CLIMATE LEADERSHIP COUNCIL

Comments on the Section 301 Investigations of Acts, Policies, and Practices of Certain Economies Relating to Structural Excess Capacity and Production in Manufacturing Sectors

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Contents

I. Introduction and Summary

USTR has requested comments on whether the acts, policies, or practices of certain countries contribute to structural excess capacity and are "unreasonable" and "burden or impair" U.S. commerce within the meaning of Section 301 of the Trade Act of 1974.[1]

As USTR has noted, "lax or inadequate" environmental standards can contribute to excess capacity. Low or unenforced environmental standards serve as a form of implicit subsidy, permitting high polluting, inefficient "zombie firms" to continue operating, resulting in excess capacity that depresses prices and denies fair market opportunities to competing manufacturers in the United States. The maintenance of these high-polluting facilities further burdens U.S. commerce through the transboundary movement of pollution to the United States, causing

[1] 19 U.S.C. §§ 2411-2420.

adverse health effects that reduce labor force participation and limiting the ability of U.S. businesses to open or expand production facilities.[2]

Pollution intensity—the quantity of pollutants emitted per unit of industrial output—provides a robust, quantifiable metric for identifying countries with low environmental standards that contribute to excess capacity. This data can be supplemented with evidence that countries with relatively high pollution intensity levels also have poor records of developing and enforcing environmental standards as stringent as the United States.

These comments identify how poor environmental performance and standards may, by contributing to excess capacity, burden U.S. commerce. They also reflect on rigorous environmental enforcement in the U.S. as compared with the low environmental performance and standards in the five countries with the highest emissions intensities within the scope of USTR's investigations: China, Vietnam, Thailand, India, and Indonesia.

II. Low Environmental Standards Contribute to Structural Excess Capacity and May Constitute an Unreasonable Policy or Practice that Burdens U.S. Commerce

In identifying unreasonable policy or practices on the part of other countries, USTR has a substantial record to draw from. Publicly available datasets document countries' environmental performance. Scholarship and investigative journalism detail countries' deficient approach to environmental regulation, poor enforcement records, and conflicting policies that drive up pollution intensities. The appendices of these comments provide a foundation of such findings for the five countries identified in USTR's investigations with the poorest environmental performance.

a. Low environmental standards promote excess capacity and may constitute unreasonable practices that burden U.S. commerce under Section 301

A growing body of economic research finds that weak environmental regulation can enable inefficient, high-polluting "zombie enterprises"—firms that are dependent on government subsidies for their survival—to continue operating and increase production.[3]

Consider the mechanisms by which high environmental standards tend to curb excess capacity: the "compliance cost effect" and the "innovation compensation effect." The compliance cost effect occurs when environmental regulations require firms to internalize environmental costs that were previously externalized, increasing the cost of production. These higher costs force inefficient firms to scale back production or withdraw from the market. The innovation compensation effect refers to the capacity of some firms to offset regulatory costs through

[2] Although the Section 301 investigations initiated by USTR on March 11, 2026, are focused on practices that create or maintain structural excess capacity, those practices may also be actionable under Section 301 if they burden or restrict U.S. commerce and in other ways. *See* 91 Fed. Reg. at 12891 (requesting comments on "[w]hether there are additional considerations for assessing acts, polices, and practices that contribute to structural excess capacity or production in manufacturing sectors.")

[3] Mengjie Li and Weijian Du, "Opening the black box of capacity governance: Environmental regulation and capacity utilization of microcosmic firms in China," *Economic Modelling* 108 (2022): 105766, https://doi.org/10.1016/j.econmod.2022.105766.

efficiency gains and technological upgrades, which ultimately render less innovative zombie firms uncompetitive and dependent on market-distorting government subsidies for survival.[4]

Together, these mechanisms improve market selection by eliminating inefficient firms while encouraging technological upgrades among healthy firms. However, when environmental standards are weak or poorly enforced, these market correcting mechanisms do not function effectively. As one study explains, "[t]he private cost of enterprises is not consistent with the social cost, and enterprises cannot optimize the allocation of resources...This mismatch causes substantial backward production capacity and pollution capacity."[5] Inefficient firms remain in operation despite low productivity, and excess capacity accumulates.

b. Low environmental standards and resulting excess capacity increase transboundary pollution that may further burden U.S. commerce

The excess capacity caused by low environmental standards further burdens U.S. commerce through the transboundary movement of pollution to the United States. Inefficient, high-polluting factories that can continue to operate because of low-environmental standards generate pollution that is transported by atmospheric currents to the United States.

Transboundary pollution can meaningfully affect U.S. air quality. During major transport events, Asian emissions can account for up to one-third of $PM_{2.5}$ concentrations in parts of the Western United States, while coal combustion in Asia contributes roughly 14–17% of mercury deposition nationwide.[6] Long-range pollution transport can raise ozone levels by up to roughly 20% of the federal ozone standard.[7] Excess pollution in the U.S. reduces the available workforces and limits the ability of U.S. businesses to open or expand production facilities.[8]

People suffering from adverse health effects from increased pollution exposure are less likely to participate in the labor force and contribute to U.S. commerce. USTR has previously determined that adverse effects on U.S. employment constitute a form of burden or restriction on U.S. commerce.[9]

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[4] Weijian Du and Mengjie Li, "Can environmental regulation promote the governance of excess capacity in China's energy sector? The market exit of zombie enterprises," *Journal of Cleaner Production* 207 (2019): 308, https://doi.org/10.1016/j.jclepro.2018.09.267.
[5] *Id.*
[6] Daniel Hoenig and George David Banks, "Assessing the Impacts of Foreign Pollution on U.S. Public Health and Manufacturing," *Bipartisan Policy Center*, March 3, 2026, https://bipartisanpolicy.org/issue-brief/assessing-the-impacts-of-foreign-pollution-on-u-s-public-health-and-manufacturing/.
[7] *Id.*
[8] Although the Section 301 investigations initiated by USTR on March 11, 2026, are focused on practices that create or maintain structural excess capacity, those practices may also be actionable under Section 301 if they burden or restrict U.S. commerce and in other ways. See 91 Fed. Reg. at 12891 (requesting comments on "[w]hether there are additional considerations for assessing acts, polices, and practices that contribute to structural excess capacity or production in manufacturing sectors.")
[9] United States Trade Representative, *Findings of the Investigation into China's Acts, Policies, And Practices Related to Technology Transfer, Intellectual Property, and Innovation under Section 301 of the Trade Act of 1974,* (Washington: Executive Office of the President, 2018), 176, https://ustr.gov/sites/default/files/Section%20301%20FINAL.PDF.

Transboundary pollution also undermines the ability of U.S. businesses to grow. At least 85 counties impacted by transboundary air pollution are in "nonattainment" for at least one criteria pollutant under the Clean Air Act.[10] Nonattainment designation triggers strict new requirements for any business seeking to build or expand, mandates costly new pollution offsets, and can delay or defund highway and infrastructure projects.[11] Investors in factories, semiconductor plants, and energy facilities routinely avoid nonattainment areas altogether. In this way, foreign emissions effectively suppress commercial development across broad swaths of the country.[12]

Research consistently finds that nonattainment status carries measurable economic costs. From 2008 to 2013, counties designated nonattainment under the 2008 ozone standard experienced $56.5 billion in lost wage earnings, $690 lower annual wages per worker, and 242,000 fewer jobs compared with similar attainment counties.[13] A study focused solely on the San Antonio metropolitan area suggested nonattainment would cost the region $3.2 billion to $36.2 billion over a 30-year planning horizon, largely from diverted manufacturing investment and project delays.[14]

To further bolster USTR's case, transboundary movement of pollution implicates the obligation on States under international law to prevent serious harm caused by the movement of pollution originating within their territorial jurisdiction to other countries.[15] Although USTR does not need

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[10] *EPA Green Book*, "Criteria Pollutant Nonattainment Summary Report," Environmental Protection Agency, May 31, 2025, https://www3.epa.gov/airquality/greenbook/ancl3.html.

[11] "Nonattainment NSR Basic Information" Environmental Protection Agency, updated on December 15, 2025, https://www.epa.gov/nsr/nonattainment-nsr-basic-information#:~:text=What%20Does%20Nonattainment%20NSR%20Require,3)%20opportunity%20for%20public%20involvement.

[12] Haley Williams, "EPA says foreign pollution kept Phoenix from meeting ozone standard," *12 News*, March 26, 2026), https://www.12news.com/article/news/local/arizona/us-environmental-protection-agency-foreign-pollution-kept-phoenix-arizona-from-meeting-ozone-standards/75-24e5def0-ad3b-4e2f-88ee-a9d15c39013d; "Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants," United States Department of Transportation, Bureau of Transportation Statistics, updated September 30, 2021, https://www.bts.gov/content/areas-nonattainment-national-ambient-air-quality-standards-criteria-pollutants.

[13] Sam Batkins, Ben Gitis, Dan Goldbeck, Curtis Arndt , "The County-Level Effects of EPA's 2008 Ozone Standards on Employment and Pay," *American Action Forum*, November 5, 2015, https://www.americanactionforum.org/research/the-county-level-effects-of-epas-2008-ozone-standards-on-employment-and-pay/.

[14] Steve Nivin, Belinda Román, David Turner, *Potential Cost of Nonattainment in the San Antonio Metropolitan Area* (Texas Commission on Environmental Quality, 2017), https://www.tceq.texas.gov/assets/public/agency/nc/air/Appendix-B-for-EPA-HQ-OAR-2018-0635.pdf.

[15] *See* Rio Declaration on Environment and Development, principle 2, June 13, 1992, U.N. Doc A/CONF.151/26 (Vol. I) (emphasis added), https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf:

> *States have*, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and *the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.*

See also Trail Smelter Case (U.S. v. Can.), Award of Mar. 11, 1941, 3 U.N. Rpts. Int'l Arb. Awards 1938, 1965 (1949) ("no State has the right to use or permit the use of its territory in such a manner as to cause

to establish a violation of international law in order to impose tariffs in discretionary actions under Section 301(b), demonstrating that transboundary pollution violates international legal principles could support a finding that the relevant policies and practices are "unfair and inequitable."[16]

IV. High Environmental Performance and Standards in the United States

The United States maintains rigorous environmental standards for sources of air and water pollution, the handling of toxic and hazardous substances, conservation, and industrial and public health. Policymakers have relied upon an iterative approach to environmental protection whereby Congress establishes broad goals and affords regulatory agencies authority to pursue those goals through regulatory efforts. Regulations are periodically reviewed and updated and generally increase the level of environmental protection over time. Evolving environmental standards require U.S. manufacturers to invest in emissions controls, wastewater treatment, waste management, and other practices to reduce their environmental impact.

American firms compete globally while fully absorbing these costs. The National Association of Manufacturers estimated that the cost of compliance with U.S. environmental regulations for American manufacturers was $206 billion in 2022. Some examples of industry costs associated with U.S. regulatory compliance are discussed below and stand in stark contrast to the lax and inconsistently applied environmental regimes in the five South and Southeast Asian nations explored in the appendix of these comments.

Air Pollution Controls

The U.S. has strict laws on air pollution, primarily established by the Clean Air Act (CAA), coupled with strong enforcement. In 2023, the U.S. Air Pollution Control Equipment Market (including equipment such as scrubbers, selective catalytic reduction (SCR) systems, and continuous emissions monitoring systems (CEMS)) was valued at $18.5 billion.[17] Including other services, such as permitting, engineering, consulting, and ongoing maintenance costs, the 2022 U.S. industry for air pollution control and monitoring totaled $67 billion.[18]

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injury by fumes in or to the territory of another . . . when the case is of serious consequence and the injury is established by clear and convincing evidence."); 1979 Convention on Long-Range Transboundary Air Pollution, art. 2 (the Parties "shall endeavor to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution"), https://unece.org/sites/default/files/2021-05/1979%20CLRTAP.e.pdf.

[16] Office of the United States Trade Representative, *Section 301 Investigation—Report on Turkey's Digital Services Tax*, (Washington: Executive Office of the President, 2021), 18, https://ustr.gov/sites/default/files/enforcement/301Investigations/Report%20on%20Turkey%E2%80%99s%20Digital%20Services%20Tax.pdf: "Tax measures that fail to comport with established principles of international taxation may be considered 'unfair and inequitable,' and thus, unreasonable under Section 301."

[17] *U.S. Air Pollution Control Equipment Market Size & Share 2024 to 2032* (Selbyville: Global Markets Insight, 2024), https://www.gminsights.com/industry-analysis/us-air-pollution-control-equipment-market.

[18] "Air Pollution Control," International Trade Administration, accessed March 26, 2026, https://www.trade.gov/air-pollution-control.

Waste Management

U.S. manufacturers operate under strict waste management regimes, including both "cradle to grave" regulation of hazardous waste under the Resource Conversation and Recovery Act (RCRA)[19] and liability for cleanup of abandoned waste sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[20] American manufacturers spent roughly $108 billion on solid waste management in 2024[21] and $9 billion on hazardous waste treatment and disposal in 2021.[22]

Remediation & Reclamation

U.S. mining companies function under strict environmental remediation laws. For example, the Surface Mining Control and Reclamation Act of 1977 requires every U.S. coal mine operator to post a financial assurance bond before mining begins, in an amount sufficient to fully fund reclamation if the operator defaults. In 2017, more than $10 billion in financial assurances for active coal mining operations was held between the federal Office of Surface Mining Reclamation and Enforcement and state agencies.[23]

V. Low Environmental Performance and Standards in Certain Countries

In contrast to the U.S., more than 30% of countries do not have any regulations on air quality.[24] Among countries that do have national air quality standards, most have pollution standards that are less rigorous than those in the United States[25] and enforcement is frequently lacking or uneven. Inadequate regulation and enforcement are apparent in countries' environmental performance.

Of the countries listed in USTR's investigation, the five with the worst air quality are major Asian manufacturing hubs: China, Vietnam, Thailand, India, and Indonesia.[26] Publicly available data indicates that these countries emit significantly higher levels of pollution—including criteria pollutants regulated under the U.S. Clean Air Act—to manufacture the same dollar value of industrial products. Figure 1 summarizes emissions-intensity (i.e., metric tons of pollution per

[19] 42 U.S.C. § 6901 et seq.
[20] 42 U.S.C. § 9601 et seq.
[21] *U.S. Solid Waste Management Market (2025 – 2033)*, (Grand View Research, 2025), https://www.grandviewresearch.com/industry-analysis/us-solid-waste-management-market-report.
[22] "Hazardous Waste Statistics to Know in 2026," Hazardous Waste Haulers Environmental, 2026, https://www.hwhenvironmental.com/facts-and-statistics-about-waste/.
[23] *Coal Mine Reclamation: Federal and State Agencies Face Challenges in Managing Billions in Financial Assurances*, (Washington: United States Government Accountability Office, 2018), https://www.gao.gov/assets/gao-18-305.pdf.
[24] "One in three countries in the world lack any legally mandated standards for outdoor air quality," *UN Environment Programme*, September 2, 2021, https://www.unep.org/news-and-stories/press-release/one-three-countries-world-lack-any-legally-mandated-standards?utm.
[25] "2023 IQAir World Air Quality Report," *IQAir*, https://www.iqair.com/newsroom/waqr-2023-pr?srsltid=AfmBOooxZh9S7mVN8hASPKvf5zCIYqEHACpv2Is5W97B2u8vfkmI7axz.
[26] "World's Most Polluted Countries & Regions," IQAir, 2025, https://www.iqair.com/us/world-most-polluted-countries.

billion dollars of industrial value added) findings for several criteria pollutants that are tightly regulated in the United States.[27]

Figure 1: Industrial sector pollution intensity for U.S. and trading partners
(MT pollutant/$B manufacturing value-add)

	U.S.	CHINA	INDONESIA	THAILAND	VIETNAM	INDIA
SO2	167	1,093	4,439	1,961	5,815	7,938
NOx	366	1,357	2,588	1,438	3,756	3,092
CO	442	8,360	7,714	12,228	12,860	7,817
PM2.5	138	949	834	1,165	1,794	2,768

Source: Pollution data from Pacific Northwest National Labs[28] and the European Commission,[29] economic activity data from the World Bank,[30] top trading partner designations from the U.S. Census Bureau, and authors' calculations.[31]

Figure 2 contextualizes different levels of pollution through a composite pollution index that weights pollutants based on their relative impact on human health. The U.S. pollution index is set at 1.0. Values higher than one, denoted by red boxes, indicate that the country's pollution intensity is higher than that of the United States.[32] China, for example, emits more than seven times as much pollution per dollar of output—and the remaining four countries are even more pollution intensive.

Figure 2: Manufacturing pollution intensity index for U.S. and trading partners
(U.S.=1)

	U.S.	CHINA	INDONESIA	THAILAND	VIETNAM	INDIA
Pollution Index	1.0	7.1	11.4	18.7	19.3	25.0

Available data provide an empirical foundation to identify countries whose deficient environmental regulations may contribute to excess capacity that burdens U.S. commerce.

[27] Manufacturing value-added describes the economic value that the manufacturing sector contributes by transforming raw materials into finished goods or services.
[28] "A Community Earth-atmosphere Data System (CEDS) for Historical Surface Fluxes," Pacific Northwest National Laboratory, https://www.pnnl.gov/projects/ceds.
[29] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, https://edgar.jrc.ec.europa.eu.
[30] "Manufacturing, value added (current US$)," World Bank Group, 2024, https://data.worldbank.org/indicator/NV.IND.MANF.CD.
[31] "Top Trading Partners – May 2025," U.S. Census Bureau, https://www.census.gov/foreign-trade/statistics/highlights/topcm.html#imports.
[32] Scott Nystrom, *Country-Level Analysis of Traditional Air Pollution Intensity,* Climate Leadership Council, 2026, https://clcouncil.org/media/2026/02/Analysis-of-Air-Pollution-Intensity.pdf.

These findings can be bolstered by specific exploration of the policies and practices within countries that have high pollution intensities. For each of the countries in Figures 1 and 2, an appendix follows that explores environmental performance and inadequate environmental policies and practices.

VI. Conclusion

- The low environmental standards of certain U.S. trade partners constitute unreasonable policies or practices that contribute to structural excess capacity by permitting high polluting, inefficient "zombie" factories to continue operating.
- The resulting excess capacity depresses prices and denies U.S. manufacturers fair market opportunities, burdening U.S. commerce.
- The low environmental standards of these countries, and the resulting continued operation of inefficient, high-polluting firms further burdens U.S. commerce through the transboundary movement of pollution to the United States, which causes adverse health effects that reduce labor force participation and limits the ability of U.S. businesses to open or expand facilities.

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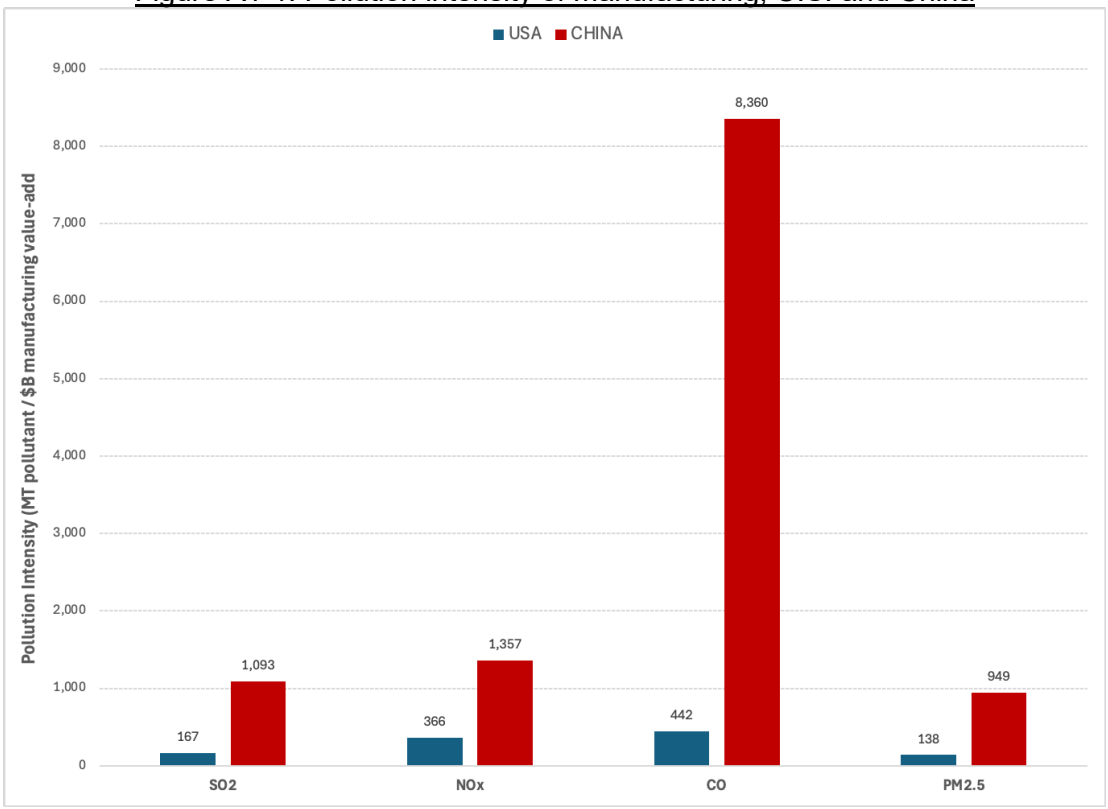
Appendix 1: Evidence of Low Environmental Performance and Standards in China

Low Environmental Performance

China is the 20th most polluted country in the world and emits significantly higher levels of pollution than the United States to manufacture the same dollar value of industrial products.[33] For example, Chinese manufacturers emit 4-19 times more SO_2, NO_x, CO, and $PM_{2.5}$ than U.S. manufacturers to produce the same value of goods. **Overall, China has a pollution index 7.1x that of the United States.**[34]

Figure A1-1: Pollution intensity of manufacturing, U.S. and China



Source: Pollution data from Pacific Northwest National Labs[35] and the European Commission,[36] economic activity data from the World Bank,[37] top trading partner designations from the U.S. Census Bureau, and authors' calculations.[38]

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[33] "World's Most Polluted Countries & Regions," IQAir, https://www.iqair.com/us/world-most-polluted-countries

[34] *See supra* at 7-8 (explaining pollution index).

[35] "A Community Earth-atmosphere Data System (CEDS) for Historical Surface Fluxes," Pacific Northwest National Laboratory, https://www.pnnl.gov/projects/ceds.

[36] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, https://edgar.jrc.ec.europa.eu.

[37] "Manufacturing, value added (current US$)," World Bank Group, 2024, https://data.worldbank.org/indicator/NV.IND.MANF.CD.

[38] "Top Trading Partners – May 2025," U.S. Census Bureau, https://www.census.gov/foreign-trade/statistics/highlights/topcm.html#imports.

Inadequate Environmental Policies and Practices

Chinese air, waste, and reclamation policies are inadequate and inadequately enforced. China's high levels of pollution are, in part, the result of the CCP's well-documented lack of enforcement of environmental standards, aimed at lowering costs for Chinese enterprises—especially in the industrial sectors—and giving those firms an advantage in the global market.[39] China's enforcement of its environmental regulations is particularly lax for state-owned enterprises and other firms that are politically connected or generate significant tax revenue. [40]

A 2020 OECD Report found multiple instances Chinese authorities supporting firms cheating on emissions tests and failing to follow pollution law: "despite the efforts of the central government to strengthen environmental policies, the impact and enforcement of laws has remained inadequate for a long time. One of the main factors in weak enforcement has persistently been the role that sub-national authorities played in impeding environmental law enforcement."[41] Additionally, a 2025 report from the U.S.-China Economic and Security Review Commission found that Chinese government policies continue to contribute to both domestic and cross-border pollution.[42]

The OECD identified that local authorities are responsible for both environmental enforcement and helping local enterprises meet economic targets; these roles often pose conflicts of interest, leading officials to "use their oversight of local environmental protection bureaus to protect local enterprises" from environmental enforcement.

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[39] United States Trade Representative, *2024 Report to Congress on China's WTO Compliance* (Washington: Executive Office of the President, 2025), https://ustr.gov/sites/default/files/files/reports/2025/2024USTRReportCongressonChinaWTOCompliance.pdf.

[40] Wenya Zhang, "Who gets what and why? A configurational analysis of China's environmental regulatory enforcement," *Journal of Chinese Governance*, 2025, https://doi.org/10.1080/23812346.2025.2523176; Xiying Luo, Ranjith Appuhami, Sammy Xiaoyan Ying, Jengfang Chen, Chris Patel, Lin-Hui Yu, "Do Political Connections Weaken the Environmental Protection Mechanism? Evidence from China," *Journal of International Accounting Research* (2025): 1-19, https://doi.org/10.2308/JIAR-2023-005; Jun Li and Jing Vivian Zhan, "Environmental Clientelism: How Chinese Private Enterprises Lobby under Environmental Crackdowns," *The China Quarterly* 255 (2023): 679-696, https://doi.org/10.1017/S0305741023000188.

[41] Chan Yang, *OECD Environment Working Papers No. 157: Policies, regulatory framework and enforcement for air quality management: The case of China (2020)* (Organization for Economic Co-operation and Development, 2020), https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/03/policies-regulatory-framework-and-enforcement-for-air-quality-management-the-case-of-china_45a49c01/7d1d1a82-en.pdf.

[42] U.S.-China Economic and Security Review Commission, *2025 Report to Congress* (Washington: U.S. Government Publishing Office, 2025), https://www.uscc.gov/sites/default/files/2025-11/2025_Annual_Report_to_Congress.pdf.

China is the biggest producer of industrial waste in the world. In 2022, China generated 4.11 billion tons of ordinary industrial waste[43] and 95.15 million tons of hazardous waste.[44] However, only about 47% of this hazardous waste is properly disposed of[45] and the hazardous waste management industry was estimated at $2.8 billion in 2023—much less than the $9 billion invested by U.S. firms that produce smaller quantities of waste than their Chinese counterparts.[46] Furthermore, industrial waste disposal is heavily subsidized by the Chinese government.[47] These subsidies and lax regulations mean Chinese industries are not bearing the cost of their waste production, allowing them to produce goods at cheaper rates than American firms, distorting competition.

China also has low environmental standards related to mining, resulting in a low rate of land reclamation, around 12%.[48] When China passed a mining remediation law in 2024, it failed to specify standards for environmental remediation.[49] Weak mining laws have allowed Chinese firms to dominate critical minerals supply chains, directly threatening U.S. commerce and trade.

Case Study: Global Steel Overcapacity Runs through China

The steel industry reflects divergent approaches to environmental regulation by the U.S. and China and the resulting consequences for excess capacity. Every year, China produces as much steel as the rest of the world combined, leading to accusations of "predatory pricing."[50] At times, Chinese steel prices have been 50 to 60 percent lower than those in market-oriented economies.[51]

In 2006, the Chinese steel industry spent $4.85 per ton of steel produced on pollution control equipment, while U.S. industries in 2005 spent $8.83 per ton—or 80% more than their Chinese

[43] "China Country Commercial Guide," International Trade Administration, September 25, 2025, https://www.trade.gov/country-commercial-guides/china-environmental-technology.
[44] "China's Hazardous Waste Sector: Market Insights, Regulations, and Opportunities for European SMEs," *EUSME*, March 21, 2025, https://www.eusmecentre.org.cn/events/chinas-hazardous-waste-sector-market-insights-regulations-and-opportunities-for-european-smes/.
[45] "China Country Commercial Guide," International Trade Administration, *supra.*
[46] Jennie Hu, *Hazardous Waste Management in China Industry Data and Analysis* (Beijing: IBIS World, 2024). https://www.ibisworld.com/china/industry/hazardous-waste-management/1053/.
[47] Yijing Jiang, Boyang Leng, Jingxin Xi, "Assessing the social cost of municipal solid waste management in Beijing: A systematic life cycle analysis," *Waste Management* 173 (2024): 62-74, https://doi.org/10.1016/j.wasman.2023.11.004.
[48] Xia Cao, "Regulating mine land reclamation in developing countries: The case of China," *Land Use Policy* 24 (2007): 472–483, https://doi.org/10.1016/J.LANDUSEPOL.2006.07.002.
[49] Lai Yun and Chen Yu, "China's draft mining law mandates ecological restoration for first time, but gaps remain," *Dialogue Earth*, April 25, 2024, https://dialogue.earth/en/pollution/china-draft-mining-law-ecological-restoration/.
[50] "Chinese overcapacity is crushing the global steel industry," *The Economist*, September 17, 2024, https://www.economist.com/business/2024/09/17/chinese-overcapacity-is-crushing-the-global-steel-industry.
[51] United States Trade Representative, *2024 Report to Congress on China's WTO Compliance, supra, at 38.*

competitors.[52] As a result, compared to U.S. steelmakers, Chinese steelmakers emit, on average, 3-20 times as much pollution per ton of steel than U.S. firms.[53] The Chinese steel industry saved roughly $1.7 billion compared to U.S. industries by not installing the same rigor of pollution controls,[54] enabling it to produce some of the cheapest steel in the world.

In 2025, global excess steel capacity hit 640 million tons, exceeding the total steel production in OECD countries by over 200 million tons, with China producing 50% of this excess capacity.[55] The OECD has found that excess capacity in non-OECD economies, most notably China, "place considerable pressure on steel companies across OECD countries, with profitability falling to near historic lows."[56] Member countries of the Global Forum on Steel Excess Capacity (GFSEC), including the United States, lost an estimated 113,000 jobs in the steel industry between 2013-21.[57] Studies have found that this overcapacity could be addressed by—and is therefore enabled by a lack of—stricter environmental regulations.

[52] Alliance for American Manufacturing, *An Assessment of Environmental Regulation of the Steel Industry in China* (Washington: 2009), 71, https://www.mcwane.com/upl/downloads/content-blocks/made-in-china-the-threat-to-our-environment.pdf.
[53] *Id.* at ix.
[54] *Id.* at 71.
[55] Vadim Kolisnichenko, "The OECD warns of a deepening crisis in the global steel industry," *GMK Center*, March 25, 2026, https://gmk.center/en/news/the-oecd-warns-of-a-deepening-crisis-in-the-global-steel-industry/amp/.
[56] "Surging excess capacity threatens steel market stability, employment, and decarbonisation plans," *Organisation for Economic Co-operation and Development*, May 27, 2025, https://www.oecd.org/en/about/news/press-releases/2025/05/surging-excess-capacity-threatens-steel-market-stability-employment-and-decarbonisation-plans.html.
[57] *Id.*

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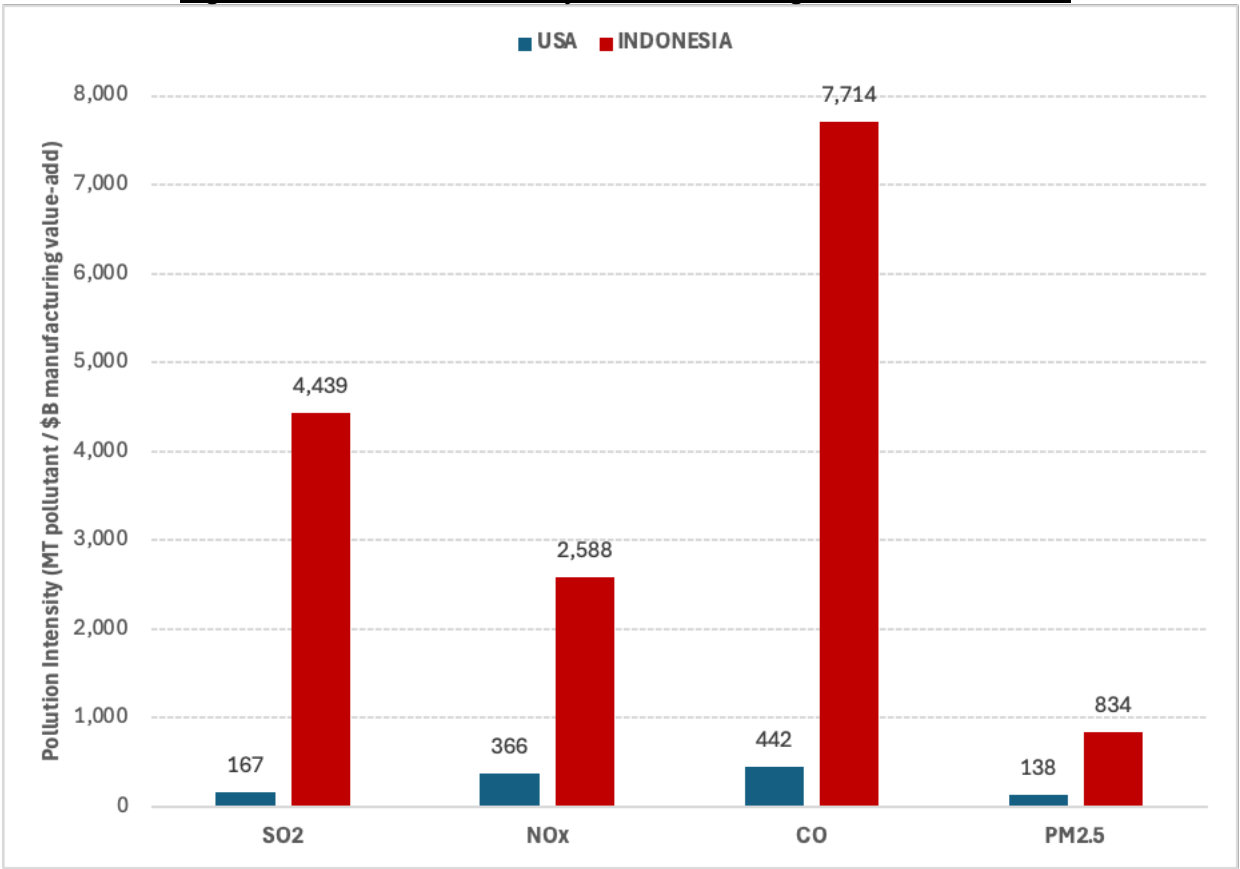
Appendix 2: Evidence of Low Environmental Performance and Standards in Indonesia

Low Environmental Performance

Indonesia's air quality is the worst in Southeast Asia and 15th worst in the world.[58] To manufacture the same dollar of industrial products, Indonesian firms emit 6-27 times more times more SO_2, NO_x, CO, and $PM_{2.5}$ than U.S. manufacturers. **Indonesia's composite pollution index is 11.4x higher than the United States'.**[59]

Figure A2-1: Pollution intensity of manufacturing, U.S. and Indonesia



Source: Pollution data from Pacific Northwest National Labs[60] *and the European Commission,*[61] *economic activity data from the World Bank,*[62] *top trading partner designations from the U.S. Census Bureau, and authors' calculations.*[63]

[58] "Air quality in Indonesia," IQ Air, updated March 12, 2025, https://www.iqair.com/indonesia.
[59] *See supra* at 7-8 (explaining pollution index).
[60] "A Community Earth-atmosphere Data System," Pacific Northwest National Laboratory, *supra*.
[61] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, *supra.*
[62] "Manufacturing, value added (current US$)," World Bank Group, *supra.*
[63] "Top Trading Partners – May 2025," U.S. Census Bureau, *supra*.

Inadequate Environmental Policies and Practices

Indonesia embodies lax environmental policy and poor enforcement. Studies consistently identify a large gap between established legal requirements and their implementation, finding industrial projects can evade meaningful regulatory scrutiny due to a confluence of revealing fragmented oversight, limited institutional capacity, and government preferences to emphasize economic growth at the cost of environmental protection.[64]

Environmental governance responsibilities are divided among multiple national and local agencies, including the Ministry of Environment and Forestry, regional environmental offices, and other sectoral regulators responsible for mining and industrial permitting. Legislation dating to 2020 centralized authority over industrial facilities within the national government and reduced regional authorities' oversight of environmentally risky developments.[65]

Provincial environmental authorities may identify environmental risks but lack the legal authority to halt mining operations. For instance, in 2023 the North Maluku Environmental Agency recommended suspending several nickel mining operations due to water pollution concerns, but under Indonesian law, only national authorities can order companies to stop operating.[66] Similarly, the Ministry of Environment identified multiple significant environmental violations at the Indonesia Morowali Industrial Park in 2025 and announced sanctions and potential legal action.[67] Months later, local residents and monitoring groups reported that no follow-up enforcement or remediation measures had occurred. Overlapping mandates and unclear lines of authority frequently create coordination gaps, delay enforcement actions, and weaken regulatory oversight.

Limited institutional capacity also contributes to enforcement gaps. Government agencies responsible for environmental oversight often face shortages of trained personnel, monitoring equipment, and financial resources, restricting their ability to supervise industrial and mining activity across Indonesia's vast territory.[68] Local government offices similarly lack sufficient resources to monitor pollution, conduct emissions inventories, and enforce regulations.[69] These

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[64] Muhtada Fatma and Heriyanto Danile, "Legal Frameworks Addressing the Environmental Consequences of Industrial Expansion," *Advances in Public Law and Crime* 1, no. 1 (2024): 11-21, https://doi.org/10.69725/plice.v1i1.120.
[65] Alvin Camba, "The Jakarta Model Is No Blueprint," *New America*, September 11, 2025, https://www.newamerica.org/insights/the-jakarta-model-is-no-blueprint/.
[66] "Indonesia: Suspend Nickel Mining in North Maluku," *Climate Rights International,* September 13, 2023, https://cri.org/indonesia-suspend-nickel-mining-in-north-maluku/.
[67] Johanes Hutabarat, "Indonesian coastal villages in the dark over nickel pollution," *Dialogue Earth*, November 5, 2025, https://dialogue.earth/en/pollution/indonesian-coastal-villages-in-the-dark-over-nickel-pollution/.
[68] Meike Kesek, "The Role of Environmental Law in Addressing Climate Change," International Journal of Business Law and Education 6(2) (July 2025):1269-1274
[69] Anissa Zahara, "Indonesia's Progress and Challenges in Air Pollution Control" (presentation, Ministry of Environment and Environment Management Agency Republic of Indonesia, Inter-Ministerial Workshop for Promoting Capacity Building to Address Air Pollution through Regional Cooperation, Vientiane, April 28, 2025), https://www.unescap.org/sites/default/d8files/event-documents/2.%20%5BIndonesia%5D%20Indonesia%E2%80%99s%20Progress%20and%20Challenges%20in%20Air%20Pollution%20Control.pdf.

constraints are particularly acute in remote regions where extractive industries operate and where monitoring infrastructure is limited.

Enforcement failures are particularly evident in the refining and smelting sectors, where regulatory capture, conflicting government mandates, and the marginalization of environmental protection within Indonesia's industrial policy framework[70] contribute to high pollution levels. A 2022 regulation exempted "captive" coal plants (those that serve industrial parks) from restrictions on new coal power development.[71] Illegal coal and mineral mining operations remain widespread, contributing to deforestation, soil degradation, and hazardous chemical contamination.[72] In many cases, illegal mining operations continue for extended periods without intervention from authorities, despite clear violations of environmental and mining laws.[73]

Transparency and monitoring challenges further weaken enforcement. Although sustainability reporting is required by law, compliance remains inconsistent; in 2022, only 42 percent of manufacturing companies complied with environmental reporting requirements. Pollution control had the lowest disclosure rate among environmental reporting categories, indicating limited transparency around operational environmental impacts for Indonesian companies.[74]

Case Study: Coal and the Indonesian Nickel Industry

Indonesia's regulatory framework has encouraged the rapid expansion of a pollution-intensive nickel and metals processing industry under comparatively weak environmental constraints. In 2022, Indonesia produced approximately 48 percent of the global nickel supply, and forecasts suggest the country could account for as much as 60 percent of global output by 2030.[75]

The expansion of the nickel industry has been accompanied by rapid growth in captive coal capacity. Captive coal capacity in Indonesia has increased by roughly 800 percent since 2013.[76] Between 2024–2025, roughly 80 percent of all new coal power additions in Indonesia were captive plants serving industrial operations, especially nickel smelters.[77] In fact, the Indonesia

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[70] Camba, "The Jakarta Model Is No Blueprint," *supra.*
[71] Jiehong Lou et al., "Decarbonizing captive coal power plants in Indonesia and implications for Chinese stakeholders: Trends, challenges and opportunities," *Center for Global Sustainability, University of Maryland and Institute for Essential Services Reform*, October 6, 2023, https://cgs.umd.edu/sites/default/files/2023-10/Indonesia%203-Oct12.pdf.
[72] Fitriani, M. Ihsan, Mustafa Kamal, and Hasanah Putri, "The Environmental Degradation and Weak Law Enforcement in Illegal Mining Activities: A Juridicial Review," *International Journal of Law, Social Science, and Humanities* 2, no. 2 (2025):253-65, https://doi.org/10.70193/ijlsh.v2i2.248.
[73] Ihsan et al., "The Environmental Degradation and Weak Law Enforcement in Illegal Mining Activities, "
[74] Gigih Rahmatullah and Indah Fajarini Wahyuningrum, "Environmental disclosure practices in manufacturing sector in developing countries: Evidence from Indonesia," *E3S Web of Conferences* 650, no. 02049 (2025) https://doi.org/10.1051/e3sconf/202565002049.
[75] Daniel Woldorff, "Indonesia's nickel industry is the 'poster child of tradeoffs' for the battery economy," *Latitude Media*, March 13, 2024, https://www.latitudemedia.com/news/indonesias-nickel-industry-is-the-poster-child-of-tradeoffs-for-the-battery-economy/
[76] Robert Walker and Hillman Palaon, "The Future of Indonesia's Green Industrial Policy," *Lowy Institute*, March 4, 2025, https://www.lowyinstitute.org/publications/future-indonesia-s-green-industrial-policy.
[77] Katherine Hasan and Lucy Hummer, *Out of sight, out of control: 31 GW of captive coal is jeopardizing Indonesia's economic and emissions goals* (Centre for Research on Energy and Clean Air (CREA) and Global Energy Monitor (GEM), 2026), https://globalenergymonitor.org/report/out-of-sight-out-of-control/.

Morowali Industrial Park alone hosts coal power capacity comparable to the entire national power systems of Pakistan and Mexico.[78] The high levels of emissions from Morowali—both from coal combustion and nickel smelting—contributes to levels of PM10, PM2.5, and SO_2 in nearby villages that exceed national safety standards.[79]

Government planning documents anticipate continued expansion, with Indonesia's National Electricity Master Plan projecting more than 25 GW of additional captive coal capacity to support mineral processing.[80]

The environmental impacts extend beyond air pollution. Open-pit coal and nickel mining contributes to deforestation, water contamination, habitat loss, erosion, and landslides, while the disposal of tailings and waste rock can introduce heavy metals and other toxins into surrounding ecosystems. While Indonesian law does mandate mining companies restore the land after projects have wrapped up, Indonesia is plagued by unabated abandoned mine pits.[81] Studies suggest that companies can avoid accountability because of ambiguous regulations and poor enforcement.[82] These insufficient regulations and lax enforcement have contributed to excess capacity of coal production that directly affect global coal prices: "Indonesia's rapid coal expansion in recent years has fueled a global oversupply, driving down prices and revenues while releasing significant methane emissions."[83]

[78] Andrew Digges, "International support crucial to decarbonization of the Indonesian nickel supply chain," *Norton Rose Fulbright*, February 2023, https://www.nortonrosefulbright.com/en/knowledge/publications/19ccd372/international-support-crucial-to-decarbonization-of-the-indonesian-nickel-supply-chain.
[79] Hutabarat, "Indonesian coastal villages in the dark over nickel pollution," *supra.*
[80] Dody Setiawan, *Captive Coal Expansion Plan Could Undermine Indonesia's Climate Goals* (Ember, 2025), https://ember-energy.org/latest-insights/captive-coal-expansion-plan-could-undermine-indonesias-climate-goals/.
[81] David Woodbury, Arbainsyah, "Being realistic about coal mine rehabilitation in Indonesia: An ecological perspective," *Mongabay*, December 23, 2020, https://news.mongabay.com/2020/12/being-realistic-about-coal-mine-rehabilitation-in-indonesia-an-ecological-perspective/.
[82] Irsan Rahman, Basrawi Basrawia, Anis Widyawati, Leony Sondang Suryani, Iyan Nurdiyan Haris, "Mineral and Coal Mining Regulatory Reform in Indonesia," *Journal of Law and Legal Reform* 6, no. 2 (2025): 499–568, https://doi.org/10.15294/jllr.v6i2.19040.
[83] Dody Setiawan, *Chasing volume, losing value: the cost of coal over expansion in Indonesia* (Ember, 2025), https://ember-energy.org/app/uploads/2025/11/EN-Chasing-volume-losing-value-the-cost-of-coal-over-expansion-in-Indonesia-PDF.pdf.

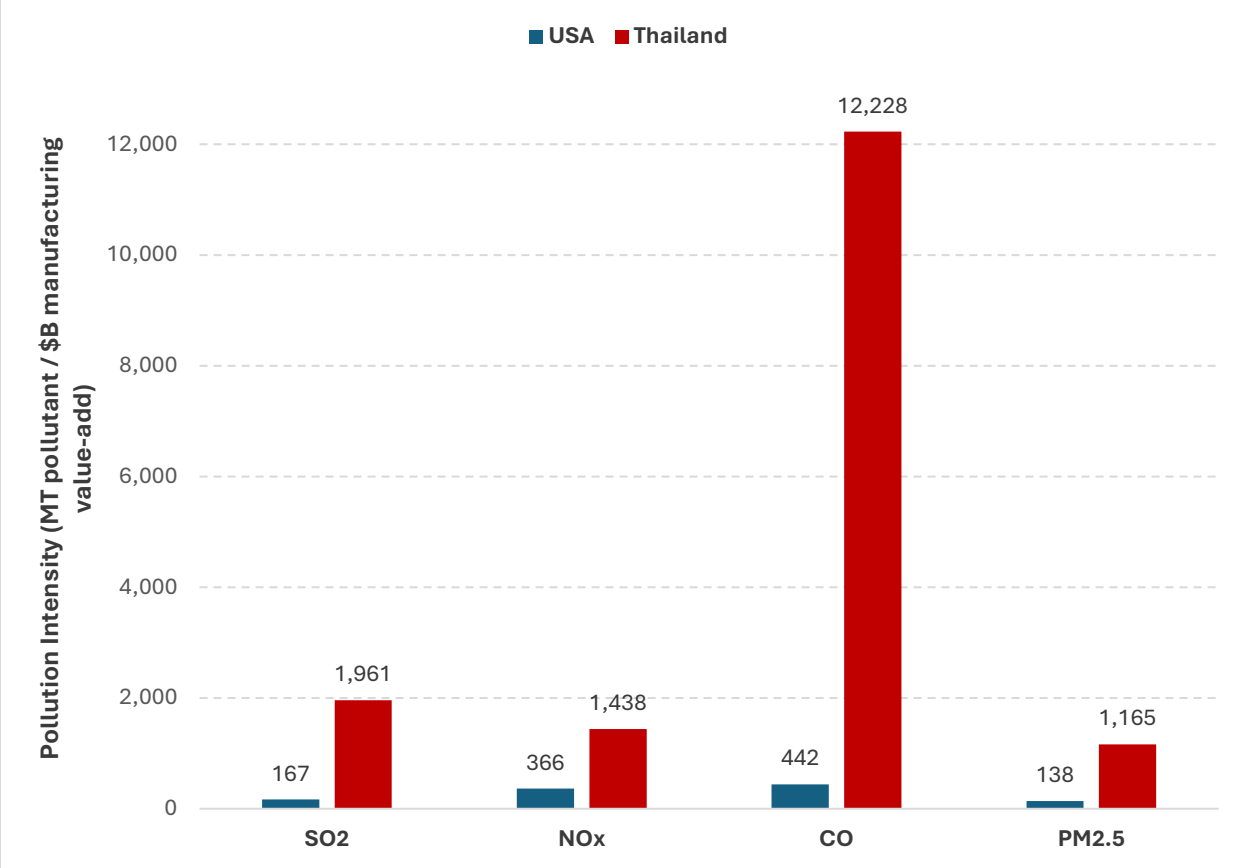
CLIMATE LEADERSHIP COUNCIL

Appendix 3: Evidence of Low Environmental Performance and Standards in Thailand

Low Environmental Performance

Thailand is ranked as the 48th most polluted country in the world.[84] Based on pollution-intensity data, Thai manufacturers emit about 4-28 times more SO_2, NO_x, CO, and $PM_{2.5}$ than U.S. manufacturers. **Thailand's composite pollution index is 18.7x higher than the United States'.**[85]

Figure A3-1: Pollution intensity of manufacturing, U.S. and Thailand



Source: Pollution data from Pacific Northwest National Labs[86] and the European Commission,[87] economic activity data from the World Bank,[88] top trading partner designations from the U.S. Census Bureau, and authors' calculations.[89]

[84] "World's Most Polluted Countries & Regions," IQAir, *supra.*
[85] *See supra* at 7-8 (explaining pollution index)
[86] "A Community Earth-atmosphere Data System," Pacific Northwest National Laboratory, *supra.*
[87] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, *supra.*
[88] "Manufacturing, value added (current US$)," World Bank Group, *supra.*
[89] "Top Trading Partners – May 2025," U.S. Census Bureau, *supra.*

Inadequate Environmental Policies and Practices

Thailand has enacted environmental laws governing pollution control and industrial regulation, including the National Environmental Quality Act (NEQA), the Pollution Control Act, and the Factory Act. Despite these efforts, Thailand's governance remains "piecemeal and siloed,"[90] reflecting fragmented governance, weak enforcement, and poor monitoring.

Responsibility for environmental oversight is divided across multiple agencies with overlapping mandates. The Pollution Control Department (PCD) is responsible for developing environmental standards, monitoring pollution levels, and identifying violations. However, primary regulatory authority over most industrial facilities rests with the Department of Industrial Works (DIW). This institutional structure separates pollution monitoring from enforcement authority. In practice, the PCD can identify and report polluting factories, but only the DIW has authority to impose fines or other penalties.[91] Because DIW has a broader mandate to promote industrial development, there is little political will to enforce cleaner production pathways.

Monitoring capacity further weakens Thailand's environmental oversight. Thailand has approximately 140,000 polluting factories. Oversight is inhibited both by regulations that limit monitoring to companies of a certain size[92] and aversion to establishing a comprehensive emissions reporting database.[93] The absence of a nationwide emissions inventory limits transparency regarding industrial pollution and prevents regulators from accurately tracking emissions across industrial zones.

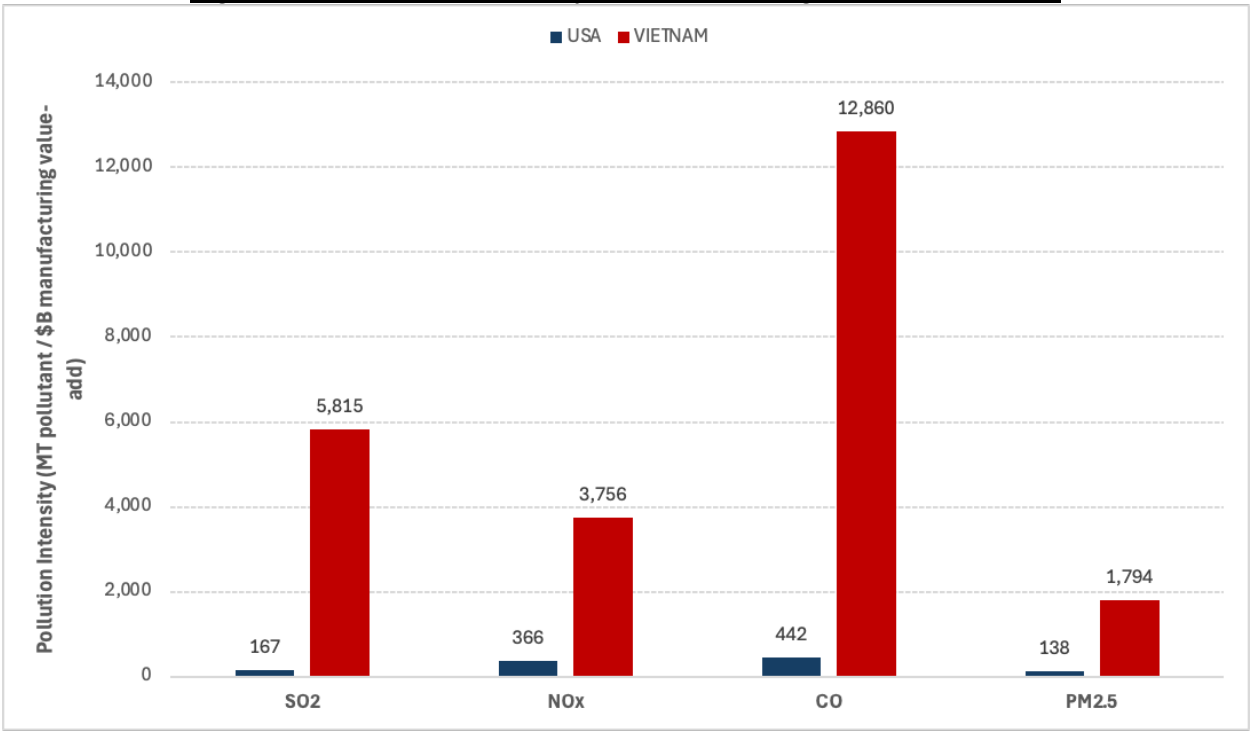
[90] Diane Archer, Dhyey Bhatpuria, Jaee Nikam and Nutta Taneepanichskul, "Particulate matter pollution in central Bangkok: Assessing Outdoor Workers' Perceptions and Exposure," *Cities & Health* (2024): 1–19, https://doi.org/10.1080/23748834.2024.2390274.
[91] Danny Marks and Michelle Anne Miller, "A transboundary political ecology of air pollution: Slow violence on Thailand's margins," *Environmental Policy and Governance* 32, no. 4 (2022): 305–319, https://doi.org/10.1002/eet.1976.
[92] Archer et al., "Particulate matter pollution in central Bangkok," *supra.*
[93] *Id.*

Appendix 4: Evidence of Low Environmental Performance and Standards in Vietnam

Low Environmental Performance

Vietnam is the 23rd most polluted country in the world.[94] Vietnamese manufacturers emit 10-35 times more SO_2, NO_x, CO, and $PM_{2.5}$ than U.S. manufacturers to produce the same value of goods. **Vietnam's composite pollution index is 19.3x higher than the United States'.**[95]

Figure A4-1: Pollution intensity of manufacturing, U.S. and Vietnam



Source: Pollution data from Pacific Northwest National Labs[96] and the European Commission,[97] economic activity data from the World Bank,[98] top trading partner designations from the U.S. Census Bureau, and authors' calculations.[99]

[94] "Air Quality in Vietnam," IQAir, updated February 26, 2026, https://www.iqair.com/vietnam.
[95] *See supra* at 7-8 (explaining pollution index).
[96] "A Community Earth-atmosphere Data System (CEDS) for Historical Surface Fluxes," Pacific Northwest National Laboratory, https://www.pnnl.gov/projects/ceds.
[97] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, https://edgar.jrc.ec.europa.eu.
[98] "Manufacturing, value added (current US$)," World Bank Group, 2024, https://data.worldbank.org/indicator/NV.IND.MANF.CD.
[99] "Top Trading Partners – May 2025," U.S. Census Bureau, https://www.census.gov/foreign-trade/statistics/highlights/topcm.html#imports.

Inadequate Environmental Policies and Practices

The Vietnamese regulatory framework is extensive on paper, though fragmented and weakly enforced in practice; environmental protection is "ineffective and lacking specific binding."[100]

This is particularly apparent in waste and water pollution. In 2018, roughly 90 percent of solid waste in Hanoi and 76 percent in Ho Chi Minh City was landfilled without prior treatment.[101] A 2022 study found that about 30 percent of industrial wastewater in Vietnam's industrial zones was not properly treated before being discharged, despite centralized treatment requirements.[102] A third of inspected facilities in 2017 did not comply with wastewater regulations and 60% exceeded permitted effluent standards. Vietnam also ranks fourth in sources of marine plastic pollution.[103]

Enforcement of environmental regulations in Vietnam is challenged by inadequate monitoring and limited resources. Vietnam lacks a reliable, nationwide system of air quality monitoring and mechanisms for public disclosure of air quality data.[104] Moreover, each province employs, on average, only eight environmental inspectors, and funding allocated for environmental protection has met only about 55 percent of identified needs. Inadequate coordination and cooperation between branches of government compounds the lack of resources, as it is often unclear which government agency is responsible for pollution management and enforcement.[105]

[100] Hoàng Hải, "Difficulties and shortcomings in implementing air quality management policies in Vietnam and propose perfect solutions," *TẠP CHÍ MÔI TRƯỜNG ĐIỆN TỬ*, November 12, 2025, https://tapchimoitruong.vn/news-13/difficulties-and-shortcomings-in-implementing-air-quality-management-policies-in-vietnam-and-propose-perfect-solutions-32841.
[101] Thi Thuy Duong Tran, "Harmonisation Between Trade Liberalisation and Environmental Protection – A Long Way to Go? An Analysis of Vietnam's Debris Importation Control in Light of WTO and CPTPP Rules," *Vietnamese Journal of Legal Sciences* 6 (2022): 19–43, https://doi.org/10.2478/vjls-2022-0002.
[102] *Id.*
[103] Bijeesh Kozhikkodan Veettil, Nguyen Thuy An Hua, Dong Doan Van, Ngo Xuan Quang, "Coastal and Marine Plastic Pollution in Vietnam: Problems and the Way Out," *Estuarine, Coastal and Shelf Science* 292 (2023): 108472, https://doi.org/10.1016/j.ecss.2023.108472.
[104] Hải, "Difficulties and shortcomings," *supra.*
[105] *Id.*

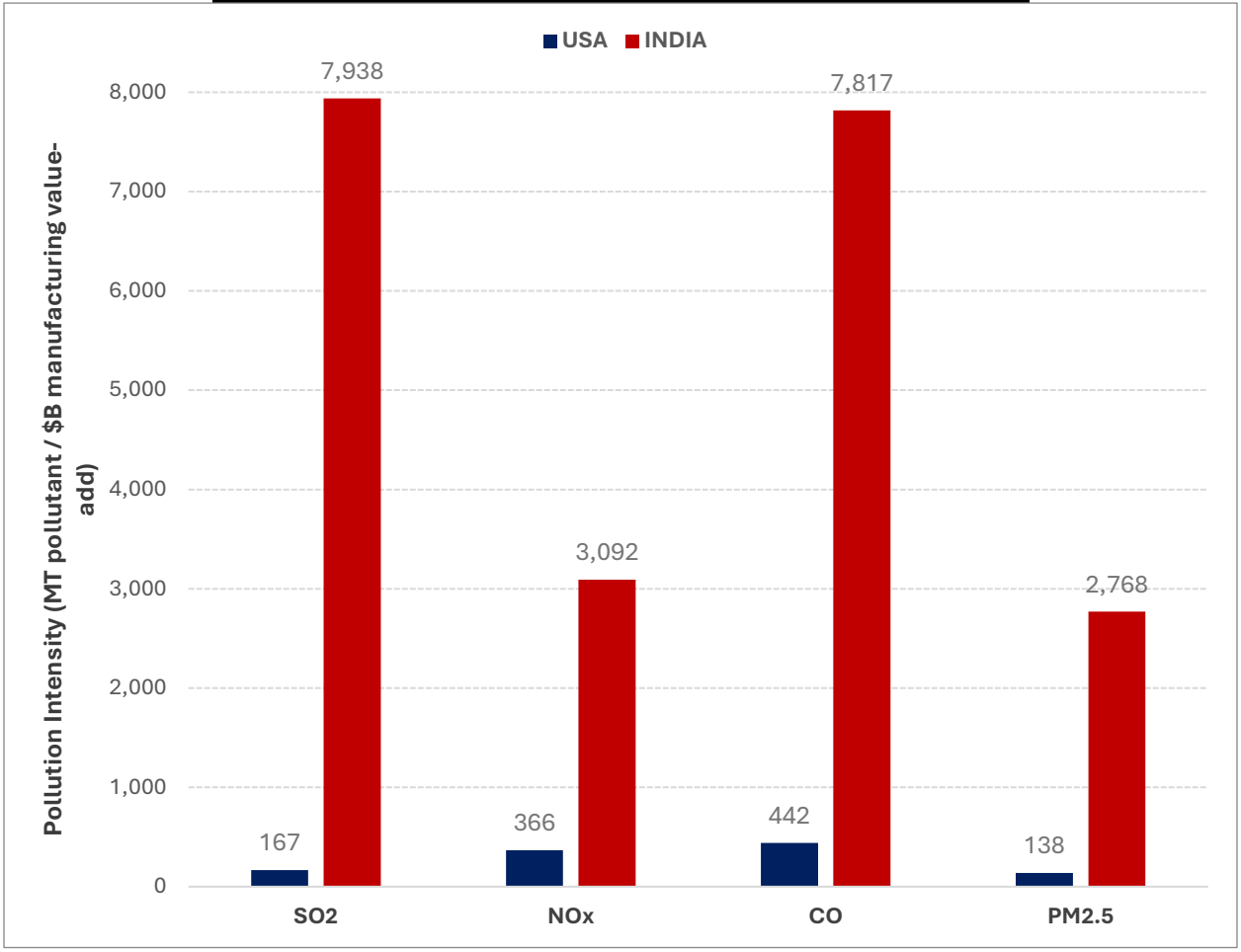
CLIMATE LEADERSHIP COUNCIL

Appendix 5: Evidence of Low Environmental Performance and Standards in India

Low Environmental Performance

India is the fifth most polluted country in the world.[106] Indian firms emit 7-35 more SO_2, NO_x, CO, and $PM_{2.5}$ than U.S. counterparts to manufacture the same dollar value. **India's composite pollution index is 25x higher than the United States'.** [107]

Figure A5-1: Pollution intensity of manufacturing, U.S. and India



Source: Pollution data from Pacific Northwest National Labs[108] *and the European Commission,*[109] *economic activity data from the World Bank,*[110] *top trading partner designations from the U.S. Census Bureau, and authors' calculations.*[111]

[106] "Air Quality in India," IQAir, accessed March 3, 2026, https://www.iqair.com/in-en/india.
[107] *See supra* at 7-8 (explaining pollution index).
[108] "A Community Earth-atmosphere Data System," Pacific Northwest National Laboratory, *supra.*
[109] "Emissions Databased for Global Atmospheric Research (EDGAR)," European Commission, *supra.*
[110] "Manufacturing, value added (current US$)," World Bank Group, *supra.*
[111] "Top Trading Partners – May 2025," U.S. Census Bureau, *supra.*

In 2025, India was home to 83 of the 100 most polluted cities in the world;[112] average $PM_{2.5}$ concentration of 50.6 µg/m³ are 10 times higher than WHO guidelines.[113] India is also one of the largest plastic polluters, contributing around one fifth of the world's plastic pollution.[114] In 2018, India ranked 177 out of 180 nations in the Environmental Performance Index.[115]

Inadequate Environmental Policies and Practices

India has an extensive environmental regulatory framework, underpinned by several pieces of legislation. While India's environmental legislation is substantial on paper, however, it is decades old and has not been adequately updated, leaving substantial gaps in environmental protection. Enforcement is severely lacking due to a combination of insufficient data collection, lack of structural capacity, and corruption. As one legal analysis notes, "[t]here is no dearth of legislations on environmental protection in India but their enforcement has been far from satisfactory."[116]

Some of the most glaring statutory gaps involve waste management. India does not have any regulations addressing liquid waste. In 2024, it attempted to implement waste management requirements for large businesses and households, though it relied on outdated standards from the 1974 Water Act[117] and regulations have still not been published, even months after the stipulated October 1, 2025, implementation deadline.

Solid waste management systems also illustrate regulatory and enforcement gaps. While 75–80 percent of municipal solid waste is collected, only 22–28 percent is processed or treated, leaving large volumes of waste disposed through open dumping or burning.[118] The government updated solid waste management rules this year, but failed to strengthen staffing, capacity, and data systems, ensuring the update will be more symbolic than substantive.[119]

Insufficient regulations and enforcement often work in tandem to allow unchecked industrial pollution. For example, in 2015, the government required coal-fired power plants to install Flue Gas Desulphurization (FGD) equipment by 2017. That deadline has been pushed back four times and the environment ministry exempted 79% of the 537 existing thermal power

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[112] "The State of Air Quality in India: Crisis, Policy, & Community-Led Action," *Earth 5R*, February 2026, https://earth5r.org/india-air-pollution-2025-crisis-community-action/.
[113] *Id.*
[114] Anhata Rooprai, "India's role in global plastic pollution: A growing crisis," *What Packaging?* March 25, 2025, https://www.whatpackaging.co.in/news/-indias-role-in-global-plastic-pollution-a-growing-crisis-58636.
[115] Aparna Sawhney, "Compliance Dilemmas in Indian Environmental Policy," *East Asia Forum*, October 10, 2018, https://eastasiaforum.org/2018/10/10/compliance-dilemmas-in-indian-environmental-policy/.
[116] Ashwani Pant, Santosh Kumar, "Environmental Law Enforcement and Need for reforming the Liability Regime in India: An Agenda to Revisit," *Dehradun Law Review* 10, no. 1 (2018): 41-51, https://www.dehradunlawreview.com/wp-content/uploads/2020/06/5-Environmental-law-enforcement-and-need-for-reforming-the-liability-regime-in-India-an-agenda-to-revisit.pdf.
[117] AOKI Kenji (EnviX, Ltd.), "India Drafts Liquid Waste Management Rules," *Enviliance ASIA*, November 7, https://enviliance.com/regions/south-asia/in/report_12705.
[118] Sawhney, "Compliance Dilemmas in Indian Environmental Policy," *supra.*
[119] "Solid Waste Management Rules 2026: What Changes for Business in India," *Earth5R*, February 27, 2026, https://earth5r.org/solid-waste-management-rules-2026-india-compliance-guide/.

plants from mandatory FGD installation entirely.[120] As of 2025, fewer than 10 percent of coal power plants had installed FGD systems.[121] Among the uncontrolled units, more than 75% exceeded prescribed emission limits and 10% failed to provide emission data.[122] India's coal industry is saving an approximate $30 billion from inadequate FGD policies alone.[123]

India also struggles to enforce coal mine reclamations. In 2009, the government mandated that all coal mines adopt a "Mine Closure Plan." By 2024, only three coal mines in India acquired formal closure certificates out of the 299 non-operational mines identified for closure.[124]

[120] Sarita Chaganti Singh, "India eases sulphur emission rules for coal power plants, reversing decade-old mandate," *Reuters*, July 12, 2025, https://www.reuters.com/sustainability/boards-policy-regulation/india-eases-sulphur-emission-rules-coal-power-plants-reversing-decade-old-2025-07-12/.
[121] Earth 5R, "The State of Air Quality in India" *supra.*
[122] "Scientific evidence is clear: Enforcing SO_2 norms in India's coal power plants is non-negotiable," *CREA*, April 23, 2025, https://energyandcleanair.org/wp/wp-content/uploads/2025/04/Enforcing-SO%E2%82%82-norms-in-Indias-coal-power-plants-is-non-negotiable.pdf.
[123] Singh, "India eases sulphur emission rules for coal power plants," *supra*.
[124] Sukriti Vats, "India's Coal Mine Closure Crisis Threatens Just Transition," *India Spend*, March 19, 2025, https://www.indiaspend.com/earthcheckindia/unfinished-business-indias-coal-mine-closure-crisis-threatens-just-transition-945963.