ChemSkills

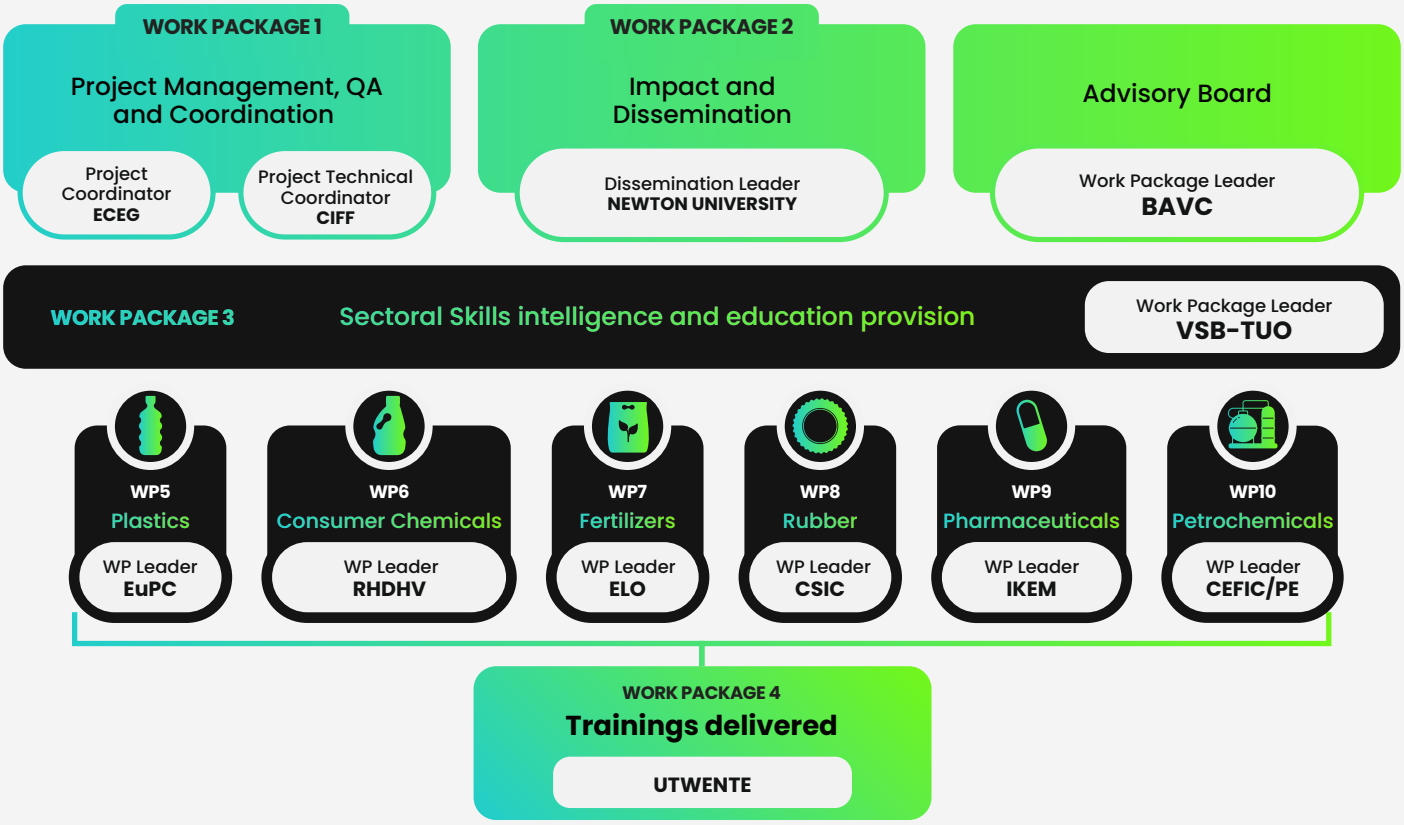
Two Years in the Making

ChemSkills Recap: Volume 2

Introduction

The ChemSkills project, co-funded by the European Union, supports the chemical industry in getting ready for the green and digital transition. From 2023 to 2027, partners from across Europe work together to identify skills needs, design new learning opportunities and support “safe and sustainable chemicals by design” in six key sub-sectors:

- Plastics
- Consumer chemicals
- Fertilisers
- Rubber
- Pharmaceuticals
- Petrochemicals



ChemSkills brings together a large partnership of employers' organisations, trade unions, companies, VET and higher education providers, research bodies and other stakeholders. Together, they aim to build a common understanding of future skill needs and to translate this into practical tools for companies, learners and training providers.

During the first two years, the consortium has put in place strong project management and communication structures, developed a shared approach to skills intelligence, and launched work in all sectoral Work Packages. Partners have begun mapping existing training, identifying skills gaps and outlining new job profiles and learning pathways.

Key cross-cutting tools, such as the ChemSkills Future Skills Survey, the competence matrix and new Skill Cards for emerging occupational profiles, are developed and presented within the relevant Work Packages of this Recap.

This document summarises the main achievements of each Work Package (WP) between September 2023 and October 2025.

Work Package 1: Project Management, QA and Coordination

WP1 is responsible for the overall coordination and quality management of ChemSkills. It makes sure that all partners work towards the same objectives, that deadlines are met and that the project follows EU rules and standards. The Work Package is jointly led by the European Chemical Employers Group (ECEG) as Project Coordinator and the Chemical Industry Federation of Finland (CIFF) as Technical Coordinator. Together, they coordinate the work of all other WPs and act as the main contact point with the European Commission.

Because ChemSkills brings together more than 30 partners from across Europe, WP1 has set up a clear but flexible coordination model. WP leaders meet regularly online to discuss progress, upcoming tasks and any issues that need attention. In addition, there are regular online consortium meetings to share cross-cutting updates, prepare major deliverables and coordinate joint activities.

These online exchanges are complemented by in-person meetings. The project started with a kick-off meeting in Brussels in September 2023, bringing together representatives from all partner organisations to agree on the work plan and next steps. A second in-person meeting was held in Brussels in April 2024, focusing on early results and the launch of key activities in skills intelligence, training development and communication. On the project's first anniversary, partners met at the University of Novi Sad in Serbia for a consortium meeting combined with the first ChemSkills public conference, creating a strong link between internal coordination and external communication with stakeholders. In April 2025, the consortium met again in Brussels, hosted by EuPC, to review the state of play across all WPs and to prepare the next project phase. More recently, the partnership working towards a major milestone: a consortium meeting and public conference held from 20 to 22 October 2025 in Milan, Italy. Hosted by Federchimica, the Italian Federation of the Chemical Industry, which showcased interim results and deepened cooperation with external partners.

To ensure that the project delivers reliable and consistent results, WP1 has put in place a Quality Assurance and Risk Management framework. This includes internal review of key deliverables before submission, simple processes for partners to flag potential risks such as delays, data gaps or staffing changes, and follow-up actions agreed with the relevant WPs. This systematic approach helps to keep the project on track and to maintain a high standard of outputs across all areas of work.

WP1 also leads the "Sustainability and Cooperation Plan", which looks beyond the formal project period. This plan sets out how core project results – including the survey findings, the competence matrix, the Skill Cards and the training modules – can continue to be used and updated after the project ends. It also encourages partners to build on ChemSkills in other initiatives and networks, so that the knowledge and tools developed in the project continue to support the chemical industry and its learners in the long term.

Overall, WP1 provides the backbone of ChemSkills: it organises the structures and meetings that allow a large European consortium to work together effectively and to deliver results that have real value for the sector.

Brussels, Kick-off,
September 2023

Brussels , meeting, April 2024

Public conference Novi Sad, Serbia
September 2024

Brussels, meeting, April 2025

Public conference Milan, Italy
October 2025

Work Package 2: Impact and Dissemination

WP2 is responsible for impact, communication and dissemination in ChemSkills. During the first two years of the project, it coordinated all communication, dissemination and stakeholder engagement activities to ensure a strong public presence for ChemSkills and full compliance with EU visibility requirements.

WP2 first developed the **Communication and Dissemination Strategy** and the **Project Results Dissemination Action Plan and Targets** (both in November 2023) and has updated them annually (August 2024 and August 2025). These documents define target audiences, channels, key performance indicators (KPIs) and responsibilities, and they are used by the whole consortium to plan and monitor dissemination activities.

A full **visual identity and promotional package** was created, including logo, templates, brochures, posters, roll-ups, infographics, video jingles and a graphics manual. These materials support partners at conferences, workshops and meetings, and many of them are publicly available on the project website so that stakeholders can reuse them when promoting ChemSkills in their own contexts.

WP2 established and now maintains the project's main **online channels**: the website, LinkedIn, X/Twitter and YouTube. These are used to publish project news, promote events and deliverables, share survey calls and skill-related content, and host audiovisual material such as conference recordings. Dissemination through these channels is well on track with the agreed KPIs. The project has delivered more than eight website updates per year and maintains a regular social media rhythm of more than eight posts per month. On LinkedIn (64 posts so far), ChemSkills has achieved on average around **641 impressions and 47 interactions per post**, with an engagement rate of **9.8%**. On X/Twitter (52 posts), posts have reached on average **76 impressions and 13 interactions**, with an engagement rate of **10.9%**. The KPI of at least **30 interactions per month** after Year 2 has therefore been clearly achieved, and the KPI of **over 500 social media followers** across platforms has also been met.

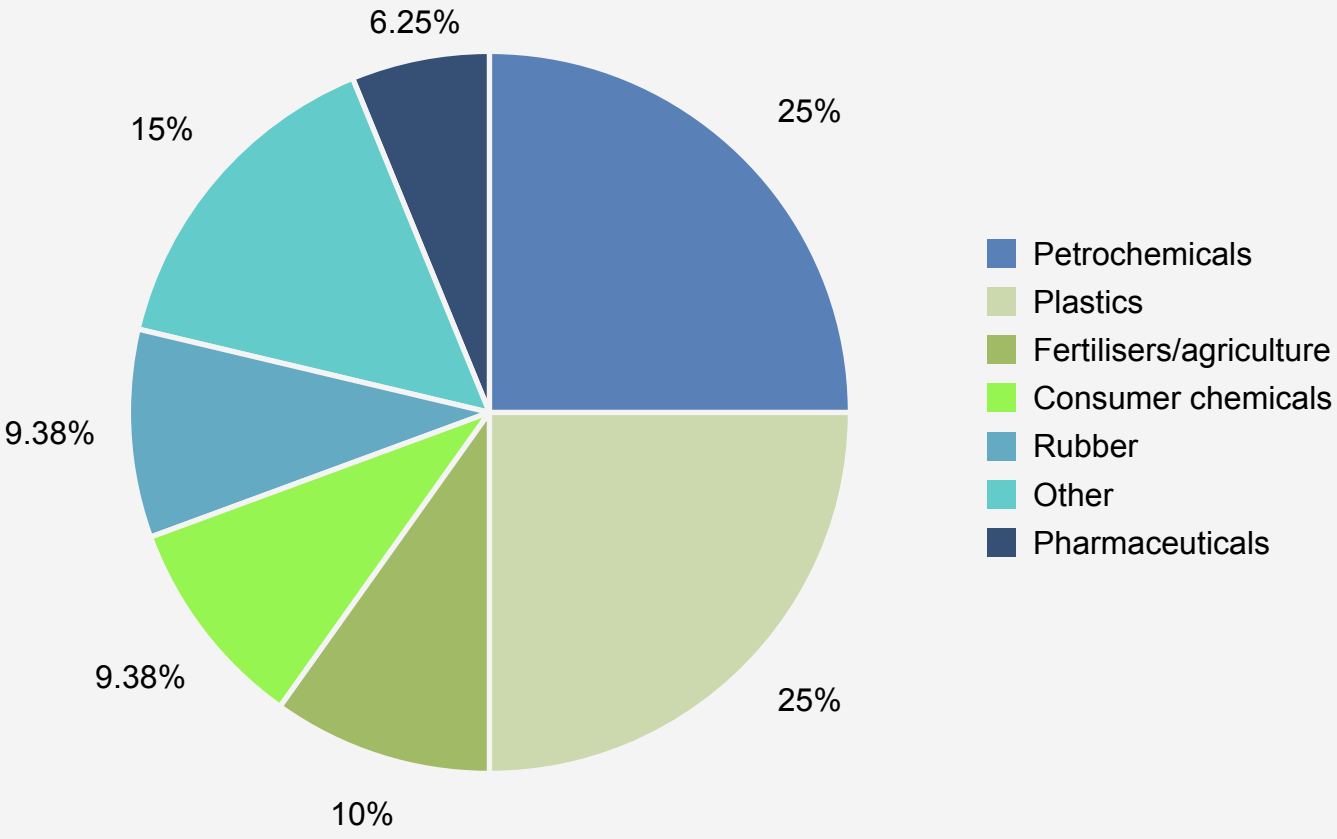
In terms of events, WP2 coordinated dissemination for **two public conferences**: the first held in **Novi Sad (17 September 2024)** and the second in **Milan (22 October 2025)**. These conferences offered a platform for all WPs to present their interim results and to exchange with external stakeholders.

The Work Package has strengthened dissemination capacity across the consortium, ensured constant visibility of ChemSkills and its results, and laid a solid foundation for the wider and long-term uptake of project outputs in the different chemical sub-sectors.

Work Package 3: Sectoral Skills Intelligence and Education Provision

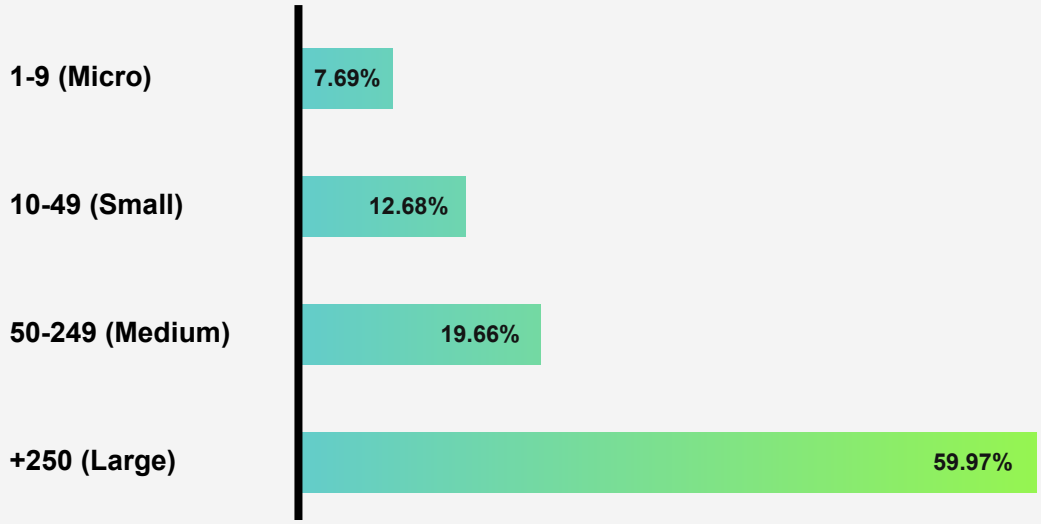
Work Package 3 brings together all the intelligence on skills and education needs across the chemical value chain and turns it into a clear, shared picture for the whole project. Over the past period, the team has moved from setting up methods to delivering concrete results that now guide the sectoral work packages, the Skill Cards and the design of new training offers.

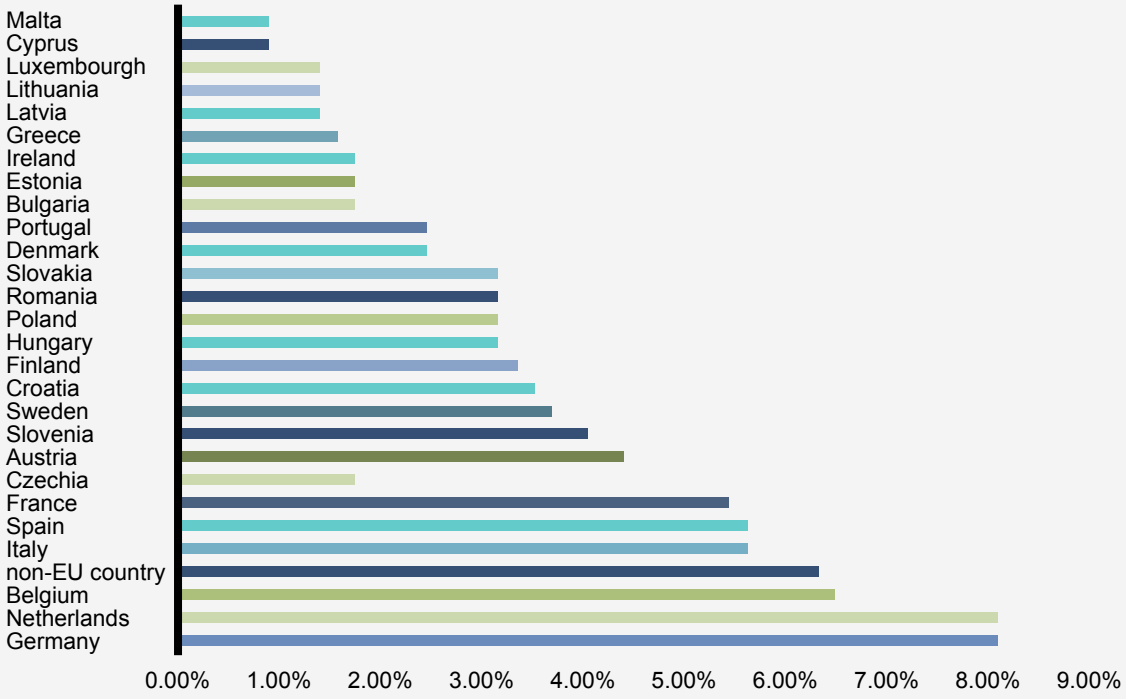
A key achievement was the preparation of the “Global Methodology, Concepts and Strategy” document, which now serves as the common reference point for all sectoral work packages (WPs 5–10). It explains how to collect and assess data through desk research, surveys, interviews and workshops, and provides ready-to-use templates so that plastics, fertilisers, rubber, consumer chemicals, pharmaceuticals and petrochemicals all work in a comparable way. This living document was first issued in early 2024 and updated again in late 2024. The following revision is planned at the end of 2025 to reflect the lessons learned from the first project activities and to better capture the emerging trends reported by the sectors.



On this basis, WP3 designed and coordinated two large “Future Skills” surveys, both hosted on the EU Digital Survey platform. In Work Package 3, the survey data are analysed and visualised using Power BI, providing a clear and accessible overview of the results both at the aggregate level and across individual sub-sectors. These consolidated insights serve as a foundation for sector-specific interpretation, enabling deeper understanding of patterns, needs, and emerging trends within each domain. **The first run** (February–October 2024) already attracted a diverse

group of respondents across the chemical value chain. Around half of the responses came from the plastics sector, with strong participation also from petrochemicals and fertilisers. More than 56% of respondents represented large organisations with over 250 employees, while smaller companies with fewer than 50 staff formed a meaningful minority in the sample. Geographically, the Netherlands provided the largest share of responses (around 38%), followed by Germany and Belgium, and about 30% of respondents came from outside the EU, confirming the global nature of chemical value chains.





The survey results provided a clear and sometimes surprising picture of current gaps. More than half of those surveyed highlighted an urgent need for new education and training in circular economy practices and cybersecurity. At the same time, roughly 40% of organisations reported that they still do not offer any training in these areas, showing a strong gap between what companies say

they need and what is currently available to workers. The results also confirmed a high demand for re-skilling and up-skilling in general, with employers looking for a mix of technical, digital and green competences that can support decarbonisation, new business models and stricter regulation.

These insights are now feeding directly into the project's Skill Cards and training offer. WP3 collects survey results, desk research and workshop outcomes from all sectoral WPs in a common competence matrix. Using this matrix, WP3 and its partners have identified 118 individual trends across the sector and grouped them into a set of megatrends that cut across subsectors, such as sustainability and circularity, digitalisation and automation, and regulatory and safety demands. In total, 242 skills relevant to the chemical industry have been mapped, including 24 skills that are completely new to the ESCO classification and 71 skills that are closely related to existing ESCO entries. This mapping ensures that the work done in ChemSkills connects to the wider European skills and qualifications framework.

Based on this work, WP3 has assembled a first set of general chemical sector skills and has coordinated the development of new occupational profiles that describe what jobs in a green and digital chemical industry will look like. Six new profiles have already been defined and validated together with companies and education providers, each supported by a Skill Card that explains the key competences, typical tasks and links to emerging training offers. These Skill Cards translate sometimes abstract megatrends into concrete job roles and learning needs, making it easier for employers, workers and training providers to understand where to focus their efforts.

WP3 has also played an important role in building national-level models that can later be used in other countries. In Slovenia, for example, partners developed the first national competence model for the chemical sector, working closely with companies such as Cinkarna, Novartis and TKI. The model links future digital, green and transversal skills to national qualification standards and is mapped again to the ESCO framework. It has already been presented at national HR events and validated in ChemSkills workshops, showing how the project's methods can support real reform in education and training systems.

Finally, WP3 has started to use this growing knowledge base to look ahead. Scenario-building activities and early roadmap work explore how talent attraction, defence-related chemicals, and other strategic topics might develop in the coming years, and what this will mean for job roles and competence needs. Combined with regular newsletters, LinkedIn updates and joint workshops, this ensures that the sectoral skills intelligence produced in WP3 is not just stored in reports, but actively shapes the Skill Cards, the Learning Platform, a comprehensive online learning portal with trainings developed within ChemSkills together with training catalogue Skills Hub and the design of future training programmes across all ChemSkills work packages.

Work Package 4: Training Delivered

WP4 is responsible for turning ChemSkills' skills intelligence into actual learning opportunities. Its role is to design and deliver trainings that help workers in the chemical industry to develop the green and digital competences identified in the project, in a way that is flexible, modular and directly linked to real job profiles.

During the first two years, WP4 has built the basic "training architecture" for the whole project. The first important result is the **mapping of existing training offers** within the consortium. By August 2024, partners had identified **32 existing training programmes** that are relevant to ChemSkills. Most of these offers come from the pharmaceutical sector (**19 programmes**), while there are currently no consortium-based training offers in the petrochemicals sector, and six programmes are of interest across all sub-sectors. These programmes are being integrated into the Skills Hub course catalogue and used as a **baseline** for where ChemSkills can add most value with new training modules.

To make sure that all new courses follow a clear and comparable structure, WP4 has created a **standard requirements framework** for training development. This framework specifies what information every ChemSkills module must include: details about the provider and related sub-sector; a short description of the course and its target group; technical information such as duration, EQF level and delivery format; and, crucially, a list of the skills covered, with their definitions and domains. This framework has already gone through its first revision cycle and now guides all partners when they design new modules, ensuring that training offers are consistent and easy to compare and re-use.

In parallel, WP4 has defined a **set of Key Performance Indicators (KPIs)** to track delivery and impact. These KPIs cover, for example, the total number of new modules to be created, how evenly they are distributed across the six sub-sectors, the minimum number of trainees to be reached, the balance between online, onsite and blended formats (including MOOCs), and basic information about participants such as gender, age and country. This means that from the start, ChemSkills training is being designed with **measurable impact** in mind, rather than as isolated one-off courses.

On the content side, WP4 has worked with the sectoral work packages and WP3 to translate identified skills needs into **concrete training modules**. Using the results of desk research, the Future Skills Survey, workshops and interviews, partners have drawn up a first portfolio of **22 planned training modules** (status August 2025). These modules cover topics such as bio-based raw materials (cellulose and lignin), sustainable materials, circular economy and "R-strategies" for plastics, green chemistry, nuclear radiation safety, toxicology, digital skills in AI and cybersecurity, business analytics, HR management, agricultural data and remote sensing, and laboratory health and safety. Each module concentrates on up to five specific skills and related learning outcomes, and modules can be combined into larger packages for particular job roles, so that companies and learners can build **customised learning pathways** rather than being limited to fixed, one-size-fits-all courses.

Importantly, some of these modules have already moved from planning to implementation. By Month 24, **four new training modules** had been fully prepared and uploaded by the University of Twente onto the ChemSkills **Learning Platform** (learn.skills-hub.eu): "Bio-based raw materials: Cellulose", "Bio-based raw materials: Lignin", "Cellulose as bio-based ingredient in rubber compounds" and "Tensile Test Training – Rubber". These modules are now ready for piloting and will be used to test not only the content but also the delivery formats, assessment methods and feedback tools that ChemSkills will apply more widely in later phases.

All of this training development work is closely linked to the **Skill Cards and competence matrix** created in other work packages. WP4 uses the occupational profiles and skills identified by WP3 and the sectoral WPs as a starting point, ensuring that each module clearly supports specific roles and competences. The requirements framework asks providers to reference ESCO skills and indicate EQF levels, which means that the resulting modules can be easily understood by HR departments and education providers and, in the longer term, can feed into updated curricula and recognition frameworks.

Work Package 5: Plastics

WP5 focuses on the plastics subsector and has spent the first project period building a solid evidence base on skills needs and turning this into new profiles and first ideas for training. The work package brings together industry and education partners and concentrates on skills for circular economy practices, recycling, emission reduction and more sustainable plastics use.

A major achievement of WP5 is its contribution to the ChemSkills Future Skills Survey. The plastics part of the survey achieved an outstanding response rate, accounting for **more than half of all answers** collected in the first run. This means that the plastics subsector is very well represented in the overall ChemSkills data set. Before launching the survey, WP5 conducted a detailed analysis of the plastics value chain and different sectoral applications, designing questions to cover its different stages while investigating in depth the evolving skills profiles and the areas where they are most needed.The survey was widely promoted among plastics converters and other stakeholders and was complemented by **targeted interviews** with selected respondents. Together, the survey and interviews provided a detailed picture of where companies see the biggest skills gaps, especially in relation to circular economy, advanced recycling, design for reuse and regulatory demands. The survey also explored generational and gender gaps in the green and digital transition, including specific questions to capture these aspects. Moreover, it investigated the supply side of education, examining which university courses and professional training programs are currently available, their relevance, and their adequacy in meeting industry needs.

In parallel, WP5 partners carried out **in-depth desk research** on the plastics sector. This work analysed the size and structure of the sector, its workforce, key players and innovation trends and over 30 courses currently offered across Europe.. It examined workforce development and technology trends, and highlighted essential skills and competences – particularly in green and digital areas – that are needed for the shift towards more sustainable plastics value chains. The desk research identified identified over 30 key skills and 10 major trends relevant for the sector. Based on this, WP5 produced a **comprehensive gap analysis** and an overview of the most relevant training opportunities across Europe, identifying where offers already exist and where new training will be needed.

WP5 has also invested strongly in stakeholder engagement. During the first project period, it organised **two thematic workshops**. One workshop focused on the **building and construction** sector and addressed the lack of technical education for specific job roles linked to plastics applications. Participants underlined the importance of coordination between businesses, education providers and public authorities to avoid future shortages of technical skills as the sector becomes more circular and digital. A second workshop, held during the **EuPC Annual Conference** in collaboration with Maastricht University, gathered key stakeholders from across the plastics value chain. This interactive session looked at recruitment and educational challenges, and discussed how to

adapt the education system to attract young people into a sector that is rapidly changing and increasingly focused on sustainability. Both workshops generated practical examples and "good practices" that now feed into the broader ChemSkills roadmap.

All these activities have been brought together in a **plastics competence matrix**, which outlines the technical, digital, green and soft skills needed in the subsector. This matrix is directly linked to three two new occupational profiles that WP5 has helped to define: the **Eco-Design Engineer**, and the **Sustainable Material Engineer and the Life Cycle Assessment (LCA) Analyst**. For each of these roles, WP5 identified the core competences, typical tasks and future relevance, and contributed to the creation of two three ChemSkills Skill Cards. The Eco-Design Engineer focuses on designing products and components for circularity, applying life-cycle thinking, and integrating regulatory and customer requirements from the start. The Sustainable Material Engineer concentrates on the development and use of new, more sustainable materials, including bio-based and recyclable plastics, and on understanding how these materials behave in real-world applications. The Life Cycle Assessment (LCA) Analyst focusing on conducting comprehensive environmental impact assessments of products and processes by collecting and analyzing data, modeling the life cycle, and interpreting results to identify areas for improvement. These profiles translate abstract trends such as "circular economy" into concrete job roles that companies, educators and learners can understand and use.

Sustainable Material Specialst **Eco-Design Expert**

Building on the first survey and the competence matrix, WP5 **launched a second plastics-specific survey in April 2025**. This second run is being disseminated through targeted emails, documents and social media and aims to deepen the understanding of skills gaps, validate earlier findings and check whether needs have changed as new regulations and technologies come into play. At the same time, WP5 organised an internal workshop in May 2025 dedicated to **future scenario analysis** for the plastics sector. This workshop explored different possible development paths for the subsector and collected ideas and recommendations that will feed into the overall ChemSkills roadmap on plastics skills.

Finally, WP5 has laid the groundwork for future training development. Its survey, research and workshops have directly inspired several planned **plastics-related training modules** that are now being shaped within WP4, such as courses on "Alphabet of plastics for non-technical staff", "Sustainable plastic materials", "Characterisation of polymers", "Introduction to R-strategies for plastics" and "Use of AI in decision-making between R-strategies". These modules will help workers and learners understand different plastics, make better choices between reduce, reuse, recycle and redesign options, and apply digital tools to sustainability decisions. In this way, WP5's work on skills intelligence and occupational profiles is already being translated into concrete learning offers that will support the transition of the plastics subsector in the coming years.

Work Package 6: Consumer Chemicals

WP6 focuses on the consumer chemicals subsector, which includes industries such as adhesives, sealants, printing inks, paints and varnishes, personal care and cosmetics. These are products that are very close to everyday life, but sit in a complex value chain with strong regulatory pressure and fast-changing customer expectations. The work package aims to understand how green and digital transitions are reshaping this subsector and to translate that knowledge into future job profiles and training offers.

An important first achievement has been a detailed **desk research exercise**. In 2024/2025, WP6 compiled an overview of the consumer chemicals sector based on reports and market information: how the sector is structured, which segments dominate, sales and market shares, key associations and companies, and which global and European trends are driving change. Particular attention was paid to trends linked to digitalisation, sustainability and regulatory evolution, as well as to current skills and training needs, typical green and digital jobs, and main bottlenecks. This desk research is updated yearly and now provides a solid reference point for all later work on skills, training and scenarios in this subsector.

WP6 has also contributed to ChemSkills' skills intelligence with several **surveys and interviews**. Partners helped promote the first joint Future Skills Survey (for WPs 5–10) between February and October 2024 via their own media channels, including LinkedIn and newsletters. From the consumer chemicals sector specifically, **15 responses** were collected. Although this is a relatively small sample, it helped to flag key areas where new competences are needed, such as chemical recycling, regulatory compliance, safety-by-design and circular economy skills.

Rather than taking part in the second joint Future Skills Survey, WP6 chose to focus on this **tailored questionnaire on training offers**, combined with in-depth interviews. This shift reflects a conscious decision to move from "what skills are needed?" to "what training actually exists, and how can we improve it?", which is particularly important in a fragmented subsector where many firms are SMEs with limited HR capacity.

WP6 has also been very active in **stakeholder engagement**. Haskoning has led stakeholder mapping and outreach throughout the project, using social media, the ChemSkills newsletter, membership networks and personal contacts to connect with companies, associations, regions and EU-level actors. This has been complemented by a series of high-profile workshops and events. Federchimica organised a "Talent management, talent attraction and retention" workshop for the adhesives, sealants, printing inks, paints and varnishes sector (16 May 2024) explored how companies can attract and keep young talent, with a strong focus on organisational culture, work–life balance, learning opportunities and the role of AI tools in recruitment and HR. A "Career event & student programme" held during the XXVIII National Congress of the Italian Chemical Society (27 August 2024) brought together industry representatives and students to discuss career paths in

chemistry, helping to bridge the gap between academia and industry.

In addition, ECRN organised a roundtable on “PFAS revision – challenges and opportunities” (12 June 2024), which focused on the skills required to deal with stricter regulation, to assess risks and benefits and to develop sustainable alternatives to PFAS. More recently, Haskoning hosted the event “Boosting competitiveness through Safe and Sustainable by Design – Building skills for the future” (2 July 2025), which highlighted how high energy costs, consumer demands for safer and more sustainable products, and complex regulatory requirements are putting new skills on the agenda, particularly around Safe and Sustainable by Design (SSbD). Together, these events have raised awareness of skills challenges and created a strong link between ChemSkills and wider policy debates on the twin transition.

On the analytical side, WP6 has contributed to the **ChemSkills competence matrix** by defining new job roles and the skills associated with them, based on its research and survey work. Haskoning prepared a competence matrix for consumer chemicals, outlining emerging roles and required competences, which was then reviewed by all partners. Federchimica prepared an additional matrix for the Italian chemical sector, capturing national specificities. This work feeds into WP3’s cross-sectoral analysis and ensures that the particular needs of consumer chemicals are clearly represented.

A concrete visible outcome of this work is the **Analytics Translator Skill Card**, produced by Haskoning. The Analytics Translator is a role that sits between data experts and business teams: it helps companies in consumer chemicals turn data on products, processes, markets and regulations into practical decisions, for example regarding safer formulations, greener product lines or more efficient production. The Skill Card describes the main tasks and competences of this role and links them to ESCO and EQF levels, making it easier for companies to design job descriptions and for education providers to design relevant modules. This is one of the first clear examples where WP6 has translated abstract trends in digitalisation and sustainability into a concrete occupational profile.

Analytics Translator

Finally, WP6 has begun to explore **future scenarios and roadmapping** for the subsector, including questions regarding scenarios, recommendations and best practices to the interviews. An internal workshop on future scenarios, organised jointly by Haskoning and VSB-TUO (WP3 leader), helped to align methods across work packages. In follow-up discussions, WP6 partners agreed to focus their scenario work on growth markets for circular and sustainable consumer products, looking in particular at how consumer attitudes and regulatory simplification might drive demand for new skills. The expected impact of WP6 is to strengthen collaboration between industry and education, provide WP3 and WP4 with robust, sector-specific evidence, and lay the groundwork for targeted training and reskilling initiatives that will support the consumer chemicals subsector as it navigates the green and digital transitions.

Work Package 7: Fertilisers

WP7 focuses on the fertilisers subsector and the way mineral fertilisers are used in agriculture. Its main objective is to address the skills gaps linked to the green and digital transition in this area – from reducing environmental impacts, preventing soil and water contamination and improving resource efficiency, to helping farmers and advisors make better, data-informed decisions.

In the first phase, WP7 built a detailed picture of the **fertiliser value chain**. Partners analysed the whole chain from research and development, through production and distribution, to on-farm use. A key achievement was the establishment of a close collaboration with a major fertiliser producer in the Czech Republic, one of Europe's largest producers, which helped to ground the work in real industrial practice. Through desk research and interviews, WP7 identified **49 job roles** along the value chain and grouped them by segment (R&D, production, distribution and utilisation). For these roles, the team mapped which competences are needed in green skills, digital skills, Safe & Sustainable fertilisers, transversal skills and sector-specific knowledge. For example, the utilisation stage alone accounts for **19 job roles** and a high concentration of green and sector-specific skills, highlighting the importance of knowledge at farm level.

WP7 also looked at what **training already exists**. On the "offer" side, partners identified **10 relevant training opportunities** for fertilisers and sustainable agriculture. Four of these are specific job-related trainings provided directly by fertiliser manufacturers, one comes from a university, and five are offered via education and innovation clusters and platforms, giving access to a wide range of e-learning opportunities on fertiliser use and application. This work confirmed that there are useful resources available, but that they are scattered and often not directly aligned with the emerging skills needs around digital technologies, precision agriculture and environmental performance.

To understand skills needs in more depth, WP7 carried out **two rounds of targeted stakeholder surveys**. These surveys were addressed to professionals and organisations across the fertiliser value chain and collected information on existing and emerging skills gaps. The responses reflect a broad range of perspectives and repeatedly point to sustainability, digitalisation and regulatory requirements as the main drivers of change. In addition to the surveys, WP7 conducted **targeted interviews** with experts from different segments of the sector. These one-to-one conversations were chosen instead of open webinars in order to allow more detailed and sometimes sensitive topics to be discussed, and they provided rich qualitative insight into day-to-day challenges and anticipated skills needs.

Alongside surveys and interviews, WP7 carried out **comprehensive desk research** on innovation trends and transformation drivers. The team analysed strategic policy documents, scientific publications and industry reports on topics such as decarbonisation, nutrient-use efficiency, new fertiliser products, precision farming technologies and changing EU policies on sustainable agriculture.

They also reviewed existing education and training programmes relevant to the fertiliser sector and analysed job advertisements across the value chain to see what skills are currently being requested on the labour market. This combination of sources made it possible to compare what policies and companies say they need with what training systems currently offer.

WP7 partners have been very active in **engaging stakeholders**. Over the first two years, they presented ChemSkills objectives and early results at **more than ten sectoral events and conferences**, using these occasions to validate findings and to connect the project to ongoing policy discussions on sustainable agriculture and resource efficiency. This outreach has helped build awareness of skills issues in the fertiliser sector and encouraged organisations to participate in surveys, interviews and later activities.

Taken together, the surveys, interviews, desk research and event feedback provided the basis for **early competence profiles** in the fertiliser subsector. WP7 used these profiles to develop a dedicated competence matrix, which was then fed into the cross-sectoral work of WP3. On this foundation, the team contributed to the creation of **ChemSkills Skill Cards** for the fertiliser area. The Methods Modeller profile reflects the growing need to understand carbon flows, emissions and nutrient cycles by combining agronomy, data analytics and modelling. The Future Farmer profile captures how modern farmers increasingly need to integrate traditional agronomic know-how with digital tools, remote sensing, robotics and precision agriculture, while working within stricter environmental and climate constraints. Both profiles translate abstract megatrends into concrete roles that can guide training, recruitment and career planning.

Methods Modeller **Future Farmer**

A further important achievement is the development of **future scenarios** for the fertiliser sector. Starting from eleven trend-based possibilities, WP7 partners followed a structured foresight process to consolidate these into **four coherent scenarios**. These scenarios take into account geopolitical developments, the availability and price of raw materials, EU policy directions, climate targets and evolving demands for human capital. They explore, for example, what happens to skills needs in a world of strict environmental regulation and high input prices versus one where technological innovation and data-driven farming advance quickly. This foresight work supports more responsible workforce planning and helps education and training providers think ahead rather than only reacting to current gaps.

Finally, the results of WP7 are already **informing new training developments** in the project. Within WP4, several planned modules – such as “Agricultural data specialist”, “Remote Sensing Specialist”, “Future Farmer” and “Circular Economy Specialist” – explicitly build on the competence needs identified in the fertiliser subsector. These modules will help farmers, advisors and

other professionals to work with agricultural data, apply remote sensing in everyday decisions, integrate circular economy principles into fertiliser use, and understand the broader sustainability context of their work. In this way, WP7's skills intelligence is being translated directly into learning opportunities that support a more sustainable and digital fertiliser sector.

Overall, WP7 has moved from understanding "who does what" in the fertiliser value chain to a much deeper picture of **which skills are needed, where the gaps lie, and how the sector might evolve**. This provides a strong basis for the next phases of ChemSkills, where competence profiles, Skill Cards and training modules will be tested and refined together with practitioners in agriculture and the fertiliser industry.

Work Package 8: Rubber

WP8 focused on the rubber sector, including tyres and general rubber goods. During the first project period, the team has built a much clearer picture of how important this industry is in Europe, what is changing, and which skills are needed to respond adress to the green and digital transitions.

The first major achievement is a **state-of-the-art desk research report** for the rubber sector. This work did not only describe the sector, but also its trends, key players and skills landscape. It showed, for example, that in 2020 European production reached around **2.3 million tonnes of general rubber goods and 4.2 million tonnes of tyres**, and that the sector included **4,386 companies**, providing **354,331 direct jobs**, with a turnover of about **60 billion euros** and exports of **10.8 billion euros**.

These figures underline why skills in rubber matter for Europe's economy and for many downstream industries.

Building on this knowledge base, WP8 developed a **specific online survey** for the rubber industry. This "open letter" was sent to key stakeholders across the tyre and general rubber goods value chain. Analysis of the first survey showed that the main drivers of change are a growing emphasis on **sustainability and the circular economy, the adoption of digital technologies and regulatory changes**, with the green transition seen as the most impactful of these. On the skills side, companies highlighted **material science** as the most important sector-specific competence, followed by **safety awareness and safety and risk management**. For digital skills, **data analytics**, sustainability-related digital competences and circular-economy expertise were rated highest, while in the green area, skills such as **embodying sustainable values, acting for sustainability and envisioning sustainable futures** came out on top. The survey also made it clear that the most pressing issues are were the **availability of workers with the right skills and the availability of training programmes** to re-skill and up-skill the existing workforce.

In response to the first results, WP8 designed a **second survey**. This follow-up focused on how important different trends really are for stakeholders, which **new job profiles** are needed in the rubber sector, and what formats companies and workers prefer for training. The second survey also feeds directly into the wider ChemSkills survey as a set of sector-specific questions and remains open on the EU Digital Survey platform, continuing to collect data from rubber companies across Europe.

Surveys have been complemented by **intensive stakeholder engagement**. Since 2024, WP8 has organised several workshops with some of the tyre industry's most important companies, such as **Toyo Tires, Bridgestone and Continental**, as well as with major general rubber goods manufacturers. These workshops were used to present ChemSkills, to discuss how digitalisation and

sustainability are changing the workforce, and to validate and deepen survey findings. A further workshop with Spanish stakeholders updated them on the project progress of the project and invited them to help define new job roles at a national level. In addition, WP8 created a **Focus Group** comprised of ten European industry representatives from across the rubber value chain. This group has provided detailed feedback on the trends, competences and occupational profiles identified so far, helping to make sure they reflect real industry needs.

To understand not only needs but also what already exists, WP8 has carried out a **systematic mapping of training offers**. Partners compiled a living database of training materials and programmes available for the rubber sector at European level, using intensive desk research and direct contacts with training providers. This database is continuously updated and feeds into the overall gap analysis, showing where rubber companies can already find relevant courses and where new training development is necessary.

All of this information has been brought together in a **rubber competence matrix**. The matrix summarises sector metrics, key players, current trends and drivers, and lists the most important skills for the green and digital transition in rubber. On this basis, WP8 has identified **20 new and emerging job roles** related to the transition, with a particular focus on roles linked to recycling, circularity and environmental performance. One of these roles has already been developed into a ChemSkills Skill Card: the **Waste Management Officer**. This profile defines the full set of competences needed to manage waste streams in rubber production and products, prevent and reduce waste, support recycling and devulcanisation, and ensure compliance with environmental regulations. It shows how green, technical and regulatory skills come together in a single job role, and provides a practical reference for companies and training providers when updating job descriptions and curricula.

WP8 has also completed a **gap analysis** comparing the sector's needs with the mapped training offers. This analysis confirms that while some courses exist on general safety and basic technical topics, there are clear gaps around advanced material science, circular-economy approaches to rubber, devulcanisation technologies and digital skills such as data analytics applied to production and recycling processes. The results of the first survey were used to refine this analysis, and new job profiles and skills identified through the gap analysis were integrated as sector-specific questions in the second ChemSkills survey.

Looking ahead, WP8 has started to work on **future scenarios** for the European rubber industry. Using the methodology developed with by WP3, partners first identified six generic key scenarios, covering topics such as changing energy costs, shifts in production capacity, growth in markets for circular and sustainable products, regulatory simplification, independence in strategic and critical products and changes in global talent flows. From these, WP8 has derived two **rubber-specific scenarios** that focus on the increasing importance of recycling rubber products and advances in devulcanisation processes. For each scenario, the team has considered which parts of the value chain will be most affected, which stakeholders need to act on it, and what kind of skills and training will be required.

Overall, the work of WP8 has moved to a much more precise view of which skills are needed, **which job roles are emerging and where training gaps lie.** Through its surveys, workshops, focus group, competence matrix and the first Waste Management Officer Skill Card, WP8 has laid the groundwork for targeted, evidence-based training solutions that can support companies and workers in managing waste, adopting circular practices and making the most of digital technologies in the rubber industry.

Waste Management Officer

Work Package 9: Pharmaceuticals

WP9 looks at the pharmaceutical industry, a key part of the EU economy and one of the most R&D-intensive branches of the chemical value chain. As the fifth-largest exporting sector in the EU, pharma plays a crucial role in many countries and faces strong pressure to decarbonise, remain competitive and respond to new health and regulatory challenges. This makes the availability of the right skills particularly important.

In the first period, WP9 has mainly focused on **building a solid evidence base and a common structure** for its future outputs. A major achievement has been the development of a harmonised structure for Deliverables **5.1–10.1** and for WP9's own Deliverables **9.1–9.5.** Designed and agreed under the leadership of IKEM, this structure ensures that all sectoral reports are comparable, follow the same logic and connect smoothly to WP3's skills intelligence and WP4's training work. It reduces duplication, clarifies how tasks within WP9 fit together and strengthens the credibility and usability of the project's outputs for stakeholders and policymakers.

WP9 has also carried out **extensive desk research** on the pharmaceutical sector. This work mapped the economic importance and workforce profile of pharma, drew on previous EU projects to avoid repeating earlier studies, and examined key trends such as the green transition, digitalisation, Safe and Sustainable by Design, technological change and shifting regulatory frameworks. Several early insights stand out. First, the pharmaceutical industry hosts a **much wider variety of roles** than the broader chemical sector, with a particularly strong emphasis on research and development. Second, the sector follows a **partly different economic cycle**: it tends to remain stable or even grow when other parts of the chemical industry slow down. Third, digitalisation is already **deeply embedded** in pharma, so the priority is now shifting from introducing digital tools to ensuring the **ethical and responsible use of AI and data**. Finally, transversal competences such as **self-leadership, cross-disciplinary communication and collaboration** are becoming increasingly important as teams become more diverse and science more complex.

To complement this research, WP9 has started to **gather sector-specific data** through surveys and seminars. A dedicated set of questions for the project-wide ChemSkills survey was designed and deployed, focusing on skills needs, recruitment challenges and training gaps in pharma. In parallel, two sectoral seminars were organised: an online workshop where company representatives discussed current and future skills needs and the availability of (online) training, and a national hearing hosted by IKEM that looked specifically at talent attraction and skills in the pharmaceutical workforce. Two further seminars are already planned for September 2025 to validate findings and collect feedback on draft conclusions.

WP9 is also preparing a **mapping of the training landscape** for Europe's pharmaceutical industry. Under Task 9.2, led by SBG, partners are collecting information on relevant training programmes and curricula, with a focus on upskilling, reskilling and company-internal training

offers. This work is coordinated with all other “x.2” tasks across WPs 5–10 so that results can be compared across sub-sectors. The mapping will highlight regional differences and best practices, describe how training is delivered and, where possible, link programmes to EQF levels. The findings will become a key reference for later reports on emerging skills, gaps and strategic roadmapping.

On the **occupational profiles** side, WP9 has already produced the **first of three planned Skill Cards** for the pharmaceutical sector, developed by ECEG in collaboration with IKEM. This first profile – the Sustainable Process Development Chemist – reflects the increasing need to design pharmaceutical processes that are safe, efficient and environmentally responsible, while meeting strict regulatory requirements. The card describes the role’s key tasks and competences and will be tested and refined with stakeholders in the seminars scheduled for September 2025 before the remaining profiles are developed. Together with later Skill Cards, it will feed into a broader analytical report on critical skills for pharmaceutical industry transformation and will support HR, curriculum designers and learners in understanding what future roles in pharma will look like.

Sustainable Process Development Chemist

Finally, WP9 has begun preparing the ground for **future gap analysis and strategic roadmapping**. Planned reports will compare sectoral needs with current training offers, identify where skills for the green and digital transition are missing, and translate these findings into **practical recommendations** for training providers and policymakers. The closing roadmap (Task 9.5) will bring together all elements – sector trends, training provision, emerging profiles and gaps – into a forward-looking strategy for reskilling and upskilling in pharma, with phased proposals for the period up to and beyond 2032. Preparatory work during this period has focused on aligning this roadmap with the overall structures developed under WP9, ensuring that later outputs can be integrated into one coherent framework.

Overall, WP9 has used the first project period to **set up the analytical backbone** for the pharmaceutical part of ChemSkills: a shared structure for all sectoral reports, a strong base of desk research, first survey and seminar activities, a growing map of training offers and an initial Skill Card. These elements now provide a robust starting point for more detailed analysis, gap identification and strategy development in the next phase of the project.

Work Package 10: Petrochemicals

Work Package 10 focuses on the petrochemicals sector and aims to turn evidence on skills gaps into concrete recommendations for policies and funding on, curricula and re/or up-skilling programmes at EU and national level. The work is particularly concerned focusing onwith skills aimed at improving the digitalisation processes in our industry and circularity, and how petrochemicals can attract and retain the workforce needed for a more circular future

.

In the first period, WP10 designed and ran a **sector-specific skills survey** tailored to the petrochemicals industry. The team developed dedicated questions, contributed them to the wider ChemSkills survey and used the Petrochemicals Europe (PE) Board network to reach companies. By mid-2024 the first survey had collected **26 responses from 16 EU Member States**, giving a cross-European snapshot of skills needs in petrochemicals operations. The responses collected came from mainly experienced professionals involved in running plants on a day-to-day basis. They reported strong demand for broader profiles that combine process know-how with skills in regulation, toxicology, Safe and Sustainable by Design (SSbD), communication and sustainability, rather than narrow technical specialisation.

Survey results were complemented by **desk research** on digital and circularity-related skills in the chemical industry, drawing on data and reports from partners such as Federchimica and FECCIA. This work confirmed that digital tools, clean technologies and circular business models are becoming central to petrochemicals, and that companies are increasingly looking for competences in areas such as renewable feedstocks, electrification of steam crackers and advanced process control, alongside new regulatory and sustainability skills.

WP10 then used a series of **workshops and conference sessions** to test and deepen these findings. A first workshop with Petrochemicals Europe focal points in May 2024 introduced the project, gathered ideas on skills gaps and officially launched the survey circulation. The initial survey results and key trends were presented to the Petrochemicals Europe Board in July 2024, helping to validate next steps. In October 2024, WP10 led the breakout session “People – Our Next Generation” at the EEPC conference, focusing on skill trends and gaps in ethylene production operations and collecting further input from industry experts. A second workshop in December 2024 brought PE focal points together again to discuss survey findings and conference takeaways, and to prepare one-to-one interviews with subject-matter specialists.

All inputs from surveys and workshops were consolidated into a **pre-final sector report** in early 2025. This report confirmed several important conclusions. First, petrochemical companies are under pressure to become cleaner and more circular, but this transition depends on having access to the right skills at the right time. Second, the skills needed for the circular transition are available globally, but are costly and often located outside the EU, which pushes companies to recruit from a broader international pool. Third, success in this transition does not only depend on technology;

it also requires supportive regulatory frameworks and clear political signals, which are essential for attracting and retaining qualified people.

The analysis also highlighted **digital skills** as a key area. AI and blockchain applications are seen as critical tools for supporting circular petrochemical operations – for example in optimising processes, tracing materials and ensuring compliance – but they must come on top of strong engineering and process fundamentals. Communication skills and regulatory knowledge are becoming equally important, as companies need staff who can explain complex technologies, engage with regulators and stakeholders and help maintain the industry's social licence to operate.

A distinctive insight from the first survey is the **difference between generations** in how they view and understand new technologies. Most respondents were senior professionals in operations, who acknowledged that their own knowledge of AI, blockchain and SSbD is limited compared to that of young graduates and students. For this reason, WP10 decided not to use the second joint survey designed by WP3, as it would largely have duplicated the first run. Instead, it designed a **second dedicated survey** in 2025 targeting last-year university students and young graduates, focusing specifically on AI, blockchain, SSbD, policy/regulation and communication. This second survey is intended to "fill the gap" by capturing the views of those who have more recent exposure to these topics and to education systems.

On the basis of all collected evidence, WP10 has taken important steps towards **defining new and critical occupational profiles** for the sector. So far, **17 occupational profiles** have been identified as crucial for supporting petrochemicals in its digital and circular transition. Among them, two fully new profiles have been developed into ChemSkills Skill Cards: the **Safe & Sustainable by Design (SSbD) Products Manager and the Sustainable Products Sales Manager**. These profiles combine technical and process knowledge with sustainability, regulatory and communication competences. The SSbD Products Manager focuses on integrating SSbD principles into product development and ensuring that new petrochemical products are safe, sustainable and compliant. The Sustainable Products Sales Manager combines a solid understanding of petrochemical products and their environmental performance with the ability to communicate credibly with customers about sustainability claims and regulatory changes.

Design Products Manager **Product Sales Manager**

WP10 has also produced a **preliminary gap analysis and set of recommendations** as part of its pre-final report. The gap analysis points to several intertwined reasons why skills needs and training offers do not yet match: generational differences in expectations and attitudes to work; challenges in making the petrochemical industry attractive to young professionals; the need to integrate new skills such as communication and regulatory affairs into traditionally technical roles; and the fact that existing training programmes often need substantial updates to address circularity, digitalisation and SSbD more directly. These early recommendations will be refined once results

from the second survey and expert interviews are available.

Looking ahead, WP10 will use the combined findings from desk research, surveys, workshops and interviews to complete its **sectoral roadmap and strategy**. This roadmap will translate identified skills gaps into practical recommendations for EU and national policymakers, for universities and VET providers and for company training departments. It will suggest how curricula, reskilling programmes and funding initiatives can better support the shift towards a more digital, circular and sustainable petrochemical industry. The work done so far means that WP10 is already well on track: it has moved from general discussions about future skills to a detailed, sector-specific understanding of **which competences are needed, where the gaps lie and which new job roles are emerging** in petrochemicals.

Ending

Over the past period, ChemSkills has clearly moved from planning to delivery. What started as a set of work plans and ideas has turned into concrete outputs in every Work Package. The project now has a shared methodology for skills intelligence, robust data from sector-specific and cross-cutting surveys, and detailed competence matrices that bring together technical, digital, green and soft skills across the chemical value chain. Sectoral analyses in plastics, consumer chemicals, fertilisers, rubber, pharmaceuticals and petrochemicals have identified where skills gaps are most urgent and how they are linked to the green and digital transitions, regulatory changes and new business models.

At the same time, the project has developed practical tools that can be used directly by companies, education providers and learners. New occupational profiles and ChemSkills Skill Cards describe what future roles will look like and which competences they require. Training development work has already produced a first portfolio of modules, some of which are available through the Skills Hub learning platform, and many more are in preparation based on the needs identified in the sectoral WPs. Communication, dissemination and stakeholder engagement have ensured that these results are visible and that feedback from companies, social partners, regions, education providers and other initiatives is continuously taken into account.

The next phase of ChemSkills will build on this foundation. Competence matrices and sectoral roadmaps will be refined, more Skill Cards and training offers will be designed, piloted and improved, and the Skills Hub will grow as a central access point for courses, tools and guidance. Scenario work and strategic recommendations will help policymakers, social partners and providers to align their efforts and to plan investments in skills more effectively. By working together in this way, the ChemSkills partnership aims to support companies and workers in managing the green and digital transitions and to make careers in the chemical industry more attractive, transparent and future-oriented across Europe.

stay tuned for more news...

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.