PHILIP MORRIS INTERNATIONAL

PMI Critical Raw Materials Assessment

March 2026

About PMI

Philip Morris International is a leading international consumer goods company, actively delivering a smoke-free future and evolving its portfolio for the long term to include products outside of the tobacco and nicotine sector. The company's current product portfolio primarily consists of cigarettes and smoke-free products, including heat-not-burn, nicotine pouch and e-vapor products. Our smoke-free products are available for sale in over 105 markets, and as of December 31, 2025 PMI estimates they were used by over 43 million legal-age consumers around the world, many of whom have moved away from cigarettes or significantly reduced their consumption. The smoke-free business accounted for 41.5% of PMI's full year 2025 total net revenues.

Since 2008, PMI has invested over $16 billion to develop, scientifically substantiate and commercialize innovative smoke-free products for adults who would otherwise continue to smoke, with the goal of completely ending the sale of cigarettes. This includes the building of world-class scientific assessment capabilities, notably in the areas of pre-clinical systems toxicology, clinical and behavioral research, as well as post-market studies.

Following a robust science-based review, the U.S. Food and Drug Administration has authorized the marketing of Swedish Match's *General* snus and *ZYN* nicotine pouches and versions of PMI's *IQOS* devices and consumables – the first-ever such authorizations in their respective categories. Versions of *IQOS* devices and consumables and General snus also obtained the first-ever Modified Risk Tobacco Product authorizations from the FDA.

With a strong foundation and significant expertise in life sciences, PMI has a long-term ambition to expand into wellness areas.

References to "PMI", "we", "our" and "us" mean Philip Morris International Inc., and its subsidiaries.

For more information, please visit www.pmi.com and www.pmiscience.com.

About this report

The report details the methodology we used to assess the inherent sourcing risks, and environmental and social impacts, associated with the Critical Raw Materials (CRMs) used in our products. The main objective of the assessment was to assess the relative magnitude of inherent risks and impacts within the CRMs used in PMI products in order to identify a priority list of CRMs. The inherent risks and impacts are considered prior to the implementation of any mitigation measures.

Although we mainly source finished goods for our smoke-free devices, our aim was to assess inherent risks and impacts throughout the entire CRM value chain, not just the stages for which PMI is directly responsible. Taking this broader view offers a more thorough understanding and greater insight into the factors influencing our business.

When designing our methodology to assess impacts and risks, we drew from electronic manufacturers best practices, academic literature, and industry standards. Following a description of the methodology, we discuss the results and describe the approach we followed to prioritize the CRMs.

We expect this knowledge to serve as a foundation for evaluating potential mitigation strategies, supporting our efforts to continuously enhance our supply chain management and due diligence, as well as our eco-design efforts. However, in doing so, we recognize that, as a relatively small player within critical raw material supply chains, several risk factors may remain outside our direct control or sphere of influence and we remain subject to overall industry trends.

Contents

Deloitte was selected as a strategic partner to support us in our first CRM impact and risk assessment. The team brought with them extensive experience in assessing environmental, social, and sourcing risks across critical raw materials supply chains, familiarity with PMI's smoke-free product portfolio and sustainability programs, thereby serving as an informed and objective partner supporting us to advance our internal capabilities and strategic approach to addressing this emerging topic.

Artificial intelligence tools were used to assist with drafting and copy-editing of this report. The final content was reviewed and finalized by PMI employees.

Overview

In line with our commitment to responsible business practices, and with the objective of mitigating negative impacts and risks, we undertook a data-driven assessment to identify our company's possible negative impacts and risks related to Critical Raw Materials (CRMs). This analysis, completed in 2025, used primary and secondary data to model a series of potential negative impacts and risks, providing an indicative picture of PMI's exposure and serving as a strategic decision-making tool to inform our work going forward.

CRMs are materials which are essential to the production of modern technologies and are associated with high supply chain risk and environmental and social impacts.[1] They include, but are not limited to battery minerals such as nickel, graphite, lithium, cobalt, rare earth elements used in high-performance magnets, platinum group metals and others such as copper and aluminum which are widely used in electronics, clean energy technologies and advanced manufacturing systems. Their unique properties, including conductivity, corrosion resistance and magneticity, make them indispensable in the production of electronic devices, and alternative materials are often unable to deliver the same performance. The scarcity of CRMs is becoming a growing concern, influenced by factors such as the ongoing energy transition, the rapid growth of information technologies, increased consumption, and the geopolitical distribution of essential resources. Moreover, the political, regulatory and stakeholder expectations landscape is rapidly evolving, with rising scrutiny on resource use and sustainable sourcing, as the extraction and processing of CRMs may be associated with negative environmental and social impacts such as a loss of biodiversity, human rights concerns, or increased pollution.

PMI is a relatively small customer within the global CRMs value chain, with a limited footprint compared to other sectors such as automotive, energy, aerospace, and high-tech industries, that dominate minerals' consumption. Nevertheless, we use a range of CRMs in our smoke-free products, including batteries, wiring, and other components. As our company continues to grow its smoke-free business, we are focused on the sustainability of our expanding electronics supply chain base. This supply chain is vastly different to our traditional agricultural supply chain, and it carries other inherent risks, such as the potential presence of conflict minerals.

A robust set of policies, guidelines, and standards guides our work, including our Code of Conduct, Human Rights Commitment, Environmental Policy, Responsible Sourcing Principles, and Responsible Sourcing of Minerals Policy.

We implement a series of internal controls across our electronics supply chain to increase accountability and engagement and are a member of Responsible Business Alliance (RBA), the world's largest industry coalition for sustainable supply chains. Moreover, we are committed to operating with integrity and to responsibly sourcing 3TGs (tin, tantalum, tungsten, and gold), which are used in our products. For further information please see PMI 2025 conflict minerals submission to the U.S. Securities and Exchange Commission (SEC) covering the year ended December 31, 2024 (available here) and PMI's Value Report 2025.

This report is published to voluntarily provide our external stakeholders with deeper insights into how we conducted the CRM impact and risk assessment, as well as the results. It serves as a complement to our annual Value Report, which outlines our CRM strategy and its progress.

By sharing this report, we aim to contribute to knowledge in this field and provide a practical example for similar organizations seeking a data-driven, structured approach to evaluating impacts and risks associated with critical raw materials.

As our smoke-free portfolio grows, so does our responsibility to understand the inherent risks and impacts associated with materials that enable the evolution of our product portfolio. This assessment reflects our broader approach to sustainable value creation: proactively mapping our dependencies, being transparent about them, and integrating these insights into how we manage our supply chain. While our footprint in critical raw materials represents a relatively small share of the broader electronics industry, the risks and impacts associated with these materials are often systemic and require collective action to address. We believe that responsible sourcing starts with visibility, and that our approach should reflect where we are heading, not only where we are today.

Jennifer Motles
Chief Sustainability Officer

1. The definition of Critical Raw Materials and universe of CRM considered in the scoping of this assessment was derived from the EU Critical Raw Materials Act (Critical raw materials act - Consilium) and the U.S. Department of Energy Critical Materials list (What Are Critical Materials and Critical Minerals? | Department of Energy). These bodies define CRM as materials that have high economic importance, are essential to energy and strategic technologies, have a high risk of supply disruption due to their economic concentration, and lack of available substitutes.

Methodology

The assessment consisted of the following seven distinct steps:

1. **Identify CRMs in-scope**
2. **Select Value chain stages**
3. **Define Indicators**
4. **Identify & input raw data**
5. **Standardization and scoring**
6. **Calculating material volume**
7. **Calculating final scores and ranking CRMs**

1 Identify CRMs in-scope

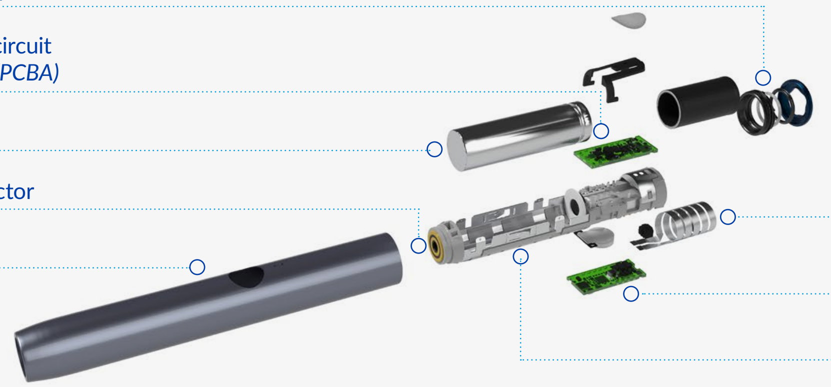
The scope of our assessment was defined through a detailed review of our product portfolio and the materials used within each. This analysis enabled us to identify 28 critical raw materials that are essential to the production and functionality of our heat-not-burn and e-vapor products.

In terms of our product portfolio, we included in the scope of the assessment the latest versions of our flagship heat-not-burn products (commercialized under the *IQOS ILUMA*, *BONDS by IQOS*, and *Lil SOLID Ez* brands) as well as both models comprising our e-vapor product portfolio at the time of the evaluation (the reusable vape pod system *VEEV ONE* and the disposable e-vapor device *VEEV NOW*).

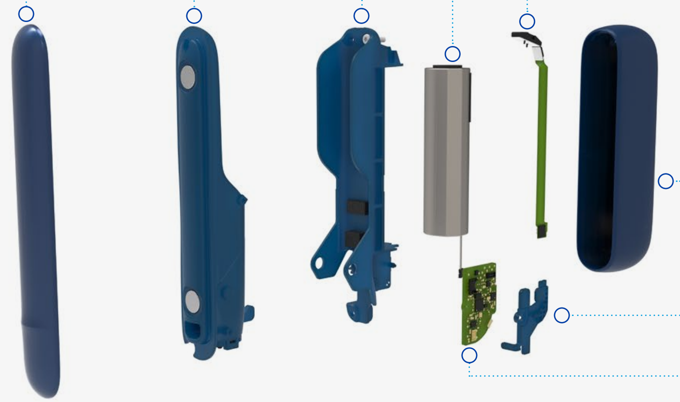
The assessment excluded products in our innovation pipeline not yet commercialized, as well as accessories, packaging, and previous versions of our *IQOS* heat-not-burn products.

Illustrative examples from *IQOS Iluma* series of products in scope of PMIs CRM impact and risk assessment

Holder (illustrative model from *IQOS ILUMA* series)



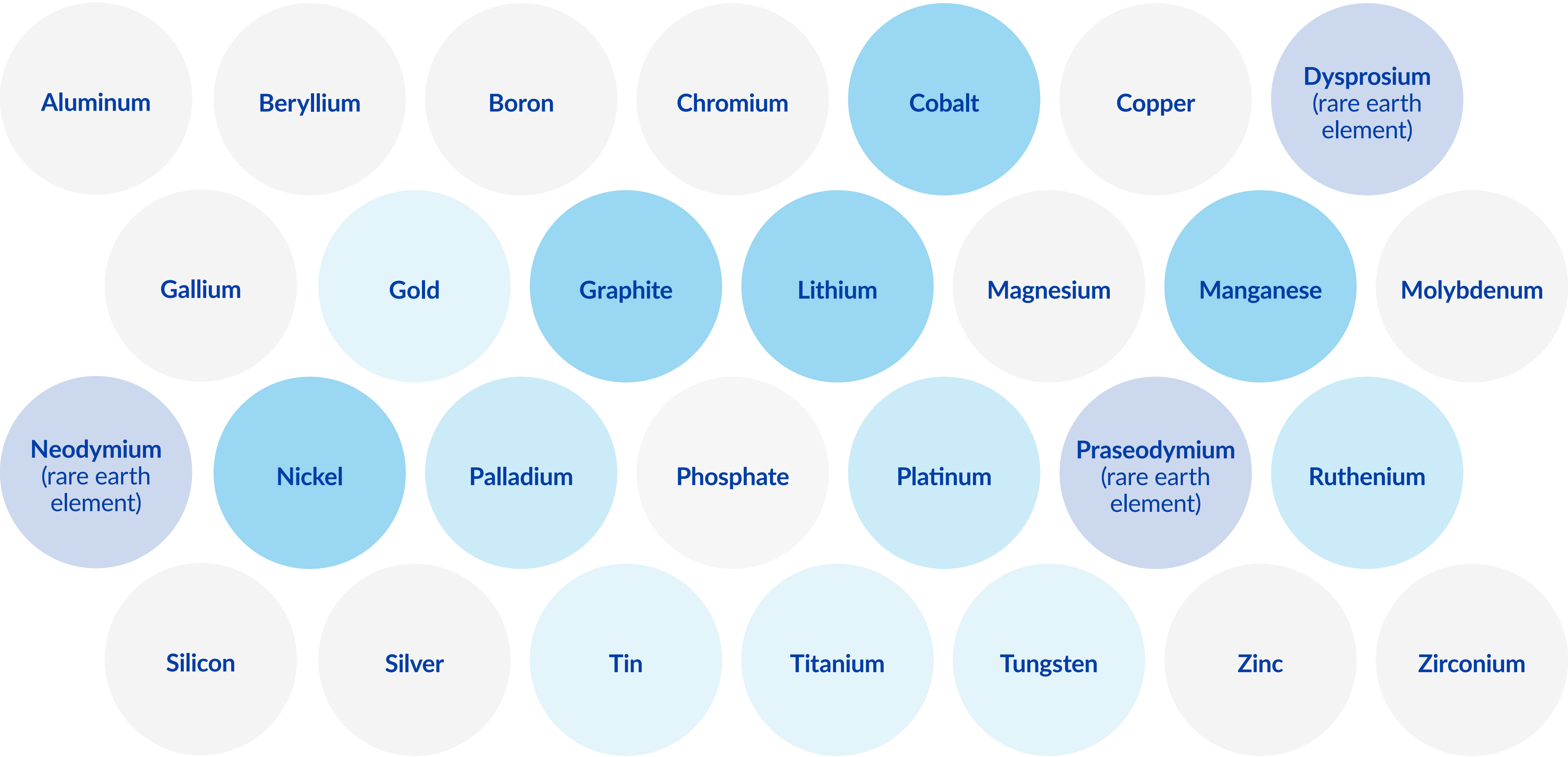
Charger (illustrative model from *IQOS ILUMA* series)



We then considered the bill of materials (BOM) for each of these products which details the components and materials contained within their design, including a broad range of CRMs in various components and alloys. When certain data was unavailable, we assumed that the material composition aligned with information provided in existing literature or other reliable secondary sources.

After analyzing these components and alloys, we identified 28 CRMs as essential to the production and functionality of our heat-not-burn and e-vapor devices, as detailed below.

List of CRMs used in PMI's smoke-free products in scope of the assessment



Key

- Battery minerals
- Rare earth elements
- Platinum group metals
- 3TGs
- Other CRMs

2 Select Value chain stages

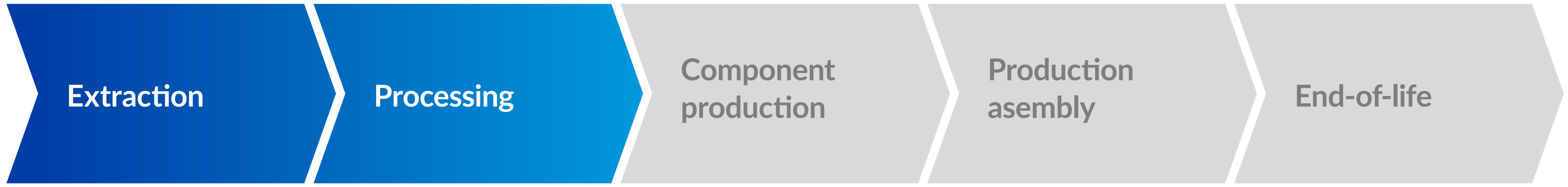
To support our goal of prioritizing CRMs based on their relative inherent risks and impacts, we concentrated our assessment on two key lifecycle stages deemed most critical within the value chain, extraction and processing.

In making this determination, we first identified which of the five value chain stages specific to CRMs – extraction, processing, component production, product assembly, and end-of-life – were most relevant for assessing the different risks and impacts of CRMs.

We selected 'extraction' and 'processing' as the key stages for our CRM assessment because they allow for a consistent and comparable analysis. At these stages, it is possible to conduct an in-depth evaluation of each individual CRM. In contrast, during 'component production' and 'product assembly', materials are combined into components, making it very challenging to analyze inherent risks and impacts and attribute these to an individual material within the component. That is why, we found it more appropriate to assess these stages at the component level, by examining the supplier's risk profile, which was already available as a part of PMI's suppliers due diligence program. Similarly, at 'the end of life' stage the main factor considered is the proportion of devices collected for disposal or recycling, which would affect all CRMs in the device equally and thereby not allow us to differentiate impacts and risks for individual CRMs.

Therefore, we only considered the "extraction" and "processing" life cycle stages to determine a relative ranking of risks and impacts associated with CRMs.

Value-chain stage included in PMIs CRM assessment



In scope

Priority lifecycle stages selected for assessing relative risks and impacts of different critical raw materials used in PMI products

Out of scope

Lifecycle stages considered out of scope of CRM assessment given assessing risks and impacts at these stages is more relevant at an overall component or device level, and not individual CRM.

3 Define Indicators

When selecting indicators to assess inherent impacts and risks of CRMs we drew from electronic manufacturers' best practices, academic literature, and industry standards.

The assessment framework we used was inspired by Thomas Graedel's methodology outlined in *Criticality of Metals and Metalloids*[2]. This leading academic approach, widely used in comparative studies, provides a balanced way to assess the inherent risks and impacts of CRMs. It enables us to evaluate the criticality of a CRM for PMI, quantify the potential sourcing risks threatening supply continuity and measure the environmental and social impacts resulting from the extraction and processing of materials.

Using this approach, we focused on the following four categories:

Criticality to PMI

Evaluates how essential a CRM is to the functionality of PMI products, and the ability to substitute the CRM with another material. This category also considers regulatory scrutiny for different CRMs.

Inherent Sourcing Risk

Examines for example geographic, physical and trade-related challenges in CRM extraction and processing to judge how likely PMI is to face sourcing risks in case of no risk mitigating actions in place.

Inherent Environmental Impact

Assesses the potential environmental impacts of PMI's CRM supply chains on countries and communities involved in production.

Inherent Social Impact

Evaluates the potential social impacts of PMI's CRM supply chains on countries and communities involved in production.

Each of these four categories comprises various indicators that differ between the "extraction" and "processing" stages due to distinct inherent risks and impacts. For instance, the extraction stage assesses the negative impact on biodiversity, while the processing stage does not, given the greater degree of land-conversion involved in mining activity. This ensures that CRMs are evaluated appropriately, using the most relevant indicators at each stage.

We selected indicators under each of these four categories following best practice from the electronic industry and the Responsible Minerals Initiative, and in line with due diligence standards on mineral supply chains from the Organization for Economic Co-operation and Development (OECD) and reporting frameworks for the mining sector from the Global Reporting Initiative (GRI). In this section, we outline the indicators we used to assess each of these two lifecycle stages. Table 2 provides an overview of the indicators in scope for each lifecycle stage can be found below, while Appendix A gives a detailed description of all indicators in scope. A complete list of excluded indicators can be found in Appendix B.

Indicators applied across extraction and process stages

	Extraction	Processing
Criticality to PMI	– Material importance – Regulatory exposure – Material volume – Material substitution index	– Material importance – Regulatory exposure – Material volume – Material substitution index
Inherent Sourcing Risk	– Mining concentration – Companion metal fraction – Price volatility – Trade restrictions – Governance – Recycled content – Economic development – Conflict areas – Natural disasters	– Processing concentration – Price volatility – Trade restrictions – Governance – Economic development – Conflict areas – Natural disasters
Inherent Environmental Impact	– Tailing waste – Water pollution – Water scarcity – Ecosystem loss – Biodiversity loss – Soil erosion – CO_2 emissions – Electricity mix	– Water pollution – Water scarcity – Air quality – CO_2 emissions – Electricity mix
Inherent Social Impact	– Employment rights – Occupational Health & Safety – Community rights violations – Child labour – Forced labour – Artisanal and small-scale mining	– Employment rights – Child labour – Forced labour

2. T. E. Graedel et al. (2021) 'Criticality of metals and metalloids,' PNAS, Vol. 112, Issue 14.

4 Identify and input raw data

To evaluate each indicator, we drew on publicly available databases, academic studies covering CRM production, their supply chains, and the countries in which these materials are produced.

Many of the sources we selected (see Appendix A) have supported other companies' CRM impact and risk assessments and provide a broad understanding of CRM implications using industry averages. In addition, we used primary data from PMI, such as device BOMs and stakeholder interviews, to inform certain indicators. The data sources used in the assessment can be split into three categories:

- **PMI-specific data** related directly to PMI's CRM dependencies and applications, such as material volume based on device composition and sales.
- **CRM-specific data** pertaining directly to a single CRM or its supply chain, such as price volatility by material.
- **Country-specific data** which indirectly evaluates CRM supply chain risk using weighted averages of top supplier countries, such as proportionate natural disaster risk.

A full breakdown of the data sources used for each indicator can be found in Appendix A.

By combining these data sources and metrics, we thoroughly assessed the inherent impacts and risks in CRM supply chains. However, since the sources used various units, we need to standardize them to ensure we can properly analyze and compare impacts and risks.

5 Standardization and scoring

Given the different units of measurement for each indicator, standardizing the raw data into universal scores enabled consistent comparison of different impacts and risk indicators and allows CRMs to be ranked according to their profile.

In this framework, we used a universal scoring scale from 1 to 5, where 1 represents the lowest and 5 the highest significance of a possible risk or impact. We converted raw data into these scores using one of the following three methods for each indicator:

- **Data source scoring method** We used this method when the data source already provided scoring thresholds that aligned with the 1-5 scale. For example, for the Natural Disaster indicator, we used the World Risk Index, which rates risk from very low to very high and could directly be converted into 1-5 scores.
- **Normal distribution method** When the data for an indicator followed a roughly normal distribution (as shown on a histogram), we split the data into five equal groups (quintiles) to assign scores from 1 to 5. For example, we used this method for the governance indicator.
- **Log distribution method** When the data for an indicator was skewed or followed a log distribution (as shown on a histogram) we could not split it into even quintiles. In these cases, we applied a logarithmic function to better spread out the data and set fair scoring levels. This method enables better relative comparability between indicators, especially when data points were concentrated or there were outliers. For example, we used this method for the conflict areas indicator, since most data points were clustered on one side of the distribution.

A full breakdown of the scoring method used for each indicator can be found in Appendix A.

By applying these three methods, we defined suitable scoring levels for each indicator, enabling us to analyze PMI's CRM-related impacts and risks. Although we aimed for consistency in how we assessed and scored different indicators, it is important to note that using these three scoring methods results limits the full comparability across indicators.

6 Calculating consumption volume

Calculating the total volume of CRMs used in PMI products is essential to assess CRM criticality and how PMI's impact and risk landscape might evolve over time.

We used the following three-step approach to calculate PMI's CRM consumption:

- **Assess CRM weight per product**
  We reviewed the BOMs for each PMI product to measure the weight of CRMs present in each device. This involved analyzing CRM-derived components and alloys and determining their specific compositions.
- **Calculate total material consumption per product**
  After identifying the CRM content in each product, we multiplied these figures by the number of units shipped to find the total weight of CRMs used in the production of the products sold.
- **Calculate total material consumption for PMI**
  Finally, we added together the CRM weights from all units shipped across PMI's portfolio to determine the company's overall CRM consumption.

By carrying out these calculations, we could clearly identify both the types and volumes of CRMs needed to produce each product. This process also revealed how risks and impacts vary across the product portfolio. Additionally, it allowed us to model how PMI's impact and risk landscape might evolve over time.

To integrate material volume as a score in the framework, we converted the total CRM weights into 1-5 scores using the log distribution method outlined in Step 5.

7 Calculating final scores and ranking CRMs

After standardizing and scoring all indicators, we calculated the average score for each of the four categories, criticality for PMI, Inherent Sourcing risk, Inherent Environmental impact, and Inherent Social Impact.

Using average scores helped us maintain consistency on the 1-5 scoring scale and identify which are the most relevant of among these four categories for each CRM. The average scores for each category was calculated following the steps below:

- **Combine average scores for criticality to PMI and sourcing risk**
  We took the average scores for criticality for PMI and supply risk and combined them by averaging across both the extraction and processing stages.
- **Weighting the environmental and social impact scores to account for CRM volume**
  To ensure that the environmental and social impact scores reflected the amount of CRM consumed by PMI (and therefore its impact in the supply chain), we adjusted these scores by factoring in the CRM volume score. The formula weighted the environmental and social impact scores against the CRM volume score:

  $$\text{Weighted Env. and Social Score} = \tfrac{5}{6} \times \text{Average Env. and Social Score} + \tfrac{1}{6} \times \text{CRM Volume Score}$$

  This approach was taken so that precious metals with a high per kilogram impact but consumed in very small quantities did not receive the highest overall impact rating. As a result, the final scores more accurately reflected the significance of the impacts at both the extraction and processing stages.

The detailed analysis including the scoring for each indicator for each CRM, though not presented in this report, will serve to inform our work going forward. In the following section of the results, we also provide a discussion outlining the key indicators that drove the results in each category.

Results

Our assessment resulted in a comprehensive overview of how each CRM ranks according to the established scoring framework.

These results offer valuable insights. Although our organization occupies a modest position in the electronics market, the data indicates that certain CRMs are indispensable for the functioning of key product components, and they are challenging to substitute. Overall, the significance of inherent sourcing risks for most CRMs is evaluated as ranging from medium to high, primarily because mining and processing are concentrated in specific regions, which heightens exposure to trade limitations and increases vulnerability to natural disasters in those areas. Inherent environmental impacts are generally evaluated as low to medium, Inherent environmental impacts are generally assessed as low to medium, while inherent social impacts—particularly for certain CRMs—are assessed as more significant. We describe these results in further detail below.

Key

- Highest
- High
- Medium
- Low
- Lowest

Overall ranking of CRMs, and score across four assessment categories

CRM	Criticality for PMI	Inherent Sourcing risk	Inherent Environmental impact	Inherent Social impact
Graphite	High	Low	Low	Low
Nickel	Medium	Low	Low	Medium
Aluminium	Medium	Low	Low	Medium
Lithium	Medium	Low	Low	Low
Manganese	Medium	Medium	Lowest	Medium
Silicon	Medium	Medium	Lowest	Low
Neodymium (REE)	Medium	Medium	Lowest	Low
Cobalt	Medium	Medium	Lowest	High
Tin	Medium	Low	Lowest	Medium
Chromium	Medium	Low	Low	Medium
Praseodymium (REE)	Medium	Low	Lowest	Low
Dysprosium (REE)	Medium	Medium	Lowest	Lowest
Tungsten	Medium	Low	Lowest	Medium
Copper	Low	Lowest	Lowest	High
Magnesium	Low	Medium	Lowest	Low
Platinum	Low	Low	Low	Lowest
Gold	Low	Lowest	Low	Low
Boron	Low	Low	Lowest	Lowest
Palladium	Low	Medium	Low	Lowest
Beryllium	Low	Low	Lowest	Low
Molybdenum	Low	Low	Lowest	Lowest
Ruthenium	Lowest	Medium	Low	Lowest
Gallium	Lowest	Medium	Lowest	Low
Silver	Lowest	Low	Lowest	Low
Titanium	Lowest	Low	Lowest	Lowest
Phosphate	Lowest	Medium	Lowest	Lowest
Zirconium	Lowest	Low	Lowest	Lowest
Zinc	Lowest	Lowest	Lowest	Low

Criticality for PMI

Amongst the highest scoring CRMs under the category Criticality for PMI are those which are found in the batteries, a critical component of the devices. PMI devices use a variety of battery chemistries, however, as graphite is used as the anode material in all of these battery chemistries, it emerged as a priority CRM for PMI. Moreover, it is more difficult to substitute graphite with alternative materials than it is for battery cathode materials, such as Lithium, Cobalt, Nickel and manganese. Nickel, in addition to being used as a cathode material, is used as an alloying element in our smoke-free products, making it the second highest ranking CRM after graphite in terms of criticality to PMI.

Beyond the battery materials, other high ranking CRMs within the category criticality for PMI include Aluminum which relatively to other materials in PMI devices is used in high volume in the device housing and mechanical parts, Silicon and Tin which are used as an alloying materials and in printed circuit boards, REE used in magnets, and chromium and molybdenum used in certain smoke-free products.

Many of these materials also fall in scope of regulations, such as the EU battery regulation, EU Carbon Boarder Adjustment Mechanism, SEC Conflict Minerals disclosure, an important indicator considered in the ranking of criticality for PMI.

All other remaining materials ranked lower, mainly because they are either used in trace amounts, or are more easily substituted.

Inherent Sourcing risk

The inherent sourcing risk of many CRMs is primarily driven by the high geographic concentration of both raw material extraction and processing. Globally, CRM processing is even more concentrated than extraction, largely because China processes the majority of the world's CRMs.

Materials used in magnets, such as Rare Earth Elements (REEs) and Gallium, as well as Magnesium which is used as an alloying material, have particularly high sourcing risks due to their strong reliance on China for both extraction and processing.

This concentration, combined with high price volatility, limited supply flexibility (as many are mined as companion metals), and exposure to trade restrictions contributes to their elevated risk profiles. Although Graphite is also heavily concentrated in China, its sourcing risk is comparatively lower due to historically lower price volatility and fewer trade restrictions.

Other CRMs, including Silicon, Manganese, and Phosphate, are more geographically diversified at the extraction phase, but remain highly concentrated at the processing stage in China. Cobalt shows high sourcing risk as well, given that mining is concentrated in the Democratic Republic of Congo, an area with heightened conflict and instability, while processing is again largely based in China.

This inherent sourcing risk due to the reliance on a single region for processing of CRMs is further amplified by China's relatively high exposure to natural disaster risk.

Platinum group metals (PGMs), such as ruthenium and palladium, also face elevated sourcing risks because mining and processing are heavily concentrated in South Africa. However, PMI uses only trace quantities of these materials in printed circuit boards.

In contrast, CRMs with more diversified supply bases, greater availability of secondary recycled materials, and lower price volatility tend to exhibit stronger overall supply security.

Inherent social impacts

In general, social impacts scored higher than environmental impacts for most CRMs. This is mainly because social issues, such as child labor, forced labor, and poor occupational health and safety conditions, often occur together/are correlated, leading to high average impact scores.

Whilst impacts on human rights can arise across different mining contexts, artisanal and small-scale mining represents one such context where impacts on human rights may be more prevalent due to the absence of effective formalization, regulation, and social protection mechanisms.

Among the critical raw materials supply chains associated with the most significant social impacts, Tin, Tungsten, Tantalum and Gold (3TGs), together with Cobalt, are strongly linked to the presence of artisanal mining. These CRMs were found to have higher risks of child labor and forced labor.

These materials are already covered by PMI's supply chain due diligence program. Our Responsible Sourcing of Minerals policy effectively articulates PMI's existing due diligence efforts, including requirements for suppliers, and demonstrates a strong commitment to minerals supply chain due diligence. For 3TGs, we are engaged with the Responsible Minerals Assurance Process (RMAP) from the Responsible Minerals Initiative (RMI). We also apply the RMI approach for due diligence in our cobalt supply chain to identify and address potential human rights risks.

In addition to the 3TGs and Cobalt, Copper also shows a high social impact, largely due to the small share of its global supply coming from the Democratic Republic of Congo (DRC), where labor issues are a significant concern.

It is important to note that these rankings of social impacts are based on industry, or in some cases country averages, however the true impact can vary vastly depending on the specific supply chain, highlighting the importance of due diligence in CRM supply chains.

Inherent environmental impacts

In contrast to social impacts, indicators of environmental impacts tend to vary more between different materials, resulting in lower average scores.

The greatest environmental impacts relate to water pollution and water scarcity. Water scarcity poses the most significant threat at the extraction stage because many CRMs such as Lithium, Boron, Chromium, Manganese, and Platinum Group metals are mined in arid regions. Water pollution is especially problematic across the majority of CRMs assessed, as mining can contaminate water sources through chemical leaks, heavy metal runoff, and degrade local ecosystems.

Certain impacts were only assessed at the extraction stage because they are largely relevant during extraction activity, rather than processing. For example, biodiversity and ecosystem loss is more likely at the extraction stage due to the land conversion associated with mining methods. Moreover, Gold and Platinum Group Metals occur in low natural abundance meaning that their extraction and processing require large quantities of ore, which also leads to increased waste (tailings) and higher greenhouse gas emissions.

Once more, given the concentration of processing of CRMs in China, the relative high carbon intensity of the electricity grid in the country results in high scores for electricity mix across the CRMs.

Limitations of assessment and interpretation of the results

The results of this assessment provide us with a strong foundation to evaluate the types and seriousness of impacts and risks across our CRM supply chain.

However, several important limitations need attention. Firstly, we calculated the volumes of CRM used in PMI products based only on those already commercialized at the time of the analysis. Hence, changes in our product portfolio could alter these results if we significantly modify material compositions. Secondly, we made certain assumptions about the exact material make-up, especially for components where suppliers do not disclose the precise compositions due to intellectual property or commercial sensitivity. Lastly, although we used industry or country averages as a proxy for inherent social and environmental impacts, assigned impacts can differ significantly between supply chains.

Priority list of CRMs and next steps

Once we had finalized the assessment, we needed to prioritize which materials to focus on first.

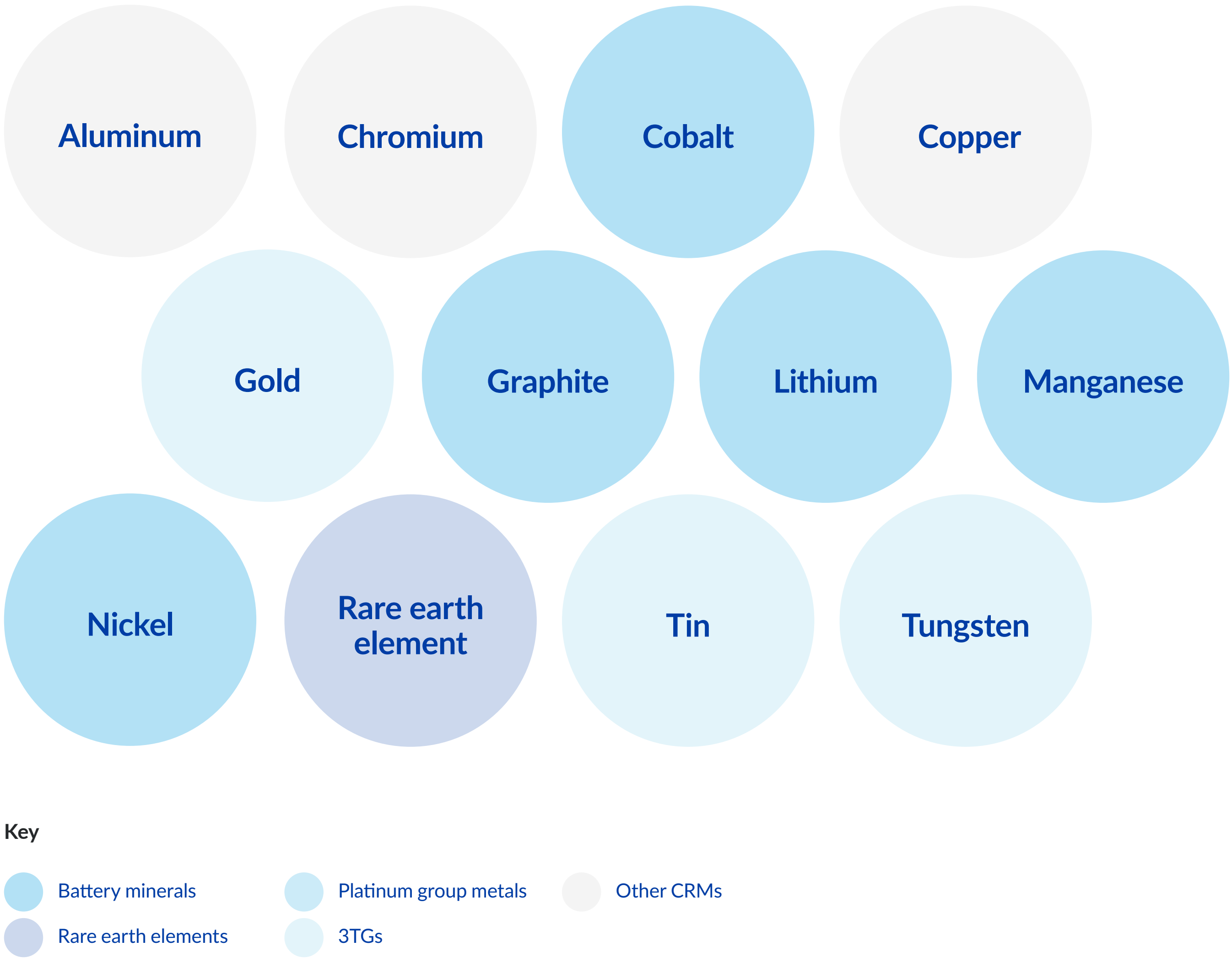
Developing targeted product design strategies to substitute, reduce, replace a material or enhance the use of recycled content, or to increase traceability in our supply chain and implement corresponding corrective actions plans requires significant resources and investment. To ensure that we are effectively and efficiently focusing our resources on the most critical CRMs we decided to prioritize from the long list of 28 CRMs included in the assessment to a shorter list of priority CRMs.

We identified our priority list of CRMs using the following criteria:

1. We included materials that were ranked in the top 10 for 'Criticality for PMI' and faced the greatest difficulty to be substituted in our products.
2. We prioritized any material that is regulated or falls within the scope of relevant regulations.
3. We also prioritized any material that did not meet the above two criteria yet presented a high inherent social or environmental impact.

Applying these criteria to our comprehensive assessment results, we established the following CRMs as priorities for PMI: lithium, cobalt, nickel, graphite, aluminum, copper, rare earth elements, chromium, manganese, tin, tungsten, and gold. These materials are especially important because they either play a critical role in our products, are tightly regulated, or have the potential to impact human rights within our supply chain.

We established the following CRMs as priorities for PMI




This assessment is a starting point, not a conclusion. As our smoke-free product portfolio evolves and the global landscape for critical raw materials shifts, driven by technological innovation, regulatory developments, and changing supply dynamics, so too must our understanding of our material dependencies. Furthering this understanding helps inform our teams as they strive to embed eco-design and circularity principles, and advance our procurement strategies and supplier engagement efforts.

Importantly, we recognize that our ability to influence certain systemic risks is limited. As a relatively small player in CRM supply chains, many of which are shaped by highly concentrated global market structures. Nevertheless, knowing what we depend on, where those dependencies are concentrated, and how they may change over time is fundamental to building a resilient business. By embedding these insights into the earliest stages of product development, we can create sustainable value not only through the products we bring to market, but through the supply chains that enable them. This is how we future-proof our R&D and operations.

Michele Cattoni
Chief Global Research & Development Officer

Scott Coutts
Chief Global Operations Officer

Appendix

Appendix A – Sources

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Criticality for PMI	Material importance	Extraction, Processing	N/A	Device BOM, PMI stakeholders[3]	1-5 score	N/A	Indicator score is estimated based on knowledge of PMI's CRM applications in PMI products.
	Regulatory exposure	Extraction, Processing	N/A	PMI Legal function. Regulations considered include: EU Battery Regulation, EU CRMA, US Energy Act of 2020, EU CBAM, US SEC Conflict Mineral disclosure, EU Regulation 2017/821 on Supply Chain Due Diligence Obligations for Union Importers of Conflict Minerals, Swiss ordinance on Due Diligence and Transparency in relation to Minerals and Metals from Conflict-Affected Areas and Child Labor.	1-5 score	If a CRM is included in a regulation for which PMI is directly or indirectly in-scope, it is scored 5. If a CRM is not in-scope of a regulation, it is scored 1.	N/A
	Material volume	Extraction, Processing	N/A	Device BOM, PMI Finance function	Tons	Tons converted into a 1-5 score using log normalization	CRM composition not available for all PMI device components, leading to potential gaps in volume calculations. However, these gaps were seen to be immaterial to the assessment (i.e., estimated to represent <2% of total weight).
	Material substitution index	Extraction, Processing	N/A	Grohol, M., Veeh, C. (2023). 'Study on the critical raw materials for the EU 2023'. European Commission.	0-1 score	0-1 score converted into a 1-5 score using log normalization.	Substitution index refers to the general use of CRMs, not the PMI applications in heat-not-burn and e-vapor devices.

Legend: Lifecycle stage/s

Extraction | Processing | Extraction, Processing

3. Material importance was determined via interviews conducted with key PMI stakeholders in the product development function to understand how important different CRMs are. The qualitative feedback was transformed to a 1-5 scoring.

Appendix A – Source continued

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Inherent Sourcing Risk	Mining top three countries		N/A	Mineral Commodity Summaries 2024 (usgs.gov)	N/A	N/A	Top three countries cover the majority of a CRM's supply (representing from 50 to 99% of supply by CRM, except for gold (33%) and copper (47%)).
	Mining concentration		N/A	Mineral Commodity Summaries 2024 (usgs.gov)	Herfindahl-Hirschman index (HHI)	HHI converted into a 1-5 score using modified HHI scoring thresholds.	HHI is based on top three countries, not the entire global supply.
	Processing top three countries		N/A	Grohol, M., Veeh, C. (2023). 'Study on the critical raw materials for the EU 2023'. European Commission.	N/A	N/A	Top three countries cover the majority of a CRM's supply (representing between 55 and 99% of supply by CRM, excepted for gold (36%) and silver (42%)), but not the entire global supply.
	Processing concentration		N/A	Grohol, M., Veeh, C. (2023). 'Study on the critical raw materials for the EU 2023'. European Commission.	HHI	HHI converted into a 1-5 score using modified HHI scoring thresholds.	HHI is based on top three countries, not the entire global supply.
	Companion metal fraction		N/A	N. T. Nassar, et al. (2015). 'By-product metals are technologically essential but have problematic supply'. Science Advances, 1 (3).	%	% converted into a 1-5 score using normal distribution.	N/A
	Price volatility		N/A	BGR, Volatilitätsmonitor, Juli 2024 For aluminum, the following source was used: Statista For nickel, the following source was used: Statista For gold, the following source was used: Daily: Record gold prices can still shine brighter | UBS Global	%	% converted into a 1-5 score using normal distribution.	Historic price volatility is not necessarily an indication of future price volatility.

Appendix A – Source continued

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Inherent Sourcing Risk	Trade restrictions		GRI 14: Mining Sector 2024 (anti-corruption, payments to gov, public policy)	OECD. (2021), 'Export restrictions on Industrial Raw Materials', OECD.	Total number of regulations and sanctions per CRM	Total number of regulations and sanctions converted into 1-5 score using log normalization	Approach used assesses number of regulations and sanctions per CRM, not severity or impact. Data is not for the most recent year
	Governance		GRI 14: Mining Sector 2024 (anti-corruption, payments to gov, public policy)	Kaufmann, D. and Kraay, A. (2023), 'Worldwide Governance Indicators', The World Bank.	Pre-standardized score	Score converted to 1-5 score using predefined thresholds.	N/A
	Recycled content		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	Recycling Rates of Metals – A Status Report (UNEP)	%	% converted into a 1-5 score using normal distribution.	Data is from 2011, as more recent sources could not be identified.
	Economic development		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	The World Bank. (2023). 'GNI Per Capita, PPP', The World Bank.	GNI per capita ($)	GNI per capita ($) converted into a 1-5 score using World Bank development thresholds, with additional 'very high' category.	Economic development may not always be a reliable proxy for business regulation infrastructure development in a supplier country.
	Conflict areas		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	ACLED. (2024). 'ACLED Conflict Index Results: July 2024', ACLED.	Pre-standardized score	Score converted into a 1-5 score using log normalization.	N/A
	Natural disasters		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	Institute for International Law of Peace and Armed Conflict. (2024). 'World Risk Index', Institute for International Law of Peace and Armed Conflict.	Pre-standardized score	Score converted into a 1-5 score using log normalization.	Natural disasters are evaluated at a country-wide level, not at an intra-country level.

Appendix A – Source continued

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Inherent Environmental and Social impact	Tailing waste		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	Naasar, N. et al. (2022) 'Rock-to-Metal Ratio: A Foundational Metric for Understanding Mine Wastes', Environmental Science & Technology, Vol 56, Issue 10.	Rock to metal ratio	Rock to metal ratio converted into a 1-5 score using log normalization.	Data was unavailable for the following CRMs: beryllium, neodymium, palladium, phosphates, platinum, praseodymium, ruthenium, and zirconium.
	Water pollution		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	Macklin, M. et al. (2023) 'Impacts of metal mining on river systems: a global assessment', Science, Vol 381, Issue 6664.	Number of people living on floodplains affected by mining-related water pollution.	Number of people converted into a 1-5 score using log normalization.	Data is per country, not per CRM.
	Water scarcity		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	World Resources Institute. (2022). 'Aqueduct', World Resources Institute.	Pre-standardized score	Score converted into a 1-5 score using log normalization.	Water scarcity is evaluated at a country-wide level, not at an intra-country level.
	Employment rights		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	ITUC. (2024) '2024 ITUC Global Rights Index: The World's Worst Countries For Workers', ITUC.	Pre-standardized score (5+ to 1)	Score converted into a 1-5 score by combining the 5 and 5+ rating.	N/A
	Occupational Health & Safety		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	Material insights	Pre-standardized score (very low – very high)	Score converted directly from 'very low – very high' into a 1-5 score.	N/A
	Community rights violations		OECD Due Diligence Guidance Annex II	Material insights	Pre-standardized score (very low – very high)	Score converted directly from 'very low – very high' into a 1-5 score.	N/A
	Ecosystem loss		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	Kramer, M. et al. (2024) 'Extracted Forests: Unearthing the role of mining-related deforestation as a driver of global deforestation', WWF.	Km^2	Km^2 converted into a 1-5 score using log normalization	Data was unavailable for CRMs with low impact. The source used provided a breakdown for the CRMs which cause 88% of ecosystem loss, but not for the remaining 12%.

Appendix A – Source continued

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Inherent Environmental & Social Impact	Biodiversity loss		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	Cabernard, L., Pfister, S. (2022) 'Hotspots of Mining-Related Biodiversity Loss in Global Supply Chains and the Potential for Reduction through Renewable Electricity', Environmental Science and Technology, Vol 56, Issue 22.	Pre-standardized score	Score converted into a 1-5 score using log normalization.	Measuring biodiversity loss accurately is challenging, especially when attributing it to mining activity.
	Child labor		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	Extraction stage: Material insights Other stages: UNICEF. (2024) 'Child Labour', UNICEF. Malaysia Vietnam Turkiye China All sources aligned to ILO 138 & 182.	Extraction: very low-very high % of child population in work	Extraction: Score converted directly from 'very low – very high' into a 1-5 score. Other stages: % converted into a 1-5 score using a unique scoring model (1 = 0%, 3 = ≤8%, 5 = >8%)	Child labor rates are challenging to measure. Data for some countries is not current. Data sources which measure child labor prevalence at a country level may not reflect the specific child labor in the metal & mining sector.
	Forced labor		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	Extraction stage: Material insights Other stages: Walk Free	Material insights: very low-very high Walk Free: number of people per 1000 in forced labor	Material insights: Score converted directly from 'very low – very high' into a 1-5 score. Other stages: Converted into a 1-5 score using a unique scoring model (1 = 0, 3 = ≤5, 5 = >5)	Forced labor rates are challenging to measure. Data for some countries is not current.
	Artisanal and small-scale mining (ASM)		N/A	Fairphone. (2023) 'Fair Materials Roadmap 2030,' Fairphone.	Yes / No	% converted into a 1-5 score using a binary model	Does not account for the proportion of a CRM supply from ASM sources.
	Air quality		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains	Air Quality Life Index, The Index - AQLI	Number of years	Number of years converted into a 1-5 score using log normalization	Refers to air pollution overall in a country, not directly attributable to CRMs

Appendix A – Source continued

Impacts/Risks categories	Indicator	Lifecycle stage/s	Industry standards	Data source	Unit	Scoring method	Limitations
Inherent Environmental & Social Impact	CO_2 emissions		OECD - Handbook on Environmental Due Diligence in Mineral Supply Chains GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	P. Nuss, M. J. Eckelman (2014) 'Life cycle assessment of metals: A scientific synthesis', Plos One, Vol. 9, Issue 7.	Global Warming Potential – kg CO_2 per kg of metal	CO_2 emissions converted into a 1-5 score using log distribution.	Data is 10 years old, but more recent sources could not be identified.
	Electricity mix		GRI: Sustainability Reporting Guidelines & Mining and Metals Sector Supplement (V3)	The International Tracking Standard Foundation: I-REC(E) Residual Mix	Kg CO_2 equivalent /kWh	$kgCO_2e$/kWh converted into a 1-5 score using log distribution.	Country level data, not based on the regions where CRMs are mined.

Appendix B – Indicators excluded

Impact categories	Indicators not in scope	Rationale for exclusion
Inherent Sourcing Risk	Resource depletion	May not account for undiscovered reserves, how depletion timelines are impacted by market dynamics and pricing, advancements in material innovation, etc.
	Reserve distribution	As with depletion, requires further analysis to be meaningful
	Financial flows	Considered to be covered by overall governance/corruption indicator
	Non-payment taxes	Considered to be covered by overall governance/corruption indicator
Inherent Environmental & Social Impact	Indigenous people's rights	Considered to be covered partially by community rights violations indicator
	Negative perception of corporate citizens	Indicator deemed to be too generic to add value to analysis
	Critical incident management	Data unavailable at a country and CRM level
	Animal rights	Partially covered by biodiversity and identified as low risk across CRM value chains based on initial assessment based on 3rd party sources
	Release of radiation	Identified as low risk across CRM value chains based on initial assessment based on 3rd party sources
	Noise & vibration	Data unavailable at a country and CRM level as it is mine specific
	Waste mismanagement	Data unavailable at a country and CRM level as it is mine specific; partially covered by tailing waste indicator

Headquarters

Philip Morris International Inc.
677 Washington Blvd.
Stamford, Connecticut
USA

www.pmi.com

Operations Center

Philip Morris Products S.A.
Avenue de Rhodanie 50
1007 Lausanne
Switzerland

PHILIP MORRIS INTERNATIONAL