



# Skilled Staff for Decarbonisation of Industry

The Skills Shortage and Recommendations for Action

Executive Summary

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The goal of achieving greenhouse gas neutrality by 2045 presents major challenges. Not least in manufacturing: current figures show that the sector produces a quarter of total emissions in Germany, with steelmaking and the production of cement or basic chemicals such as ethylene or ammonia still responsible for high levels of emissions (source: German Federal Ministry for Economic Affairs and Climate Action, 2022). At the same time, the manufacturing sector has a key role to play in the energy transition – by producing important basic materials, for example. If we throw inflation, high energy prices and technological planning uncertainty into the mix, we see that the sector's energy-intensive industries also pose tough management challenges and face increasing international competitive pressure.

To prepare energy-intensive manufacturing industries in Germany for the future, comprehensive, long-term decarbonisation is needed for all of its production processes. To avoid GHG emissions, the large-scale development and rollout of new technologies, methods and processes is also needed. There are no magic bullets here: instead of ready-made, off-the-shelf solutions, manufacturing businesses are instead faced with developing and applying made-to-measure technological solutions for a wide variety of manufacturing methods.

Being able to draw on **well-qualified new hires and seasoned employees** is also an essential part of this process. Yet, according to a 2022 report from the Association of German Chambers of Commerce and Industry (DIHK), some 58% of manufacturers are now experiencing shortages here – an uptick from the previous year (DIHK 2022). This shortage of specialists, resulting from demographic change, is likely to grow more serious from this point forwards. As a result, a lack of skilled specialists is threatening to become a **roadblock to successful decarbonisation** for energy-intensive industries.

### Study methodology

For this study, commissioned by the Cluster Decarbonising Industry (CDI), Prognos AG investigated the skilled personnel and skills in general being sought by energy-intensive industries to meet the challenges of decarbonisation. Key questions asked here covered the specific challenges and obstacles companies are encountering in hiring skilled employees and skilling up their workforce. The study was conducted as an **online survey** of representatives from businesses, industry associations, research institutions and other stakeholders from the energy-intensive industries, further enriched by insights gained by **face-to-face interviews of company representatives**. A total of 218 people took part in the online survey.

The overall aim of the study was to use the findings of the quantitative and qualitative surveys to identify specific approaches to improving existing structures for skills training and professional development. Alongside desk research, **interviews** were also conducted with **educational and training experts**. Based on the skills training approaches identified, specific recommendations for action were then derived for the higher education, vocational and further training sectors, as well as policymakers and companies, together with business associations.

The role of the CDI as initiator and nationwide thought leader in Germany was also addressed.

The recommendations for action aim to offer decision-makers in the energy-intensive industries, educational institutions and research institutes as well as policymaking circles a set of actionable ideas for securing skilled employees and skilling up workers for decarbonisation.

## Study findings

A key finding from the present study is that approaches to securing skilled personnel involve clear challenges of both a quantitative and qualitative nature.

- More than three quarters of respondents state that **not enough candidates apply** to their skilled job vacancies or vocational training courses. Eight out of ten companies also say that the candidates that do apply are not well-qualified enough for the position. In terms of qualifications required, (technical) college graduates and vocational trainees are the most sought-after group.
- For decarbonisation itself, **technical (engineering) skills** are required on the one hand – e.g. in relation to energy/environmental engineering, process engineering or electrical engineering. On the other hand, transferable skills such as process-independent, systematic thinking are also (even more) highly sought after by almost all respondents. For many professions, a high degree of **digital literacy** is also important, so as to exploit synergistic benefits relating to both digitalisation and sustainability.
- At the same time, the survey shows that improves need to be made to the **'fit' between current degree and vocational training course curricula and the needs of company practice**. As one example, more than half of respondents want to see changes to the course content in engineering professions. Course corrections are also seen as necessary in manufacturing-related metalworking and electrical jobs, as well as IT roles and consulting jobs in energy/energy management.

These findings from the quantitative and qualitative surveys point to the need for fundamental improvements in relation to the basic and further training offered in a higher education or vocational context in order to successfully decarbonise energy-intensive industries.

- One key action area here is the development of courses with **practical relevance at higher education institutions (HEIs)**. While basic and further educational courses of an academic nature do now exist that link the theoretical subject content at the college with practical professional experience, these are still few and far between. Survey respondents are also keen to see HEIs further embracing basic and further training focused on specific professions. A corresponding updating and alignment of existing course curricula plus the development of entirely new degree courses could transform more HEIs into 'places of living learning', by offering specific further training modules at degree level for a wide variety of target audiences.
- Another area where action is needed is the development of **modular, online courses**. Due to the skills shortage, employees in energy-intensive industries experience a demanding day-to-day environment that may involve shift work, for example. Putting professional duties on hold to skill up the workforce is therefore often difficult for companies to manage. This is where modular courses can help people to develop their skills and keep them up-to-date, alongside

their day jobs. In relation to new technologies, online formats can be attractive, which allow employees to gain new skills at their own pace. Massive Open Online Courses (MOOCs) focused on a particular topic can lead to the broad availability of advanced expertise.

- One specific skills area needing attention was mentioned repeatedly within the survey, namely **decarbonisation management**. This skills area focuses on the integration of subject-specific technical expertise with process-based thinking and (operational business) know-how with the aim of improving production processes and value chains. While there are isolated cases of courses covering this specific need at individual HEIs, their overall reach is by no means sufficient to serve the manufacturing sector as a whole.
- Last but not least, **continuing professional development** is also important **for training staff themselves**. To engage in practical capacity-building as part of decarbonisation, company-internal training personnel need access to up-to-date course content. To train these trainers, degree course-integrated additional qualifications as well as regional- and industry-specific further training programmes could be developed.

The study findings show that practical, **tailor-made qualification programmes are a condition precedent for the successful implementation of decarbonisation**. Yet skills training is all too rarely seen as a necessary component of this transition.

This results in a range of recommendations for action for the Cluster Decarbonisation in Industries (CDI), policymakers and businesses, with the aim of working together on further improving vocational and further training. A central aspect is that the responsible stakeholders should intensify dialogue here, and both utilise and improve on good practice examples from regions already in the process of transition.

As an **initiator and nationwide thought leader** in Germany, the CDI can help to raise public awareness of the skills shortage in relation to decarbonising manufacturing and therefore also improve the attractiveness of in-demand professions among young career starters. Beyond this, the CDI can work with sector industries, civic society partners and policymakers to not only assist in the innovative process but also suggest new ideas and solution strategies for improving educational resources.

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