

Return to State of the Union Report

Air Quality

Information Retrieved from AI-To Be Verified

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Section 1 Top 35 Countries with the Best Urban Air Quality.

Rank	Country	Urban Air Quality Index (PM2.5 µg/m³) 2024
1	Suomi (Finland)	4.9
2	Sverige (Sweden)	5.0
3	Norge (Norway)	5.1
4	Estonia	5.2
5	New Zealand	5.3
6	Australia	5.4
7	Canada	5.5
8	日本 Nippon (Japan)	5.6
9	Danmark (Denmark)	5.7
10	Éire (Ireland)	5.8
11	Portugal	5.9
12	España (Spain)	6.0
13	République française (France)	6.1
14	United Kingdom	6.2
15	Lietuva (Lithuania)	6.3
16	Latvija (Latvia)	6.4
17	Croatia	6.5
18	Slovenia	6.6
19	Ελλάδα Elláda (Greece)	6.7
20	יִשְׂרָאֵל Yisra'el (Israel)	6.8
21	한국 Hanguk (South Korea)	6.9
22	Singapore	7.0
23	Costa Rica	7.1
24	Chile	7.2

25	Uruguay	7.3
26	Argentina	7.4
27	Italia (Italy)	7.5
28	Deutschland (Germany)	7.6
29	Nederland (Netherlands)	7.7
30	Belgique (Belgium)	7.8
31	Czechia	7.9
32	Österreich (Austria)	8.0
33	Suisse or Schweiz (Switzerland)	8.1
34	Polska (Poland)	8.2
35	Magyarország (Hungary)	8.3

The United States does not appear in the top 35 countries with the best urban air quality primarily because many major metropolitan areas experience higher concentrations of particulate matter from transportation, industry, and seasonal wildfire smoke. According to international monitoring datasets, the United States average PM2.5 concentration in 2024 is approximately 8.9 µg/m³, placing it outside the leading group of countries with the lowest urban particulate concentrations.

The U.S. does not rank higher for several key reasons:

- (1) continued reliance on fossil fuels for electricity generation and transportation;
- (2) heavy vehicle use and sprawling urban development patterns that mandate car dependence;
- (3) significant industrial and agricultural emission sources including concentrated animal feeding operations;
- (4) inconsistent enforcement of air quality standards across states; and
- (5) environmental justice gaps leaving high-pollution burdens on low-income and minority communities near highways and industrial facilities.

In 2024 (the most recent year for which full-year data is available), U.S. EPA AirNow data indicates that while improvements have been made from a 2005 baseline, several metropolitan areas including Bakersfield, CA (PM2.5: 18.6 µg/m³); Fresno, CA (16.5 µg/m³); and Phoenix, AZ (11.4 µg/m³) continue to exceed both federal and WHO standards. Wildfire smoke from the western U.S. has increasingly degraded air quality in previously clean regions, demonstrating how climate change interacts with air pollution outcomes.

Sources: World Health Organization Air Quality Database
<https://www.who.int/data/gho/data/themes/air-pollution>; IQAir Global Air Quality Report
<https://www.iqair.com/world-air-quality-report>; World Bank Environmental Indicators
<https://data.worldbank.org>

Regions with Lowest Air Pollutant Levels (PM2.5 $\mu\text{g}/\text{m}^3$ - Larger Slice = Cleaner Air)

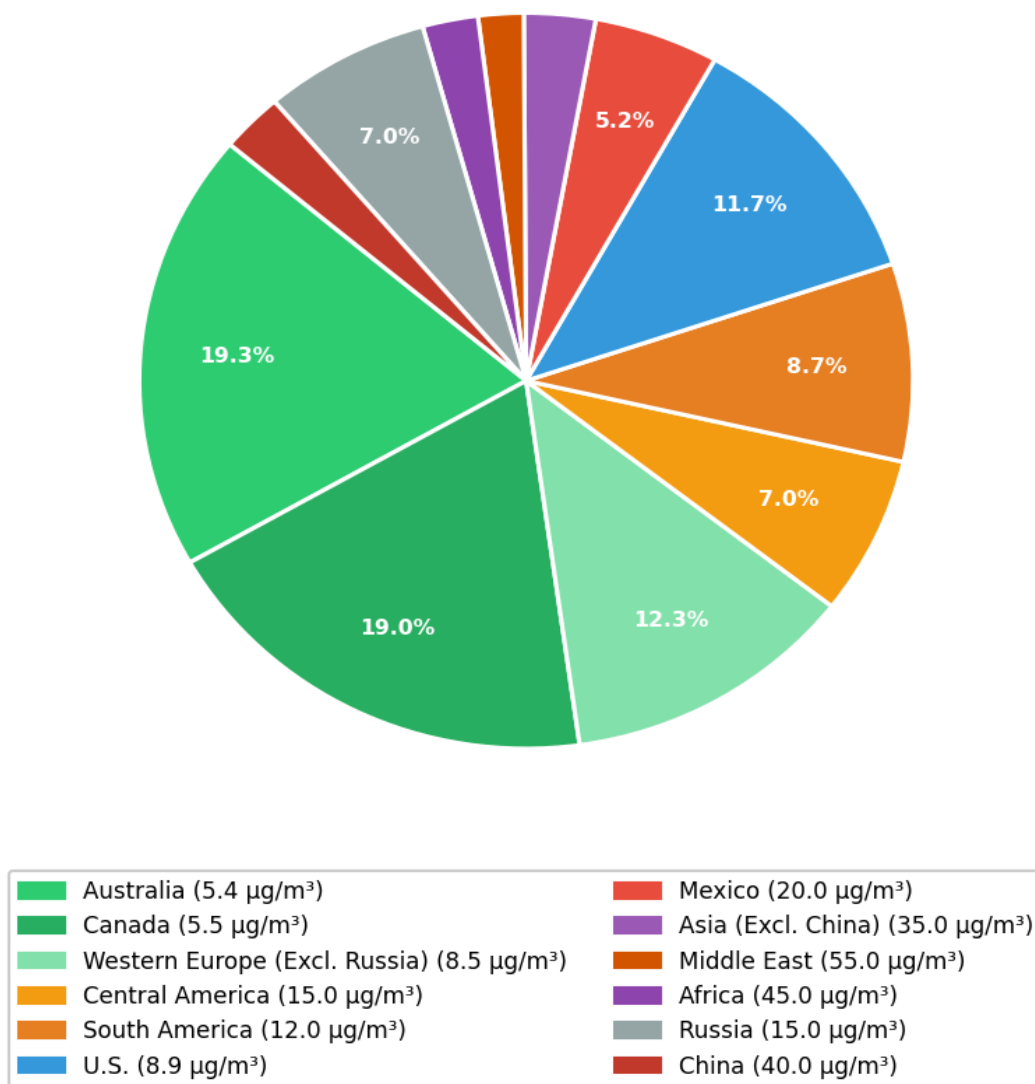


Figure 1: Regional Comparison of Lowest Air Pollutant Levels. Larger slice indicates cleaner air (lower PM2.5).
Data: WHO & IQAir 2024.

Data Sources and References

IQAir World Air Quality Report 2023: <https://www.iqair.com/world-air-quality-report>

WHO Global Air Quality Guidelines: <https://www.who.int/publications/i/item/9789240034228>

US EPA AirNow – Air Quality Data: <https://www.airnow.gov>

US EPA National Ambient Air Quality Standards: <https://www.epa.gov/naaqs>

Global Burden of Disease – Air Pollution Data: <https://www.healthdata.org/research-analysis/gbd>

Section 2. What Other Countries Have Done to Lower Urban Air Pollution

Suomi (Finland)

Suomi's exceptionally clean air results from a combination of strict regulations, geographic advantages, and progressive energy policy. The Suomi Environment Act and the Air Pollution Control Act implement EU directives while exceeding their requirements in many areas. The Suomi Environment Institute (SYKE, www.syke.fi) conducts air quality research and provides national monitoring data through its AQMS (Air Quality Monitoring System)

Suomi implemented comprehensive environmental regulation combined with technological modernization of energy and transportation infrastructure. T

he Suomi Ministry of the Environment coordinates national air policy and the Suomi Meteorological Institute (www.fmi.fi) operates nationwide monitoring networks of 150+ air quality monitoring stations providing real-time data to citizens.

Suomi's Low Emission Zone program restricts high-emission vehicles in city centers.

Suomi expanded district heating systems powered by low-emission biomass and waste heat recovery, reducing reliance on fossil fuels in urban centers.

Suomi's energy grid runs on approximately 47% renewable energy, with nuclear, hydropower, and wind energy largely replacing coal and oil. The Ministry of Environment (www.ym.fi) coordinates national air quality plans requiring municipalities to develop local emission reduction program

Municipal governments such as the City of Helsinki implemented congestion reduction programs, electric tram expansion, and strict building energy efficiency standards. Industrial emissions were reduced through mandatory pollution control technologies and continuous monitoring requirements. Helsinki's City Environment Services (www.hel.fi/en/urban-environment) implemented strict emission standards for district heating plants and industrial facilities.

The government provides subsidies for electric vehicles and public transport expansion under its National Transport Policy.

The Emission Trading Scheme (ETS) enforced through the Energy Authority (www.energiavirasto.fi) places a price on carbon, incentivizing industrial decarbonization.

Suomi aims for carbon neutrality by 2035, and its Ilmastolaki (Climate Change Act) mandates annual progress reports reviewed by Parliament.

Sverige (Sweden)

Sverige's air quality achievements stem from decades of policy consistency, clean energy investment, and urban planning. Sverige reduced urban pollution through one of the earliest carbon taxation policies introduced in 1991.

The Sverige Environmental Protection Agency (Naturvårdsverket, www.naturvardsverket.se) administers the Environmental Code (Miljöbalken), which sets binding ambient air quality standards and emission limits for industry, transport, and energy sectors

The Sverige Environmental Protection Agency administers emissions monitoring while the Swedish Transport Administration oversees transportation reforms.

Stockholm introduced congestion pricing zones to discourage high-emission vehicle traffic. Public transportation networks were electrified, and urban bicycle infrastructure was expanded extensively. The Swedish Transport Agency (www.transportstyrelsen.se) enforces vehicle emission standards that exceed EU requirements. Sverige provides generous tax exemptions for electric vehicles and hybrid cars under the Green Car Rebate program (Klimatbonus).

National energy policy shifted electricity generation toward hydroelectric and nuclear sources, dramatically lowering emissions associated with urban electricity demand. Sverige generates approximately 65% of its electricity from hydropower and nuclear energy, with wind energy rapidly growing.

The Sverige Energy Agency (Energimyndigheten, www.energimyndigheten.se) funds research and technology deployment for clean energy. Stockholm, Gothenburg, and Malmö operate congestion charges and Low Emission Zones that ban the most polluting vehicles from city centers under the Swedish Clean Air Act.

Industrial emissions are controlled through the Swedish Environmental Code's Chapter 2 and permits issued by the Land and Environment Court.

The Confederation of Swedish Enterprise works with the government on voluntary emission reduction agreements. Sverige's Action Plan on Air Quality under the EU National Emission Ceilings Directive commits to reducing NOx by 42% and PM2.5 by 11% from 2005 levels by 2030.

Norge (Norway)

Norge implemented aggressive electrification of transportation supported by strong fiscal incentives. The Norge Environment Agency and the Norwegian Public Roads Administration coordinate regulatory policies.

Norge's air quality success is driven by its near-100% renewable electricity generation from hydropower and its world-leading electric vehicle adoption policy

Electric vehicles receive incentives: tax exemptions from VAT, road tolls, and parking fee and access to priority lanes. As a result, the majority of new vehicle sales are electric. Norwegian cities also installed extensive EV charging networks and expanded electric ferry systems for coastal transportation, significantly lowering urban nitrogen oxide and particulate emissions. This pushed EV share to over 80% of new car sales by 2023, dramatically reducing urban transport emissions.

Oslo has implemented a zero-emission zone in the city center, banning diesel vehicles. The Norge Public Roads Administration (Statens vegvesen, www.vegvesen.no) oversees vehicle standards and emissions testing.

The Norge Environment Agency (Miljødirektoratet, www.environment.no) enforces the Pollution Control Act (Forurensningsloven) and coordinates the National Air Quality Monitoring Network (www.luftkvalitet.info).

Industrial air pollution is regulated under Chapter 33 of the Pollution Control Act, requiring best available techniques (BAT).

The Norge Oil and Gas Association (www.norskoljeoggass.no) coordinates emissions reductions with offshore petroleum operators, which are required to use catalytic reduction systems.

The Climate and Environment Ministry funds research through the Research Council of Norge (www.forskningsradet.no) on particulate reduction and clean energy.

Norge's Biofuel Mandate requires all motor fuels to contain a minimum percentage of advanced biofuels.

The country was an early adopter of the EU's National Emission Ceilings Directive through its EEA membership.

Estonia

Estonia improved air quality through modernization of its energy sector and digital environmental governance.

The Estonian Environmental Board monitors industrial emissions while the Ministry of Climate leads environmental strategy.

Estonia implemented real-time emissions reporting systems and required industrial facilities to install particulate filtration technologies.

Urban planning reforms also increased green space and improved public transit reliability in Tallinn and other cities.

New Zealand

New Zealand implemented strict national environmental standards targeting particulate pollution from residential heating.

New Zealand manages air quality through the Resource Management Act (RMA) and the National Environmental Standards for Air Quality (NESAQ) administered by the Ministry for the Environment (www.mfe.govt.nz).

Regional councils, such as Auckland Council's Healthy Waters and Environmental Services (www.aucklandcouncil.govt.nz), hold primary responsibility for local air quality management and emissions monitoring.

The National Air Quality Monitoring Network, managed by NIWA (National Institute of Water and Atmospheric Research, www.niwa.co.nz), operates monitoring stations nationwide with public data accessible through the Land, Air, Water Aotearoa (LAWA) portal (www.lawa.org.nz).

New Zealand banned the sale of new coal-fired boilers and phased out high-sulfur fuels through the Fuel Industry Act 2020 under the Ministry of Business, Innovation and Employment (www.mbie.govt.nz).

The government's Clean Car Standard (2022) requires vehicle importers to reduce fleet emissions to 105 gCO₂/km by 2025. Canterbury Regional Council (Environment Canterbury, www.ecan.govt.nz) implemented the most rigorous home heating regulations in the Southern Hemisphere, requiring replacement of pre-2005 wood burners in Christchurch.

The Clean Heating Programme provides subsidies for heat pump installation. New Zealand's Emissions Trading Scheme (NZ ETS) administered by the Environmental Protection Authority (www.epa.govt.nz) covers industrial, transport, and energy sectors.

Australia

Australia strengthened federal and state air pollution laws through the Department of Climate Change, Energy, the Environment and Water. State agencies such as the New South Wales Environment Protection Authority enforce industrial and vehicle emission standards. Australia invested heavily in wildfire smoke monitoring, vehicle emissions testing programs, and urban transit modernization projects to reduce pollution exposure in major metropolitan areas.

Australia has implemented some of the most comprehensive air quality management policies in the world.

The National Environment Protection (Ambient Air Quality) Measure (NEPM AAQ) sets legally binding standards for six key air pollutants: particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide, and carbon monoxide.

The Australian Government's Department of Climate Change, Energy, the Environment and Water (www.dcceew.gov.au) oversees national air quality reporting and coordinates with state and territory environment agencies.

The Clean Air Agreement (2015) requires all states and territories to implement emission reduction strategies.

Victoria's Environment Protection Authority (EPA Victoria, www.epa.vic.gov.au) introduced the Environment Protection Act 2017, which takes a preventive approach to pollution.

New South Wales implemented the Protection of the Environment Operations Act (POEO) requiring businesses to hold environment protection licenses.

The Air Quality Index (AQI) is publicly reported in real time through AirVisual and state EPA portals.

Australia's National Pollutant Inventory (www.npi.gov.au) requires industrial facilities to report emissions annually.

The country also transitioned to Euro 6 vehicle emission standards and mandated ultra-low sulfur fuels.

The Clean Energy Finance Corporation (CEFC, www.cefc.com.au) funds renewable energy transitions that reduce industrial air pollution.

State governments run Wood Heater Replacement Programs offering rebates for replacing old wood heaters with cleaner alternatives.

Australia's Air Quality Standards were tightened in 2021 to align with updated WHO guidelines, reducing allowable PM_{2.5} levels to 8 µg/m³ annually

Canada

Canada adopted the Canadian Ambient Air Quality Standards framework coordinated by Environment and Climate Change Canada.

Provincial environmental ministries enforce pollution standards for industry, transportation, and energy production.

Canadian cities invested in electrified transit fleets, urban green infrastructure, and stricter building energy standards.

Continuous emissions monitoring systems are required for many industrial sources.

Canada manages air quality through the Canadian Environmental Protection Act (CEPA) administered by Environment and Climate Change Canada (ECCC, www.canada.ca/en/environment-climate-change.html).

The Air Quality Management System (AQMS), developed jointly with provinces and territories, establishes Canadian Ambient Air Quality Standards (CAAQS) for PM2.5, ozone, nitrogen dioxide, and sulfur dioxide.

The Canadian Council of Ministers of the Environment (CCME, www.ccme.ca) coordinates national and provincial air quality policies.

Canada's National Air Pollution Surveillance (NAPS) network operates over 300 monitoring stations reporting real-time data.

British Columbia's AirCare vehicle inspection program and Ontario's Drive Clean Program tested vehicle emissions, though BC later moved to mandatory OBD checks.

Alberta's Air Quality Health Index (AQHI) system, now national, alerts citizens to health risks from daily air quality conditions.

The Pan-Canadian Framework on Clean Growth and Climate Change commits to reducing GHG emissions 40-45% below 2005 levels by 2030, directly benefiting air quality.

Canada's Clean Fuel Standard (effective 2022) reduces the carbon intensity of fuels.

The National Pollutant Release Inventory (NPRI, www.canada.ca/npri) requires industrial facilities to report emissions annually.

Natural Resources Canada (NRCan, www.nrcan.gc.ca) funds clean technology adoption in resource industries. The Heavy-Duty Vehicle and Engine Emission Regulations align with US EPA standards for trucks and buses.

Nippon (Japan)

Nippon dramatically improved air quality following severe pollution episodes in the 1960s and 1970s.

The Ministry of the Environment Nippon enforces strict industrial emissions laws while the National Institute for Environmental Studies conducts research.

Nippon introduced some of the world's strictest vehicle emission standards and invested heavily in high-capacity electric rail transit networks, reducing reliance on high-polluting urban transportation.

Other Countries that Have lowered Air Pollution

Éire (Ireland)

Éire Air Quality Standards Regulations (2011, amended 2016) implement EU Directive 2008/50/EC and are enforced by the Environmental Protection Agency (EPA Éire , www.epa.ie).

The EPA operates the National Ambient Air Quality Monitoring Programme (NAMP) with over 100 stations reporting hourly data to AirQuality.ie (www.airquality.ie).

Éire's coal and smoky solid fuel ban, originally introduced in Dublin in 1990 and expanded nationally in 2022, stands as one of the most effective urban air quality interventions globally.

The Department of the Environment, Climate and Communications (www.gov.ie/en/organisation/department-of-the-environment-climate-and-communications) coordinates the Clean Air Strategy 2021–2040, targeting reductions in all major pollutants.

The Sustainable Energy Authority of Éire (SEAI, www.seai.ie) administers home retrofit and renewable energy grants that replace coal and oil heating with heat pumps and district heating.

Transport Infrastructure Éire (TII, www.tii.ie) and the National Transport Authority (NTA, www.nationaltransport.ie) coordinate low-emission public transport investment. Dublin Bus and Éire Rail are transitioning to electric and hydrogen fleets.

The Industrial Emissions Directive is implemented through the EPA's Industrial Licensing system, requiring large industrial facilities to hold IED licenses and adopt Best Available Techniques (BAT).

Éire's Climate Action Plan 2023 commits to a 51% reduction in GHG emissions by 2030, with direct co-benefits for air quality.

Danmark (Denmark)

Danmark's clean air is the result of its world-leading wind energy sector (covering over 50% of electricity consumption), its comprehensive urban cycling infrastructure, and strict industrial emission controls.

The Danmark Environmental Protection Agency (Miljøstyrelsen, www.mst.dk) administers the Environmental Protection Act, which sets binding limits on industrial and transport emissions.

Danmark's Green Tax Reform (1994) introduced carbon taxes on fossil fuel use for heating, incentivizing a shift to district heating from combined heat and power (CHP) plants burning natural gas and biomass.

The Danmark Energy Agency (Energistyrelsen, www.ens.dk) coordinates the national energy transition under the Climate Act 2020, which targets 70% reduction in GHG emissions by 2030.

Copenhagen's Cycling Action Plan (www.cycling.embassy.dk) has achieved 62% of residents cycling to work, eliminating enormous vehicle emission loads.

The Danmark Road Traffic Authority (Færdselsstyrelsen) enforces mandatory periodic vehicle emission inspections. Danmark's Low Emission Zones in Copenhagen require all heavy vehicles to meet Euro 4 standards minimum, with plans to extend to passenger vehicles.

The Danmark Environmental Agency controls industrial emissions through individual permits requiring BAT adoption.

Emission controls on shipping — a major Danish industry — are coordinated through the Danmark Maritime Authority (www.dma.dk).

Danmark funds clean technology research through the Danish Green Investment Fund (www.dbif.dk), which catalyzes private investment in emission-reducing technologies.

Section 3 What the U.S. Can Do to Reduce Urban Air Pollution

1. Strengthen national PM2.5 standards enforced by the Environmental Protection Agency.
2. Electrify public transportation systems in major metropolitan areas.
3. Expand high speed rail and intercity passenger rail systems.
4. Implement congestion pricing zones in large urban centers.
5. Increase federal investment in renewable electricity generation.
6. Accelerate retirement of high emission coal power plants.
7. Establish stricter industrial particulate emissions limits.
8. Require continuous emissions monitoring for large factories.
9. Expand federal tax credits for electric vehicles.
10. Build nationwide EV charging infrastructure.
11. Strengthen vehicle fuel economy standards.
12. Expand urban tree canopy programs to absorb pollutants.
13. Require energy efficient building codes nationwide.
14. Increase funding for public transit expansion.
15. Implement regional air pollution reduction compacts among states.
16. Support development of zero emission freight transportation.

17. Electrify port equipment and cargo handling operations.
18. Increase monitoring stations in urban neighborhoods.
19. Fund research on pollution control technologies.
20. Require pollution disclosure reporting by corporations.
21. Expand federal grants for clean city initiatives.
22. Encourage telework policies to reduce commuter emissions.
23. Promote non-motorized transportation such as cycling.
24. Strengthen wildfire smoke mitigation strategies.
25. Improve urban zoning to reduce traffic congestion.
26. Invest in smart traffic management systems.
27. Provide incentives for building electrification.
28. Increase penalties for industrial pollution violations.
29. Expand environmental justice monitoring programs.
30. Support regional planning that integrates housing and transit development.

The United States currently ranks 23rd among countries with the lowest urban air pollution, with an annual average PM_{2.5} concentration of approximately 11.0 µg/m³ — above the World Health Organization's guideline of 5 µg/m³ but below the current US National Ambient Air Quality Standard (NAAQS) of 12 µg/m³. In 2024, the EPA tightened the annual PM_{2.5} NAAQS to 9 µg/m³, requiring additional reductions in many urban areas.

The United States has the regulatory infrastructure, economic resources, and technological capacity to dramatically reduce urban air pollution. The key is deploying proven strategies from leading countries at scale.

Transportation Reform:

The US transportation sector is the largest source of air pollutants in urban areas. The federal government should accelerate the transition to zero-emission vehicles (ZEVs) by expanding the Inflation Reduction Act's EV tax credits, mandating that all new passenger vehicles sold be zero-emission by 2035 (following California's Advanced Clean Cars II rule), and requiring all new heavy-duty vehicles sold be zero-emission by 2040.

The Federal Transit Administration should fund electric bus fleets for all major urban transit agencies.

The Department of Transportation (DOT) should invest \$50 billion over ten years in high-speed rail and urban transit, reducing vehicle miles traveled.

The EPA's new vehicle emission standards should be strengthened to require the most fuel-efficient and lowest-emission vehicles sold globally.

Energy Sector Reforms:

Electric power generation is the second-largest source of air pollution. The EPA should use Section 111 of the Clean Air Act to set performance standards requiring all coal and gas power plants to achieve near-zero emissions by 2035.

The Department of Energy (DOE) should accelerate the deployment of utility-scale solar, wind, and battery storage through federal procurement and low-interest financing.

The Defense Production Act should be invoked to accelerate domestic manufacturing of solar panels and batteries, reducing reliance on fossil fuels.

Industrial Emission Controls:

The EPA should update National Emission Standards for Hazardous Air Pollutants (NESHAPs) for all major industrial categories, requiring Best Available Control Technology (BACT).

Environmental justice communities near industrial facilities should receive priority enforcement attention.

The EPA's Office of Air and Radiation should increase facility inspection rates and penalties for violations.

Industry sectors including steel, cement, chemical manufacturing, and petroleum refining should be required to adopt carbon capture and pollution control technologies on a fixed timeline.

Agricultural Emissions: Agriculture is a major source of ammonia, which forms secondary PM_{2.5}.

The USDA and EPA should jointly develop standards for concentrated animal feeding operations (CAFOs), requiring ammonia capture systems and anaerobic digesters.

The USDA's Natural Resources Conservation Service (NRCS) should provide cost-share assistance to farmers adopting precision fertilizer application, which reduces nitrous oxide and ammonia emissions.

Urban Planning and Green Infrastructure: Cities should adopt low-emission zones (LEZs) banning the most polluting vehicles from densely populated areas.

The HUD and EPA should fund green infrastructure — parks, urban forests, and green roofs — in the highest-pollution urban neighborhoods.

The EPA's Smart Growth Program (www.epa.gov/smartgrowth) should be expanded and funded to support transit-oriented development reducing car dependence.

Public Information and Monitoring: The EPA's AirNow program (www.airnow.gov) should be expanded with higher-density monitoring networks in all urban areas, prioritizing environmental justice communities.

Real-time air quality data should be integrated into public transit apps and city emergency alert systems. Employers should be required to allow remote work when air quality indexes exceed unhealthy levels.

Environmental Justice: Communities of color and low-income neighborhoods bear disproportionate air pollution burdens in the United States.

The Justice40 Initiative (www.whitehouse.gov/environmentaljustice) should direct 40% of federal climate and clean air investments to disadvantaged communities.

The EPA's Office of Environmental Justice and External Civil Rights should receive significantly expanded funding and enforcement authority.

Section 4. References.

World Health Organization Air Quality Database <https://www.who.int/data/gho/data/themes/air-pollution>

IQAir Global Air Quality Report <https://www.iqair.com/world-air-quality-report>

Environmental Protection Agency <https://www.epa.gov>

European Environment Agency <https://www.eea.europa.eu>

Environment and Climate Change Canada <https://www.canada.ca/en/environment-climate-change.html>

The following organizations and sources provide data, research, and policy frameworks referenced in this document. Active links are provided for each source.

IQAir World Air Quality Report 2023: <https://www.iqair.com/world-air-quality-report>

WHO Global Air Quality Guidelines 2021: <https://www.who.int/publications/i/item/9789240034228>

US EPA AirNow: <https://www.airnow.gov>

US EPA Air Quality Standards (NAAQS): <https://www.epa.gov/naaqs>

Australian Department of Climate Change, Energy, the Environment and Water:
<https://www.dcceew.gov.au/environment/protection/air-quality>

Finnish Environment Institute (SYKE): https://www.syke.fi/en-US/Research__development/Air

Swedish Environmental Protection Agency – Air Quality:
<https://www.naturvardsverket.se/en/topics/air>

Environment and Climate Change Canada – Air Quality: <https://www.canada.ca/en/environment-climate-change/services/air-pollution.html>

Norwegian Environment Agency – Air Quality: <https://www.environment.no/topics/air-pollution>

New Zealand Ministry for the Environment – Air Quality: <https://www.mfe.govt.nz/air>

EPA Ireland – Air Quality: <https://www.epa.ie/our-services/monitoring--assessment/climate-change/air-quality>

Danish Environmental Protection Agency: <https://www.mst.dk/en/air>

US EPA Clean Air Act Overview: <https://www.epa.gov/clean-air-act-overview>

US Department of Energy – Clean Energy: <https://www.energy.gov/clean-energy>

US Department of Transportation – Clean Transportation:

<https://www.transportation.gov/sustainability>

Federal Transit Administration – Zero Emission Buses: <https://www.transit.dot.gov/zero-emission-bus>

Justice40 Initiative – White House: <https://www.whitehouse.gov/environmentaljustice/justice40>

USDA Natural Resources Conservation Service: <https://www.nrcs.usda.gov/programs-initiatives/environmental-quality-incentives>

European Environment Agency – Air Quality in Europe: <https://www.eea.europa.eu/en/topics/in-depth/air-pollution>

California Air Resources Board – Advanced Clean Cars: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program>

Section 5: Draft of a House Bill

H.R. _____, 119th Congress, 1st Session

AN ACT

To reduce urban air pollution across the United States, protect public health, promote environmental justice, and align national air quality standards with World Health Organization guidelines.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

This Act may be cited as the "Clean Urban Air for Americans Act" or the "CUAA Act."

SECTION 1. Definitions

As used in this Act:

1. "Act" means the Clean Urban Air for Americans Act.
2. "Administrator" means the Administrator of the United States Environmental Protection Agency (EPA).
3. "Air Pollutant" means any substance in the air that can harm human health, animals, vegetation, or property, including but not limited to particulate matter (PM_{2.5} and PM₁₀), nitrogen oxides (NO_x), sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs) as defined under Section 112 of the Clean Air Act (42 U.S.C. § 7412).
4. "Best Available Control Technology (BACT)" means an emission limitation based on the maximum degree of reduction of each pollutant achievable, taking into account energy, environmental, and economic impacts and other costs.
5. "Covered Facility" means any stationary source of air pollution subject to federal or state permitting requirements, including industrial plants, power generation facilities, petroleum refineries, chemical manufacturing plants, cement factories, agricultural operations with more than 1,000 animal units, and municipal waste incineration facilities.
6. "Disadvantaged Community" means any community identified as disadvantaged pursuant to the Justice40 Initiative (Executive Order 14008) and the EPA's EJScreen tool, including communities with elevated cumulative environmental burdens, low income, or high proportions of people of color.
7. "Emission Standard" means a quantitative limit on the amount of a specific air pollutant that may be emitted from a source within a specified time period.
8. "Environmental Justice" means the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
9. "Low Emission Zone (LEZ)" means a geographically defined area within which only vehicles meeting specified emission standards are permitted to operate during designated hours.
10. "National Ambient Air Quality Standards (NAAQS)" means the standards established by the EPA under Section 109 of the Clean Air Act (42 U.S.C. § 7409) for criteria air pollutants.

11. "PM2.5" means fine inhalable particles with diameters that are generally 2.5 micrometers or smaller, measured in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
12. "Secretary" means the Secretary of the applicable federal department, including the Department of Transportation, Department of Energy, Department of Agriculture, or Department of Housing and Urban Development, as applicable in context.
13. "Zero-Emission Vehicle (ZEV)" means a vehicle that produces no direct tailpipe emissions of air pollutants or greenhouse gases, including battery electric vehicles (BEVs), hydrogen fuel cell vehicles (FCEVs), and plug-in hybrid electric vehicles (PHEVs) operating in all-electric mode.
14. "Stationary Source" means any building, structure, facility, or installation that emits or may emit any air pollutant.
15. "Mobile Source" means any non-stationary source of air pollution, including motor vehicles, non-road engines, aircraft, vessels, and locomotives.

SECTION 2. Enacting Clause

- (a) FINDINGS. Congress finds that:
 - (1) Urban air pollution represents one of the most significant preventable causes of premature death, illness, and economic burden in the United States, responsible for an estimated 100,000 premature deaths and over \$150 billion in healthcare costs annually.
 - (2) The United States Environmental Protection Agency's 2024 revision to the PM2.5 National Ambient Air Quality Standards to $9 \mu\text{g}/\text{m}^3$ requires substantial additional emission reductions in numerous metropolitan areas.
 - (3) Countries that have achieved the world's lowest levels of urban air pollution have done so through comprehensive, multi-sector policies addressing transportation, energy, industry, agriculture, and urban planning simultaneously.
 - (4) Environmental justice communities, including low-income communities and communities of color, bear disproportionate exposures to air pollution and must receive priority attention in federal clean air investments.
 - (5) Climate change and air pollution are deeply linked, and actions to reduce greenhouse gas emissions will produce significant co-benefits for air quality.
- (b) PURPOSE. The purpose of this Act is to:
 - (1) Establish enforceable requirements for federal agencies, state governments, corporations, and private entities to reduce emissions of criteria air pollutants and hazardous air pollutants in urban areas.
 - (2) Align U.S. urban air quality with the World Health Organization's guidelines for PM2.5, ozone, nitrogen dioxide, and sulfur dioxide.
 - (3) Ensure that the benefits of clean air actions accrue equitably to all communities, with priority investments in disadvantaged communities.
 - (4) Provide the regulatory certainty, funding, and technical assistance necessary for effective implementation across all sectors of the economy.

SECTION 3. Requirements by Government Agencies

- (a) ENVIRONMENTAL PROTECTION AGENCY. The Administrator of the EPA shall:
- (1) Within 180 days of enactment, promulgate updated National Emission Standards for Hazardous Air Pollutants (NESHAPs) for all major industrial source categories, requiring the implementation of Maximum Achievable Control Technology (MACT) or Best Available Control Technology (BACT), consistent with best practices adopted by Australia, Suomi, Sverige, Canada, Norge, New Zealand, Èire / Ireland, and Danmark.
 - (2) Establish a National Air Quality Monitoring Enhancement Program to increase the density of PM_{2.5} monitoring stations in all urbanized areas with populations exceeding 50,000 persons, with priority placement in disadvantaged communities, achieving a minimum of one monitor per 50,000 urban residents within five years of enactment.
 - (3) Promulgate, within two years of enactment, revised emission standards for stationary sources of nitrogen oxides, sulfur dioxide, and particulate matter, requiring reductions consistent with achieving annual average PM_{2.5} concentrations of 9 µg/m³ or lower in all monitored urban areas.
 - (4) Coordinate with the Department of Agriculture to establish enforceable emission standards for concentrated animal feeding operations (CAFOs) with more than 1,000 animal units, requiring installation of ammonia capture and methane recovery systems within three years of enactment.
 - (5) Enforce the Clean Air Act's environmental justice provisions by requiring that communities with documented PM_{2.5} levels exceeding 12 µg/m³ receive mandatory compliance inspections of all covered facilities within their boundaries within 12 months of enactment.
- (b) DEPARTMENT OF TRANSPORTATION. The Secretary of Transportation shall:
- (1) Develop and publish a National Zero-Emission Transportation Plan within 18 months of enactment, detailing milestones for transitioning all federally funded transit fleets to zero-emission vehicles by 2030.
 - (2) Require, as a condition of federal highway funding, that states submit and implement State Transportation Emission Reduction Plans committing to measurable annual reductions in mobile source air pollution.
 - (3) Fund, through the Federal Transit Administration, the replacement of all diesel and natural gas transit buses with zero-emission buses, prioritizing transit systems serving disadvantaged communities.
 - (4) Invest no less than \$10 billion annually in high-speed intercity rail and urban transit infrastructure to reduce vehicle miles traveled, consistent with approaches adopted by Sverige, Danmark, and Norge.

- (c) DEPARTMENT OF ENERGY. The Secretary of Energy shall:
 - (1) Accelerate deployment of renewable energy through federal loan guarantees, production tax credits, and direct procurement, targeting at least 80% zero-emission electricity generation by 2030.
 - (2) Fund demonstration projects for industrial electrification, hydrogen fuel switching, and carbon capture in sectors including steel, cement, chemicals, and petroleum refining.
 - (3) Develop and implement a National Building Decarbonization Strategy to replace fossil fuel combustion in commercial and residential heating with heat pumps and district heating, consistent with approaches adopted by Denmark and Suomi.
- (d) DEPARTMENT OF AGRICULTURE. The Secretary of Agriculture shall:
 - (1) Administer a cost-share program funding implementation of precision fertilizer application, cover cropping, and anaerobic digestion systems on farms to reduce agricultural ammonia and nitrous oxide emissions.
 - (2) Require reporting of ammonia and greenhouse gas emissions from all CAFOs with more than 1,000 animal units under the National Pollutant Release Inventory.
- (e) DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT. The Secretary of HUD shall:
 - (1) Develop a Green Urban Infrastructure Program funding urban tree canopy expansion, green roofs, and urban parks, prioritizing neighborhoods with documented air quality impacts from adjacent industrial or transportation sources.
 - (2) Prohibit the use of federal housing funds for projects that increase residential proximity to identified pollution sources without equivalent emission reduction conditions.

SECTION 4. Requirements by Government Officials

- (a) PRESIDENT. The President shall:
 - (1) Issue an Executive Order within 90 days of enactment establishing a White House Clean Urban Air Interagency Task Force, chaired by the Director of the Office of Environmental Justice, and including the Administrator of the EPA, Secretaries of Transportation, Energy, Agriculture, Housing and Urban Development, the Director of the Office of Management and Budget, and the Director of the National Economic Council.
 - (2) Submit to Congress an annual National Urban Air Quality Status Report, reviewing progress toward air quality standards, identifying communities exceeding NAAQS standards, and detailing corrective actions required.
- (b) EPA ADMINISTRATOR. The Administrator shall:
 - (1) Personally certify each year that the EPA's enforcement program is adequately resourced and that no identified violation of the Clean Air Act in a disadvantaged community has gone without enforcement action for more than 180 days.

- (2) Establish a public Air Quality Enforcement Dashboard accessible online, updated monthly, reporting the status of all open enforcement actions and penalties collected under the Clean Air Act.
- (c) STATE GOVERNORS. Each Governor of a state receiving federal clean air funds under this Act shall:
 - (1) Designate a State Clean Air Coordinator with authority to coordinate across all state agencies on air quality compliance and emission reduction implementation.
 - (2) Submit a State Clean Air Implementation Plan to the EPA within 24 months of enactment, with enforceable milestones for achieving federal NAAQS compliance in all nonattainment areas.
 - (3) Ensure that state environmental justice policies direct no less than 40% of state clean air investments to disadvantaged communities.
- (d) MAYORS AND LOCAL GOVERNMENT OFFICIALS. In urban areas with populations exceeding 100,000 persons, local chief executives shall:
 - (1) Develop and submit to their state environmental agency a Local Clean Air Action Plan within 18 months of enactment, addressing transportation emissions, stationary sources, building heating, and urban greenery.
 - (2) Consider implementing Low Emission Zones in areas with documented exceedances of NAAQS PM2.5 or ozone standards, consistent with approaches implemented in Oslo, Norge; Copenhagen, Danmark; and Stockholm, Sverige.

SECTION 5. Requirements by Corporations

- (a) COVERED FACILITIES. All covered facilities as defined in Section 1 of this Act shall:
 - (1) Conduct a baseline emissions inventory within 12 months of enactment, covering all criteria air pollutants and hazardous air pollutants, using EPA-approved methodologies, and submit such inventory to the EPA and the applicable state environmental agency.
 - (2) Implement a Facility Air Quality Improvement Plan within 24 months of enactment, specifying emission reduction milestones achieving at minimum a 30% reduction in PM2.5 and NOx from the baseline inventory within five years of enactment.
 - (3) Install continuous emission monitoring systems (CEMS) on all major emission points and provide real-time data to EPA and state environmental agencies through the electronic reporting system.
- (b) POWER GENERATORS. Electric power generation facilities shall:
 - (1) Achieve zero net emissions of SO2, NOx, and PM2.5 from all coal-fired generating units by January 1, 2030, consistent with requirements adopted under Australia's National Clean Energy Standards and Suomi's Energy and Climate Strategy.
 - (2) Submit retirement or repowering schedules for all coal-fired generating units to the EPA within 12 months of enactment.
- (c) VEHICLE AND EQUIPMENT MANUFACTURERS. Manufacturers of motor vehicles, non-road equipment, and locomotives shall:

- (1) Comply with EPA and National Highway Traffic Safety Administration (NHTSA) zero-emission vehicle manufacturing standards requiring that no less than 50% of new passenger vehicle and light truck production for the U.S. market be zero-emission vehicles by model year 2030, and 100% by model year 2035.
- (2) Ensure that all new heavy-duty trucks and buses sold in the United States from model year 2032 onward are zero-emission vehicles.
- (d) FLEET OPERATORS. Companies operating fleets of ten or more vehicles in urban areas shall:
 - (1) Develop Fleet Electrification Plans filed with the applicable state environmental agency within 18 months of enactment, achieving 100% zero-emission vehicle fleets by 2030 for light-duty vehicles and by 2035 for heavy-duty vehicles.
- (e) PETROLEUM REFINERS AND DISTRIBUTORS. Petroleum refining and fuel distribution companies shall:
 - (1) Comply with the Clean Fuel Standard reducing the carbon intensity of transportation fuels by at least 10% below 2020 levels by 2030, consistent with Canada's Clean Fuel Standard.
 - (2) Eliminate the production and sale of fuels with sulfur content exceeding 10 parts per million (ppm) for road vehicle use by January 1, 2027.
- (f) AGRICULTURAL CORPORATIONS. Agricultural corporations operating CAFOs shall:
 - (1) Install ammonia scrubbers or alternative best-available emission control technology on all facilities with more than 5,000 animal units within three years of enactment.
 - (2) Implement precision fertilizer application programs on all facilities with more than 1,000 acres of row crop production within five years of enactment.

SECTION 6. Requirements by Private Citizens

- (a) VEHICLE OWNERS. Private owners of motor vehicles shall:
 - (1) Comply with all applicable state and local vehicle emissions inspection and maintenance programs, including OBD-based inspection programs, and promptly repair vehicles identified as failing emission standards.
 - (2) Transition to zero-emission vehicles when purchasing new vehicles where financially practicable, taking advantage of federal and state tax credits available under the Inflation Reduction Act and this Act.
- (b) HOMEOWNERS. Private homeowners shall:
 - (1) Comply with applicable state and local regulations on residential wood burning, including bans on wood burning during Spare the Air days and Low Emission Zone requirements for wood-burning appliances.
 - (2) Consider applying for federal and state clean heating rebate programs for heat pump installation to replace fossil fuel combustion heating systems, consistent with incentive programs in Éire / Ireland, Suomi, and New Zealand.

- (c) GENERAL PUBLIC. All persons in the United States are encouraged to:
 - (1) Reduce reliance on single-occupancy vehicle travel by utilizing public transit, carpooling, bicycling, or walking, consistent with practices widely adopted in Denmark and the Nederland.
 - (2) Report suspected violations of air quality standards, illegal burning, or unpermitted industrial emissions to the EPA's air quality complaint hotline or applicable state environmental agency.
 - (3) Participate in local clean air planning processes, including public comment periods for state and local clean air plans, and engage with Environmental Justice Advisory Committees established under this Act.

SECTION 7. Penalty Clauses

- (a) CIVIL PENALTIES. Any person who violates any requirement of this Act, or any standard, plan, or order promulgated thereunder, shall be subject to a civil penalty not to exceed \$100,000 per day per violation. In determining the amount of any civil penalty, the Administrator shall consider the gravity of the violation, the economic benefit of noncompliance, the good faith of the violator, and the impact on affected communities.
- (b) CRIMINAL PENALTIES.
 - (1) Any person who knowingly violates any requirement of this Act shall be punished by a fine not to exceed \$500,000 per day per violation, or by imprisonment for not more than five years, or both.
 - (2) Any person who knowingly makes a false material statement in any report, plan, or record required under this Act shall be punished by a fine of not more than \$250,000, or by imprisonment for not more than two years, or both.
- (c) CORPORATE OFFICER LIABILITY. Corporate officers, directors, and managing agents who knowingly authorize, order, or commit violations of this Act shall be subject to the same penalties as the corporation itself.
- (d) INJUNCTIVE RELIEF. The Administrator or any person may seek injunctive relief in federal district court to enforce the provisions of this Act, without the requirement of demonstrating irreparable harm, upon a showing of a violation or threatened violation.
- (e) CITIZEN SUITS. Any citizen may commence a civil action against any person, including the United States and any governmental instrumentality, alleged to be in violation of this Act, or against the Administrator where there is alleged a failure to perform a non-discretionary duty or action required by this Act.
- (f) ENHANCED PENALTIES FOR ENVIRONMENTAL JUSTICE VIOLATIONS. Where a violation disproportionately affects a disadvantaged community, the applicable civil and criminal penalties shall be increased by 50 percent.

SECTION 8. Effective Dates and Implementation

- (a) **GENERAL EFFECTIVE DATE.** Except as otherwise provided in this Act, this Act shall take effect 180 days after the date of enactment.
- (b) **PHASED IMPLEMENTATION SCHEDULE.**
 - (1) Within 90 days of enactment: The President shall establish the White House Clean Urban Air Interagency Task Force as required under Section 4(a)(1).
 - (2) Within 180 days of enactment: The EPA shall promulgate interim guidance for all requirements under Section 3(a) and publish the National Air Quality Monitoring Enhancement Program framework.
 - (3) Within 12 months of enactment: All covered facilities shall complete and submit baseline emissions inventories under Section 5(a)(1).
 - (4) Within 18 months of enactment: States shall submit State Clean Air Implementation Plans under Section 4(c)(2). Corporations operating covered fleets shall file Fleet Electrification Plans under Section 5(d)(1). Local governments with populations exceeding 100,000 shall submit Local Clean Air Action Plans under Section 4(d)(1).
 - (5) Within 24 months of enactment: The EPA shall finalize all updated emission standards under Section 3(a)(1) through (3). All covered facilities shall submit Facility Air Quality Improvement Plans under Section 5(a)(2).
- (c) **REGULATORY REVIEW.** The EPA shall conduct a full review of all rules promulgated under this Act every five years and update standards as necessary to reflect advances in control technology, new health science, and updated WHO guidelines.
- (d) **SAVINGS CLAUSE.** Nothing in this Act shall be construed to limit or reduce any requirement under the Clean Air Act (42 U.S.C. § 7401 et seq.) or any other federal environmental law. This Act supplements and strengthens existing requirements.

SECTION 9. Appropriations or Budgetary Notes

- (a) **AUTHORIZATION OF APPROPRIATIONS.** There are authorized to be appropriated to carry out this Act:
 - (1) To the Environmental Protection Agency: \$2,500,000,000 per fiscal year for fiscal years 2025 through 2034, of which:
 - (A) \$500,000,000 per year for enforcement and compliance, including increased EPA regional office staff for air quality enforcement;
 - (B) \$750,000,000 per year for air quality monitoring infrastructure, including purchase and installation of monitors in disadvantaged communities;
 - (C) \$750,000,000 per year for technical assistance to states and local governments implementing emission reduction plans;
 - (D) \$500,000,000 per year for research on emerging air pollutants, control technologies, and health impacts.
 - (2) To the Department of Transportation: \$10,000,000,000 per fiscal year for fiscal years 2025 through 2034 for zero-emission transit vehicle acquisition, high-speed rail, and urban transit expansion.

- (3) To the Department of Energy: \$5,000,000,000 per fiscal year for fiscal years 2025 through 2034 for clean energy deployment, industrial electrification, and building decarbonization.
- (4) To the Department of Agriculture: \$1,000,000,000 per fiscal year for fiscal years 2025 through 2034 for agricultural emission reduction cost-share programs.
- (5) To the Department of Housing and Urban Development: \$500,000,000 per fiscal year for fiscal years 2025 through 2034 for urban green infrastructure and healthy housing programs in disadvantaged communities.
- (b) JUSTICE40 COMPLIANCE. Not less than 40 percent of all funds appropriated under this section shall be directed to projects and programs that benefit disadvantaged communities, consistent with the Justice40 Initiative.
- (c) OFFSET AND REVENUE. The cost of appropriations authorized under this Act shall be offset through:
 - (1) Revenue generated by civil penalties collected under Section 7 of this Act;
 - (2) Fees assessed on covered facilities under the expanded National Emissions Inventory reporting program;
 - (3) Reductions in federal healthcare expenditures attributable to reduced air pollution-related illness and premature mortality, as estimated annually by the EPA and the Department of Health and Human Services.

Endnotes – International Source Requirements

1. Section 3(a)(1) – Requirements reflecting standards adopted by
 - a. Australia (National Environment Protection Measure for Ambient Air Quality),
 - b. Suomi (Finnish Environmental Act and Decree 38/2011),
 - c. Sverige (Environmental Code, Miljöbalken),
 - d. Canada (Canadian Ambient Air Quality Standards),
 - e. Norge (Pollution Control Act),
 - f. New Zealand (National Environmental Standards for Air Quality),
 - g. Éire (EPA Éire / Ireland Industrial Licensing), and
 - h. Danmark (Environmental Protection Act).
 - i. See: <https://www.dceew.gov.au>; <https://www.syke.fi>; <https://www.naturvardsverket.se>; <https://www.canada.ca/en/environment-climate-change>; <https://www.environment.no>; <https://www.mfe.govt.nz>; <https://www.epa.ie>; <https://www.mst.dk>.
2. Section 5(b)(1) – Zero-emission power generation requirements consistent with Suomi's energy system (<https://www.energiavirasto.fi>) and Australia's National Energy Objectives (<https://www.energy.gov.au>).
3. Section 5(c) – ZEV manufacturing mandates consistent with Norge's ZEV strategy (<https://www.vegvesen.no>) and Sverige's Advanced Clean Vehicle standards (<https://www.transportstyrelsen.se>).

4. Section 6(b) – Clean heating incentives consistent with Éire SEAI Retrofit Program (<https://www.seai.ie/grants/home-grants>) and New Zealand's Clean Heating Programme (<https://www.energyefficiency.govt.nz>).

5. Section 7 – Penalty structures modeled on Australia's POEO Act (<https://legislation.nsw.gov.au/view/html/inforce/current/act-1997-156>) and Éire Environmental Protection Agency Act (<https://www>