the scene in a single automotive-producing country. The increase in electric vehicles could mean that around 76,000 jobs in drive technology will become redundant in the automotive industry by around 2030. This is the conclusion of the study "Effects of vehicle electrification on employment in Germany" ("ELAB") by the Fraunhofer Institute for Industrial Engineering and Organization (IAO) in Stuttgart. The job losses primarily affect the supplier industry. In their most likely scenario, the researchers assume that 25 percent of vehicles will be electric and 15 percent will be hybrid vehicles. With such a level of electrification and improvements in combustion engines, it would be possible to reduce the environmental impact of carbon dioxide from car traffic by up to 40 percent. But this will mean huge changes for the car industry.

Research undertaken for CLEPA is one of the only regional analyses on the impact of different electrification scenarios, and gave an indication of the potential scale of employment impacts for ICE suppliers (as shown in the graph below).

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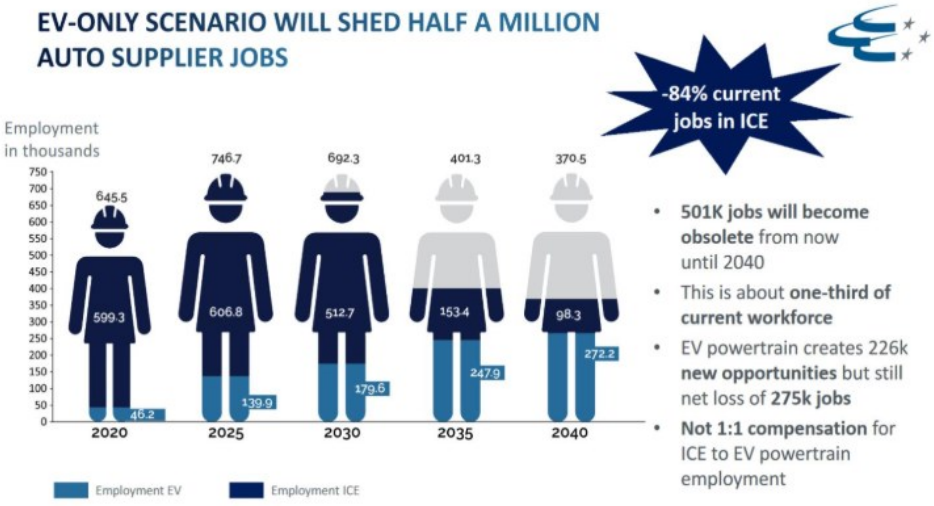

Figure 14: EV-only Scenario and Impact on Jobs

Furthermore, industrial clusters dominate these ecosystems but new clusters aren't in the same locations. There is a need for data of structural character of concerned regions.

Secondly timing really matters: need smooth transitions and supportive frameworks to avoid unemployment, ie. when you phase out jobs and create others.

2.1 Changes in the Garage/Maintenance sector: Electrification Aspects

Major impacts on the automotive maintenance sectors (garages) as a result of the twin transition. Conventional engines, transmissions and exhaust systems — together making up a car's powertrain — are a lot more complicated than their battery-powered replacements — which consist of a battery pack and an electric motor. A conventional powertrain has about 1,400 parts, while an electric one only has about 200. There are significant changes in the maintenance sector notably widespread reskilling and upskilling to work on high voltage equipment.

As the mobility Transition Pathway lays out, electrification, new sustainable modes of transport, increased connectivity and an increased role of software and data sharing are all shaping how businesses and consumers will operate and behave in the future.

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With an accelerated transition from ownership to usage, business models such as on-demand mobility and vehicle as a service are transitioning the asset ownership from private to corporate. The sale distribution model is also changing with new brands opting for direct sales to consumers with an eCommerce approach. Additional services never explored before may appear with new patterns of mobility and increased data gathering like “pay-how-you-drive” and “pay when-you-drive” insurance plans for car owners or usage-based products. The increased ownership of electric vehicles assets under single mobility providers also opens the door to alternative revenue streams with fleet management and vehicle to grid technology.

Data and particularly data-driven innovation are becoming increasingly important. The use of data across the entire value chain and life cycle of the vehicle, could have multiple benefits: it could, for example, increase awareness of value chain constraints and performance, allow the optimization of processes and logistics, carry out predictive maintenance with digital twins, provide transparency and control at the end-of-life of the vehicles or create additional value for other sectors like utility companies and retailers. Despite this significant potential, stakeholders believe that the current data landscape in the automotive value chain is highly complex, fragmented, and lacks sufficient transparency and interoperability.

Figure 15: Sales Model Transition

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The garage and repair sector is very widely spread geographically and made up of many micro-enterprises. This poses particular challenges in the transition.

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3 Emergence of New Automotive Sector Activities: Battery Sector

It's expected that the battery supply chain alone will require 4M jobs by 2025 as the energy transition continues to accelerate, with 800K workers required to have access to additional training to meet demand. A collaborative and coordinated approach is necessary to ensure Europe takes a leading role in driving the transition as the sector dramatically increases in scale.

As noted by the ALBATTS project, it is presently very hard to be competitive in the small-scale production of energy high-density cells. This involves large investments, a qualified workforce and rationality in their education and training. However the "one fits all" and "once-upon a lifetime" education models are not enough. Today, adaption to the individual background, knowledge gaps, ambitions and way of learning are necessary to find suitable educational and skills training. Production of high-energy density battery cells at a very low price (compared with today) is a necessity for the development of the activity in the future chain links in the value chain of electromobility.

More recent picture on battery production in Europe for 2030 [2023]

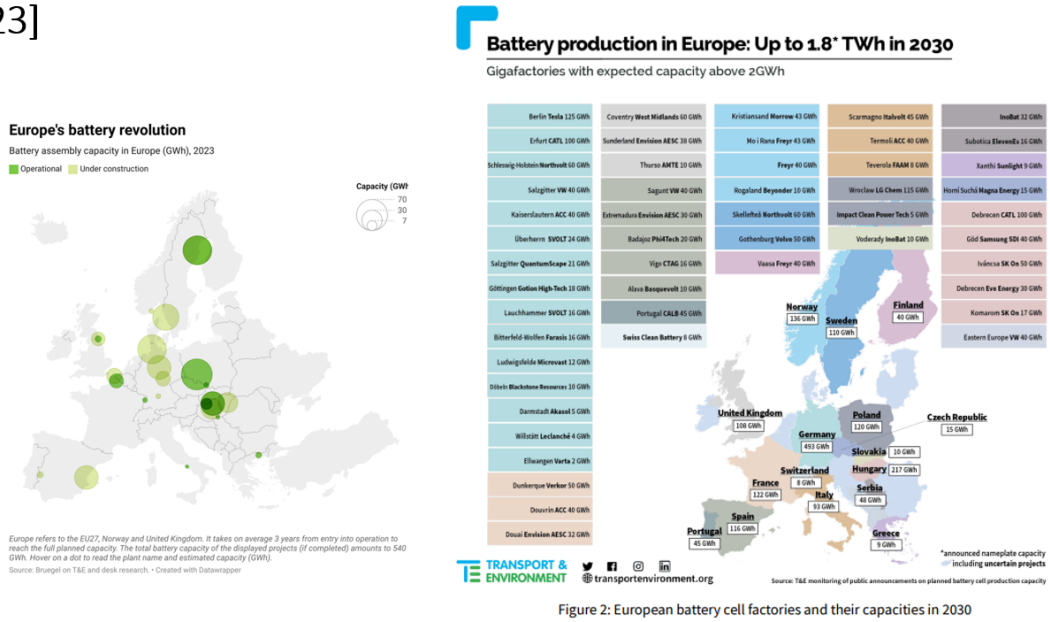

Figure 2: European battery cell factories and their capacities in 2030

Figure 16: Battery Production Estimation

Many businesses want to engage in the battery-pack or battery systems link of the value chain, producing solutions for different application areas. These work environments are less

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automated and more dependent on manual labour. The question is however if there will be enough supply of green European cells needed for development of this sector to full potential.

The availability of a skilled workforce is crucial to enable companies to be established in Europe. By forming a consortium at the European level, we can collect the necessary expertise to develop the needed qualifications for the sector, based on competencies. This makes the qualifications more transparent and will also facilitate the movement of the European workforce across the continent.

The European Battery Alliance (EBA) was launched in 2017 by the European Commission, EU countries, industry, and the scientific community. Batteries are a strategic part of Europe's clean and digital transition and a key enabling technology, essential to the automotive sector's competitiveness. Therefore, the Commission aims to make Europe a global leader in sustainable battery production and use.

In November 2022, the Automotive Skills Alliance (ASA) and European Battery Alliance Academy backed by EIT InnoEnergy, the innovation engine for sustainable energy supported by the European Institute of Innovation and Technology (EIT), an institution of the European Union have today signed a Memorandum of Understanding on a strategic partnership that will upskill and provide additional skills to the current mobility and battery industry to meet the demands of the growing sector.

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4 Transition Planning: Collective Bargaining and Social Dialogue

Ultimately the transition is experienced by individuals. Often focus is on helping the industries to fill gaps but must also ensure addressing the concerns of the workers impacted. If all the discussion is on the needs of industry, then ignores the needs of the workers themselves. This is why a strong social dialogue at every level is vitally important.

Every country has its own industrial relations system, culture and organization. However, these all reflect three key elements which are all vital to anticipate and manage transitions:

- Social dialogue: includes all types of negotiation, consultation or simply exchange of information between, or among, representatives of governments, employers and workers, on issues of common interest relating to economic and social policy.
- Collective bargaining: all negotiations which take place between an employer, a group of employers or one or more employers' organisations, on the one hand, and one or more trade union.
- Worker participation: refers to any process in the company that allows workers to exert influence over their work or their working conditions. Worker participation is obligatory in various processes in the company due to European legislation.

Social partners have a central role to play in the transition at all levels (site, company, regional, sectoral, national and European levels). Negotiation is the best way to deal with transition.

Recent national collective agreements (CBAs) in Sweden (2022) and German metal sector (2021) offer concrete examples of how social partners can negotiate a framework to anticipate and manage the transition, ensure transition plans and rights to training for individual workers:

- Swedish national agreement on transition and training: Training during employment or after employment (1 year/80% pay compensation) to strengthen position in the labour market. It wasn't stated explicitly in the negotiations but it is underpinning the twin transition in Sweden. This isn't only about re/up-skilling but also 2nd element termination due to collective redundancies or individual choice. Read more about the agreement here.

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- In France, companies obliged to negotiate CBAs on management of jobs and skills – demands support to understand prospective jobs/skills, especially for SMEs. At sectoral level, social dialogue is key to support all companies but especially SMEs to anticipate changes. National and regional bodies – consultation bodies and observatories on skills and employment trends. Joint analysis between social partners that can lead to CBAs. For example, in Hauts de France, the CBA on support for SMEs on mobility transition signed by the different territorial entities.
- In Germany, collective bargaining and codetermination are key tools. Strong sectoral CBAs, but also company negotiations. Example: groundbreaking 2021 CBA with GesamtMetal-IGM – dedicated fund for transformation, which can be used by workers impacted by transformation but also to support 'Zukunft' joint analysis in companies. Incentive for SMEs to engage.

Instrument	Innovative element	Company/site
Future collective agreement (Zukunftstarifertrag)	Expansion of co-determination beyond the legal level Participation of works councils in the elaboration and development of company future concepts	ZF (2019-2022); Bosch (2023- 2025), Mahle (2023- 2025), Musachi (2023- 2030)
Social collective agreements (Sozialtarifvertrag)	Increasing severance payments and other compensation benefits above usual levels; Strengthening associational power through strikes	Musashi; GKN diveline; several Continental sites
Company-centered organizing campaigns	Building trade union structures in strategically important companies	Tesla factory Grünheide; CATL factory Erfurt
Location negotiations conducted in a conflictive manner	Preventing factory closure through the conflictive use of associational power and institutional power resources such as co-determination	Mercedes Benz-Plant, Berlin Marienfelde
„Economic, Innovation and Investment Committee"	Strengthened right to information and consultation and a say GWCs in strategic decisions about investments and innovations	Mercedes Benz Group AG

Figure 17: Innovation Agreements in Transformation Conflicts – Germany (Source: ETUI)

Unfortunately, social dialogue is not working effectively in every corner of the EU.

The effective implementation of the two recent Council Recommendations on Just Transitions and Social Dialogue is key. Capacity building is crucial.

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In new segments, industrial relations will have to adapt potentially with sectoral categories stretching into new areas. Fundamental ILO rights to organize and negotiate collectively should be ensured in all emerging and existing sites.

Where strong social dialogue exists, social partners can ensure good terms and conditions. Strong stable industrial relations is a precondition.

- A concrete example comes from the German metal 2021 CBA on the transition, a transformation fund was created which can support reduced working time (4 day week) to avoid layoffs in sites in transition.
- Another example from Austria saw the construction of Europe's first climate protection training centre in Sigmundsherberg, in the Waldviertel. Students get unemployment benefit plus a small fee, and the aim is to have 50% female alumni (therefore free childcare and a range of other measures have been offered). This experience has shown the importance of employment guarantees to counter the financial risk for individuals.

The gaps in the availability of social protection measures led to both the Coalition for a Just Transition for mobility workers' (2021) and the Automotive Regions Alliance's (2022) calls for the need for a European mechanism for the regional transition – a JTF 2.0 – building on the experience of the Just Transition Fund.

The demography of the ecosystem means that difficulties of retraining need to be taken into account. Also important to consider health and safety measures to support older workers to stay active in good conditions. Need to look at working time reduction for older workers to redistribute work and ensure active ageing. High rates of chronic illness in older workers must be addressed to ensure "work to pension" rather than "illness to pension" transitions. Need to think differently and find balanced solutions which are sustainable for industry and workers.

Every retraining is an investment on both sides and need a return on investment for both. The higher the skills that people have initially the easier to motivate for reskilling, the less skilled the more need for additional offers and motivation – these uncertain times make it very difficult. Social protection is vital to provide bridges for individuals. Social protection systems can support intergenerational knowledge exchange (there are a number of different national

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examples) – ensures reduced working hours for older workers and integration of younger workers.

Ultimately today relatively small numbers are getting adult training, and it's crucial to avoid that people in transition fall in poverty. The Council recommendation on just transitions is very clear on the importance of social safety nets. Its recommendations should be implemented.

Safety nets are key to ensure job to job transitions and ensure workers are confident about the changes underway. The Council recommendation on just transitions calls for innovative job to job transitions, the need to involve local and regional stakeholders to support this. There are good practices at company, regional, national and European level to learn from. Anticipation of change is key.

There is a need for a cultural change in relation to training and learning, to communicate and raise awareness on how specific training will contribute to personal development – chambers have a key role here (especially towards SMEs). Support a culture of Learning to Learn from young learners to retirement.

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5 Identifying Skill Shortages and Adapting Up/Reskilling Programmes

The scale of the skills challenge is staggering. According to the Boston Consulting Group, the number of people who will need retraining due to the new requirements is estimated to be about 2.4 million. The graphic below clearly represents the measures that will have to be considered when talking about up/reskilling for manufacturing in the same, similar or even completely new job profiles – measures ranging from on-the-job training to retraining, relocation and even requalification.

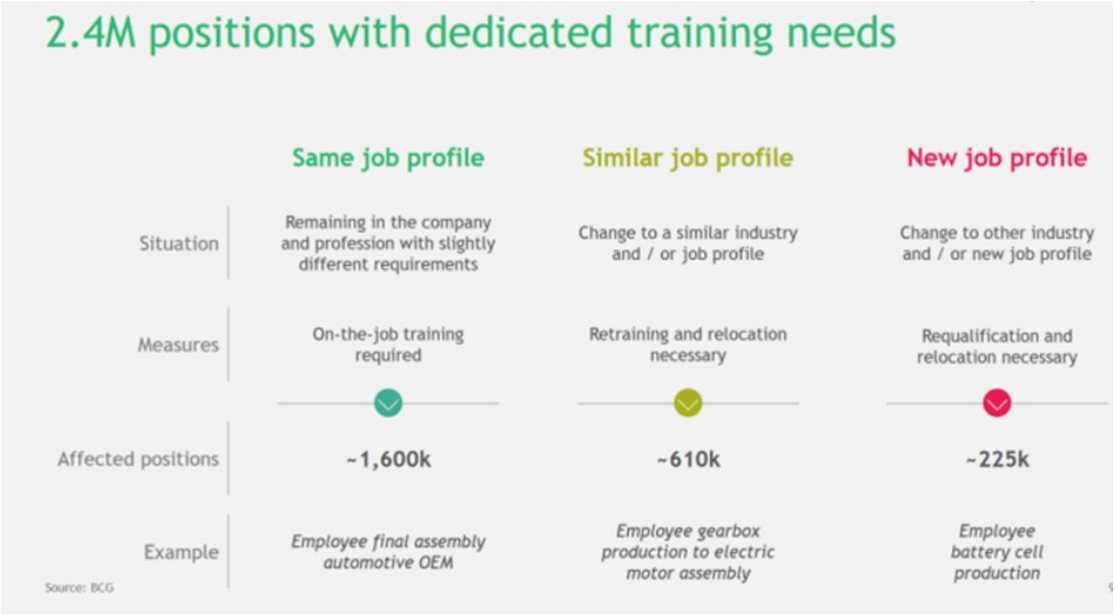

Figure 18: Estimated Changes in the Manufacturing

Substantial skills shortages exist throughout the ecosystem at the same time as the twin transition is changing and threatening many existing jobs. These are intensified by skills-worker location mismatches. There is too often a disconnect between training plans and investment decisions.

While much attention is focused on the emergence of new professions or jobs, much of the transition is about new profiles and skills. This makes continuous lifelong learning and training a key issue for workers and industry alike. Methodology to address the automotive industry needs to take a broader approach sectorally (electricity/charging infrastructure/battery

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plants). Forecasts suggest that new jobs that will be created will be higher skilled (largely IT jobs).

Industry analysis shows that by 2025 the main occupations won't change dramatically but there are new horizontal skills needed in all roles in industry – e.g. ecodesign and environmental standards. All roles will need to be refreshed and complemented. While there are skills needs which are shared throughout the ecosystem there are also sector-specific needs. Consistency within the ecosystem is needed around skills on battery cells, H2 and other common technology routes, as well as transversal skills (AI, cybersecurity). But then the products mean that the combinations of skills needed are often specific to the different sectors. This is corroborated by CEDEFOP analysis, which has identified that more data and information is needed on the sectoral level skills needs. The greater the standardisation of the industry (e.g. automotive) the greater the potential for collaboration across the ecosystem.

The Automotive Skills Alliance (ASA-Pact for Skills) has also been identifying skills needs and building collaboration. There's a need for technical skills (ESCO 6-8 or 3-4). Different skills needs in R&D, production, aftersales, marketing. Different levels of skills in gigafactories than traditional auto sector (80% EQF 3-4). Within the ASA, different working groups but need to develop tools for better collaboration. Have done training courses with ECITS points and micro-credentials at university partners in PfS.

We have moved beyond traditional sectoral boundaries to understand skills needs. For instance, in automotive industry, it's important to consider vehicles, batteries and infrastructure systematically rather than separately.

While, highly skilled workers are in high demand, it is important to maintain a focus on basic skills as well to ensure workers can benefit from the transition. There is a strong need for workers with medium skills.

Policies should support a cultural shift towards a 'learn to learn' culture. Workers must be confident enough in their employment and income security to engage in the transition as an opportunity.

Quality career guidance is crucial. Sectoral career guidance might be implemented in regions in line with regional industrial strategy. TJTPs include provisions on this – transition plans,

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outplacements, career guidance. Regional level is better placed. Need expert support but also data-based tools. Cross-border cooperation is also necessary to 'train the trainers'. Furthermore, entry routes for young people should be promoted (e.g. Danish engineers Icebreaker model).

There are different social status attached to jobs and industries. A lack of data/insights can lead to misconceptions hampering attractiveness of different sectors. Building trust in the transition is vital, to ensure that people perceive changes in a positive light rather than as negative evolution. Edelman's Trust Barometer provides informative results on how workers perceive their changing world of work and the importance of collective voice in the transition – this is why worker involvement in negotiating the transition is so critical.

It is therefore important to reiterate that the countries which have achieved effective anticipation of change processes and skills strategies are where the social partners are involved in every stage of the VET system. As explored by the European Training Foundation over many years, by working together, governments, employers and trade unions can develop education and training to respond to the diverse needs of society, the economy and individuals. Cooperation between all these actors however remains a challenge in most countries. For vocational training in particular, it is of paramount importance that governments, employers and trade unions develop their capacities to work together in making and implementing vocational education and training policies.

5.1 Tackling SME-specific skill challenges

In the context of intense competition for skilled workers, for SMEs there are key challenges in recruitment processes and addressing the attractiveness of industrial jobs and professions. Moreover, in contrast to large companies, SMEs need more support on internal training.

Europe needs a comprehensive industrial strategy with a strong social dimension, ensuring the attractiveness and quality of jobs in the ecosystem, investment and coordination in training and skills. A stronger skills governance approach is necessary. Examples exist at the national level. The dual system in Germany and Austria is considered as a leading model for VET. In France regional observatories feed "green" skills anticipation observatory ONEMEV.

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OSKA system in Estonia, based on sectoral committees is another example. Difficulty is that one model can't be transposed to another country as much linked to culture and practice.

A European Just Transition Observatory could provide a means of exchanging best practices, mutual learning and data collection across the EU. Regional observatories would be able to interlink in a joint network in this way, as well as initiatives foreseen in the first generation of Territorial Just Transition Plans (e.g. Moravian-Silesian TJTP project on automotive reskilling or the Silesian regional transition observatory).

Greening must take place across all VET provision, alongside the participation of and awareness raising amongst all stakeholders. This must not be based on one-shot projects but the promotion of continuous action and a systematic approach.

Should ensure that VET ensuring career development, recognition and validation of prior learning (vital for job to job transitions) – about empowering the worker to understand their options. Occupational standards can offer a common ground for designing new curricula and updating existing ones.

Targeted support for SMEs on training offers – here chambers of commerce and local public employment services (PES) have key roles to play.

Build better and stronger links between students and industry through collaboration with universities, student work placements, industry input into curriculum (e.g. ASA brought together teachers to develop a series of microcredentials for teachers (e.g. visiting battery sites)). With the aim of tackling the perception of students on industry itself. Building collaborations and managing skills networks needs to be credited/recognised professionally as well.

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6 Identifying Good Practices

Through common analysis in the MET sectoral social dialogue committee, a series of good practices (as mentioned throughout this report) have been identified.

BEST PRACTICE	DESCRIPTION	TYPE OF SOCIAL DIALOGUE
Joint European social dialogue positions related to the transition in the automotive industry	• STEM strategy: Joint recommendations on STEM • 2021 - Boosting continuing vocational education & training in the MET industries DE EN FR	MET European sectoral social dialogue committee (joint positions)
European Metal, Engineering and Technology-based (MET) on apprenticeships	• joint pledge connected to the European Alliance for Apprenticeships (renewed in 2021) • 2021 - Robust MET industries require future-proof apprenticeships – renewed EAfA pledge DE EN FR	2021 2018
European Metal, Engineering and Technology-based (MET) on VET and career development	Joint positions or statements	2021 2019 2017 2013 2011 2010
Joint seminar iAE-CEEMET, Brussels, 18 October 2022	• Federmeccanica EN • Unionen EN • Jyrki Raina EN • Syndex EN	MET European sectoral social dialogue committee (collecting good practices)
Swedish national agreement on transition and training (2022)	Training during employment or after employment (1 year/80% pay compensation) to strengthen position in the labour market. More about the agreement here	Interprofessional collective agreement (complemented

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		by legislation to implement)
Interprofessional agreements or laws on rights to training and VET	BE: October 2021. The broad coalition government in Belgium has reached an agreement for the 2022 budget. Social partners agreed to introduce a **right for all to five days of professional training per year**. This measure is for full-time workers. Furthermore, the government will introduce the possibility of combining unemployment benefits with workers' starter wages in sectors facing labour shortages. ES: 22 December 2021, a tripartite social dialogue agreement was reached in Spain which repeals central aspects of the 2012 labour reform implemented by the then Conservative government. The agreement covers collective bargaining, temporary contracts, subcontracting and retraining schemes. The new agreement is part of a deal between the Spanish government, made up of the Socialist Party and the left-wing coalition, UNIDAS Podemos, and the European Commission. The text defines training arrangements for alternating work and training. It also requires that remuneration for internship contracts can never be lower than the minimum wage. Furthermore, to limit employers' use of subcontracting and outsourcing, service companies will have to respect working conditions and salaries established in the sectors in which they operate. NL: The Dutch trade union FNV provides an interesting example with regard to a social dialogue about life-long learning and continuous skills development between social partners, employers, trade unions and national advisory boards, taking place in the so-called Labour Foundation ('Stichting van de Arbeid'). According to the Foundation, all employees should have access to new knowledge and skills, for career development and to improve their employability within and outside the sector they are employed.	Tripartite national social dialogue

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	PT: On 28 July 2021, the Government and the social partners signed a **strategic document for VET**: Agreement [6]for vocational training and qualification: a strategic goal for people, for companies and for the country. The new agreement promotes participation in training and qualification levels and strives for achieving, by 2030, the European target of having at least 60% of adults annually attending lifelong learning activities. It also supports the aims of the EC (Recommendation 2021/402 of 4 March) in active support to employment following the COVID-19 crisis.	
German metal agreement (2021)	Created a dedicated fund for transformation, which can be used by workers impacted by transformation but also to support 'Zukunft' joint analysis in companies. Incentive for SMEs to engage.	CBA with GesamtMetal-IGM
French metal agreement	Sectoral collective agreement [7] Agreement to face serious economic difficulties and re- and upskilling plans in a specific sector (e.g. automotive) at national, regional or local level. State-OPCO2i recovery plan [8] UIMM and Trade unions. Tripartite: employers' association(s) + trade union(s) + public authorities.	UIMM and French trade unions

[6] Acordo para a Formação Profissional e Qualificação: um Desígnio Estratégico para as Pessoas, para as Empresas e para o País

[7] https://uimm.lafabriquedelavenir.fr/wp-content/uploads/2017/08/2016-09-23_Accord-national-relatif-%C3%A0-lemploi-dans-la-m%C3%A9tallurgie.pdf
https://uimm.lafabriquedelavenir.fr/wp-content/uploads/2020/02/U7401_2019-09-16_Accord_mesures_urgentes_EmploiFP_11.pdf
https://uimm.lafabriquedelavenir.fr/wp-content/uploads/2020/02/U0101_2019-12-10_Accord_Emploi-secteur-auto_12.pdf

[8] https://www.opco2i.fr/formation-et-financement/convention-relance-industrie/#:~:text=Objectifs%20de%20la%20convention%20Relance%20Industrie,-Il%20s%27agit&text=Les%20objectifs%20sont%20les%20suivants,li%C3%A9s%20%C3%A0%20la%20crise%20sanitaire.

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	Re- and upskilling plans. The consequences of the covid-19 crisis have hit companies in the industrial sector particularly hard, but the recovery has begun as of 2021. In order to meet the economic and social challenges and to support the development of skills, OPCO 2i (joint body in charge of informing, advising and supporting companies in the implementation of HR and training projects in industrial sectors) has concluded a framework agreement with the Ministry of Labour: 310 million euros have been allocated within the framework of the FNE-Formation between 2021 and 2022. UIMM Campaign and trade unions Communication campaign targeting young people #FiersDeFaire to attract young workers and women to the MET industries. This campaign aims to make industry a sector of interest for young people and to demonstrate that apprenticeship is a great option for training in its jobs. The campaign shows that the industry's professions, and the training courses that lead to them, have a meaning, especially through the words of those who are “proud to make” (#FiersDeFaire). UIMM / CFDT / CFE-CGC / FO / CGT - Joint Observatory 9for the Forecasting of Professions and Qualifications in the Metal industry The initiative is bipartite: employers' association(s) + trade union(s).The aim is to anticipate and forecasting skills needs. UIMM and trade Unions Attracting young workers and women to the MET industries by an attractive dual learning policy in the our sector, targeting a 50% increase in the number of dual students between 2019 and 2023 (this target is included in our national collective agreement on employment and training dd. 8 November 2019).	

[9] https://www.observatoire-metallurgie.fr/

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	• advanced training, meeting the needs of companies, in industrial training centers (equipped with the latest technologies, with a plan to support investment in these structures to enable them to have the latest technologies used by companies. Very attractive to young people in terms of image (connected industry, industry of the future, etc)). €80 million were invested over two years by Opco 2i (joint body in charge of informing, advising and supporting companies in the implementation of HR and training projects in industrial sectors) to support investments in training centers. Attractiveness of the sector (wages, quality of life at work, etc.). In particular, the minimum wages granted to dual students in our sector are higher than the statutory minimum.	
Italian metal agreement (2021)	In February 2021 a new agreement for the metalworking sector which maintains the provisions concerning **the right to continuous training** also broadening the beneficiaries of this right (namely to employees under fixed-term contracts under certain circumstances - i.e. minimum duration of the contract-). National training platform in metals sector October 2021, the social partners in the Italian metal sector have decided to launch a digital platform called MetApprendo, with a view to **implementing the right to training provided for in the collective agreement.** The platform will provide companies with services to gauge training needs, build customised plans and provide online courses. The new association has been established by the National Commission for Vocational Training and Apprenticeship. It is a non-profit organization. So far, the metal sector is the only one in Italy to have created individual right, which entitles each worker to 24 hours of training for the validity of the collective agreement.	the main Italian trade unions (FIOM-CGIL, FIM-CISL, UILM) and their employers' organisations counterparts (Federmeccanica and Assistal) signed

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Spanish industrial agreement (2021)	Training as a tool to transform the industry September 2021 Extending the support measures for workers and companies to cope with the pandemic even if the economy has improved significantly. Employers will benefit from a **reduction of up to 80% in social security contributions if they offer training** to their employees on short-time work. Modules of at least **40 hours of training** will have to be offered, which may be reduced to 30 hours for enterprises with fewer than 50 workers Furthermore, the Spanish government has put forward a legislative proposal to **reorganise and integrate vocational training**, which has also been prepared in collaboration with the social partners. The proposal is expected to be approved by Parliament in the coming months. It introduces **dual training** with at least 25% of time spent in companies and an apprenticeship system better connected to the labour market. CADEFOP Survey Around 77.3% of the country's companies offered some kind of training activity to their workers in 2015, an increase from 65% in 2010. The share of workers who attended a training course also rose from 45.4% in 2010 to 52.2% in 2015. These are the results of the continuing vocational training survey carried out every five years by the Ministry of Employment and Social Security among enterprises with five or more employees. The sectors with the highest share of companies that trained were **automobile manufacturing** (89%), **metallurgy** (88.4%).	The government and the social partners in Spain
Belgian private sector agreement	In Belgium, as part of the collective labour agreement for the private sector, social partners (employers' organisations and trade unions) agreed on clauses regarding employee training. This follows from the legal obligation to implement the "Flexible and Workable Work" (FWW) act, which entered into force on 1 February 2017.	Private sectoral social partners

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Moravian-Silesian Region (Czech Republic)	Initiative: TRAUTOM [10]- Competencies for 21st Century. It is a regional initiative that involves Moravian-Silesian Region. The aim is re- and upskilling with: • barrier-free employee training • Training of employees in existing positions in connection with technological changes and commitments of the Green Agreement • Increasing the ability of employees to move to new jobs • Training of new employees and easier adaptation process • Increasing the attractiveness of jobs in the sector	Regional project
Swedish Teknikforetagen Initiative: Ingenjör 4.0.	• www.ingenjor40.se • Industry + academia + 13 Swedish universities collaborate to develop short course modules within the Industry 4.0 paradigm. The universities also execute the modules in a flexible way. The pedagogic model contains mixed learning: seminars, quiz, reading, Q&A, etc. Large number of industry companies are engaged in a reference group, where feedback and development is conducted. The capacity is 1000 engineers/year. Several hundred people have been enrolled and there is a long back log of participants. We have not seen a more effective model to reskill many, with high quality and a large capacity. There is flexibility for the participants, but part of the curricula is set in time/date. Feedback from engineers at Scania, SKF, Volvo, etc has been overwhelmingly positive. Aim: re-skilling and up-skilling of employees with engineer background.	Unionen, IF Metall and Teknikföretagen, New reinforced system for transition and skill. The initiative is tripartite: employers' association(s) + trade union(s) + public authorities. Initiatives on motivating workers to engage into (re-)training

[10] www.mspakt.cz

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Renault - Agreement with unions on creation of ElectriCity	• This agreement, signed on 8 June 2021, organises the social rights of the employees and allows, as of 1 January 2022, the creation of RENAULT ElectriCity. This new subsidiary, owned by Renault SAS, brings together the three existing sites of Douai, Maubeuge and Ruitz, which currently employ a total of 5,000 people.	Company agreement
Lamborghini introduces 4-day week for production workers and retraining schemes	• In December 2023, car manufacturer Lamborghini on the one side and metal unions FIOM-CGIL and FIM-CISL on the other side, signed a company agreement for the years 2023-2026, focusing on work-life balance. It provides for alternation between five and four-day weeksfor production workers, without pay cuts.	Company agreement
Stellantis readjust the employment and career management agreement for the next three years	• Stellantis (resulting from the merger between Peugeot-Citroën and Fiat) and workers' organizations (FO-CFE-CGC, CFTC, and CFDT) have signed a new employment and career management agreement (GEPP) for the period 2024-2026 in the French branch. However, CGT did not sign the agreement.	Company agreement
Renault 'Refactory' plan at its historic site in Flins, near Paris	• In 2021, Renault launched its 'Refactory' plan at its historic site in Flins, near Paris. This project is designed, inter alia, to give vehicles a second life. The site is also becoming a vocational and academic training centre to secure employment.	Company agreement

Moreover, within the recent industriAll Europe-ETF 'Just Transition for Mobility Workers' project a series of good practices were identified by consultant Spin360 (also a TRIREME partner). The table below gives some examples gives some best practices and studies, often based on social partner engagement, conducted at EU, extra-EU and national level which should be considered, as their application and replication can be extremely useful in ensuring the fairest possible harmonisation of the transition.

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BEST PRACTICE	DESCRIPTION	WHERE
Greenectra[11]	Greenectra offers hybrid and flexible courses in order to train battery enthusiasts and workers to deal with li-ion battery technology (including safety, testing of li-ion batteries, fundamentals of electrical engineering, and fundamentals of electro chemistry).	International level
EU Battery Academy[12]	The European Battery Alliance Academy aims at training, reskilling and upskilling approximately 800,000 workers by 2025 to meet the demands of the skills shortages in the rapidly growing European battery value chain.	EU level
Automotive Skills Alliance[13]	The Automotive Skills Alliance aims at putting in place an up/reskilling framework to maximise the competitiveness of the industry, job retention and job opportunities. The plan is to present a roadmap for the transformation of skills in order to achieve a full recovery of the industry from the COVID-19 pandemic, and to meet future requirements towards greater eco-sustainability. The aim is to upskill and reskill 5% of the workforce each year.	EU level
DRIVES	Blueprint for sectoral cooperation on skills	EU level
UK Hydrogen Strategy[14]	Report compiled by the UK Government to boost the prospects of implementing hydrogen in the transport industry, involving both the development of a specific action plan running from the 2020s to the 2030s with a view to facilitating the transition towards the integration of hydrogen, and collaboration with various stakeholders in order to assess future skill needs.	United Kingdom
ALBATTS Project[15]	EU-ERASMUS+ funded project with the aim of contributing to the electrification of transport and green energy in Europe. The aim is to	EU level

[11] Greenectra, *Our Courses,* https://greenectra.com/our-courses/, accessed 3 May 2023.
[12] European Institute of Innovation & Technology Site, *Launching the European Battery Academy to Reskill Thousands of Industry Workers,* https://eit.europa.eu/news-events/news/launching-european-battery-academy-reskill-thousands-industry-workers, 24 February 2022.
[13] ASA, *A Skills Partnership for the Automotive Ecosystem,* https://automotive-skills-alliance.eu/pact_for_skills/, accessed 29 May 2023; and The Pact for Skills, *Skills Partnership for the Automotive Ecosystem (Summary)*.
[14] UK Government, *UK Hydrogen Strategy,* August 2021. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011283/UK-Hydrogen-Strategy_web.pdf.
[15] ALBATTS, *About ALBATTS,* https://www.project-albatts.eu/en/aboutus, accessed 29 May 2023.

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	design a blueprint for competences and training schemes of the future, bringing together the supply and demand of the battery sector.	
IRU Academy[16]	The IRU Academy Safe Loading and Cargo Securing course is based on the International Guidelines for Safe Load Securing for Road Transport, which incorporate the latest international standards. Anyone involved in the loading and securing of cargo, including transport operators, commercial drivers, loaders, customers and suppliers, can participate in the classes, using interactive tools to simulate certain situations.	International level
Scania[17]	Scania is a world-leading provider of transport solutions, including trucks and buses for heavy transport applications. Scania is committed to finding the skills of the future in STEM (Science, Technology, Engineering and Mathematics). Scania is also committed to involving young people in STEM and developing the skills of existing employees in their group.	International level

Additionally, stakeholders in the social workshop on the transition pathway stressed that actions are needed to address the attractiveness of industrial jobs is key. Entry point to attract talent, as highlighted in Cedefop's foresight studies, e.g. on smart and green cities – showing how engineers entering into the sector can make a difference.

Need to both ensure the quality of new jobs and bust myths around new industries. Actions between industry, universities and VET schools are key to the latter. Ensuring stable and strong industrial relations with collective bargaining on good terms and conditions is key to job quality.

Greater attention is needed to attract women to STEM studies and industrial jobs.

[16] IRU Academy, *Safe Loading and Cargo Securing,* 2017. Available at: https://www.iru.org/system/files/IRU_Academy_Factsheet_Safe_Loading_web.pdf.
[17] Scania, *Education & Skills,* https://www.scania.com/group/en/home/about-scania/sponsorship-and-community-engagement/education-and-skills.html, accessed 31 May 2023.

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