



## ANALYTICAL HIGHLIGHT

### FOCUS ON

# Automotive sector and clean vehicles

- Although the number of motor vehicle manufacturing jobs is forecast to grow at a moderate rate to 2025, demand for clean vehicles is contributing to the creation of **213,000 new high-skilled job openings** in research and development (R&D), design and senior roles in the manufacturing process.
- Clean vehicles will also require existing workers to **learn new skills** in the assembly of electric motors, computing, electronic control devices and sensing equipment.
- The majority of R&D and design jobs are expected to be in Western Europe, notably Germany. Central and Eastern European countries will experience a **growth in engineering jobs**. A steady supply of engineering and science, maths and computer science graduates and postgraduates will be required to fill these roles.

### Challenging EU targets for carbon reduction in transport are driving innovation in clean vehicles

The automotive sector includes the design and production of passenger cars and commercial vehicles, the production of vehicle body work and trailers and the manufacture of electrical and mechanical parts and accessories for cars and commercial vehicles.

It forms part of a wider transport industry that employs around 10 million people in Europe and accounts for around 5% of output<sup>1</sup>. Around 3 million of those jobs relate to the manufacture of motor vehicles. The remaining 7 million jobs are in the sale, repair and maintenance of vehicles and in the manufacture of vehicle components.

The development of cleaner, more efficient vehicles is a growing priority for EU car manufacturing. The European Commission's Transport White Paper<sup>1</sup> sets a goal of reducing transport CO<sub>2</sub> emissions by 60% up to 2050. Regulations adopted in 2009 set average CO<sub>2</sub> targets for new cars sold in the EU. This is leading to demand for:

- Increased energy efficiency in combustion engine powered vehicles; achieved through the use of lighter materials, smaller engines with greater power boost and more efficient energy recovery systems.
- Alternative energy powered vehicles, such as Battery Electric Vehicle, plug-in Hybrid Electric Vehicles, Fuel Cell Electric Vehicles, Liquefied Natural Gas (LNG), Compressed Natural Gas (CNG) and biofuel powered vehicles

Jobs supporting the development clean vehicles are primarily found within the automotive manufacturing sector. However, the growing market for clean vehicles also influences skill requirements in the wholesale and retail motor vehicle sector.

Additional jobs will also be created in the infrastructure for alternative energy-powered vehicles. For example, the use of electric, hydrogen and natural gas powered vehicles (CNG and LNG) will require significant investment in charging and fuelling infrastructure. The annual cost of electric vehicle infrastructure is estimated to be from €26 billion to €80 billion in 2050<sup>2</sup>. This is also expected to lead to new jobs in the construction, service and energy sectors.

### Average employment growth for the sector, but a changing job profile linked to clean vehicles

In 2013, over 2.3 million people were employed in the motor vehicle manufacturing sector across the EU28. Employment in the sector is forecast to grow by 3.2% to 2025, roughly equivalent to the economy as a whole (see Table 1). Taking account of a substantial need to replace employees leaving the sector due to retirement or for other reasons, an estimated 888,000 automotive jobs will need to be filled from 2013 to 2025.

The continued development of cleaner vehicles is projected to impact considerably on the occupational and skills profile of the sector. Over half of the total job openings to 2025 are forecast to require high-level qualifications (461,000 jobs). This includes 213,000 new jobs requiring high-level qualifications, countering an anticipated decline in the number of jobs requiring low- and medium-level qualifications in the sector.

An increase in the production of electric vehicles is likely to reduce the number of assembly line jobs. Electric vehicles are less labour-intensive to produce, because they have fewer parts<sup>3</sup>. Moreover, the growing use of electric components will increase safety risks, leading to the production process becoming further automated<sup>4</sup>. The push for clean vehicles will

▼ Table 1 - EU-28 medium-term employment forecast 2013 to 2025

	Employment levels		% change	2013-2025		
	2013	2025	2013-2025	Change in total employment (jobs created/lost)	Replacement needs	Total number of job openings
Motor vehicles	2,242,000	2,314,000	3.2	72,000	816,000	888,000
All sectors	223,763,000	231,241,000	3.3	7,598,000	96,623,000	104,221,000

Source: Cedefop (2014)

lead to new jobs in R&D, design and senior roles in the manufacturing process. In particular, there will be demand for:

- material scientists;
- computer analysts;
- chemical, electrical, industrial, material and mechanical engineers.

**Many of the new high-skilled jobs are likely to be in Western European countries and particularly Germany**

The forecasts for the vehicle manufacturing sector vary significantly by country. The largest expansion in automotive employment is expected in Romania (an additional 48,040 jobs, representing a 38% increase in sector employment by 2025) and the United Kingdom (an additional 33,050 jobs, representing a 25.8% increase). Other countries anticipated to have an above-average employment growth include Finland, Spain and Hungary. The small Latvian automotive sector is also expected to grow considerably.

Germany dominates automotive employment in the EU. Its 850,650 automotive workers in 2013 represented 37.9% of the total automotive industry in the EU. While Germany is only anticipated to have a small net increase in the number of automotive jobs (1.8%), this still represents an additional 15,160 jobs. Accounting the need to replace existing staff, it is forecast that 35.8% of all automotive job openings in the EU up to 2025 will be in Germany (341,590 job openings). In other countries, such as Poland, France and Italy, employment in the sector is expected to decline.

Innovation in clean vehicle production can have a substantial impact at national level. For example, in Slovakia<sup>5</sup>, the manufacture of three new clean vehicles in 2012 created nearly 1,000 new jobs.

**There is a good supply of graduates and postgraduates to meet the future skills needs of the sector**

Workers directly involved in the manufacture or maintenance of motor vehicles are expected to require new skills as cleaner vehicles add complexity to the design and production process. These new skills relate to:

- the assembly of electric motors
- computers
- electronic control devices
- sensing equipment<sup>6</sup>.

In Western European countries, there is an increased concentration of jobs requiring high-level qualifications within the automotive industry. This reflects that core activities, such as R&D and design, tend to be located in the countries where the car manufacturers are based. Conse-

quently, most of the new R&D and design occupations will be created in these countries.

Research in Slovenia<sup>7</sup> and France<sup>8</sup> has identified that clean vehicles are likely to require the workforce to have a wider range of transversal competencies ('mechatronics'). In France, it was identified that the skills demand would be greater among associated motor vehicle occupations in repair, maintenance and the recycling of motor vehicles.

For assembly line and machine operator jobs, it is expected that most of the new required skills can be developed through on-the-job training. Many of the skills required for low-carbon vehicles are also required for conventional cars.<sup>9</sup>

A growing supply of the engineering, science, mathematics and computing graduates are required to fill new high-skilled job roles<sup>10</sup>. There has been considerable growth in engineering graduates over the last decade in countries that have a large motor vehicle manufacturing sector, such as Germany, Slovakia, Czech Republic and Romania. The proportion of graduates specialising in science, maths and computer science is slightly higher than that for engineering, and higher within Europe than the USA or Japan.

There is also a good supply of postgraduates to support the development of new vehicle technologies. The proportion of postgraduates specialising in engineering, science, maths and computer science is relatively high in many of the countries that are most likely to benefit from the growth in R&D and design jobs (Germany, France, Sweden and the Spain). ■

- 1 European Commission (2011), Roadmap to a single European transport area - Towards a competitive and resource efficient transport system
- 2 Delft (2012), Literature review of the economic impact of GHG reduction policies for transport
- 3 Delft (2012), Literature review of the economic impact of GHG reduction policies for transport
- 4 Cambridge Econometrics, Element Energy Ricardo-AEA (2013), Fuelling Europe's future: How auto innovation leads to EU jobs
- 5 Automotive Industry Association of the Slovak Republic (ZAP SR)
- 6 Cambridge Econometrics, Element Energy Ricardo-AEA (2013), Fuelling Europe's future: How auto innovation leads to EU jobs
- 7 Synergetic ecologic safe car association, Slovenia
- 8 Commissariat General Au Development Durable, France, (2011), Gestion prévisionnelle des emplois et des compétences dans les secteurs de l'industrie et de l'énergie dans le contexte d'une économie verte
- 9 Cambridge Econometrics, Element Energy Ricardo-AEA (2013), Fuelling Europe's future: How auto innovation leads to EU jobs
- 10 Cambridge Econometrics, Element Energy Ricardo-AEA (2013), Fuelling Europe's future: How auto innovation leads to EU jobs



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