

Chromium VI

Executive Summary

On September 2023, the European commission requested ECHA to prepare an Annex XV restriction dossier for certain CR(VI) substances that are currently subject to authorization, with the aim of adding them to Annex XVII of REACH.

VECCO and **ZVO**, industry associations who represent the interests of Cr(VI) users in Germany and Austria, requested **EPPA** to analyze the aggregated data gathered by **VECCO** from their members to assess the economic cost associated with the non-use of Cr(VI) substances. The assessment included the potential impact of ceasing the use of CR(VI), such as job losses, EBIT losses, downstream impacts and other costs.

The analysis is based on information and data gathered from 35 participating companies located in Germany and Austria. Collectively, they employ approximately 6,000 full-time equivalent employees (FTE), of whom more than 305 FTE are directly exposed and involved in the process of using Cr(VI) substances. Their combined turnover in 2025 amounted to approximately 625.8 million EUR. Companies supply chrome-plated articles to a customer base of more than 3,300 clients, with small and medium sized enterprises (SMEs) accounting for approximately 79% of their customer portfolio. The total number of chrome-plating companies in Germany amounts to 973¹, which employ around 47,650 people². Given the modest sample size of the participating companies, EPPA refrains from extrapolating figures for the entirety of the population, maintaining a conservative but consistent approach.

The companies in the sample expressed similar concerns regarding a potential REACH restriction. Companies identified closure and relocation of production towards non-EEA countries as the most likely scenario in case of a REACH restriction.

Table 1 illustrates the main findings of the non-use cost analysis.

Table 1: Quantitative findings

Upstream impacts			Other impacts	Total cost (A+B+C+D)
Economic impact (A)	Social impact (B)	Cost of dismantling – resale value (C)	Downstream impact (D)	
252 million EUR	57 million EUR	18 million EUR	1.3 billion EUR	1.65 billion EUR

¹ Federal Statistical Office of Germany

² Ökopol – Institut für Ökologie und Politik GmbH

By dividing the total upstream costs (i.e., A, B, C) by the number of companies participating in the assessment (i.e., 35 companies), the **average cost per company is approximately 13 million EUR**.

Similarly, by dividing the total upstream cost by the number of exposed workers (i.e., 307.5 full-time equivalent (FTE) employees) **the average cost per exposed worker is approximately EUR 1 million**

By dividing the total costs (A+B+C+D), by the number of companies participating in the assessment (i.e., 35 companies), the average cost per company is approximately 47.7 million EUR. By dividing the total cost by the number of exposed workers (i.e., 307.5 full-time equivalent (FTE) employees) the average cost per exposed worker is approximately 5.4 million EUR. This means the costs in the supply chain are 41,5 higher than the costs calculated in the SEAC approach (0.13 million EUR per worker). The inclusion of downstream impact increased the previous figures.

Regulatory Background & Participating Companies

Hexavalent chromium (Cr(VI)) compounds are recognized as carcinogenic substances, they have been widely used across a range of industrial applications within the European Economic Area (EEA). These substances, due to their hazardous properties, have been classified as Substances of Very High Concern (SVHCs) and are regulated under the authorisation provision of the REACH regulation.

Currently, under the REACH framework, companies willing to continue using Cr(VI) substances must obtain individual authorisation or operate under an authorisation granted to an upstream supplier within the supply chain. Since the introduction of this requirement, the European Chemicals Agency (ECHA) has received hundreds of Applications for Authorisation (AFAs) covering a variety of Cr(VI) uses. The number of applications exceeded expectations when these substances were originally included in Annex XIV of REACH.

The need for a harmonized regulatory approach with the willingness to reduce the administrative burden led the European Commission to request ECHA to prepare an Annex XV Restriction Dossier for certain Cr(VI) oxides, oxyacids and salts that are currently subject to authorisation. The proposals aim to replace the existing authorisation regime with a restriction under REACH, providing a more efficient approach to Cr(VI) risk management.

The proposed Annex XV restriction aims to address the risk associated with the use of the following Cr(VI) substances: chromium trioxide; acids generated from chromium trioxide and their oligomers, including chromic acid and dichromic acid; sodium dichromate; potassium dichromate; ammonium dichromate; sodium chromate; potassium chromate; dichromium tris(chromate); strontium chromate; potassium hydroxyoctaoxodizincate dichromate (1-); pentazinc chromate octahydroxide.

The key objective of the proposed REACH restriction is to ensure a high level of protection for human health and the environment from the risks posed by Cr(VI) substances. To achieve this, ECHA developed a modular restriction proposal considering also six possible alternative restriction options. These options incorporate different exposure limit values for workers and environmental emission limits, allowing the regulatory framework to accommodate various levels of risk management maintaining flexibility across industrial sectors.

VECCO and **ZVO**, industry associations who represent the interests of Cr(VI) users in Germany and Austria, requested EPPA to analyze the aggregated data gathered by VECCO from their members to assess the economic cost associated with the non-use of Cr(VI) substances. The assessment included

the potential impact of ceasing the use of CR(VI), such as job losses, EBIT losses, downstream impacts and other costs.

VECCO is an industry association dedicated to safeguarding the application and use of chromium trioxide and other chemicals in surface technology. Its approximately 120 members are medium-sized electroplaters and manufacturers with in-house electroplating facilities. These companies work with chromium trioxide to provide surface treatments on behalf of their customers, as it is established technology for enhancing corrosion and wear resistance in metals and plastics. The reasons for the use of chromium trioxide and the situation related to alternatives have been explained in separate documents by VECCO and ZVO.

The aim of the association is to support the sustainable use of chromium trioxide by promoting high standards of occupational safety and environmental protection. Its members are committed to minimizing workers' exposure and environmental emissions coming from handling and processing chromium trioxide while maintaining technical performance and economic viability of their manufacturing processes.

ZVO is an industry association representing the interests of raw and process chemical suppliers, plant manufacturers, component manufacturers, service providers, coaters and electroplating companies in the German electroplating and surface technology sector. ZVO hosts more than 240 member companies which are engaged in surface finishing processes involving the application of metals or metal compounds from liquid process media, serving a broad range of industrial sectors.

Descriptive Statistics

The review of the aggregate data and assessment of the economic impact was conducted by EPPA. It was based on a sample of 35 companies located in Germany and Austria. **Collectively, these companies employ approximately 6,000 full-time equivalent employees (FTE), of whom more than 305 FTE are directly exposed and involved in the process of using Cr(VI) substances. Companies in case of a REACH restriction expect more than 735 layoffs. Companies supply chrome-plated articles to a customer base of more than 3,300 clients, with small- and medium-sized enterprises (SMEs) accounting for approximately 79% of their customer portfolio.** This highlights the key role of SMEs within the downstream supply chain. **The total number of chrome-plating companies in Germany amounts to 973³, which employ around 47,650 people⁴.** Given the modest sample size of the participating companies, EPPA refrains from extrapolating figures for the entirety of the population, maintaining a conservative but consistent approach.

In 2025, the combined turnover of the companies in the sample amounted to approximately 625.8 million EUR. The aggregated turnover for 2025 was estimated on the individual company turnovers reported for 2022, applying company specific growth rates. The calculation reflects the projected evolution of each company's turnover rather than a simple extrapolation based on a single average growth rate.

³ Federal Statistical Office of Germany

⁴ Ökopol – Institut für Ökologie und Politik GmbH

Companies operate in more than 20 sectors. The sector most represented among the sample companies are machinery and mechanical engineering, defence industry, food industry, plastic industry and medical technology.

The data presented in this report are based on the most recent information made available to EPPA and refer to the 2022 reporting year.

Most Likely Scenario and Wider Economic Impact

A Cr(VI) restriction could have a negative impact on the industries and on EEA competitiveness if current proposals are implemented. **The companies in the sample expressed similar concerns.** At present, **the European surface and plating technology industry is facing competitive pressure due to high energy prices and material costs.** While bigger customers can handle higher prices to a certain degree, the overall production and value creation within the EEA remain under pressure.

This situation, combined with the additional costs associated with the potential new regulatory compliance and restriction requirements, could accelerate concentration towards larger companies. Small and medium enterprises, like those adhering to VECCO and ZVO, could face reduced R&D capabilities due to re-allocation of resources towards compliance and are likely to exit the market. The closure of production facilities within the EEA is the most likely scenario among the companies in the sample. While the respondents indicated that this outcome could allow larger and more established companies to increase their market share, they also highlighted that the remaining EEA companies are likely not to have sufficient capacity to absorb the production left by exiting firm in the short term.

Companies also identified, company closure and the relocation of production towards non-EEA country (e.g., Switzerland, Turkey, Asian country) as a likely scenario in case of a REACH restriction.

Of particular significance is the concern expressed by the companies in which production serves strategic sectors such as pharmaceutical, food, defense, and energy technology. Production related to these sectors could shift outside the EEA, potentially weakening the competitiveness and strategic autonomy of the EEA industry.

Economic Impact.

One of the cost components of a Cr(IV) restriction is represented by the loss of contribution (i.e., business loss) to the EEA economy. The relevant economic measure to quantify this economic impact is Earnings Before Interest and Taxes (EBIT). A time period of four years is used, which is the time frame suggested by SEAC when there are no suitable alternatives available in general (SAGA). The monetization (net present value, NPV, with a 3% discount rate) is reported in this section.

Companies expect the proposed REACH restriction to result in a 100% reduction in EBIT. To estimate the overall economic impact over the 2025-2028 assessment period, the NPV of the EBIT losses were calculated individually for the participants and then aggregated to derive **the total economic impact, which amounts approximately to 252 million EUR.**

EBIT and turnover figures for the period after 2022 are based on company-specific projections. Each participant estimated its future financial performance by applying its own growth rate from the base scenario, 2022.

Social Impact

The proposed restriction would directly affect employment for companies working with Cr(VI) in the EEA. A well-known guideline to monetize the social impact of unemployment has been developed by the European Chemicals Agency (ECHA) to evaluate this impact in different regulatory processes. Estimates have been made in accordance with the ECHA document on the evaluation of unemployment (SEAC/32/2016/04) and the paper of Dubourg (2016) endorsed by ECHA.^{5,6} Therefore:

- Using Table A7 (column G, considering the gross wages including the employer's social security contributions) in Dubourg's paper, the total social cost of unemployment in Germany is equal to 2.18 times the annual gross salary. Although the companies are in Germany and Austria, given the limited number of the Austrian companies, only the social cost of unemployment of Germany it has been used in the estimate of the social impact.⁷
- **Table 2** presents the statistics from Eurostat (data for 2026-Q1) on the average duration of unemployment for both men and women between the ages of 15-64 years in Germany⁸
- The weighted average of the annual salaries across workers (including the employer's social security contributions).⁹
- Only 75% of the average duration of employment is considered to reflect the fact that some affected workers are highly skilled and could find employment sooner.

Table 2 Average duration of unemployment in EU-27 (2026-Q1)

Duration grouping	Duration of unemployment (in thousand persons, rounded)	Proportion (A)	Assumed duration (B)	Weighted average (A*B, rounded)
Less than 1 month	214.5	0.12489083	0.5	0.062445415
From 1 to 2 months	392.2	0.228355167	1.5	0.342532751
From 3 to 5 months	346.4	0.201688501	4.5	0.907598253
From 6 to 11 months	291.6	0.169781659	8.5	1.443144105
From 12 to 17 months	157.9	0.091935953	14.5	1.333071325
From 18 to 23 month	83.8	0.048791849	20.5	1.000232897
From 24 to 47 months	119.7	0.069694323	35.5	2.474148472
48 months and over	111.4	0.064861718	48	3.113362445
Total	1717.5	1	/	10.67653566

⁵ ECHA, 2016. The Social Cost of Unemployment. Available at: https://echa.europa.eu/documents/10162/13555/seac_unemployment_evaluation_en.pdf/af3a487e-65e5-49bb-84a3-2c1bcbc35d25

⁶ Richard Dubourg, 2016. Valuing the Social Costs of Job Losses in Applications for Authorization. The Economics Interface Limited.

⁷ This value is greater than one (1) because it considers the following components: lost wage, costs of job searching, recruitment costs, the impact of unemployment status on future wages (scarring effect) and employment possibilities, and leisure time (which is a benefit and therefore subtracted from the previous components).

⁸ Eurostat, 2025. Unemployment by sex, age, and duration of unemployment. Available at: https://ec.europa.eu/eurostat/databrowser/view/lfsq_ugad/default/table?lang=en (accessed in July 2026).

⁹ The participating companies report the number of workers and their average annual salary (including social security contributions).

The **social cost of unemployment** from a societal perspective for FTE workers across the EEA have been assessed as follows for each company individually:

$$\text{Average annual salary (in EUR)} \times \# \text{ affected FTE workers} \times \text{social cost of unemployment} \times \frac{\text{Average duration unemployment}}{12}$$

This led to an aggregate social cost of unemployment of approximately 57 million EUR.

One-off Cost and Re-Sale Value

Companies, in the event of non-compliance with the REACH restriction, could be required to dismantle their relevant production lines. This process is costly from both financial and time perspectives.

Chrome plating lines require important upfront capital investment; however, their residual resale value is generally limited due to the prolonged exposure to aggressive chemical processes resulting in wear and deterioration of the equipment. Evidence collected from the 35 companies indicates that the resale value amounts to approximately 4% of the original fixed asset value. Components (e.g., copper piping) maintain a certain level of salvage value; the revenues are offset by the costs associated with dismantling, transportation, disposal and environmental compliance.

Similar considerations refer to auxiliary equipment and peripheral installations, like wastewater treatment facilities. The dismantling and disposal of contaminated plant components and hazardous liquids must be carried out by specialized contractors according to environmental and safety regulations.

In addition, the dismantling process of galvanic lines is estimated to require between one and two years, according to participants.

The aggregated one-off cost for the companies amounts approximately to 19 million EUR, while the aggregated re-sale value amount to 980,000 EUR, subtracting these two figures it can be obtained the net cost of dismantling considering the hypothetical re-sale value, totaling approximately 18 million EUR.

Downstream impact

During previous AFAS, **some downstream users, through support letters, quantified the potential impact that the proposed restriction would have on their activities.** Where possible, the 12 downstream respondents assessed both social and economic impact at a downstream level in the event of a restriction. By aggregating the estimates reported by these companies, **the total downstream impact is estimated to amount approximately to 1.3 billion EUR**

Total costs

By aggregating all the upstream cost components (economic, social, one-off impacts) considered in the analysis, the economic cost of the non-use of CR(VI) amounts to EUR 327 million EUR.

By dividing the total upstream costs by the number of companies participating in the assessment (i.e., 35 companies), the **average cost per company is approximately 13 million EUR**.

Similarly, by dividing the total upstream cost by the number of exposed workers (i.e., 307.5 full-time equivalent (FTE) employees) **the average cost per exposed worker is approximately EUR 1 million**

Adding the downstream impact to the upstream impact the total cost of the REACH restriction amounts to approximately 1.65 billion EUR.

By dividing the total costs (A+B+C+D in Table 1), by the number of companies participating in the assessment (i.e., 35 companies), the average cost per company is approximately 47.7 million EUR. By dividing the total cost by the number of exposed workers (i.e., 307.5 full-time equivalent (FTE) employees) the average cost per exposed worker is approximately 5.4 million EUR. This means the costs in the supply chain are 41,5 higher than the costs calculated in the SEAC approach (0.13 million EUR per worker).

The inclusion of downstream impact increased the previous figures.

The estimates reported should be considered a lower bound, which likely underestimates the overall economic impact. The estimated cost would be expected to increase with a larger sample of companies and the inclusion of additional cost components that were outside the scope of the present assessment. These include, among others, downstream economic impacts, the costs associated with the implementation of additional risk management measures, and other wider economic impacts.

Data and methodology disclaimer

The analysis presented in this report is based on data and information provided to EPPA by Vecco. EPPA did not independently collect or verify the underlying data and did not directly engage with the companies included in the sample as part of the data-gathering process. The data were reviewed, consolidated and analysed by EPPA for the purpose of assessing the potential socio-economic impact of the proposed REACH restriction of Cr(VI) substances. The findings and estimates presented in this report should therefore be understood in light of the underlying data and information provided to us.