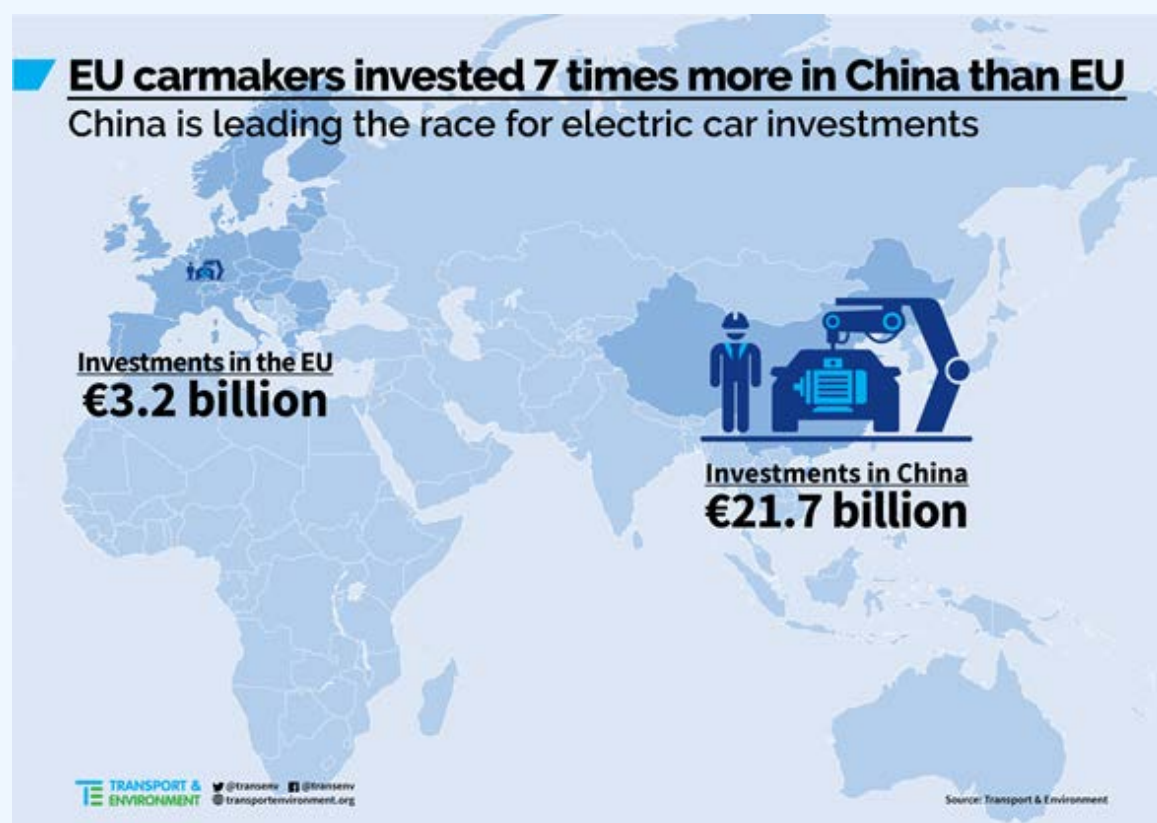


EU playing catch-up: China leading the race for electric car investments

Europe is losing the race to produce the cars of the future and the job opportunities it would create¹

June 2018

Mobility is at a crossroads and in each of the key three revolutions, automation, sharing and electrification of cars, Europe is falling behind. China has secured seven times more investments in electric vehicle manufacturing than the EU has in the last year only. Based on public announcements, China has received over EUR 21.7 billion of investment to produce electric vehicles while the EU secured only EUR 3.2 billion, seven times less. Front runners the Volkswagen Group, Daimler AG and Nissan have provided the bulk of the investment in China, driven by the aggressive electric vehicle policy. This policy requires carmakers to obtain credits for the production of EVs that are equivalent to 10% of the overall passenger car market in 2019 and 12% in 2020.



Europe runs the risk that by 2030 a quarter of the jobs in automotive manufacturing could be lost if electric vehicles are imported rather than manufactured here. But a new study also shows 200,000 jobs could be created across the EU economy through a shift to low and zero emission vehicles built here; and this is supported by a range of other published work including the European Commission's impact assessment on the new car CO2 regulation. The market for batteries alone is estimated to be worth 250 million euros.

¹ The research for this paper was undertaken by Joseph Houghton, T&E Vehicles and Energy research assistant, in June 2018.

If Europe is to reap the economic, employment and climate benefits of the transition to e-mobility, it needs to adopt a progressive policy that actively encourages investment in manufacturing of plug-in vehicles here in Europe, just as China and California have done through their mandates. The most effective way to achieve this is to develop a sizeable market for plug-in vehicles here in Europe. This is more likely to be met through local production of vehicles, as opposed to a niche market that can be more cheaply met by importing vehicles.

EU environment ministers gather in Luxembourg on 25 June to discuss the new EU CO2 rules for cars and vans, the key regulation that will define the pace of the e-mobility transition in Europe post 2020. A progressive 2025 target of 20% CO2 reduction, together with a sales target for low and zero emission vehicles will help drive the market in Europe that is currently stagnating through a lack of supply. Member states can also support the growth in plug-in vehicle manufacturing locally in Europe through investment in recharging and reform of vehicle taxes. Strong policies can help Europe to retain its global leadership in the automotive industry. With weak targets it is likely the EU position and its key sector will be usurped by China.

1. Background: the mobility revolutions - not happening in Europe

There is common consensus that the automotive industry will change more in the next 5 years than it has in the last 50. The shifts to electric, autonomous and shared vehicles has begun and, together with advanced manufacturing techniques, will transform the sector in the next decade. The pace of change will vary across the globe and early investments will flow to where the changes are most rapid - but Europe is falling behind. The development of autonomous cars is being led from the US in particular by Waymo that have now completed over 10 million kilometres of road tests and launched a pilot programme of autonomous taxis. The market for new shared mobility services is twice the size² in the US and China than it is in Europe. Roland Berger in its electromobility competitiveness report³ concluded “China is underscoring its position as a lead market, and “Chinese automotive start-ups for electric vehicles are actively positioning themselves on the market right now.” The report also acknowledges “France has taken the lead in technology.” **This briefing presents new evidence that also in the shift to develop the electric car of the future Europe is seriously falling behind and proposes interventions that will help the EU to compete globally.**

The 2020s will be a key decade in the shift to electromobility, and the shape and stringency of CO2 regulations for cars and vans to 2030 will be a key driver and could determine whether the EU remains a global leader in automotive innovation or China usurps its position. The Commission's proposal, tabled in November 2017, was watered down⁴ at the last minute following industry pressure. But in the European Parliament the Rapporteur's (Miriam Dalli) report has significantly strengthened the proposal with a diverse range of other amendments proposed⁵.

In Council, the first exchange of views between Environment Ministers is scheduled for the 25th of June. The Commission's proposed 30% reduction in new car CO2 emissions between 2021 and 2030 is much less than needed by those member states with higher effort sharing targets. The European car industry has heavily invested in diesel in the hope it would become a mainstay in the global shift to lower CO2 emissions from cars. But sales in the EU are now collapsing⁶ following the dieselgate scandal and are negligible in the rest of the world (except for small markets in India and South Korea). Having wrongly bet on diesel technology to decarbonise cars, European automakers and its supply industry are now lagging behind their Asian and

² T&E, https://www.transportenvironment.org/sites/te/files/publications/2018_03_New_mobility_policy_paper_final.pdf

³ Roland Berger, https://www.rolandberger.com/en/Publications/pub_e_mobility_index_for_q2_2017.html

⁴ T&E, <https://www.transportenvironment.org/press/juncker%E2%80%99s-early-christmas-present-car-industry-undermines-climate-goals>

⁵ Euractiv, <https://www.euractiv.com/section/electric-cars/opinion/the-battle-for-low-carbon-cars-round-2/>

⁶ ICCT, <https://www.theicct.org/blog/staff/2017-year-review-european-diesel-down-electric-vehicles-rise>

American counterparts in the development of low and zero emission technology, including: hybrid, plug-in hybrid, fuel cell and battery electric vehicles.

EU companies have also failed to develop manufacturing of the key lithium-ion cells that will be needed as vehicles electrify and electricity grids become increasingly renewable. The Commission has recognised the risk and as part of the Third Mobility Package, announced a strategic Action Plan⁷ for the development and manufacturing of batteries in Europe. But for this to succeed it is essential for electric cars to be developed in significant volumes in the EU. This will lead to the battery packs also being assembled in the EU, and cells also being produced here, in order to create a secure local supply chain. However, the indications are that more of the investment in manufacturing for electric vehicles is happening outside of Europe.

2. China has secured seven times more EV investments than EU in the last 12 months

Based on carmakers public announcements into electric vehicle manufacturing in the last 12 months, China has secured EUR 21.7 billion of investment to produce electric vehicles. In comparison the EU has only secured EUR 3.2 billion, seven times less. Front runners: the Volkswagen Group, Daimler AG and Nissan have provided the bulk of the investment in China, driven by the aggressive electric vehicle policy, which requires every carmaker to produce a minimum share of EVs equivalent to 10% of overall capacity by 2019. Table 1 details the publicly accessible investment announcements made by European car makers into producing vehicles in the EU and China, where the figures and location is specified.

The biggest EU carmaker, the Volkswagen Group, leads the investments with a EUR 10 billion joint venture with Chinese Anhui Jianghuai as part of its Roadmap E initiative to release 80 new electric vehicle models by 2025⁸. Nissan has pledged EUR 8 billion, some of which making up its joint venture with Renault and Dongfeng to open a new electric vehicle factory. Daimler AG teamed up with BAIC in a venture worth EUR 1.6 billion that would extend the production of Mercedes-Benz electric vehicles under a new production facility in Beijing.

The investment surge into China is the result of the New Energy Vehicle (NEV) Mandate agreed in September 2017, taking effect in April 2018. The policy demonstrates a clear commitment to position China as the leader in the global EV race. Modelled on the California ZEV mandate, the Chinese NEV mandate established credit targets for manufacturers' passenger vehicle fleets. The first credit target is 10% for 2019, followed by a 12% target for 2020⁹. With additional deployment policies for charging infrastructure, China aims at 7 million EVs¹⁰ registered by 2025. The investment made by European companies in China clearly shows that the EU car makers are gearing up to hit these targets through investment in China. Even larger investments are being poured into EV battery production, where Chinese manufacturers such as CATL and BYD are now in world's top 5, squeezing out Panasonic and LG.

Companies have been clear that the strong Chinese policy is the driver of their investments. A VW spokesperson told Bloomberg that the Chinese policy "perfectly fits our recently announced Roadmap [E] for electric vehicles"¹¹, an initiative designed to increase EV sales to 1.5 million globally by 2025. Following its decision to produce the electric MINI in China, BMW claimed that the stick to the strategy, "Production

⁷ European Commission, https://eur-lex.europa.eu/resource.html?uri=cellar:0e8b694e-59b5-11e8-ab41-01aa75ed71a1.0003.02/DOC_3&format=PDF

⁸ VW, https://www.volkswagenag.com/en/news/2017/09/Roadmap_E.html

⁹ ICCT, <https://www.theicct.org/publications/china-nev-mandate-final-policy-update-20180111>

¹⁰ Bloomberg, <https://www.bloomberg.com/news/articles/2018-03-27/how-california-taught-china-to-sell-electric-cars>

¹¹ Bloomberg, <https://www.bloomberg.com/news/articles/2017-09-28/china-to-start-new-energy-vehicle-production-quota-from-2019>

follows the market.”¹² Nissan Chief Executive Officer Hiroto Saikawa expressed his admiration for the policy, claiming China will contribute a third of its revenue target by 2022¹³, bypassing the U.S as the largest market for the company.

Table 1. Electric Vehicle production investments made in the last 12 months

Investments in the EU		Investments in China	
€1b	Renault second EV production plant in Douai, France	€10b	VW-Anhui Jianghuai venture for NEV production
€1b	Volkswagen Zwickau e-mobility production plant, Germany	€8b	Nissan 2022 plan to introduce 20 EV models
€500m	Daimler Hambach plant extension for EV production, France	€1.6b	Daimler-BAIC venture for new production site
€300m	BMW Leipzig plant extension for EV production, Germany	€670m	Volvo (Geely owned) for EV production
€200m	PSA-Nidec venture, Tremery plant EV production, France	€650m	Ford-Anhui Zotye venture for EV production
€200m	BMW Munich battery production centre, Germany	€480m	PSA-ChangAn venture for CAPSA EV production
Undisclosed	Daimler Sindelfingen plant for EV production, Germany	€200m	Renault-Brilliance venture for NEW LCV production (EVs included)
		€67m	Daimler-BYD venture for Denza EV production
		Undisclosed	Renault-Nissan-Dongfeng venture for EV production
		Undisclosed	BMW-Great Wall venture for EV production
€3.2 billion total		€21.7 billion total	

source: details are sourced from car companies official announcements and surrounding news articles. Annex provided. PHEVs, BEVs and NEVs qualify as Electric Vehicle. Assumes a 7.48 RMB to 1 Euro conversion for Chinese investments.

¹² BMW, <https://www.press.bmwgroup.com/global/article/detail/T0278754EN/bmw-group-plans-joint-venture-for-mini-electric-vehicles-in-china?language=en>

¹³ Bloomberg, <https://www.bloomberg.com/news/articles/2018-02-05/nissan-to-invest-9-billion-in-china-to-boost-sales-over-5-years>

The contrast with policy in the EU is stark. Sales of plug-in vehicles in Europe are only expected to reach 5-7% by 2021 to meet CO2 targets. Furthermore, the use of super-credits in 2020 and 2021 will reduce the actual share of plug-in vehicles in those years as each one is counted more than once toward the targets. Such a small European market is likely to be met, at least in part, through imports rather than new production in Europe, effectively offshoring jobs. The EU has no sales or production mandate and is already importing zero emission vehicles.¹⁴

3. More ambitious CO2 limits and ZEV targets for cars and vans will bring more jobs to Europe

A range of national and pan-European studies show that a shift to more fuel efficient, low and zero emission cars creates both jobs and growth. For example, the Commission's Impact Assessment states that "Higher levels of ambition for the CO2 target would lead to a higher increase in the number of jobs."¹⁵ It concludes that for the 30% reduction scenario an additional 22,000 jobs are created in 2030 in the EU economy, mainly in the services and equipment sectors. A much smaller number, 4000 jobs, are estimated to be reduced in the automotive sector. With a higher reduction in emissions of 40%, between 86,000 and 88,000 net jobs are created, depending on whether the battery cells are manufactured in Europe. The evidence suggests jobs will change in the automotive industry, but overall the impact of more ambitious CO2 standards remains positive.

A recent pan-European multi-stakeholder study¹⁶, endorsed by stakeholders ranging from environmental NGO's to vehicle manufacturers and trade unions, concluded that 206,000 net jobs will be created in the EU through a shift from fossil-fuel powered vehicles to ones driven by renewable energy in Europe by 2030. This is based upon a scenario that assumes that in 2030, of vehicles sold 25% will be hybrid, 8% PHEV, 15% BEV

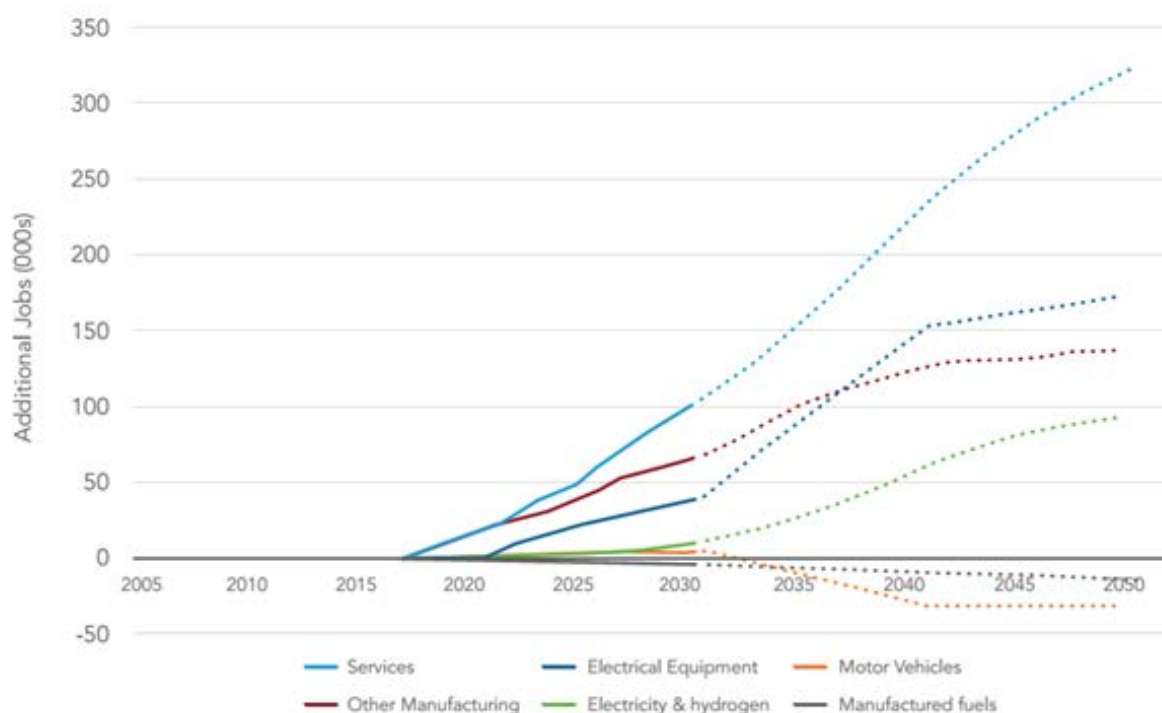


Figure 15. The employment impact per sector in Europe of the transition to low-carbon cars (thousands). Dashed lines reflect the increased uncertainty after 2030.

¹⁴ ICCT, https://www.theicct.org/sites/default/files/publications/EV_Government_WhitePaper_20180514.pdf

¹⁵ [COM Impact Assessment](#) on reviewed emission performance standards for new passenger cars and for new light commercial vehicles, p. 95f

¹⁶ ECF, <https://www.camecon.com/how/our-work/fuelling-europes-future/>

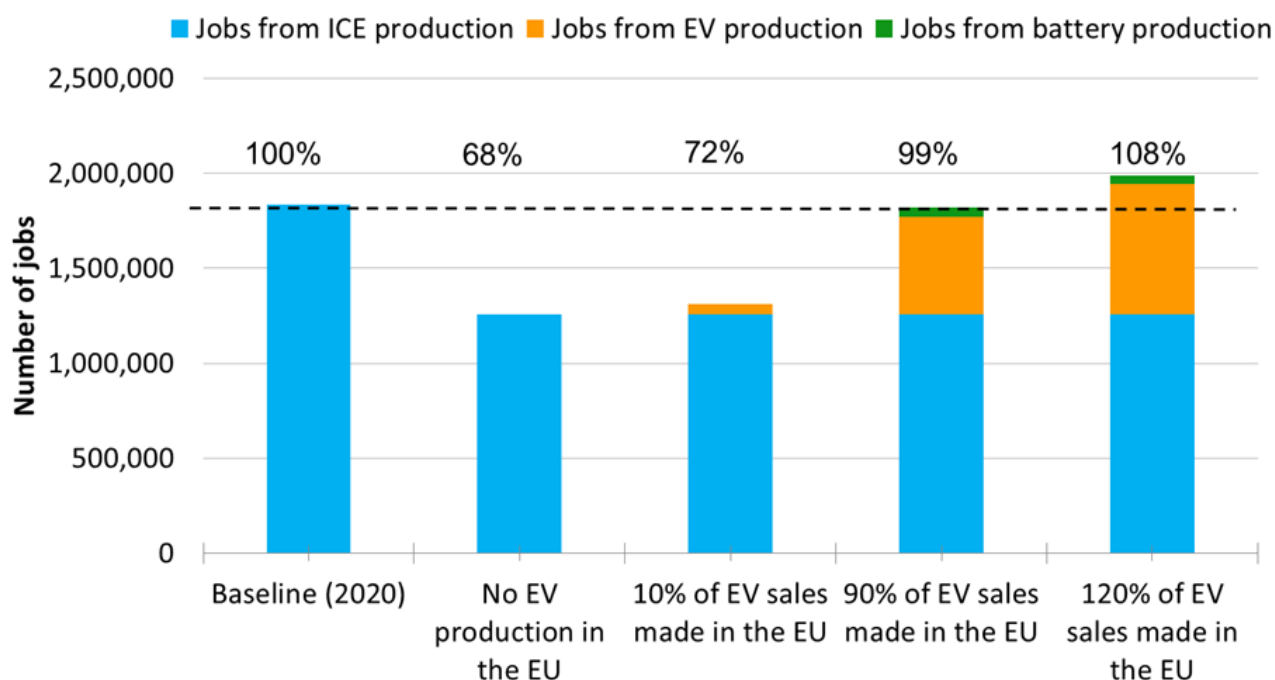
and 2% fuel cell cars. The remaining 50% are internal combustion engine vehicles. Employment is created in the construction industry, electronics industry, electricity supply and distribution, hydrogen services and most other manufacturing sectors. While the employment effects in the automotive sector are positive until 2030, there is a slow decline after, arising from less manufacturing of combustion engines and employment in fossil fuel refining. Re-skilling, training and natural turnover of the workforce will mitigate these effects.

The Cambridge Econometrics study also finds that the shift to zero-emission vehicles will drive an increase in gross domestic product (GDP) of 0.2% a year in the EU and cut the EU’s oil imports by €49 billion in 2030. By this time the purchase costs of plug-in vehicles will be similar to oil-powered cars but total costs of ownership will be much lower.

A recent study by workers’ unions shows that rather than the shift to plug-in cars being the main cause of job losses in the automotive industry, it will be innovations in manufacturing leading to increased automation. The study, by German metal workers’ union IG Metall modelled several scenarios for the take up of plug-in cars. The case in which by 2030 there were 25% battery electric cars and 15% PHEVs (more than the Commission proposal) found a net loss in employment of about 20 thousand jobs as a result of electrification and 55 thousand jobs through productivity changes. Of the total of 75 thousand jobs ‘affected’ only about 20,000 is related to the transition to e-mobility. An even more ambitious scenario of 40% sales of battery and 20% sales of PHEV models resulted in 27,000 automotive jobs affected by the transition to e-mobility. No estimates were made in the study of jobs created through the shift to e-mobility.

T&E estimated¹⁷ the impact of jobs in automotive manufacturing lost in the event that a shift to electric cars is met through imports, and another scenario in which Europe becomes a net exporter of plug-in vehicles. The jobs projections are based upon a scenario in which 25% of new cars sales are electric in 2030 and 10% PHEVs. To be manufactured, battery cars are assumed to require 0.75 the manpower and PHEVs 1.05 compared to a 2020 vehicle. No account is taken of changes in productivity. The analysis shows that if the EU manufacturers 90% the electric cars that are sold in the EU and the cells are also produced in the EU, there is just a 1% decline in manufacturing jobs. If the EU could become a net exporter of electric cars jobs

Car manufacturing job projections for 2030



¹⁷ T&E, <https://www.transportenvironment.org/sites/te/files/publications/Briefing%20-%20How%20will%20electric%20vehicle%20transition%20impact%20EU%20jobs.pdf>

will be created in automotive manufacturing. In contrast, if just 10% of the electric cars sold in Europe are made here employment will be greatly reduced to 72% of 2020 levels. The message is clear: the risk of electric cars being imported into the EU has a far greater job impacts on the automotive sector than the shift to electrification per se.

4. EU Member States need to support more ambitious CO2 standards for cars and vans and EV sales target to ensure market uptake and manufacturing in Europe

If Europe is to reap the economic, employment and climate benefits of the transition to e-mobility, it needs to adopt a progressive policy that actively encourages investment in manufacturing of plug-in vehicles here in Europe, just as China and California have done through their mandates. The most effective way to achieve this is to ensure there is a sizeable market for plug-in vehicles here. A significant market is more likely to be met through local production of vehicles as against a niche market that can be more cheaply met from imported vehicles. Member states can support the growth in plug-in vehicle sales manufactured locally here in Europe through reform of vehicle taxes, specifically raising taxes on gas-guzzlers to reduce those on low and zero emission models (e.g. applying a lower rate of VAT on zero emission models).

At present the EU market for plug-in vehicles is suppressed through limited supply and minimal advertising and promotion¹⁸. It is expected to grow to 5-7% of new car sales by 2021 as manufacturers increase supply to achieve 2020/1 CO2 targets. However, it is unclear how many of these vehicles will be built in the EU or imported - in particular from China for battery models and the US for PHEVs. It is even more uncertain how the market will develop after 2021. Ambitious (a 20% reduction) and binding 2025 cars and vans CO2 standards are essential as in their absence there will be no incentive for carmakers to expand the market for plug-in vehicles beyond the 5-7% expected in 2021 until the end of the decade. This would significantly slow investment in EU manufacturing for plug-in vehicles. A 2025 target also has the benefit of significantly reducing fleet CO2 emissions in 2030, helping member states to achieve their Effort Sharing targets. An additional sales target for zero emission vehicles – either as a ZEV mandate or a two-way adjustment over the CO2 targets with a malus – should also be included in the new regulation. This is imperative to get manufacturers serious about producing and selling EVs, to create a market for these vehicles and reduce the cost of production and prices for consumers due to economies of scale.

This paper presents a worrying picture of global investments in electromobility. It shows that China is attracting the investment from carmakers, not the EU, as a result of China's stronger policies. A strong market for electric cars will encourage vehicles to be manufactured close to market and will also drive the development of cell manufacturing, a market estimated to be worth EUR 250 billion by 2025 according to the new EU Battery Strategy¹⁹. Carmakers' own announcements are that they expect electric vehicles to account for around a quarter of car sales in 2025 in Europe²⁰. But it is far from certain how many of these cars will be built in EU member states. During the forthcoming Environment Council the Commission's proposals for post-2020 car and van CO2 standards will be a key topic for debate. Both to help member states meet their climate goals and put Europe on a path to achieve its Paris Commitments, a more ambitious proposal than that made by the Commission is needed. This is also the path that will secure investment and jobs in the European automotive industry and drive growth and yet more employment in the wider EU economy. Low carbon cars are good for the environment, jobs and growth - but zero carbon cars are better! The meeting on 25 June will show which member states are serious about both achieving their climate goals and the future of EU automotive industry (rather than its past).

¹⁸ T&E, https://www.transportenvironment.org/sites/te/files/2018_06_EV_announcements_report.pdf

¹⁹ European Commission, https://eur-lex.europa.eu/resource.html?uri=cellar:0e8b694e-59b5-11e8-ab41-01aa75ed71a1.0003.02/DOC_3&format=PDF

²⁰ T&E, https://www.transportenvironment.org/sites/te/files/2018_06_EV_announcements_report.pdf

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Annex

Annex: EU car company electrification investments: Investments and long term pledges made in the last 12 months

Car Company	Announced investment		Type of Investment	Source	Country
BMW	Undisclosed	Venture with Great Wall	EV manufacturing - Mini EV models	BMW Press, Feb 2018	China
	€300 million		Leipzig plant extension - BMW i range	BMW Press, May 2018	Germany
	€200 million	Until 2022	Munich Battery production centre	BMW Press, Nov 2017	Germany
Daimler	\$1 billion pledge	Mercedes-Benz	EQ EV manufacturing	Electrek article Sep, 2017	U.S.
	11.9 billion RMB	Joint venture with BAIC	EV manufacturing - BEV Mercedes-Benz	Daimler Press, Feb 2018	China
	Undisclosed	Mercedes-Benz	EQ EV manufacturing	Daimler Website, May 2018	Germany
	€500 million	Car plant investment	EQ EV manufacturing	Daimler Press, May 2018	France
	\$120 million	Mercedes-Benz	Battery factor	Electrek article Mar 2018	Thailand
	500 million RMB	Venture with BYD	Denza Brand EV	Bloomberg article Sep, 2017	China
FCA	\$9 billion	5 year electrification plan	BEV, PHEV manufacturing	Automotive News article, June 2018	Global
Ford	\$753 million	with Anhui Zotye Automobile Co.	Small manufacturing	Reuters article, Nov 2017	China
Nissan-Renault-Mitsubishi	1 Trillion Yen	Nissan 2022 plan	Introduction of 20 Electric models by 2022	Bloomberg article, Feb 2018	China

	\$1 billion	2023 pledge	New Mobility, Autonomous Driving, Connected Services, EV, Energy enterprise 2.0	Renault-Nissan-Mitsubishi Alliance Website, 2018	Globally - The Netherlands, U.S., France, Japan, China, Israel (2018)
	Undisclosed	Renault-Nissan venture with Dongfeng (eGT New Energy Automotive Co)	Locally designed Electric Vehicle for 2019	Renault Press, Aug 2017	China
PSA	3.6 billion RMB	Venture with ChangAn Automobile (CAPSA)	EV manufacturing - new PHEV, BEV and DS models	PSA Press, June, 2017	China
	€220 million	Venture with Nidec Corp	PHEV, EV production	PSA Press, May 2018	France
Renault	€1 billion		second electric production site	Renault Press, June 2018 Reuters Article, June 2018	France
	1.5 billion RMB	Venture with Brilliance	LCV Manufacturing venture - first e-LCV	Renault Press, Dec 2017 ChinaDaily article Dec 2018	China
Volvo	5 billion RMB		Polestar EV and hybrids	Volvo Press, Oct 2017	China
VW Group	€50 billion	2030 pledge	Battery cells	Volkswagen Press, Nov 2017	Unspecified
	€34 billion	2022 pledge	Overall development of E-mobility, autonomous driving, new mobility and digitalisation	Volkswagen Press, Nov 2017	Global
	€20 billion	2025 Roadmap E initiative	Industrialising e-mobility	Volkswagen Press, Nov 2018	EU and China

	€10 billion	2025 venture with Anhui Jianghuai Group	EV car manufacturing - 40 models, NEVs	Bloomberg article, Nov 2017	China
	€1 billion	2022 plant upgrades	Zwickau e-mobility plant	Volkswagen Press, Nov 2017 Automobil Produktion article, Nov 2017	Germany