

How will electric vehicle transition impact EU jobs?

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Summary

The automotive sector is on the brink of a major disruption and car makers are about to see “... more change in the next five years than [we’ve seen] in the last 50 years.”¹ One of these shifts is from internal combustion engines to electric mobility. The change will upset the market, create uncertainty, and redistribute power within the industry and will require new strategic orientations as well as stable, forward-looking policies. The evidence suggests jobs will change in the automotive industry but there will be a net increase in employment across the economy of 500-850 thousand. Estimates of how many jobs will be lost in automotive are highly uncertain but it seems likely in the medium term to 2030 none or few.

The biggest short term risk is that European OEMs have bet on the wrong technology in diesel and could shortly face new competition from China on EVs. If sizable numbers of electric cars are imported into the EU because new manufacturing capacity has been created there, then a quarter of jobs in manufacturing could effectively be offshored.

If the European OEMs are to avoid a “Kodak moment” they need to invest quickly and policy needs to establish a significant European market to encourage manufacturers to build EVs in Europe in response to a strong market here. An EU zero emission vehicle sales target as part of the forthcoming car CO2 regulation for post 2020 is the solution with a target of 15-20% sales by 2025. This would drive domestic investments in EV production, help maintain European manufacturers’ competitive advantage in the automotive sector, and ultimately lead to job creation in the EU.

1. Electric vehicles will replace conventionally fueled vehicles within the next two decades

Recent forecasts from ING bank indicate that by 2035, all new cars sold in Europe will be electric, because of falling battery costs and economies of scale.² Consumer organisations forecast for European drivers that BEVs (battery electric vehicles) will become cost competitive compared to their internal combustion counterparts in the early 2020’s based upon the total cost of ownership for the original buyer.³ Daimler forecast within 10 years there will be purchase price equivalence⁴ with BEVs on sale for around €10,000 with a 500km range. The debate is no longer whether such a revolution occurs but when between 2025 and 2040 sales of cars with engines are effectively over.

Along with declining diesel sales, partially as a result of Dieselgate and proposed city bans, there has been considerable concern expressed in the automotive sector about the impact of the change on jobs. BEVs contain significantly less components than cars with engines so some reductions in employment, particularly in the supply sector are to be expected. However, some recent claims appear to be

scaremongering and lack credibility.⁵ This paper considers how significant are the risks and what the net effects on the economy are expected to be.

2. What is the net impact on jobs and GDP?

One of the key benefits from a shift to e-mobility is that it reduces Europe’s dependence on oil. Transport is oil’s biggest customer, driving two-thirds of the demand for final petroleum products. Europe’s dependence on crude imports has increased sharply in the past 15 years as North Sea oil reserves have sharply declined such that 88% of all crude oil is imported and in 2015 Europe spent in total around €215bn on crude oil and diesel imports. This money flows out of the EU economy - there is only one EU company (Shell) in the top 10 oil suppliers in the EU (at 10th).⁶

Through reducing oil demand by more efficient and electric cars the European Climate Foundation estimated that employment will increase by 500,000 to 850,000 million in 2030.⁷ Driving the shift to electric vehicles would lead to a 1% increase in EU GDP, create up to 2 million additional jobs and reduce emissions from cars and vans of 83% by 2050.⁸

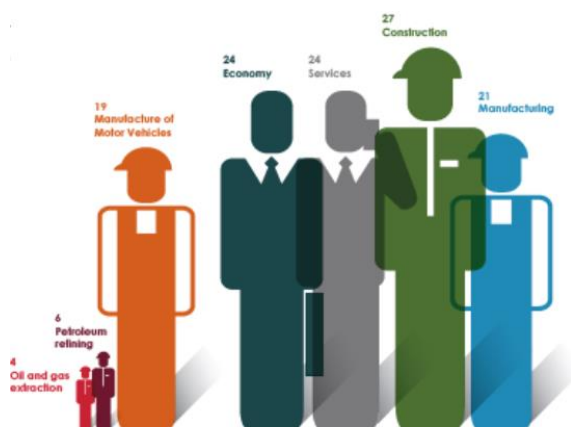
	UK	France	Europe
Consumer spending on fuel	-£600 per annum (\$860)	-EUR 590 per annum (\$655)	-EUR 480 per annum (\$530)
Net employment impact	7,000-19,000	66,000-71,000	500,000-850,000
CO ₂ emissions reduction from passenger cars	30mt per annum	26mt per annum	c. 240 mt per annum

So the net effect of electrification on the EU economy is hugely positive - even in countries with significant automotive industries. There are 3 reasons:

1. Extra technology in the motor vehicles sector providing high quality jobs in research and development
2. Additional infrastructure investment
3. Higher general consumer spending because of the substantially lower running costs of electric cars over their lifetime that more than offset their higher purchase price.

Oil production and distribution has very low employment intensity of just 4 jobs per million euros value added compared to 24 in the economy as a whole. Therefore any

shift in expenditure from buying imported oil to other expenditure choices creates employment. Furthermore, the claimed loss in excise revenues for Governments is simply replaced by higher tax revenues in other economic sectors.



A recent study by the Fraunhofer Institute provides a comprehensive estimate of the job impact of electric vehicle transition, looking at the finding of several recent studies.⁹ Drawing on the literature, Fraunhofer indicates that the impact of the transition will be nearly neutral to slightly positive, depending on OEMs investments in electric powertrains.

3. What is the impact on the automotive sector?

The shift in sales away from the ICEs towards BEVs results 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 automotive job losses are likely since the manufacturing process for a conventionally fueled car differs significantly from the one of an electric vehicle that requires many fewer parts. According to one estimate,¹⁰ an ICE requires 1400 components compared to 200 components for an EV.

A recent study by the German IFO institute for the car manufacturer association VDA (June 2017)¹¹ estimates that alone in Germany 600,000 jobs will be directly or indirectly impacted by the transition to electric vehicles. But this is only quantifying the potential losses, and ignoring job creations in other sectors resulting from the shift to e-mobility.

The electric vehicle disruption will also have an impact on the supply chain, which will undergo significant transformations:

- 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...
- New suppliers will emerge in the automotive supply chain, such as battery manufacturers, lightweighting and mining companies

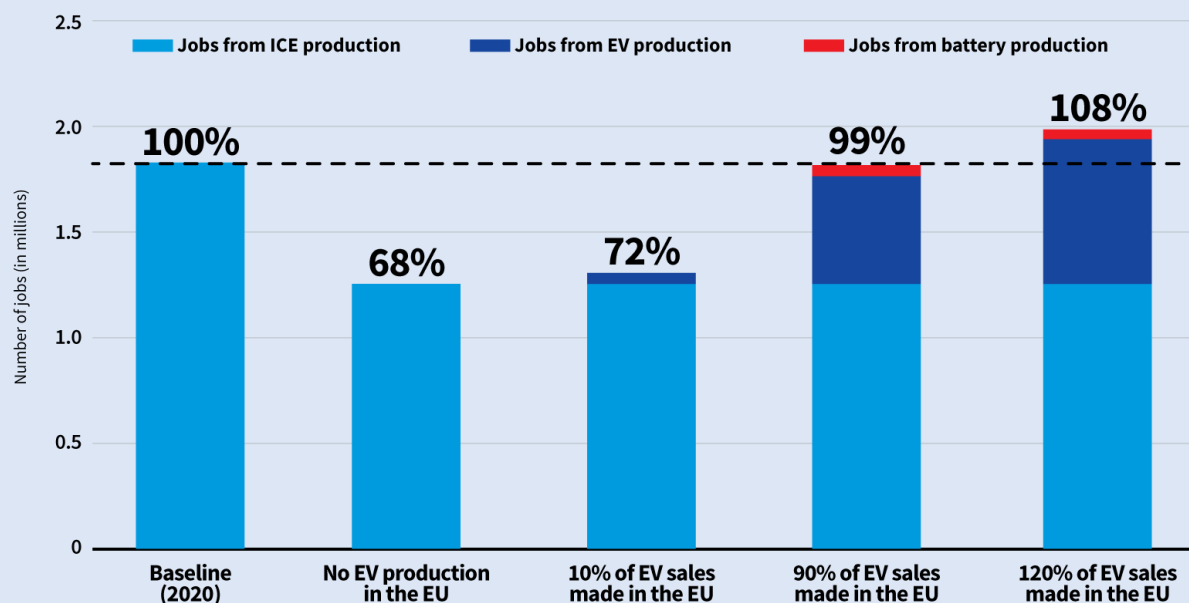
The above suggests that net jobs won't be lost, but will incrementally change: engineers and skilled workers will have to be trained to match the automotive sector's evolving needs. With the increased integration of the energy, telecommunication, and transport sectors, the impact of electric vehicles on job creation will need to be decoupled from its mere consequences on OEMs and their traditional tier 1 suppliers.

But despite the important changes in the value chain the competitiveness of the European industry is not expected to be significantly affected because future CO2 regulations impact equally all manufacturers. This is clearly illustrated in a study undertaken for the European Commission. This finds that "post 2020 EU LDV CO2 legislation has **no direct impacts** on the cost competitiveness of EU car manufacturing as the legislation is targeted at the CO2 performance of vehicles and not at factors that determine the costs of producing cars or their components."¹²

4. What if BEVs are not manufactured in Europe?

There is considerable focus on fewer jobs being required to manufacture BEVs. T&E estimates that one in four jobs in manufacturing could be lost through a switch to EVs but that the greater risk is that these EVs are not made in Europe at all. Vehicle manufacturing occurs close to market and the biggest market is China - that is gearing up to export EVs globally. The figure illustrates the impact on jobs from a 35% shift to EVs by 2030.

Car manufacturing job projections for 2030



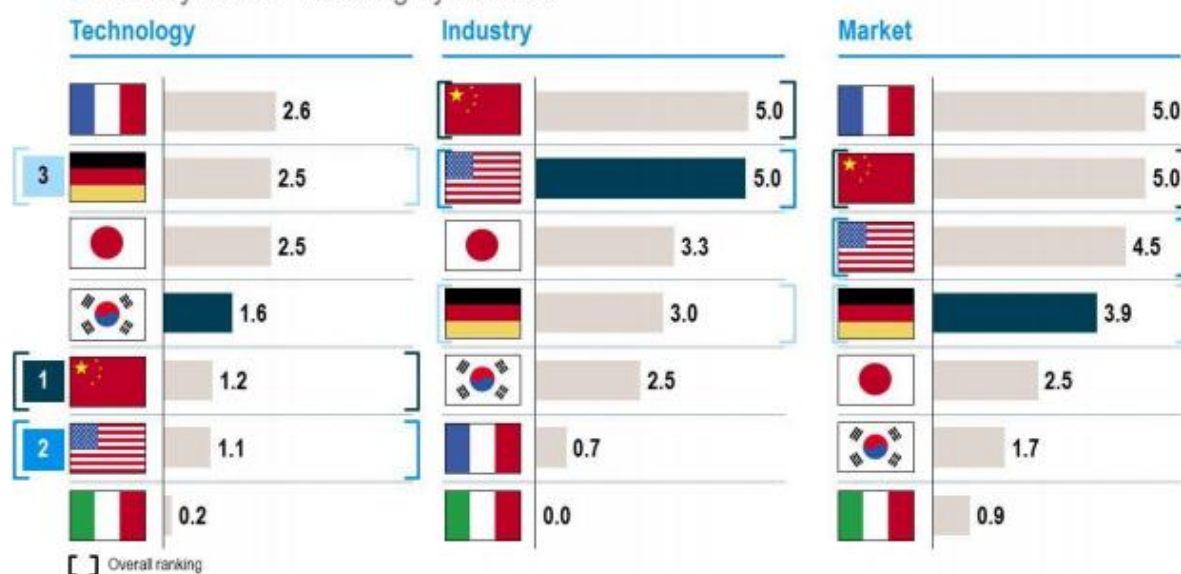
The difference between the three scenarios in terms of jobs is very significant. If EU OEMs largely neglect electro-mobility production in Europe such that just 10% of the EVs are manufactured here jobs in the automotive sectors could amount to only 72% of current employment levels. But if manufacturers seriously develop their EV production and supply 90% of the vehicles in Europe, automotive jobs by 2030 will decrease by only 6% compared to today (this assumes a 10% share of plug-in hybrid vehicles that require additional people to build two powertrains). Should EU OEMs be ambitious in ramping up local EV production and Europe becomes a net exporter of EVs additional jobs would be created (108% of current employment levels).¹³

5. Could Europe become a net importer of electric cars?

China is the world's largest market for electric cars (146.720 BEVs sold in 2016), followed by the European market partially due to high sales in Norway (84.520). The Chinese market is however forecast to grow more strongly with 500,000 sales in 2017 compared to 280 000 in Europe. This growth is largely explained by the strong political determination of the government, which has been linking industrial and consumer policies to create a significant domestic market prior to establishing massive export capacities. China has announced an electric vehicles sales quota, similar to the zero emission vehicle mandate already in place in California. The plans require 8%, 10%, and 12% of so-called New Energy Vehicles (NEVs - BEVs and PHEVs) credits for year 2018, 2019 and 2020.

Backed by this rapid market growth, China is extending its lead in developing the Electric Vehicle supply chain, because car makers tend to manufacture their products close to their market. Consequently, China and the US are building up their EV industry more rapidly than the EU, as the Roland Berger emobility index for Q2 2017 illustrates ¹⁴:

E-Mobility Index – Ranking by indicator



Source: fka; Roland Berger

In anticipation of the EV sales quota, EU OEMs started to expand their EV production capacities in China:

	Manufacturer	Announcement
China	Changan/Ford	100% of vehicles sold in China in 2025 should be electrified - Start of production of electric motors in China in 2020. ¹⁵
	Daimler/BAIC	Invest \$735mio in battery electric vehicle plant. ¹⁶
	Volkswagen/Jianghui Automobile Co.	Electric motors in Tianjin, with the intention to build 120,000 electric motors at full production. ¹⁷
	Volkswagen/FAW Group Corp. /SAIC Motor Corp.	Expand EV offer in China to 13 different models by 2020 ¹⁸
	Volkswagen/Jianghui Automobile Co	Build a 5.1 billion yuan EV assembly plant in Hefei. The factory will have annual capacity of 100,000 vehicles; production will start late 2018. ¹⁹
	Volkswagen/FAW Group Corp.	Build the electric Golf in China as of 2018. ²⁰
	Volvo (Geely)	Export 30,000-40,000/year S90 to Europe. ²¹

In contrast the announcements in Europe are more modest and Volvo is already exporting Chinese-made PHEVs to Europe.²² 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.

6. Conclusion: regulatory environment can incentivise electric vehicle production, securing future jobs in the automotive industry

The automotive sector is on the brink of a major disruption and car makers are about to see “... more change in the next five years than [we’ve seen] in the last 50 years.”²³ One of these shifts is from internal combustion engines to electric mobility. The change will upset the market, create uncertainty, and redistribute power within the industry and will require new strategic orientations as well as stable, forward-looking policies. The evidence suggests jobs will change in the automotive industry but there will be a net increase in employment across the economy of 500-850 thousand. Estimates of how many jobs will be lost in automotive are highly uncertain but it seems likely in the medium term to 2030 none or few.

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Endnotes

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