

# Integrating Climate Change into ISO 14001 for Chemical and Refinery Operations

## Executive Summary

The 2024 amendment to International Organization for Standardization (ISO) 14001:2015 introduces explicit requirements for organizations to consider climate change within their environmental management systems (EMS). This update mandates assessing climate change relevance and incorporating related stakeholder requirements. For chemical plants and refineries, which are high-emission sectors vulnerable to regulatory shifts and physical risks like extreme weather, integration enhances compliance, resilience, and sustainability. This whitepaper outlines the amendment, its implications, practical integration steps, and examples, drawing from verified sources. Key benefits include reduced greenhouse gas (GHG) emissions, improved risk management, and alignment with global standards like the Paris Agreement.

## Introduction

ISO 14001:2015 provides a framework for effective EMS, helping organizations minimize environmental impacts and achieve continual improvement. The February 2024 amendment (ISO 14001:2015/Amd.1:2024) responds to the London Declaration on climate action, embedding climate considerations into the standard to support net-zero goals. In the U.S., over 27,000 sites are ISO 14001-certified, with heavy adoption in manufacturing and energy sectors. Chemical and refinery operations face unique challenges, including GHG emissions from processes like refining and chemical synthesis, supply chain disruptions from climate events, and evolving regulations such as U.S. Environmental Protection Agency (EPA) GHG reporting. Integrating climate change strengthens operational efficiency and competitiveness.

## Overview of the 2024 Amendment

The amendment introduces two key changes:

1. **Clause 4.1 (Understanding the Organization and Its Context):** Organizations must “determine whether climate change is a relevant issue.” This requires evaluating internal and external factors, such as physical risks (e.g., flooding, heatwaves) and transition risks (e.g., carbon pricing).
2. **Clause 4.2 (Understanding the Needs and Expectations of Interested Parties):** A new note states: “Relevant interested parties can have requirements related to climate change.” This includes stakeholders like regulators, investors, and communities expecting GHG reductions or adaptation measures.

These updates apply to all ISO 14001-certified organizations, with audits incorporating them since March 2024. The amendment aligns with broader ISO efforts, including ISO 14007 for GHG valuation and ISO 14008 for adaptation cost-benefit analysis.

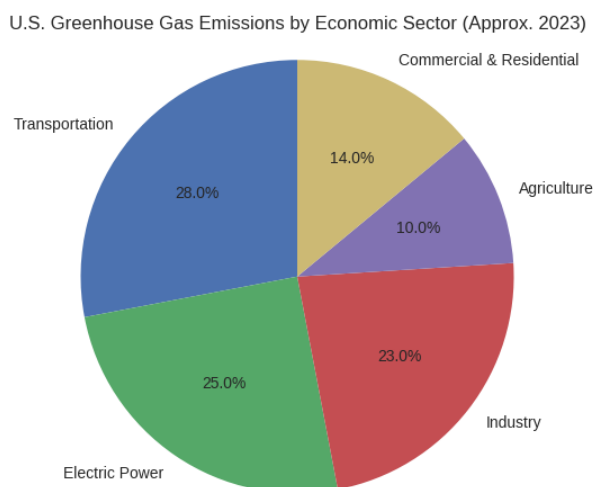
## Implications for Chemical and Refinery Operations

Chemical plants and refineries contribute significantly to GHG emissions (e.g., through flaring and energy-intensive processes) and are exposed to climate risks like hurricanes impacting Gulf Coast facilities. The amendment requires these sectors to:

- **Assess Risks:** Identify climate impacts on operations, such as water scarcity affecting cooling processes or sea-level rise threatening infrastructure.
- **Enhance Compliance:** Align with U.S. regulations like EPA's Cap-and-Trade or U.S. Securities and Exchange Commission (SEC) climate disclosures, and global frameworks like the European Union (EU) Carbon Border Adjustment Mechanism.
- **Drive Opportunities:** Adopt clean technologies, such as renewable energy integration or carbon capture, to reduce Scope 1, 2, and 3 emissions (direct emissions, indirect from purchased energy, and other indirect emissions, respectively).
- **Build Resilience:** Prepare for extreme weather through contingency planning, improving long-term stability.

To illustrate the role of industry in overall emissions, see Figure 1 below, which shows the approximate breakdown of U.S. GHG emissions by economic sector (based on EPA data for 2023; industry accounts for about 23%, highlighting the significance for chemical and refinery operations).

**Figure 1: U.S. Greenhouse Gas Emissions by Economic Sector (Approx. 2023)**



(Data verified from EPA sources; total emissions ~6,343 million metric tons of carbon dioxide equivalent (MMT CO<sub>2</sub>e) in 2022, with similar proportions in 2023.)

Failure to integrate could lead to non-conformities during audits, while proactive adoption supports sustainability goals like Science-Based Targets.

## Steps to Integrate Climate Change into ISO 14001

Follow these verified steps, structured around ISO 14001 clauses, to ensure accurate implementation:

1. **Evaluate Context (Clause 4.1):** Conduct a climate risk assessment using tools like Task Force on Climate-related Financial Disclosures (TCFD)-aligned frameworks (now under the International Sustainability Standards Board (ISSB) as International Financial Reporting Standards (IFRS) S2). For refineries, map vulnerabilities like flood-prone sites; for chemical plants, analyze emission hotspots. Determine relevance by reviewing data from sources like Intergovernmental Panel on Climate Change (IPCC) reports.
2. **Engage Stakeholders (Clause 4.2):** Identify interested parties (e.g., regulators, suppliers) and their climate expectations. Incorporate feedback via surveys or consultations.
3. **Address Risks and Opportunities (Clause 6.1):** Prioritize actions, such as installing energy-efficient equipment or diversifying suppliers to mitigate disruptions. Set measurable objectives, like 20% GHG reduction by 2030.
4. **Operational Controls and Preparedness (Clauses 8.1-8.2):** Implement controls for emission reduction (e.g., flare minimization) and emergency plans for climate events.
5. **Monitor and Evaluate (Clause 9):** Track metrics like GHG emissions using CDP (formerly Carbon Disclosure Project) protocols. Conduct internal audits to verify integration.
6. **Review and Improve (Clause 10):** Use management reviews to refine the EMS based on performance data.

These steps are based on cross-verified guidance; consult certified auditors for site-specific application.

## Real-World Examples

While sector-specific examples for chemical and refineries are limited in public sources, broader applications illustrate the approach:

- **Automotive Sector (Analogous to Chemical Processes):** Ford reduced carbon dioxide (CO<sub>2</sub>) emissions by 30% per vehicle through ISO 14001, focusing on energy efficiency and risk assessment—applicable to chemical plants for process optimization.

- **Food Manufacturing (Scalable to Refineries):** Nestlé cut GHG emissions by 35% per tonne across 450+ sites via ISO 14001, emphasizing supply chain resilience against climate disruptions.
- **General U.S. Implementation:** In energy-intensive industries, ISO 14001 has supported GHG tracking and renewable adoption, aligning with federal incentives.

For refineries, similar integrations could involve biomass alternatives to reduce fossil fuel dependency.

## Conclusion

Integrating climate change into ISO 14001 is essential for chemical and refinery operations to navigate regulatory pressures and build resilience. By following the amendment's requirements and outlined steps, organizations can achieve measurable sustainability gains. ClearPath Environmental Consulting recommends starting with a gap analysis—contact us at [clearpathenv.com](http://clearpathenv.com) for tailored support.

## References

This whitepaper draws from official ISO documents and industry analyses. For further verification, refer to [iso.org](http://iso.org) or [epa.gov](http://epa.gov). Limitations: Examples are generalized; actual implementation varies by site.

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