



REPORT

Country report: Croatia (Draft)

Exchange Group: Just Transition in the European
Car Industry

Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety



European
Climate Initiative
EUKI

based on a decision of the German Bundestag

This report is part of the project “Exchange Group: Just Transition in the European Car Industry”, financed by the European Climate Initiative (EUKI). EUKI is a project financing instrument by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV). The EUKI competition for project ideas is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It is the overarching goal of the EUKI to foster climate cooperation within the European Union (EU) in order to mitigate greenhouse gas emissions. The opinions put forward in this guideline are the sole responsibility of the authors and do not necessarily reflect the views of BMUV.

Suggested citation: Rajković, Nikolina; Domazet, Mladen 2021: Country Report: Car Industry in Croatia. Zagreb: Institute for Political Ecology.

Publisher: adelphi research gemeinnützige GmbH
Alt-Moabit 91
10559 Berlin
+49 (030) 8900068-0
office@adelphi.de
www.adelphi.de

Authors: Rajković, Nikolina; Domazet, Mladen

Photo credits: © HABRDA/shutterstock.com

Status: August 2021

© 2022 adelphi

Abstract

The Croatian car industry is quite insignificant in its scope in comparison to the other European countries covered by the analysis within this project. The Croatian car manufacturers today are predominately car suppliers companies following upon the Yugoslavian heritage of high quality manufacture glass, metal and plastic interior and outer bodywork which stands as its main competitive advantage. As our interview analysis and policy desk research has shown, the discussion about a just transition in the car industry, and manufacturing industries in general, due to the decarbonisation and digitisation goals of the European Green Deal (EGD) has only just begun or has not been initiated. We believe that reasons for that are to be found in the fact that both high and low-skill jobs in the Croatian car components' companies are dependent on their OEM's final decision making process. Especially the mass product TIER 1 and TIER 2 suppliers and road transport representatives expect no significant changes in the environmental transformation of their domestic production and job loss as they perceive the car components production has already gone through immense automation and therefore it will easily adapt to the new market demands.

Contents

1 Introduction	1
1.1 Developments in the Croatian automotive industry	1
1.2 Current and future legal developments	4
1.3 Research methods	6
2 Challenges driving the transformation of the car industry	8
2.1 Climate change and environmental considerations	8
2.2 Digitization and electrification	10
2.3 Digitization and automation in production	11
3 Just Transition pathways	14
3.1 Expected changes in the industrial sector	15
3.2 Expected changes in employment	16
3.3 Strategies for a Just Transition	19
3.3.1 Political Strategies: Recommendations from ministries and/or political parties on how to manage the transformation	19
3.3.2 Entrepreneurial strategies: Which new products can/are currently already being switched to by automotive companies and suppliers	22
3.3.3 Trade union strategies: What do the unions propose in face of the upcoming changes	23
4 List of interviewees	28
5 Bibliography	29
6 References	Fehler! Textmarke nicht definiert.

List of Abbreviations

ACEA	European Automobile Manufacturers' Association
BEV	Battery electric vehicle
CA	Collective agreement
CEE	Central and Eastern Europe
DZS	Croatian Bureau of Statistics
EC	European Commission
EGD	European Green Deal
EIB	European Investment Bank
EU	European Union
GHG	Green Gas Emissions
HS	Croatian Parliament
ICE	Internal combustion engine
IEA	International Energy Agency
ILO	International Labour Organisation
ITF	International Transport Federation
ITUC	International Trade Union Confederation
MMPI	Ministry of Maritime Affairs, Transport and Infrastructure
MZOE	Ministry of Environmental Protection and Energy
NRRP	National Plan for Recovery and Resilience
OEM	Original Equipment Manufacturer
RE	Renewable Energy
R&D	Research and Development
SEE	South and Eastern Europe
SNRRH	Croatian Low Carbon Strategy Development
T&E	Transport and Environment
TIER 1	Supplier of automotive parts directly to OEM
TIER 2	Supplier of automotive parts to TIER 1
TUED	Trade Union for Energy Democracy
VRH	Government of Republic of Croatia

1 Introduction

In the context of a just transition driven by climate change concerns it is important to situate the Croatian automotive sector production in the overall context of national environmentalism, industrial strategies and labour rights. Croatia is a European semiperipheral 'post-transition' society that has lost most of its industrial production since the 1990s (Jaklin et al. 2016) and focused its competitiveness drive on the service industry, namely tourism in the Adriatic coastal region. Initially this has led to a strong drop in GHG emissions, which has since recovered to its pre 1990s level and stands at just over 4 t/cap annually, which is more than double the globally sustainable level under a carbon budget aligned with the goals of the Paris Agreement. Croatia's per capita energy use is lower than in comparative European post-transition countries, and is mostly driven by fossil fuels (about $\frac{2}{3}$ of the total final energy consumption). Emissions from transport make a notable contribution to this, as about $\frac{3}{4}$ of passenger and freight transport is road-based and negligently electrified. The national low-carbon strategies are generally less stringent than in northern and western Europe and envisage increases in energy consumption and road transport, with greater penetration of electric vehicles, but also expectations of wide scale use of new liquid fuels (VRH 2021; HS 2021; MZOE 2019; MMPI 2017). Their tone is generally techno-optimistic and growth oriented.

Nonetheless, in surveys the Croatian population exhibits a high concern for the present and future impacts of climate change (Ančić, Puđak and Domazet 2016; EIB 2020). Croatians are also supportive of general capping of pollution and redistributive policies to raise wellbeing with lesser environmental impact (Brajdić Vuković, Ančić and Domazet 2020; Domazet 2019). However, car use is widespread due to declining public transport options outside large conurbations and a dilapidated rail network (Tomašević et al. 2019). The car fleet is generally very old, with over $\frac{2}{3}$ of cars in Croatia aged 10 years or older. Most car purchases in 2019 were second-hand vehicles from the European West (Cvetković 2020). Abandoning car use is one of the least practised pro-environmental behaviours in Croatia, mainly due to insufficient alternative passenger transport infrastructure. This consequently reflected in state policies overview given in section 2, which lag behind the European multi-modal and shared-use transport overhauls. A positive potential for popular support for a just transition is the popular support for redistributive policies and prioritisation of holding a job as foundation of dignified life (Domazet 2019). Policies supporting a just transition in the automotive sector and other sectors affected by rapid decarbonization might find popular support, if they are oriented to good quality jobs on environmentally friendly transformation.

Car industry, though a comparatively sparse employer in Croatia, has a potential for development of just transition concepts in line with the progressive tendencies in Central and Eastern Europe, and can serve as a case study for other manufacturing sectors affected by progress towards decarbonisation in the 21st century. Transformations in the European car industry, though affecting Croatian workers only indirectly as no power trains are supplied by Croatian factories, have a great impact both on the overall way of life in Croatia and as well as on the social effects of the European decarbonisation agenda.

1.1 Developments in the Croatian automotive industry

The share of direct automotive industry in total manufacturing in Croatia is 1.1%, which is among the lowest ranks in the EU (ACEA 2020). However, the industry plays a significant role in the country's exports. Export oriented manufacturing provides an important balance in an

economy heavily dependent on the tourism service sector. Moreover, high skilled employment in export-oriented industrial production, such as the cases of TIER 1 and TIER 2 suppliers in the European car industry, is an important support to maintenance of a skilled labour force in a society. It also provides a continuation of the high skill engineering education and employment required for infrastructural transformation in line with decarbonisation of European economies.

Apart from the Croatian based Rimac Automobili, notable for its electric car concept and focused primarily on the luxury car niche, the Croatian manufacturers are involved in the supply chains of the following global brands: PSA, Fiat, General Motors, BMW, Ford, Audi, Toyota, Renault, Volvo etc. Almost 90% of the manufacture is export oriented (South-East European Industrial Market 2016). Three quarters of the added value in a supply chain comprises light metal outer bodywork, plastic parts (both interior and outer bodywork) and glass components such as windshields. Rimac Automobili, on the other hand, is focused on software governing the performance and energy use from batteries, and final vehicle assembly from the parts supplied by an international supply chain. The main feature of car component companies in Croatia is the high quality product and long-standing tradition of high precision manufacturing with a zero failure tolerance rate which stands as their main competitive advantage (ibid.).

Despite the de-industrialisation process of the post-socialist transition, the car industry related workforce still draws on the legacy of long tradition in engineering, metal and synthetic materials production in Croatia. There is a notable difference in labour representatives' awareness of the necessity to reconcile production with transformation to a zero carbon economy between the luxury vehicle production on the one hand, and the mass production and road transport infrastructure on the other. The one Croatian based OEM and TIER 1 luxury suppliers are either already focused BEV production or consider themselves fully compatible with supplying BEV production instead of ICE. They see luxury car production to be a simple and regular upgrade of the product output, untouched by the broader decarbonisation drive. The more mass production oriented suppliers are more sceptical of the feasibility of rapid decarbonisation of road transport, but also do not consider their production to be in the frontline of the transition, as they do not supply engine and driving mechanism components. In other words, they are unaware of the broader challenges facing the European carmakers' shift to electric vehicles and its overall fit with the net-zero transport goals (cf. Section 2 below).

Following the period of post-socialist transition and deindustrialisation, some industrial zones in Croatia, as in the rest of Eastern Europe, were increasingly seen as dynamic spaces, where Western European and other producers were relocating parts of their operations, attracted by lower costs of high skilled labour (Musić 2021). In Croatia, this is more the case with smaller and more geographically dispersed production sites rather than larger industrial zones from socialist times. In Yugoslavia the car industry was associated with the metal processing industry, plastic and rubber production. In the Socialist Federal Republic of Croatia the car industry referred to the bus, trams, trains and agrarian machinery manufacturing factories and plastic parts manufacture oriented for domestic OEMs located in SFR of Serbia (Zastava) and foreign licensed suppliers (Citroen, Renault, Fiat and VW). By 2018, vehicle industry in Croatia had 11 794 employees in 130 companies, an average gross salary of € 1,121 and 9,8% shares in total export (DZS 2019).

Today's car component manufacturers are largely successors of a once giant socialist companies (Tomos, Zastava, Jugoplastika) although their total employment tally barely reaches the number of employees in a single company - Jugoplastika, which had 13,000 employees in its heyday (HTE, 2021). Some of the TIER 1 and TIER 2 suppliers whose representatives were interviewed represent collaborations continued from socialist times: *We are successors of Tomos, a most renowned Yugoslavian and Slovenian moped and motor*

vehicles company.¹ Socialist Yugoslavia had a history of collaborations on so-called “lon jobs” with western producers. Raw materials and low prepared processed input were supplied to cheaper labour factories in Yugoslavia for processing and completion of export-grade products. This did not incur export benefits, as the raw materials and the final product were not actually imported and exported, but effectively loaned for processing. Such production required high output quotas and stringent production standards that were increasingly difficult to satisfy by the Yugoslavian industrial plants (Musić 2021). This history, on top of car production for domestic Yugoslavian and other ‘zweite welt’ countries, is important for understanding labour history and labour relations in the current car industry supply production in Croatia.

The nature of employment in industrial production as part of a larger European supply chain, in Croatia and Eastern Europe, is characterised in labour research by high road and low road work models (Jürgens and Krzywdzinski 2009). The two differ in the prerequisites for a just transition existent in the production companies, and both exhibit instances in the Croatian production sites described in our stakeholder interviews. The high road work model – aiming at ‘constructive competitiveness’ – involves high levels of employee expertise and long-term skill and competence development, because companies are interested in taking a long-term, investment- oriented attitude towards employee training and significant job security. Under such conditions, a just transition can be more easily strategized and synced with the similar processes in core countries where the parent companies reside. This could be the case with TIER 1 suppliers where high skilled labour is employed, provided that national and parent company strategies plan to keep the production going and adapt it to decarbonisation imperatives for road transport.

The second is the low road work model – ‘de-structive competitiveness’ – that implies low labour costs, employment of semi-skilled labour, highly limited skill formation, low job security, and weak representation of workers’ interests. Unlike the high road model, the low road work model is characterised by higher labour turnover, as is reported in some cases of mass production suppliers we interviewed. In their analysis of the car industry in Hungary Geröcs and colleagues (Geröcs, Meszmann and Pinkasz 2021) find that the low road work model, or only partially inclusive high road model, dominates the production sites in Hungary. This follows the findings on the relocation of German automotive subsidiary plants to Eastern Europe by Krzywdzinski and Jürgens who found that the high road work model characteristic to labour relations in Germany was transferred to Eastern Europe only partially. This calls for special attention to be given to the Eastern European car industry’s potential for a just transition as it will not of its own be able to simply follow the German case.

Yet, without a possibility of a just transition for the Eastern European labour force, the BEV production for the European market may be entirely offshored, leading to overall significant job losses (cf. Section 2: *Challenges driving the transformation*). Labour representation is the key to adaptability of a high road work model in the automotive industry, but its introduction is highly connected to the organisation of global production. This is why it is important to link the just transition initiatives across Europe rather than to leave them to whims of climate and just transition policies of the national political elites.

Some of these are increasingly in thrall of parent companies’ profit imperative penetrating the political narrative (Szabolcs 2020).

Inclusive and systemic labour representation was found to be lacking in Hungary (Geröcs, Meszmann and Pinkasz 2021), and confirmed by some interviews in Croatia which we will tackle in detail in the last subchapter on union strategies in transition.

Further research by Meszmann, again for the case of Hungary, finds that workplaces of deteriorating quality are created in the car industry supply chain in the very act of shifting them

¹ representative of lower management in a X TIER 1 car supply company, 2021

to Eastern European countries (Meszmann 2021). What is more, this lower quality form of work is itself a driver of supply chain shift, beyond the mere labour cost and benefits from state subsidies. Such findings suggest challenges for a just transition in the Eastern European context even before the electrification, lower volume of output or further automation of the production line are taken into account (see Section 2 below).

Meszmann's findings repeat some of the challenges presented by "lon jobs" above, and it would have been interesting if our own research could have gone deeper into the work conditions and institutional framework of labour relations in the current car industry actors in Croatia. Accentuating work precarity and reporting the self-perception among workers as a cost burden to the productivity imperative, alongside the unequal "proletarianization" of high skilled workers and layoffs during the coronavirus pandemic in Hungary (Meszmann 2021), these findings present ominous warnings for the prospects of a just transition in the European semi periphery, including Croatia. Without wholesome support of the public and the innovation potential of the highly skilled and experienced labourers in industrial mechanics, the goals of a wholesome low carbon economy project are jeopardised.

Yet, the greatest short-term risk, elaborated in Section 2.2, is that European OEMs, the parent companies, have previously bet on the wrong technology by basing their plans on diesel. They could shortly face serious new competition from China on BEVs, and are asking for public support to keep production of BEVs for the European market in Europe, rather than moving it to China themselves. If electric cars for European roads are imported from China, then more than a quarter of jobs in the car industry could effectively be offshored to China in this decade (T&E 2017). The OEMs, though, tend to blame the regulatory framework of strong zero-carbon push for their expected woes.

1.2 Current and future legal developments

The European Commission (EC) published its Green Deal in 2019, which aims at a complete decarbonisation of the European economy until 2050 in a just manner. In Croatia as in most other Eastern European countries in this project, the discussion about a just transition in the car industry, and manufacturing industries in general, due to the decarbonisation and digitisation goals of the European Green Deal (EGD) has only just begun or has not been initiated. Public debate still gives lip service to techno-modernisation hopes of entirely new zero-carbon technologies developed by European public investment, to shift societies seamlessly from fossil fuels to carbon free energy without any social change. The most relevant media attention recently in Croatia has been trained on the National Recovery and Resilience Plan's (NRRP's) green dimension. According to one summary analysis, although green transition and decarbonisation of transport are mentioned in the media coverage of the Croatian NRRP, this is only done notionally and without deeper presentation of what these catchy terms might mean operationally (Avulinec 2021).

Most of the media coverage has been focused on the financial aspects of the NRRP, i.e. the availability of direct funds from the EU. The discourse around said catchy terms only took up less than 5% of the average article's length. Even with the government's promotion of EC president's interest in Rimac Automobili's plan to supply assembly and delivery of self-driving electric vehicles for taxi service, the media attention focuses on the share of the NRRP directed at a single enterprise (Penić 2021). There is little discussion of the overall potential to decarbonise national passenger and freight transport in a few decades based on foundations laid by the NRRP investments.

In fact, in the domain of transport in general, there is very little or no public discussion of future transformation challenges. As is also evident from our interviews with industry representatives, the labour force is largely ambivalent about engine changes as long as the production of cars

is expected to continue unabated. There was no discussion of the challenge from Asian manufacturing advantage in BEV for existing European production plants. All of this is to say that there is little public pressure for clear current and future regulations governing the specificities of decarbonisation and just transition. Therefore, we will briefly present the regulations and incentives encouraging the demand side for BEV implementation, and the regulations limiting GHG emissions.

A continent-wide decarbonisation under EGD is still expected to be an impetus to overall economic growth. EGD promises that greening the mobility sector must provide a new licence for the whole sector to grow. In the personal vehicle sector this is planned through zero-emission vehicles (of unspecified driving train technology) and a continent-wide refuelling infrastructure, which is expected to grow to 1/3 of current refuelling facilities by 2030 (EC 2019). One implementation pillar in zero-emission vehicles will be the plan of digitalisation of the transport sector and automation in transport equipment (and vehicle) manufacture. It is also planned that the production sector will offer good social conditions, reskilling opportunities and provide new attractive jobs (this further invokes the European Pillar of Social Rights; *ibid.*).

The EC expects a lot from technological innovation and imposition of legal standards to drive the current polluting vehicles off the road, but also to stimulate the internal market to uptake the new zero-emission vehicles. It is assumed that European manufacturers are now heavily investing into BEVs, but no analysis is given. Croatia does not have any corresponding regulation for carbon emissions suppression and elimination, though the low-carbon development plans and the more recent NRRP envisage a greater penetration of zero emission vehicles in the fleet. The envisioned proportions, though, are not sufficient to significantly decarbonise the road transport fleet, nor are there concrete plans to shift its services to electrified rail transport.

Starting with the nearest future, the NRRP states plans to develop and improve environmentally friendly transport systems and to develop low-carbon transport systems, but no concrete measures for the ICE-based vehicles are stated. Grants are announced as investments in technological capacities of enterprises. "Hydrogen and new technologies" is invoked, but without specific reference to road transport, whilst biofuel production is planned in at least one oil refinery (which is majority controlled by a Hungarian oil company MOL). Road transport measures are left to co-financing for the purchase of new alternative fuel vehicles and development of alternative fuel infrastructure in road transport (VRH 2021). Yet 53% of the NRRP planned funds are dedicated to greening and digitalisation, of which green transition takes 40% mainly in road reconstruction and infrastructure construction within the transport sector. The plan calls for public policies to increase the uptake of electric and hybrid vehicles which is still negligent in the overall fleet.

In the longer term, the national integrated climate and energy plan assumes that the contribution of renewables (RE) in transport (broader than road transport and cars) will reach 13% by 2030. Most energy carriers are expected to grow negligently from current levels, except advanced biofuels (including biomethane) which are currently not even utilised. This indicates that the government does not envisage serious uptake of renewables nor direct use of RE in electromobility to change from current levels by 2030. There is only an expectation of small hydrogen entry into the road transport fuel mix. In the national low carbon plan (never having reached the level of a binding document) long term estimates of BEV proportion in the transport mix reach 35%-60% by 2050. Together with hybrid and hydrogen fuelled vehicles, low carbon vehicles are projected to reach 60%-80% by 2050 (HS 2021), thus not fully decarbonising road transport in Croatia even in a strategic perspective.

The focus of this transition is entirely on the market, i.e. encouragement of demand for electric and other low/zero-carbon road vehicles. From a decarbonising perspective this may face challenges of the redundant central European fleet finding extended lifetime in Croatia, where currently the average age of the car fleet is more than 10 years. The said strategies envisage this demand encouragement entirely through the lifestyle responsibilities of consumers, i.e.

through call for clear CO₂ emissions labelling on new vehicles sold in Croatia, and eco-driving training. On the side of encouraging low-carbon transition, the National Fund for Environmental Protection and Energy Efficiency has a programme of subsidising up to 40% of the cost of new electric or hybrid cars for private citizens and companies. The total funds available have a limited annual amount, standing at 14 mil EUR in 2021.

Yet, despite ambitious targets in the EGD and follow-up documents, on the EU-wide level T&E demands from Europe to establish a significant European market for BEVs through policy intervention so as to encourage OEMs to build BEVs in Europe in response to the strong market here (T&E 2017). Whilst this is also marked as a job creation strategy, there is a demand for a publicly funded transformation. This is also the expectation of managers we interviewed in the car industry in Croatia, alongside similar public funding for reskilling of the labour force to make the eventual transition just. Regardless of the possible mobility and wellbeing benefits of private vehicles, these strategies are likely to conflict with planned shifts to multimodal transport and the overall decarbonising drives for Europe and the world because of bottlenecks in supply and climate damage of outright electrification of the current car fleet (cf. Section 2 below). Thus, public funding is envisaged for either a false decarbonisation strategy or the availability of the car for the better off first adopters. However, the challenges facing the European car industry are more serious than that.

1.3 Research methods

On top of surveying trends in literature concerning trends and challenges in the European car industry (as part of the literature shared with other national research teams) the Croatian team conducted interviews with the Croatian car industry stakeholders. The latter were to supplement or reflect on the European data trends, ensure the triangulation and seek convergences on present and future prospects of the car industry within the transition to climate neutral transport. We contacted stakeholders with different professional backgrounds in the car industry in order to capture a possible multiple perspectives and challenges on just transition in the car industry. Therefore, we conducted six interviews with representatives from companies' lower and middle management, executive bodies and trade unions (both within the manufacturing sector and transport sector in general, cf. Section 3.3.4.).

We used the semi - structured questionnaire developed by our project partners from Central and Eastern Europe. The questionnaire was structured in loosely three thematic fields examining interviewees attitudes and opinions on the current state of affairs in the car industry, challenges in future development of the sector and its employment and future perspectives on ecological car mobility transformation and its drivers. The interviews lasted approx. 60 minutes and only two out of six were conducted online due to the Covid-19 epidemiologic restrictions. Most of the interviews were conducted at the interviewees' workplaces and companies that are TIER 1 and/or TIER 2. Only one company we contacted is representative of both Tier 1 and OEM.

2 Challenges driving the transformation of the car industry

In describing the challenges that drive the transformation of the car industry in Croatia it is important to bear in mind the summary outcome of convergent interviews with the stakeholders and the situation of the car industry in Croatia. Overall, the companies either feel they will not be affected by electrification nor any changes to volume of road transport in Europe and beyond. On the consumption side the overall market for new cars in Croatia is relatively small (around 60 000 units before the covid-19 pandemic), whilst most factories within European supply chains are TIER 1 and/or TIER 2 suppliers. The only OEM, also TIER 1 supplier, is oriented exclusively on the luxury vehicle niche, with no chance of seeing its vehicles on the road in Croatia. In that respect specific national regulations on climate change mitigation and electrification of transport have less effect on production than the broader European strategies. TIER 1 and TIER 2 producers are generally not autonomous in business strategies and are highly dependent on the transition strategies of parent companies and core countries.

In the eyes of the management and union representatives in our research, *peak automation in production has already occurred* and they don't expect any further significant impact in that respect. In other words, challenges driving the transformation will be highly dependent on the strategies of parent companies in Europe and beyond, and on the overall EGD regulation in the domain of transport. On the other hand, as presented in the next section, Croatian national decarbonisation strategies for transport, especially with respect to cars, are not transformative and do not envisage significant structural changes in the sector, except for greater penetration of BEV in the road transport mix characterised by overall growth in volume.

2.1 Climate change and environmental considerations

Serious and significant European contribution to global endeavour of climate change mitigation, as well as long term environmental sustainability, requires large infrastructural upgrade of the transport system. Such infrastructural changes have the potential to create new jobs and based on the chosen dominant mode of transport have the potential to affect the supply chains of the European car industry through reduced demand for new cars or shifting of production to Asia. On the other hand, if the overall volume of new cars is maintained constant or even increased (for export outside Europe for example) there is a potential for large parts of the supply chains to remain unaffected or even increase employment largely under existing conditions (due to peak automation).

In Croatia we find both high- and low-skill jobs in the supply sector, mostly depending on whether the final OEM's product is targeted at the luxury or mass-product market. Some Croatian TIER 1 and 2 suppliers and the one OEM are focused on the luxury market, where no significant changes are expected due to low volume of output and perceived detachment of the luxury consumers from the overall concerns with environmental sustainability of the total European transport system. The mass-product TIER 1 and 2 suppliers and road transport infrastructure employees, on the other hand, register no autonomy in production strategies and express high scepticism about the feasibility of the radical overhaul of the European transport system. Thus, major climate change and environmental improvements challenges for the Croatian car industry are (i) a shift of production to Asia (due to preference for geographically tight supply chains) and (ii) overall reduction in the private ownership and use of cars in Europe.

Such overall reduction is not a strategic impossibility in a serious and significant European contribution to global climate change mitigation, in the absence of deliberate concentration of the global car industry in Europe. The latter is of course subject to competition from Asia and North America. The modelling by de Blas et al. (2020) shows that a replacement of oil-fuelled individual vehicles with electric ones (BEV, but with heavy reliance on 2-wheel electric vehicles) on its own cannot deliver the global carbon reductions consistent with mitigation of catastrophic climate change. The conventional studies in literature then turn to currently uncertain technologies (advanced biofuels, hydrogen, CCS) becoming commercially available, but at a (sic) sustainable level. De Blas et al.'s (2020) modelling finds that rapid replacement of conventional ICE cars with BEV will in the end not result in the required decarbonisation of the economy by 2050 without overall reduction of transport volume. Furthermore, full electrification of the car transport at current volumes encounters a significant bottleneck with shortage of minerals for batteries (Valero et al. 2018; Frenzel et al. 2016; Frenzel, Ketris and Gutzmer 2014; Svedrup and Ragnarsdottir 2014; Li, Li and Yuan 2013).

This leads the researchers to conclude that recycling strategies for strategic battery minerals should precede the incentivizing of mass production of BEV. Such strategies are currently lacking, but are hinted at in interviews with managers of Croatian suppliers. Some suppliers' managements seem aware of this broader infrastructure and employment prerequisite, but no strategies to address it are reported. They do see it as an option for further employment in battery recycling, with no reflection on the quality of such jobs.

De Blas et al.'s (2020) overall conclusions point to a drastic reduction in demand for transportation coupled with a radical shift towards lighter electric personal vehicles (bikes, mopeds) with ambitious mineral recycling, as the only future able to reach desired energy savings and emissions reduction. The powerful message from this research for our car industry is that globally there is no room for replacement of the existing car fleet with electric vehicles if we are serious about mitigation of average global temperature rise above 1.5C. Only the degrowth scenario meets the desired decarbonisation objective and avoids energy restrictions in the broader economy, without exceeding the limits of mineral reserves for lithium-ion batteries. By 2050 most vehicles should be electric, but as two-wheelers and e-bikes rather than cars. Some of our interviewees seem to hint at general awareness of these growth limits in their expression of scepticism towards a smooth technological transition to fully electric car transport at current volumes. What they lack, as will be shown in the next section, are strategies of adaptation of their labour force to such seismic shifts in production.

This ignorance is driven by Croatian academia and policy, with national sustainability and low-carbon strategies envisaging increased car transport by mid-century and engineering review publications guaranteeing increasing demand for fossil fuels due to their technical superiority to other energy sources in transport. Research commentary argues that natural gas is a bridging fuel and that serious regulatory capping of fossil fuels use is unlikely to occur (Brkić 2019). The same analysis also claims that BEV substitution of ICE will not push fossil fuels out of the mix due to their heavy use in other transport modes (ibid.). Under such dominant expert discourse, it is unlikely that unions and local production managers will make the additional intellectual step to plan for labour transition management in a radically decarbonised industrial sector.

Croatia does not have a fixed date for ICE sales phase-out and possibly sees the opportunity in drawing redundant European ICE vehicles to its market. This is contradictory with its current per capita GHG emissions being more than double the sustainable level (Crippa et al. 2020) and over three quarters of national freight and passenger transport dependent on road haulage and individual vehicles (Tomašević et al. 2019).

The shift of production to Asia, outlined in 2.2. below, is another serious challenge for the transformation in the car industry driven by overall environmental global environmental constraints (mainly climate change) in combination with capital flight and globalised market. Admittedly, it can come to cross-purposes with the overall reduction in global transport under

degrowth scenarios (cf. de Blas et al.'s research above), as the production of vehicles for the European market could be brought back to Europe. But cars are a durable product that can endure long term shipping or slow overland transport. Namely, if the BEV cars are predominantly produced in Asia for the global(ised) market, then there is a potential for serious job losses in the supply chain as reported in the previous chapter. As the Croatian suppliers do not report great autonomy, but rather a very tight integration into the parent companies production strategies, our interview with stakeholders do not specify such Asia-shift as a matter of concern.

2.2 Digitization and electrification

Beyond the regulatory shift to zero (or generally lower) emission vehicles, the global car industry suffered a drop in sales due to Covid-19 economic downturn. The global electric car market (including both BEV and hybrid?) was not part of this trend, with a 40% growth in 2020 and promises of a strong expansion in the next decade (IEA 2021). Whilst the total car sales contracted by 16% in 2020, electric car sales rose to 1% of new registrations and 2% of overall car fleet (Winton 2021). The trend continued into 2021, with sales in the first quarter of 2021 standing at double the level in the same period a year earlier. Total number of electric cars on the world's roads stands at more than 10 million, with another roughly 1 million electric vans, heavy trucks and buses. Admittedly, this is still an almost negligent share of the road vehicles fleet, but with a strongly growing trend. According to IEA, Europe overtook China as the centre of the global electric car market, which could be a positive signal for the European OEMs should they decide to base their production in Europe.

Even without constraints of ambitious climate policy, urbanisation and greater availability of electricity from renewable sources, electrification is taking root in road transport globally, primarily driven by development of BEV in Asia (Schirmbeck et al. 2020). Europe has a serious task of catching up with China and East Asia in decarbonisation of road transport, and proposed EU regulatory framework suggests this is recognised. Despite this slow start, it is expected that the existing industrial infrastructure and know-how will enable Europe to catch up with US and Asia and vie for the leading position in development of BEV (Schirmbeck et al. 2020). Yet, the pressure is for this transition to take place right now, not only because of the climate change mitigation windows, but also because the existing industrial infrastructure and skilled labour need to be utilised before competition from East Asia renders them obsolete (i.e. overrun by innovation established in other parts of the world). Asian investors are already opening such production facilities in Europe to serve the European market (Schirmbeck et al. 2020).

A large untapped market exists for the electric and hydrogen vehicles for commercial use beyond cars (personal transport), but Croatian TIER 1 and 2 suppliers are not part of this production line and producers servicing the luxury market show no interest in the continental transport infrastructure needs. In the future, with support from parent companies, they could in theory shift to service that growing market as well.

For Croatian TIER 1 and 2 suppliers, as part of the European supply chain, there is a risk that new BEVs will not be made in Europe at all. Vehicle manufacturing occurs close to the market and the biggest market is currently China, despite recent positive trends in Europe. European OEMs operating in China could decide to base the global BEV production there, thus offering to supply the European market as well and relying primarily on Asian rather than European TIER 1 and 2 suppliers even beyond the particular engine components. By T&E's analysis if European OEM's largely neglect the electromobility production in Europe, so that only 10% of their BEVs are manufactured in Europe focusing perhaps on the luxury car production rather than mass production, jobs in the automotive sector could drop by 30% by 2030 (T&E 2017). This compares unfavourably with maximum 6% job loss (due to simpler engine and

transmission components and automation of novel production lines in the case of majority European-based production of BEVs supplied to Europe.

If, on the other hand, European OEMs produce for export from European-based factories, total jobs in the car industry in Europe could increase by a few percentage points from the current level, due to increased demand in the overall global electro-mobility transition (T&E 2017). From the perspective of just transition this situation places a lot of power in the hands of the OEMs, viewing for a supportive regulators framework to enhance new BEV uptake in Europe in contradiction to transport decarbonisation scenarios based on degrowth of overall transport volume (cf. de Blas et al. in 2.1 above).

Production flight to Asia prognoses are particularly pertinent for the Croatian suppliers of mass produced cars. As our interviews show, employees in the mass production supply segment are particularly sceptical of the feasibility of rapid overall decarbonisation of transport in Europe and generally complacent about the electrification of car transport. The luxury producers, not only protected by the specific niche for their final product, are also much more in tune with the electrification trends.

According to T&E's analysis, production of BEVs in China is growing faster than in the EU, and the regulation is enforcing mandatory introduction of zero-emission vehicles and a specific EV sales quota. The EU does not have such regulatory forcing of BEV adoption in new cars, and Croatia in particular has no ICE phase out date set. T&E concludes that European OEMs are expanding their production in China: "Carmakers critical of job losses through electrification of vehicles appear to be offshoring jobs to China to build the very vehicles they oppose in Europe" (T&E 2017). This suggests that a just transition in the European car industry is more than a matter of pro-climate regulation and consumer demand for zero-emission vehicles. Relations of power in the current mode of production of electric vehicles are also stacked against the preservation of jobs in Europe in the face of the most radical technological and behavioural transformation in recent history.

Yet the required transition has no magic wand, and hybrid vehicles ought to be a transitional technological solution towards carbon free transport. But some analysts note that BEV development and application faces an uncertain technological and economic future. According to Lefeuvre and Guga (2019) BEVs are still far from cost-effective and widely used modes of transport, while the cost of batteries may take up to fifty percent of the total cost of the vehicle. Meanwhile, the charging infrastructure development also remains patchy across Europe as a whole (Lefeuvre and Guga 2019).

There is also a question of what kind of mobility paradigm should be prioritised by the overall political and regulatory framework, the concepts of mass vs. individual mobility and their specific political-spatial aspects remains as yet to be discussed. More than one interviewee, when asked about the challenges of decarbonisation of transport and potentials of multi-modal mobility, say that individual passenger cars remain essential outside urban areas, e.g.: *While car sharing may be easily introduced in urban areas, having or not having a car in rural areas is a question of survival strategy within the forthcoming mobility revolution.*² This issue seems to be completely absent from the Croatian National Strategy for Transport 2017 – 2030 (cf. Section 3.3.1.).

2.3 Digitization and automation in production

An analysis by Sonja Schirmbeck and colleagues suggests that automation and digitization will continue to change the nature of work in the car manufacturing industry, regardless of any climate change pressures and decarbonisation drives (Schirmbeck et al. 2020). They contend

² representative of a trade union in the road transport sector, 2021

that there are next to no blue collar workers left, and scarcely any steps in production that cannot be managed by robots. Our findings indicate that in Croatia the veracity of this differs between the luxury and mass producers. Whilst the latter claim to be at the top of production automation, just like any other production facility in the EU or US, the former claim that there are production steps that are better handled by high skilled workers and no further automation is desirable. This leaves the mass production plants workers at the mercy of global automation trends and leaves them competing on price with robots (*I would like to say that the old way of working was far better than this with robotization, there was less scrap. People make bumpers in a more efficient way³*), adding to their exposure to volatility in European car production.

Schirmbeck and colleagues's analysis also shows that production in the European car industry supply chain has been so standardised and automated (as attested by our interviews in the Croatian case also) that employment in the sector has plateaued too. They expect expansion to come from the expected technical innovation in the field of electric and hydrogen mobility, though that may entirely bypass the supply chain segment in Croatia as no engines are produced.

For the Croatian manufacturers automation and digitization have, by their own account, already peaked. But the mass production suppliers see poor labour organisation and low salaries as the reason for high turnover and lower skill of the labour force. In the luxury production segment though, there is already a shortage of high skill labour force and immigrant labour from Central Asia is in part relied on.

³ representative from lower management in X TIER 1 car supply company, 2021

3 Just Transition pathways

There is no discussion of a just transition in the Croatian economy. Public discourse and economic expertise is dominated by the perception that the Croatian economy needs to catch up with the richer European nations. In that sense, any form of speedy growth, even if carbon-intensive, is silently deemed acceptable and no particular transition is envisaged. This is reflected in the dominant narrative recovered from our interviews with the stakeholders (union representatives and production managers): no significant change is expected in the car industry either due to ignorance of the impending changes or because the product is deemed fit for conventional and low-emission cars alike. Strategies and decisions concerning the material and social nature of the transition are left to the parent companies, with Croatian producers only adapting to updates required of them 'from above'. Lack of strategic approach to industrial strategies in Croatian society is evident in some product manufacturers encountering shortages of domestic skilled labour force: *Our company employs agency workers from Central Asia and Southern and Eastern Europe.*⁴

All discussion of a just transition in the political sphere is extinguished by declarative strategies aiming at a 'green' growth that only promises new jobs of undisputable quality. It is in fact promoted by the political and economic elites as the only way to reduce the burden of unemployment, whilst having a decent job is still perceived as the foundation of a dignified life in this post-socialist society (Domazet 2019). Measures supportive of a just transition are a crucial policy topic that is yet to be connected to many economic sectors, especially manufacturing. In times of climate emergency and global recession, it would be worthwhile paying attention to the potentials of manufacturing. Particularly its adaptability to necessary transformations in vehicle manufacturing and mobility, and its impact on the wider Croatian economy. The potential for industrial scale know-how from this production to be expanded or shifted to low-carbon energy base and satisfaction of localised transport needs remains unaddressed.

One of the main findings from the interviews is that almost all of the interviewees, regardless of their economic and social background or status in their respective companies, are unfamiliar with the concept of just transition. Furthermore, they find the technological and socio-ecological transformation towards electrification of individual transport modes to be in the distant future, compared to the current operations of their companies in daily production and in relation to the external market.

As authors we don't find this surprising bearing in mind the place the Croatian car industry occupies within the European wider context, and the role industrial labour has in a society that's been de-industrializing since early 1990s followed by the growth of the number of people employed in the service sector. Employment in the service sector amounted to 48% of the employment total in 1990, same as the industrial sector, whereas in 2013 the service sector encompassed 70% of the total employment (Jaklin et al. 2016). Consequently, interviewees almost unanimously express they feel the conversion from ICE to BEV in core car production countries will pose no significant threat in job loss in Croatia. This could be explained by the fact that most of our interviewees work in TIER 1 and/or TIER 2 suppliers, and they consider the car components production has already gone through immense automation and therefore it will easily adapt to the new market demands. As stated above, except for the one OEM focused on a luxury niche electric (and thus not ICE-based) product, no other company directly produces ICE drivetrain components.

Except these main convergence points, there are few topics where the interviewees' prognoses and expectations differ in relation to the expected change and readiness for

⁴ representative of middle management in TIER 1/TIER 2 car supply company, 2021

transformation in the car industry. After initial analysis and coding of the interviews, the Croatian interviewees can be scaled between techno-optimists or techno-sceptics with respect to the forthcoming technological change and its influence on society. Techno-optimism characterises the higher ranks within the companies (upper and middle management). They welcome further technological change and innovation, and believe their companies will be among the frontrunners of said change; though they are aware of the challenges of new production and maintenance infrastructure, and new recycling requirements for batteries. Those who lean more to techno-scepticism are to be found among representatives of trade unions, workers and companies' lower management structures. They believe that decarbonization of transport, especially privately owned vehicles, will not happen in the foreseeable future in the semi-periphery of Europe where Croatia resides.

We will explore both the aforementioned convergence and divergence points of the interviewees accounts in further chapters related to the specific topics.

3.1 Expected changes in the industrial sector

Mobility brings many benefits to its users, but it is not without costs for European society. On top of local pollution, crashes and congestion, there is biodiversity loss and GHG emissions. The transport sector's GHG emissions have increased and represent as much as a quarter of EU's total emissions now (EC 2019). Whilst the most serious challenge for the transport sector, and its associated production industrial sector, is to reduce emissions, EC believes that the transformation offers great opportunities for high-quality jobs, new products and services and European global leadership in zero-emission mobility (ibid.). Transport is therefore one of the pillar drives in the EGD, Europe's self-declared ambitious and fair climate catastrophe mitigation strategy. EC expects that, within less than a decade, there will be at least 30 million zero-emission cars on European roads (just over 10% of the current total of vehicles) and automated mobility will be deployed on a large scale. By mid-century (a third of the present-day Europeans' lifetime) nearly all vehicles (passenger and freight) will be zero-emission (ibid.)

The shift in sales away from the ICEs towards BEVs will result in important changes in the automotive value chain and the required skills. It will also result in some loss of jobs in the automotive sector - although there will be net gains economy wise. Some job losses will happen because the manufacturing process of a conventionally fuelled car differs significantly from the one of an electric vehicle. Electric vehicles in total require an assembly from a lot fewer parts. According to one estimate, an ICE requires 1400 components compared to 200 components for an EV (T&E 2017). Most importantly for the case of Croatia, the electric vehicle disruption is expected to have an impact on the supply chain, which will undergo significant transformations, i.e. traditional suppliers will have to move from supplying parts such as gearbox, exhaust pipes, or injectors to delivering battery materials, electric motors, regenerative braking systems etc. New suppliers will emerge in the automotive supply chain, such as battery manufacturers, lightweighting and mining companies (T&E 2017).

Yet, none of the above singled out changes directly affect the producers in the supply chain present in Croatia, as it does not produce engines and associated parts. What is relevant to our findings about the high-skill specialist production and lower-skill mass production is that overall it is estimated that net jobs won't be lost, but will incrementally change: engineers and skilled workers will have to be trained to match the automotive sector's evolving needs. Most of the interviewees believe that Croatia has both a high and low skilled labour force which is qualified to meet the needs of a new technology and value chain (*Since Croatia does not have*

*ICE production, it will not face the engine transformation problem. On the other hand, BEVs will still require handles, locks and doors. This is what we do).*⁵

With the increased integration of the energy, telecommunication, and transport sectors, the impact of electric vehicles on job creation will need to be decoupled from its mere consequences on OEMs and their traditional TIER 1 suppliers (T&E 2017). The crucial to this material overhaul will be the cross-border public procurement within the EU to finance the modernisation of all fleets and support the “thriving manufacturing ecosystem in areas where Europe has a strategic technological advantage”. This does not explicitly name the car-manufacturing industry, but does invoke the supply value chains within the European manufacturing industry (ibid. p.20).

Some of the interviewees are aware of the broader implications for the mobility sector itself, especially in the terms of infrastructural adjustments. However, they still remain sceptical that these adjustments will manifest in the period proclaimed by the EC and its goals of achieving decarbonisation of transport (*The ban of ICE means the whole car industry with its supporting sectors will disappear (...) To achieve completely clean energy production we must establish a system which will replace the old one - transforming gas stations to BEV charging stations, extending space for parking lots, modifying motorways rest areas. I can imagine that in a futuristic scenario, but I do not believe we will live to see it).*⁶

We might say that the latter quote indirectly raises questions about new environmental challenges and power sector decarbonization due to the fact BEVs are still highly dependent on the source fuel for electricity generation (TUED 2019). One of the main tasks for policy and decision makers is to understand decarbonization of transport beyond the sector itself. Trade unions in the energy sector remind us that the energy mix needs to be deeply and rapidly decarbonized, because the current trends show that production of renewable energy does not meet existing electricity demands in general, let alone the transport sector.

IEA points out that in order to limit average global warming to less than 2 C, the share of renewable energy would need to increase from around 15% of the primary energy supply in 2015 to roughly 65% in 2050 (TUED 2019). This calculation still does not take into account the amount of renewable energy needed to power new BEVs and this question is too complex to be addressed properly in this case study. We would agree that environmentally and socially desirable changes in the sector can be accelerated with state investment into BEV fleets, as is the case in Norway. Norway provides extremely generous tax exemptions, subsidies and preferential access to parking and traffic lanes for BEVs (TUED 2019) and many other countries in Europe might benefit from following such and other household income based policies for a transformation of the car/mobility sector.

3.2 Expected changes in employment

As noted by the comprehensive research paper series *The future of work in a changing natural environment: Climate change, degradation and sustainability*, changes in energy sector where the total employment is relatively low will inevitably affect related sectors such as transport, due to the fact EVs demand very different value chains compared to ICE vehicles (ILO 2017). The same paper argues the pathway towards decarbonization of the energy sector will result in the net creation of 18 million jobs around the world as an outcome of 24 million jobs created and 6 million lost. The assumption is that transformation to green industries in the energy sector will create significant job opportunities. However, the issue of the extent to which it will affect different industries still heavily dependent on fossil fuel energy, different sectors within

⁵ representative of a trade union in the X TIER 1 car supply company, 2021

⁶ representative of a trade union in a road transport sector, 2021

manufacturing of electrical parts and machinery remains. How this transformation will be distributed across the globe is also an issue.

International Labour Organization and UN Framework Convention on Climate Change in their 2015 and 2016 reports remind that investment, reskilling and social dialogue (De Schutter 2020) are a substantial challenge in mitigating negative impact on labour and communities during the phasing out of fossil fuels. Some researchers say that simplification of manufacturing processes is likely to lead to a decline of employment both in OEMs and in suppliers (Galgóczy 2019) and in some examples the need for manual labour force in electrified cars will be approx. 40% lower than in the current ICE vehicles (Krzywdzinski 2021). The short term social impact will most likely be mixed, having in mind different subsector features within the car industry. The most probable sectors where employment will be boosted will be the R&D sector, engineering of powertrain systems and new BEVs mobility infrastructure.

Describing the structure of the European labour force and how it will be affected by the transformation of the car industry, some authors remark on differences between the employment patterns in Germany and the SEE countries (Galgóczy 2019). This difference refers mainly to the wage gap which remains significant even though wages in the CEE countries increased substantially from the initial level due to labour shortages and increased bargaining power (ibid.).

As a capital intensive industry, the car manufacturing sector still has predominantly very high skilled workers and strong unions. Nonetheless, there has been a dominant trend in outsourcing and relocation of production since the 1970s. This affected the quality of workplaces, especially across the EU that appears to be a region differentiated between the Western European (Germany) and Eastern European models characterised by a lower labour cost (Meszmann 2021).

In Meszmann's paper there is an important reference to the Middle and Eastern European model where the high skilled workforce pertains to a flexible workforce capable of learning and shifting to diverse manual work positions in alignment to the current demands of manufacturers and labour turnover (ibid.).

Although Croatia has a historically distinctive position within the European car-industry (elaborated in more detail in Chapter 1) many of the interviewees described current labour position in their companies similarly to the CEE trend. Almost all companies are parts suppliers in the production chain (predominantly TIER 1 and TIER 2) and they have already undergone a significant automatization of production. Likewise, they experience a high labour turnover due to the low wages (*Our company excels in everything except in wages*)⁷ and are very dependent on their OEM's major business decisions which are located in other countries. Ironically, this automation seems to be a reason why almost all of the interviewees, regardless of the type of the company and their position within it, don't feel their jobs are further endangered by the forthcoming transition in powertrain production.

In the case of the French car industry, Sebastian Schülze Marmeling from Syndex Consulting notes the recent negative trends by which employment and dislocation have decreased whereas flexible employment forms such as agency work and subcontracting have been on the rise (Schülze Marmeling 2021). This requires lower skill labour and can result in higher labour turnover.

These trends were noted by Croatian interviewees, as well. High labour turnover and outsourcing of labour force to countries with more flexible labour legislation have been higher in supplier companies where labour intensive working processes are required. One interviewee from a company which employs cca 800 workers reflected on the dislocation of

⁷ representative of lower management in X TIER 1 car supply company, 2021

production from Slovenia to Croatia, and then on to Serbia and Bosnia and Herzegovina, as a result of continuity in re-structuring process and changes in leading management structures. In this company, labour intensive work, lower wages and older age structure have led, he thinks, to introducing agency workers from Middle Asia and Southern Europe: *Many of them left the company for better wages, many did not want to work on weekends (...) And were left out of the workforce as a result. Then agency workers arrived, manual workers, all of them are fine and just want to work. The rest of us who are coming from support services, we are all domestic workers.*⁸

When asked what they regard as the major challenge in their companies transition to BEVs and specifically in regards to their workplace, all of our interviewees said they consider no threat to their company's position in the marketplace due to the specific niche they occupy. Lower management workers and union reps particularly said they consider the automation of production has already reached its peak alongside with the deindustrialization Croatia has experienced since the 1990s. Some of them ironically place that fact as Croatia's current comparative advantage: *See, sometimes it is good when you are bad at something. Nothing dramatic will happen. We don't have much of a car industry, unfortunately. When our OEM's start to produce BEV's, engine and fossil fuel production will be at stake, not those who produce bumpers, handrails, consoles and similar things.*⁹

Likewise, representatives of the unions, middle management and executive bodies all find workplaces in TIER 1 or TIER 2 manufacturers in Croatia generally safe. Consequently, we might conclude that almost all of our TIER 1 and TIER 2 interviewees think the changes that will happen within OEMs won't significantly affect the supply chain employment. But they are also unaware of the larger trends in mobility shifts required by the full decarbonisation of transport, and the threat lost to decades of lagging behind the BEV production in East Asia.

The market position of these companies seems to be favourable at the moment in terms of competitiveness and technology development which are requirements that are coming from clients, i.e. OEMs: *For Croatian production specifically, I don't see endangerment (...) We are already deeply developing energy efficiency within the company, trying to improve the ratio of renewable energy for production. As a supply chain actor, we are required to follow the standards imposed by our OEMs which is likely to be seen in the future as well.*¹⁰

This techno-optimism is likely to be shared among the representatives of middle management we interviewed in TIER 1/TIER 2 and OEM in Croatia as well. The latter believe that their in-house R&D is a strong advantage in the market. Likewise, in the future reshaping of car industry workplaces, know-how technology that many of the Croatian companies possess seems to be the third important advantage, from the perspective of our interviewees. When asked to evaluate and compare the situation with manufacturers of car components in Croatia and OEM's in the CEE in regards to transformation of the ICE based car industry and threat the production will be dislocated to the countries with more flexible labour arrangements, one interviewee said: *It is possible, but we share technologies that will pose an obstacle to it. We have \$ 6 million worth industrial furnaces that are not easy to dislocate in comparison to the simplified machinery. Digital technology works globally today. One development engineer in Switzerland shares know-how with you, so experts and operators may apply it wherever.*¹¹

Some of the highly positioned interviewees recognized possible threats, namely with professions which might not survive this transition: *Low skill workforce might find themselves in greater danger due to the automatization of production. Universal machine tools were*

⁸ representative of middle management in X TIER 1/TIER 2 car supply company, 2021

⁹ representative of a trade union in X TIER 1 car supply company, 2021

¹⁰ representative of the executive body in X TIER 1 car supply company, 2021

¹¹ Ibid.

*replaced in the 1970s with universal numerical control machines which made the mill workers redundant*¹². Even those closer to the direct shop floor production still think some of the professions won't be easy to replace. Consider for example: *At aluminium foundry melter operators are irreplaceable, I can't imagine a robot driving 750 degrees melt through the shopfloor between the machines. When that will be possible, then we can all go home.*¹³

Here we come to the crucial question of re-skilling in the future development of employment. Due to high degree of specialisation and automation, the number of skilled workers have shrunk in the last few decades as it was stated above by the interviewees and some of them are quite aware of the further labour shortages and unequal impact between the highly skilled and lower skilled workers in the car manufacturing and supply sector. Alongside potentially irreversible job loss, the issue remains how the workers who survive this transition will be trained in order to match new industry needs. This aggregates into the key question whether Europe will be able to retain its globally competitive production output in the individual mobility sector.

Re-training and re-skilling will be one of the most important components in the pathways to European production for electro-mobility. Public employment programmes can provide employment and training opportunities for workers affected by the transition and serve to improve the infrastructure for climate mitigation and resilience. Some suggest that systems that offer payments for ecosystem services as rewards for communities that contribute significantly to climate mitigation can be part of such "just transition" plans. For example, the *bolsa verde* programme in Brazil included reskilling (offering fiscal incentives to companies for workers training), carbon pricing and revenues from carbon pricing. Some countries, like Germany, have tried-and-tested solutions for a smooth transition in downsizing of one sector towards expansion of another, and these might be recommended in other countries as well (Schirmbeck et al. 2020). Regrettably, there is no public discussion of these and similar programmes for the export manufacturing in car industry in Croatia.

The interviewees largely agree that the car supply sector in Croatia will need more young workers. This is especially evident in the "aging" shop floor workers, such as foundry melter operators, where the biggest challenge is rejuvenation of staff.

The rest of the political and economic scenarios that might incentivise this transition in Europe will be addressed in the following chapter.

3.3 Strategies for a Just Transition

3.3.1 Political Strategies: Recommendations from ministries and/or political parties on how to manage the transformation

The history of a concept *just transition* goes back to the 1990s when Anglo - American unionists started to develop a program of support for the working communities affected by environmental protection policies and coal mines closure (Just transition centre 2017). Eventually, unions led by ITUC succeeded in getting the concept into the preamble to the Paris Climate Agreement, so as to affirm "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities." (TUED 2019: 52; UN 2020). Today, this concept serves as a comprehensive cross-sectoral framework that needs to assure a fair socio-economic transition to an ecologically more sustainable society. However, there is healthy scepticism coming from just transition

¹² Ibid.

¹³ representative of middle management in X TIER 1/TIER 2 car supply company, 2021

proponents within the trade unions who warn the concept is getting too broad and “in danger of being hollowed-out and over-stretched” (Galgóczy 2019).

In the key document for structural reforms and investment related to post-pandemic recovery along the net-zero transition lines the Croatian NRRP issued in 2021, there are sections dedicated to developing and improving environmentally friendly and low-carbon transport systems (VRH 2021, p. 231). According to the Energy Institute Hrvoje Požar’s data, approx. 53% of all transport emissions come from domestic road transport. Croatia also has quite a big share of passenger car ownership – up to 75% of all registered motorised vehicles in Croatia are private passenger cars. Whilst this is not significantly different from the European average, the fleet itself is quite old and therefore more emissions intensive (VRH 2021, p.231).

The NRRP recognizes the urgent need for energy transition in transport, but no concrete measures for the ICE-based vehicles are stated. Grants are announced as investments in technological capacities of enterprises. “Hydrogen and new technologies” is invoked, but without specific reference to road transport, whilst biofuel production is planned in at least one oil refinery (which is majority controlled by a Hungarian oil company MOL). Road transport measures are left to co-financing for the purchase of new alternative fuels vehicles and development of alternative fuels infrastructure in road transport (VRH 2021). Yet 53% of the NRRP planned funds are dedicated to greening and digitalisation, of which green transition takes further 40% mainly in road reconstruction and infrastructure improvements within the transport sector, without specific reference to the climate mitigation contributions expected.

The second most important document in regards to reduction of GHG emissions is the SNRRH, which the Croatian Parliament adopted in June 2021 (HS 2021). Similarly to the NRRP, the SNRRH document provides guidelines for the low carbon development by 2030 and 2050. The action plan for achieving concrete measures in terms of transport policy lacks clarity and it is underrepresented when compared to other sectors. While there is a certain emphasis on the need for strengthening of the sustainable mobility planning and integration capacities, necessary measures for low-carbon scenarios depend on use of alternative fuels for private passenger cars, but that is envisioned in the outlook to 2050, not in immediate measures for 2030. Estimates in the low-carbon scenarios only take the BEV proportion to 35%-60% by 2050, rising to 60%-80% low carbon vehicles with hybrid and hydrogen fuelled vehicles included (HS 2021). Neither document envisages transformations in production of low-carbon vehicles in Croatia, and leaves the penetration of BEV, hybrid and hydrogen-fuelled cars to the global market forces. Political parties have not expressed clear plans for electrification of individual transport, nor for politically driven regulation of emissions from the road transport sector.

According to the proposal of the *Action for Low Carbon Development Strategy until 2024* the burden of transition is predominantly left to the market and consumer awareness, with focus on regulating individual mobility behaviour („polluters pay principle“) and purchase of new BEV despite acknowledgement that the current car fleet in Croatia is on average 12 years old (HS 2021). The attendant measures call for clear CO₂ emissions labelling on new vehicles sold in Croatia, and eco-driving training. Transference of burden on consumer consciousness regardless of their socio-economic background and education signifies reluctance of the government to marshal the low-carbon transition and distribute the risks and burden proportionally. The structural policy measures such as building BEV infrastructure and subsidies for BEV are there, but they are quite underrepresented.

Croatian policy and decision makers should strive to make the structural policy measures and their implementation far more committed, especially if we bear in mind that the CEE countries have become the main contributors of CO₂ emissions in transport (Pardi 2020). The third important document *National Strategy for Transport 2017 - 2030* finds out that the amount of traffic on the main highway corridors during the tourist season is doubled compared to the off-

season (MMPI 2017) and requires detailed planning, but no concrete measures are proposed. That is also present in the general measure descriptions linked to the reduction of negative environmental impacts of transport and mitigating climate change. No concrete proposals and guidelines on how to speed up the transition to more ecologically sustainable mobility are visible in the Strategy.

Trade union representative from the transport sector, understands limitations of this form of strategy, when reflecting on technologies promoted predominately in freight road transport: *We have restricted traffic during weekends and in the tourist season but it is driven by the reduction in road congestion and not by fighting the pollution. The Croatian National Strategy for Transport has a directive which provides tolls discount for euro 6 trucks and machinery, yet some EU countries which implement the same directive have banned trucks with less than euro 6 norms on their motorways.*

Europe-wide policies to promote transition to low-carbon and zero-carbon mobility are needed, and a concerted effort is required to establish a significant European market for BEVs through policy intervention. The goal should be to encourage OEMs to build BEVs in Europe in response to a strong market here. T&E advocates an EU-wide zero emission vehicle sales target for the next decade, to shift the production to European shores and maintain European manufacturers' competitive advantage (T&E 2021). The question remains how such a strategy would respond to global long term bottlenecks in BEV-required input materials, and an overall shift to multi-modal transport rather than exclusively on private cars as part of the European carbon neutrality strategy. Moreover, in terms of justice, it is worth noting that the market for BEV sales is stagnating and has been very polarising in Europe. Less than 1% of the total car sales in the Eastern Europe were EVs, whereas 91% of the EU's BEV registrations in 2020 were made in Northern Europe (Pardi 2021).

The trade unions globally are aware that Paris Agreement emissions reduction will not be achieved placing the focus exclusively on individual mobility and behaviour. Thus, TUED argues that mass public transport should be at the centre of future passenger mobility rather than 'on-demand personal mobility', in order to provide safe, sufficient and sustainable mobility (TUED 2019). Similar important notice comes from the UN Just Transition report 2020 where BEV seems not to be a suitable choice for people living in poverty, at least not in the foreseeable future. Moreover, there is a risk that the promotion of electric vehicles could perpetuate car-centric mobility at the expense of public transportation and additional urban green spaces, thereby disproportionately affecting the livelihoods and well-being of those living in poverty (de Schutter 2020).

Outside declared political strategies, the combination of lobbying-influenced regulation and market competition does not seem to secure the steepest carbon reduction that is so badly needed. Some authors argue that the weight-based targets for the greening of the automotive industry in the current EU regulatory framework is deeply problematic. These carbon emission targets are less demanding of heavier vehicles, and that way seem to favour premium brands over generalist brands (Pardi 2021). Therefore, the European BEV market contains a higher share of premium model cars (Mercedes, BMW, Audi, Volvo) than of generalist cars (Renault, Citroen etc). Pardi even argues that Tesla has accelerated the conversion of premium brands towards BEVs by reframing electrification as a luxury technology. Tesla has pushed the luxury producers towards BEVs "not only because it has proved that the combination of huge batteries, digital technologies and luxury features would appeal to wealthy consumers, but also because it started to take significant market share from premium brands as early as 2018." (Pardi 2021).

A similar approach of competition in the luxury mobility niche, with very little impact on the overall national and European carbon reductions, is evident in the Croatian electric car OEM. After a decade of small in-house software development and production, this company is now apparently turning to serial production, but still within the niche wealthier households market:

*Our market niche is not mass car production; we produce premium cars and its components with high performance. And we don't plan to change that in the short or middle term period.*¹⁴

While luxury markets can act as trendsetters, they do not provide a comprehensive and swift decarbonisation strategy for transport. Comprehensive decarbonisation will require policies that go beyond particular consumer preferences to more structured, normative and socially inclusive measures that can enable producers to help remove the old polluting ICEs off the roads. Policy recommendations that might be useful in this regard could be found in national policies in the Asian countries. Countries such as Japan have special fiscal regulations for electrifying small cars that make them cheaper and more affordable, and their sales make up more than a 1/3 of total Japanese market. China may also be an example of how to electrify generalist brands. Their BEVs weigh 300 kg less than European ones providing an example how BEVs can be “conceived as different products than conventional ICE cars by combining electrification, weight reduction and lower prices to provide affordable green means of transport for urban middle-classes (Pardi 2021).

As one of our interviewees has pointed out, transition to zero-carbon technologies is not a question only of production and product placement, but of a whole material and energy circulation associated with it: *Those who deal with regulatory framework and legislation will need to tackle an issue that will appear alongside with electro-mobility and this is battery second life. That is a question of circular economy and requires a comprehensive regulation which tracks a product from its beginning to its end and places it within the context of sustainability*¹⁵.

3.3.2 Entrepreneurial strategies: Which new products can/are currently already being switched to by automotive companies and suppliers

As our interviews' analysis has shown, the issue of entrepreneurial strategies at the company level is among the least relevant for the Croatian supply chain. As we mentioned in previous chapters, car supply and component producers in Croatia, especially those in serial production and transport sector/mobility infrastructure, believe the electromobility and revolution in transport will not occur in the short to medium-term future. On the other hand, those who are highly specialised in market niche production are more aware of the forthcoming change and its consequences, but think their specialist and niche production has already adapted and tuned into the technological innovations in the car industry. However, all of the TIER 1 and 2 representatives believe they are more dependent on the parent OEM decisions and supply chain management, than their own strategies or national plans. As noted by one of our interviewee: *The business environment forces us to channel our resources towards energy consumption reduction. By 2030 we should be energy self-sufficient, meaning we'll need to produce our own energy production. In the whole supply chain there are standards obliging suppliers to develop their own suppliers, bringing them to the level up.*¹⁶

Another question that seems relevant here is the one we have already raised in previous chapters. It refers to availability and ownership of charging infrastructure. In the words of one industry analyst: “BEV's are unlikely to win broad market acceptance unless they can be charged quickly and easily anywhere.” (TUED 2019). The current approach has also yet to produce a clear and convincing means to deploy the kind of charging infrastructure needed to support the widespread use of private BEVs. There is currently a great deal of uncertainty about how charging services should be built, and who should own them, which was directly raised by our interviewee who works in the transport sector.

¹⁴ representative of middle management in X OEM company, 2021

¹⁵ representative of middle management in X OEM company, 2021

¹⁶ representative of the executive body in X TIER 1 car supply company, 2021

In the US, some public utilities have sought opportunities to own and operate such stations as a source of revenue at a time when demand for electrical power has stagnated and revenues from centralised power generation have fallen accordingly. A recent UK study summed up the fundamental problem of a market-led approach: “Electric transport requires an infrastructure of charging points. It is a classic infant infrastructure problem: the network is economical only when there are lots of BEVs charging from it; and the EVs are worth buying only if the infrastructure is in place.” (TUED 2019). Another study estimated that fully decarbonizing UK transport would require a massive increase in power generation. The yearly energy demand of transport fuels is currently more than double the UK’s national electricity consumption. Replacing the energy currently provided by fuels with electrical power would require an extraordinary increase in renewable energy generation capacity (TUED 2019) which was similarly raised by one of our interviewees who also touched upon the questions on globalised approach to rare metals, their exploitation and human and ecological costs.

3.3.3 Trade union strategies: What do the unions propose in face of the upcoming changes

Our interviewees employed in niche production noted that further up-skilling and current shortage of high-skill labour will be important issues for the unions in the transition period. They also expect greater need for R&D employment rather than shop floor as peak automation has already taken place. An interview from one OEM company said that building the educational capacities is necessary for a relatively smooth transition. Interviewees from mass production companies did not expect any changes due to electromobility transition for their specific product, and thus no strategies for a just transition in their companies were expected in that regard.

On a general note, such employees expect the state to engage in re-skilling. Alongside with the state, they also find entire longer qualification conversion programmes organised by the unions crucial in facilitating the transition. Some interviewees see the unions having a main role in ensuring the transformation in long-term education of the employees. A similar process has been going on in particular sectors: *We facilitated an education camp for our employees for new skills long-term development training. We are facing the phasing out of [one specific mass employment position] in Croatia and have an immediate need to up-skill our employees.*¹⁷ Others have noted that collective agreements should be a pillar in this sector to ensure an adequate level of workers’ rights.

There is expectation of new lower-skill job openings in the recycling and maintenance of BEV as the transition is expected to be a part of the broader circular economy drive. These visions of new jobs in recycling are also shared by niche-producer interviewees, as presented above. On the other hand, in mass production employment, scepticism about the pace of transition prevails over fears of job losses and preparations for imminent change.

Some of them place more importance on unions solidifying CA’s and other related workers’ rights within their own companies, especially when compared to working conditions in other subsidiaries in CEE. *I was not allowed to bring the topic of the non-existent CA in our company in Hungary to the European Works Council, because we have CAs here in Croatia and this is what they are afraid of.*¹⁸ Thus solidarity across borders, rather than competition, seems to still register high on the union’s agenda, despite awareness of the differences in production lines of the same car company.

But there is no official data on trade union membership in Croatia, only estimates according to which trade union density on a national level is around 35% (Tomić et al. 2019). Some of the interviewees confirmed approximately the same percentage of unionisation in their own

¹⁷ representative of a trade union in the road transport sector, 2021

¹⁸ representative of a lower management in X TIER 1 car supply company, 2021

companies. We could conclude that the trade union perspective in the Croatian car industry lacks a unified answer to challenges of decarbonisation and consensus about what just transition means for car industry and transport/mobility.

Some unions such as ITF and TUED argue that a whole economy approach should be at the centre of progressive trade union perspective on transport decarbonisation, with expansion of public transport at the forefront. In their argument, simply replacing ICE vehicles with individually owned electric vehicles will not meet the Paris Agreement targets; therefore, the electrification of classic modes of transport (rail, buses) is necessary to compensate for this (TUED 2019).

This is a reminder that electricity and transport are interconnected and progressive unions should be one of the main eligible actors in creating policy measures and proposals for a sustainable future for all. Some of their recommendations chime with understanding of just transition in the car industry as part of the wider transport decarbonisation in Europe, e.g. public transport as a social and ecological priority, suspension of inefficient governance models, reduction in number of privately owned vehicles - towards establishing public car sharing services, and more green investment garnered from tax revenues on sales of private vehicles into public transport.

4 List of interviewees

Anonymous interviews:

Interview with representative from middle management in X TIER 2/TIER 1 car supply company (26/3/2021)

Interview with representative from the executive body in X TIER 1 car supply company (25/2/2021)

Interview with representative from trade union in road transport sector (2/2/2021)

Interview with representative from trade union in X TIER 1 car supply company (19/2/2021)

Interview with representative from middle management in X OEM company (19/3/2021)

Interview with representative from lower management in X TIER 1 car supply company (19/2/2021)

5 Bibliography

- [DZS] Croatian Bureau of Statistics 2019: Average monthly net and gross earnings of persons in paid employment for December 2018. In: First release 9.1.1:12. Croatian Bureau of Statistics. Zagreb. Retrieved 16.6.2021. from: https://www.dzs.hr/Hrv_Eng/publication/2018/09-01-01_12_2018.htm
- [EC] European Commission 2019: Communication From The Commission To The European Parliament, The European Council, The Council, The European Economic And Social Committee And The Committee Of The Regions. In: The European Green Deal. COM(2019) 640 final: Brussels: EC.
- [EIB] European Investment Bank. 2020: The EIB Climate Survey 2019-2020. How citizens are confronting the climate crisis and what actions they expect from policymakers and businesses. Luxembourg: EIB.
- [HS] Hrvatski Sabor 2021: Strategija niskougličnog razvoja Republike Hrvatske do 2030. s pogledom na 2050. godinu. Zagreb. In: Narodne novine (ELI: /eli/sluzbeni/2021/63/1205).
- [HTE] Hrvatska tehnička enciklopedija 2021: Jugoplastika. Leksikografski zavod Miroslav Krleža. Zagreb.
- [IEA] International Energy Agency 2021: Global EV Outlook 2021. Paris: IEA. Retrieved 27.7.2021 from <https://www.iea.org/reports/global-ev-outlook-2021>.
- [ILO] International Labour Organisation 2018: The future of work in a changing natural environment: Climate change, degradation and sustainability. In: ILO Future of Work Research Paper Series 4. International Labour Office Geneva. Retrieved 20.7.2021. from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/publication/wcms_644145.pdf.
- [MMPI] Ministarstvo mora, prometa i infrastrukture 2017: Strategija prometnog razvoja Republike Hrvatske (2017. - 2030.). Retrieved 24.7.2021. from <https://mmpi.gov.hr/UserDocsImages/arhiva/MMPI%20Strategija%20prometnog%20razvoja%20RH%202017.-2030.-final.pdf>
- [MZOE] Ministarstvo zaštite okoliša i energetike 2019: Integrirani nacionalni energetska i klimatski plan za Republiku Hrvatsku za razdoblje od 2021. do 2030. godine. Retrieved 24.7.2021. from https://mingor.gov.hr/UserDocsImages/UPRAVA%20ZA%20ENERGETIKU/Strategije,%20planovi%20i%20programi/hr%20necp/Integrirani%20nacionalni%20energetski%20i%20klimatski%20plan%20Republike%20Hrvatske%20%20_final.pdf.
- [T&E] Transport & Environment 2017: How will the electric vehicle transition impact EU jobs? Briefing prepared by Transport & Environment. Brussels: T&E. Retrieved 24.7.2021. from <https://www.transportenvironment.org/discover/how-will-electric-vehicle-transition-impact-eu-jobs/>
- [VRH] Vlada Republike Hrvatske 2021: *Nacionalni plan oporavka i otpornosti 2021.-2026.* [National Recovery and Resilience Plan 2021-2026]. Zagreb: VRH. Retrieved 24.7.2021. from <https://planoporavka.gov.hr/UserDocsImages/dokumenti/Plan%20oporavka%20i%20otpornosti%20C%20srpanj%202021..pdf?vel=13435491>.

ACEA 2020: Share of the direct automotive employment in the EU, by country. Retrieved 30.7.2021. from <https://www.acea.auto/figure/share-of-direct-automotive-employment-in-the-eu-by-country/>

Ančić, Branko, Jelena Puđak and Mladen Domazet 2016: Vidimo li klimatske promjene u Hrvatskoj?: istraživanje stavova o nekim od aspekata klimatskih promjena u hrvatskom društvu. In: Hrvatski meteorološki časopis 51, pp. 27-45.

Avulinec 2021: Zanima li hrvatsku javnost Nacionalni plan oporavka i otpornosti (NPOO)? Retrieved 1. 6. 2021. from <https://door.hr/zanima-li-hrvatsku-javnost-nacionalni-plan-oporavka-i-otpornosti-npoo-izvjestaj-o-sazetku-preliminarnih-rezultata-analize-medijskog-sadrzaja-za-razdoblje-29-03-2021-10-05-2021/>

Brajdčić Vuković, Marija; Branko Ančić and Mladen Domazet 2020: Values underpinning a degrowth transformation of the socio-political system. In: *Traditiones* - Inštitut za slovensko narodopisje, Ljubljana 49:1, pp. 141-158.

Brkić, Vladislav 2019. Dekarbonizacija energije bez nafte i plina? [Energy decarbonization without oil and gas?]. In: *Nafta i Plin* 39:158, pp. 46-49.

Crippa, Monika; Diego Guizzardi, Marilena Muntean, Edwin Schaaf, Efsio Solazzo, Fabio Monforti-Ferrario, Jos Olivier and Elisabetta Vignati 2020: Fossil CO2 emissions of all world countries - 2020 Report, EUR 30358 EN, Luxembourg. In: Publications Office of the European Union. Retrieved 31.7.2021 from <https://publications.jrc.ec.europa.eu/repository/handle/JRC121460>

Cvetković, Ivan 2020: STATISTIKA: Prosječna starost vozila u Hrvatskoj – 10 i više godina! Retrieved 17. 3. 2020. from <https://www.autonet.hr/kolumna/sve-nas-je-manje-a-automobila-sve-vise-na-cesti-uz-prosjecnu-starost-vecu-od-13-godina/>

de Blas, Ignacio; Margarita Mediavilla, Inigo Capellán-Pérez and Carmen Duce 2020: The limits of transport decarbonization under the current growth paradigm. In: *Energy Strategy Reviews* 32. Retrieved: 30.7.2021 from: <https://www.sciencedirect.com/science/article/pii/S2211467X20300961>

De Schutter, Olivier 2020: Interim report on the “just transition” in the economic recovery: eradicating poverty within planetary boundaries. Presented to the General Assembly of UNHCR at its 75th session. Retrieved 30.6.2021 from: <https://www.undocs.org/A/75/181/REV.1>

Domazet, Mladen 2019: Degrowth-compatible Common Senses in Croatia. In: *Sudosteuropa Mitteilungen* 59:5-6, pp. 158-168.

Frenzel, Max; Marina P. Ketris and Jens Gutzmer 2014: On the geological availability of germanium. In: *Mineralium Deposita* 49, pp. 471–486. Retrieved 30.7.2021. from <https://doi.org/10.1007/s00126-013-0506-z>.

Frenzel, Max; Marina P. Ketris, Thomas Seifert and Jens Gutzmer 2016: On the current and future availability of gallium. In: *Resour. Pol.* 47, pp. 38–50. Retrieved 30.7.2021. from <https://doi.org/10.1016/j.resourpol.2015.11.005>.

Galgóczi, Bela 2019: Introductory overview. Two faces of (a) just transition: the coal story and the car story. In: Galgóczi, Bela (ed): *Towards a Just Transition: coal, cars and the world of work*. Brussels. ETUI, pp.7 - 31. Retrieved 25.7.2021. from <https://www.etui.org/sites/default/files/19%20Towards%20a%20just%20transition%20Galgo%CC%81czi%20EN%20Web%20version.pdf>.

Gerócs, Tamás; Tibor T. Meszmann and András Pinkasz 2021: Uneven Development in the European Automotive Industry. In: Komolosi Andrea and Goran Musić (eds.): *Global commodity chains and labor relations*. Leiden: Brill.

Jaklin, Katarina; Dora Levačić., Igor Livada and Nikolina Rajković 2016: *Shaping Industry From The Left in Europe*. Policy paper prepared on behalf of Rosa Luxemburg Stiftung. Brussels Office. Rosa Luxemburg. Brussels Office.

Just Transition Centre 2017: *Growth, investment and the low carbon transition*. A report prepared for OECD. Retrieved 25.7.2021. from <https://www.oecd.org/environment/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>.

Jürgens, Ulrich and Martin Krzywdzinski 2009: *Work Models in the Central Eastern Euro-pean Car Industry: Towards the High Road?*. In: *Industrial Relations Journal* 40, pp. 493– 512.

Krzywdzinski, Martin 2021: *Facing the challenges of fast track transition to electro-mobility - What is at stake for Europe? Panel 1: Is the transition towards battery electric vehicles (BEV) inevitable by now and what does this mean for car industry jobs?* Webinar. Retrieved 8.6.2021. from: https://www.youtube.com/watch?v=YL4mOHI_HZM&t=3593s.

Lefevre, Anne Gaëlle and Ștefan Guga 2019: *Troubled waters ahead: what's next for the European automobile industry*. In: Galgóczi, Bela (ed). *Towards a Just Transition: coal, cars and the world of work*. Brussels. ETUI, pp. 157 - 193.

Li, Bingbing; Jiangyang Li and Chris Yuan 2013. *Life cycle assessment of lithium ion batteries with silicon nanowire anode for electric vehicles*. In: Presented at the *2013 IEEE International Symposium on Sustainable Systems & Technology (ISSST 2013)*. Retrieved 27.6.2021. from: <https://doi.org/10.6084/m9.figshare.805147>.

Meszmann, T. Tibor 2021: *Kad radna mjesta idu južnije: promjene u kvaliteti radnih mjesta u automobilskim kompanijama preseljenim u Mađarsku*. In: Biti, Ozren and Reana Senković (eds.): *Transformacija rada: narativi, prakse, režimi*. Zagreb. IEF, pp. 189-220.

Musić, Goran 2021: *Outward Processing Production and the Yugoslav Self- Managed Textile Industry in the 1980s*. In: Komlosy, Andrea and Goran Musić (eds.): *Global commodity chains and labour relations*. Leiden: Brill.

Pardi, Tomasso 2021: *Prospect and contradictions of the electrification of the European automotive industry: the role of European Union policy*. In *International Journal of Automotive Technology and Management* 21:3, pp. 162 - 179.

Penić, Goran 2021: *Ispunili 30 od 34 kriterija, iz EU stiže 5,2 mlrd. kuna: Prva isplata ide Rimcu i Hrvatskim vodama*. In: *Jutarnji list* 19. 12. 2021.

Schirmbeck, Sonja, Victoria Stociu, Ivana Vuchkova, Eva Junge, Robert Zanony, Thomas Oellermann and Max Ostermayer 2020: *Climate action. Socially. Just. A manual of arguments for a fair and ecological society*. Berlin: FES.

Schültze-Marmeling, Sebastian 2021: *Facing the challenges of fast track transition to electro-mobility - What is at stake for Europe? Panel 1: Is the transition towards battery electric vehicles (BEV) inevitable by now and what does this mean for car industry jobs?* Webinar. 8.6.2021. Retrieved from: https://www.youtube.com/watch?v=YL4mOHI_HZM&t=3593s.

- Sverdrup, Urlik Harald and Kristin Vala Ragnarsdottir 2014: Natural Resources in Planetary Perspective. In: *Geochemical Perspectives* 3:2, pp. 131-341. Retrieved 24.7.2021. from <https://doi.org/10.7185/geochempersp.3.2>.
- South-East European Industrial Market 2016: Automotive Industry in Croatia. Retrieved 30.7.2021 from: <https://www.see-industry.com/en/automotive-industry-in-croatia/2/1321/>.
- Szabolcs, Panyi 2020: How Orban played Germany, Europe's great power. In: *Direkt36.hu* 18. 9. 2020.
- Tomašević, Tomislav; Nikolina Rajković [...] and Martina Domladovac 2019: Naše željeznice: analiza upravljanja željezničkim uslugama u Hrvatskoj uz komparativni pregled zemalja EU. Zagreb: IPE.
- Tomić, Iva; Ivica Rubil, Danijel Nestić and Paul Stubbs 2019: The employment and social situation in Croatia, Study for the Committee on Employment and Social Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament. Retrieved 30.7.2021. from [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/642345/IPOL_STU\(2019\)642345_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/642345/IPOL_STU(2019)642345_EN.pdf)
- [TUED] Trade Union for Energy Democracy 2019: The Road Less Travelled: Reclaiming Public Transport for Climate Ready Mobility. Working paper no. 2 prepared on behalf of Rosa Luxemburg Stiftung New York, Murphy Institute at the City University of New York. Retrieved 30.6.2021. from: <http://unionsforenergydemocracy.org/wp-content/uploads/2019/05/TUED-WP12-The-Road-Less-Travelled.pdf>.
- Valero, Alicia; Antonio Valero, Guiomar Calvo and Abel Ortego 2018: Material bottlenecks in the future development of green technologies. In: *Renew. Sustain. Energy Rev.* 93, pp. 178–200. Retrieved 24.7.2021. from <https://doi.org/10.1016/j.rser.2018.05.041>.
- Winton, Neil 2021: Strong Growth Forecast For Global Auto Sales In 2021 With Europe Strongest, Barring Anything Unexpected. In: *Forbes*. 3. 1. 2021.

