E-mobility: A green boost for European automotive jobs?
Development of automotive jobs till 2030 …

Affected industries and major trends driving job demand

Total number of jobs until 2030 and shifts between industries

Temporal, industry & job-related as well as regional transitions

1. EU27 + UK + Norway
Source: BCG
5.7 million jobs spread across eight industries

Number of employees (2019, in thousands)

Core automotive
- OEMs: 1.020
- ICE-focused suppliers: 2.280
- ICE-unfocused suppliers: 670
- Maintenance and Repair: 1.080

Adjacent industries
- Equipment & Services: 440
- Energy production: 50
- Energy infrastructure: 20
- Recycling: 90

Source: EuroStat; BCG
Five major trends are driving employment in Europe

<table>
<thead>
<tr>
<th>Trend</th>
<th>Development of trends - not direct impact on jobs</th>
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<tbody>
<tr>
<td><strong>Market volume</strong></td>
<td>-0.4% Yearly production decrease¹</td>
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<td>-0.7% Yearly sales decrease¹</td>
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<td></td>
<td>0.7% Yearly car parc increase¹</td>
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<tr>
<td><strong>Technology evolution</strong></td>
<td>11% Yearly increase in software value per car</td>
</tr>
<tr>
<td><strong>Product mix</strong></td>
<td>1.0% Yearly increase in content per car</td>
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<td>0% Increase in overall car portfolio</td>
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<tr>
<td><strong>Productivity</strong></td>
<td>0.8% Average yearly increase in productivity across industries</td>
</tr>
<tr>
<td><strong>Shift to EV</strong></td>
<td>59% 2030 BEV production share</td>
</tr>
<tr>
<td></td>
<td>100% High value-add in battery production</td>
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1. 2019 as baseline year
Source: IHS Markit; BCG

Legend:
- Positive impact on job demand
- Negative impact on job demand
- No impact on job demand
Sum of trends keeps employment stable …

Job losses and job gains (in thousands) due to various trends

Source: BCG
... but leads to significant shifts between industries

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<tbody>
<tr>
<td><strong>Core automotive</strong></td>
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<tr>
<td>OEMs</td>
<td>-20%</td>
<td>-220</td>
<td></td>
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<td>Strong reduction in production due to lower labor content in BEVs</td>
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<tr>
<td>ICE-focused suppliers</td>
<td>-42%</td>
<td>-280</td>
<td></td>
<td></td>
<td>Strong downsizing in all areas due to falling demand from components</td>
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<tr>
<td>ICE-unfocused suppliers</td>
<td>10%</td>
<td>240</td>
<td></td>
<td></td>
<td>Expansion in all areas, in particular driven by cell production facilities</td>
</tr>
<tr>
<td>Maintenance and Repair</td>
<td>2%</td>
<td>20</td>
<td></td>
<td></td>
<td>Increase due to increasing and aging overall car parc, BEVs still limited</td>
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<tr>
<td><strong>Adjacent industries</strong></td>
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<tr>
<td>Equipment &amp; Services</td>
<td>3%</td>
<td>15</td>
<td></td>
<td></td>
<td>Slight build up through rebuilding in factories of OEMs and suppliers</td>
</tr>
<tr>
<td>Energy production</td>
<td>128%</td>
<td>60</td>
<td></td>
<td></td>
<td>Build-up due to increasing capacities and higher share of renewable energies</td>
</tr>
<tr>
<td>Energy infrastructure</td>
<td>543%</td>
<td>120</td>
<td></td>
<td></td>
<td>Increase for the production, installation and operation of charging infrastructure</td>
</tr>
<tr>
<td>Recycling</td>
<td>8%</td>
<td>10</td>
<td></td>
<td></td>
<td>Nearly stable as life of electric cars is longer than the period under review</td>
</tr>
</tbody>
</table>

Source: BCG
On top, EV shift demands ~400k construction man-years until 2030 - on average ~40k jobs per year

Battery manufacturing
Labor demand increase driven by building of new battery manufacturing plants
~ 270k man-years

Energy production
Labor demand increase driven by installation of new renewable energy capacity (e.g., solar, wind)
~ 60k man-years

Charging infrastructure
Labor demand increase driven by set up of major charging points and associated grid enforcements
~ 60k man-years

~400k construction man-years demanded driven by the "Switch to EV"

Note: Job numbers shown represent the total labor demand and not necessary lead to permanent employment.
Source: BCG
Transition of job positions in 3 perspectives

1. Transition over time
   - Employment needs change continuously

2. Transition between industries & job families
   - ~2.4 million jobs have partly high training requirements

3. Transition across regions
   - Example Germany: Slight regional effects expected

Source: BCG
Employment needs change continuously

Total job demand across the industries in Europe [in k]

- Pre-COVID level reached '24 and exceeded after '29
- Governmental programs
- COVID setback
- Consolidation phase

No return to previous growth trajectory until 2030
Recovery from COVID setback expected until ~2023
Consolidation phase 2025-27 due to total volume decline

Source: EuroStat; IHS Markit; BCG
2.4M positions with dedicated training needs

### Situation
- **Same job profile**: Remaining in the company and profession with slightly different requirements
- **Similar job profile**: Change to a similar industry and / or job profile
- **New job profile**: Change to other industry and / or new job profile

### Measures
- **Same job profile**: On-the-job training required
- **Similar job profile**: Retraining and relocation necessary
- **New job profile**: Requalification and relocation necessary

### Affected positions
- **~1,600k**
- **~610k**
- **~225k**

### Example
- **Employee final assembly automotive OEM**
- **Employee gearbox production to electric motor assembly**
- **Employee battery cell production**

Source: BCG
Example Germany: Small regional effects expected

Regional impact on jobs in Germany [in k]

Differences across regions due to specific industry structure

Germany

Western Germany

2019: 283
2030: 289
+6k (+2%)
Jobs in 2030 vs. 2019

Eastern Germany

2019: 179
2030: 195
+16k (+9%)
Jobs in 2030 vs. 2019

Baden-Württemberg

2019: 452
2030: 450
-2k (~0%)
Jobs in 2030 vs. 2019

Bavaria

2019: 416
2030: 414
-2k (~0%)
Jobs in 2030 vs. 2019

Source: BCG

Transition across regions

Northern Germany

2019: 360
2030: 365
+5k (+1%)
Jobs in 2030 vs. 2019

Jobs in 2030 vs. 2019

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Transition across regions
Our three key findings

In total, the number of jobs across the eight investigated industries will remain nearly constant until 2030. However, there will be significant shifts.

In consequence, strong temporal, industry and job-related as well as regional transitions will occur in the labor market.

For a successful transformation, industry as well as politics are jointly required to manage these turbulent times.
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