PROPOSED

Thailand Integrated Air Quality Investment Program

Dialogue on Scaling up Investment on Air Quality Management in Thailand

Asian Development Bank

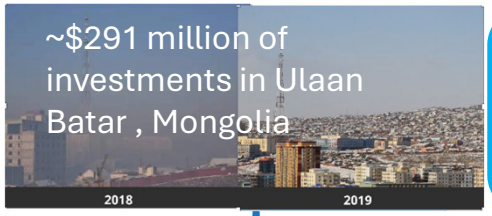
11 March 2026 | Better Air Quality Conference

ADB Support for Air Quality Management

Supported the establishment of Clean Air Asia together with World Bank and USAID

$2.85 million

Regional TA: Promoting low carbon development in CAREC cities



Asia Clean Blue Skies Program (ACBSP)

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

$0.5 million

Regional TA: Mainstreaming Air Quality in urban development through South – South Twinning

$4.61 million

Regional TA: Strengthening Knowledge and Actions on AQM

$4.3 million

Regional TA: Scaling up Clean Air Actions for Better Health and Resilience

PRC: Beijing – Tianjin – Hebei Air Quality Improvement Program

Total of
$2.5 billion

8 projects
approved between
2015 and 2020

- **1** Policy Based Loan (PBL)
- **5** Financial Intermediary loans (FI)
- **1** Results Based Lending (RBL)
- **1** Project Loan

Air Quality benefits Generated
- 40% $PM_{2.5}$
- 74% SO_2, - 37% NO_x by 2022 in comparison to 2015

Mongolia: Ulaanbaatar Air Quality Improvement Program

2 Policy Based loans (PBL):

$130 mill in 2018

$160 mill in 2019

Scope of the 2 PBLs:

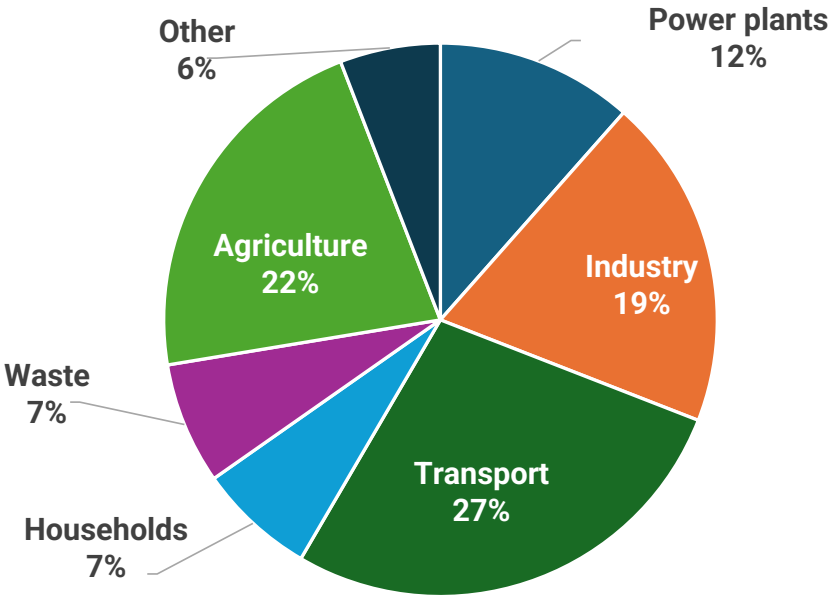
- 3 Policy Reforms and 36 policy actions
- Supports implementation of the 2017 – 2025 National Program for reducing Air and Environment Pollution

Air Quality benefits:

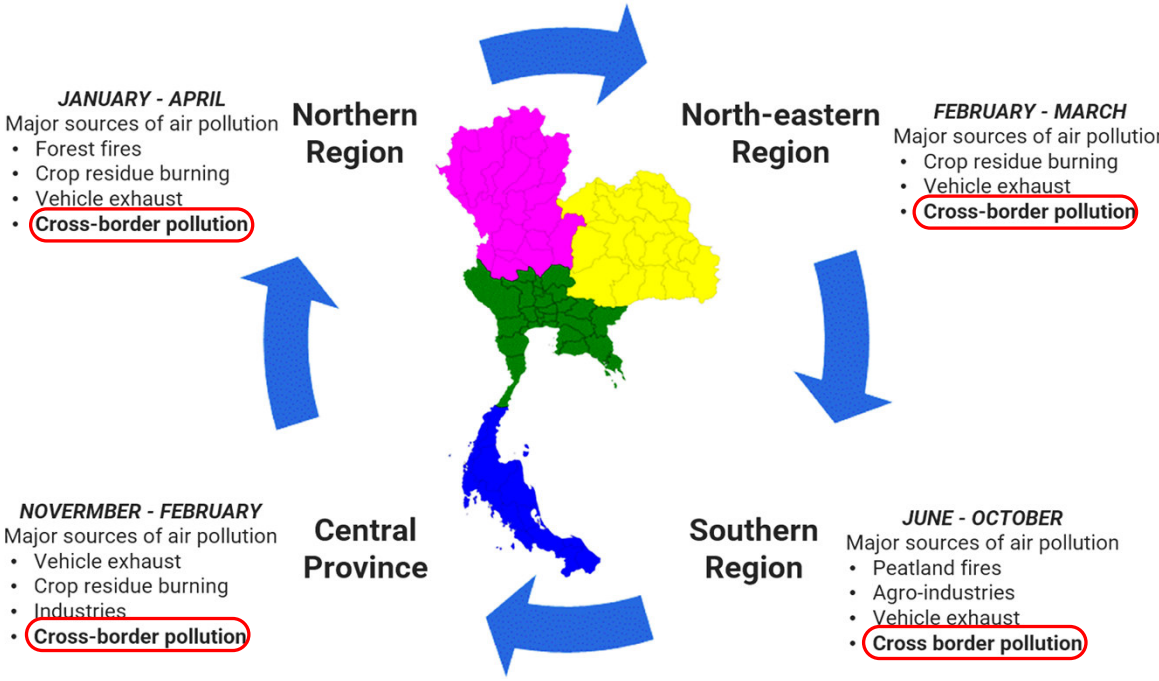
- PM2.5 levels reduced by 46% between winter of 2018 and 2019
- PM10 levels reduced by 43% between winter of 2018 and 2019

Key sources of air pollution in Thailand

Thailand: Share of premature deaths due to air pollution from key sectors (2022) [a]



Temporal variation in source contribution during seasonal air pollution episodes by Thailand regions [b]



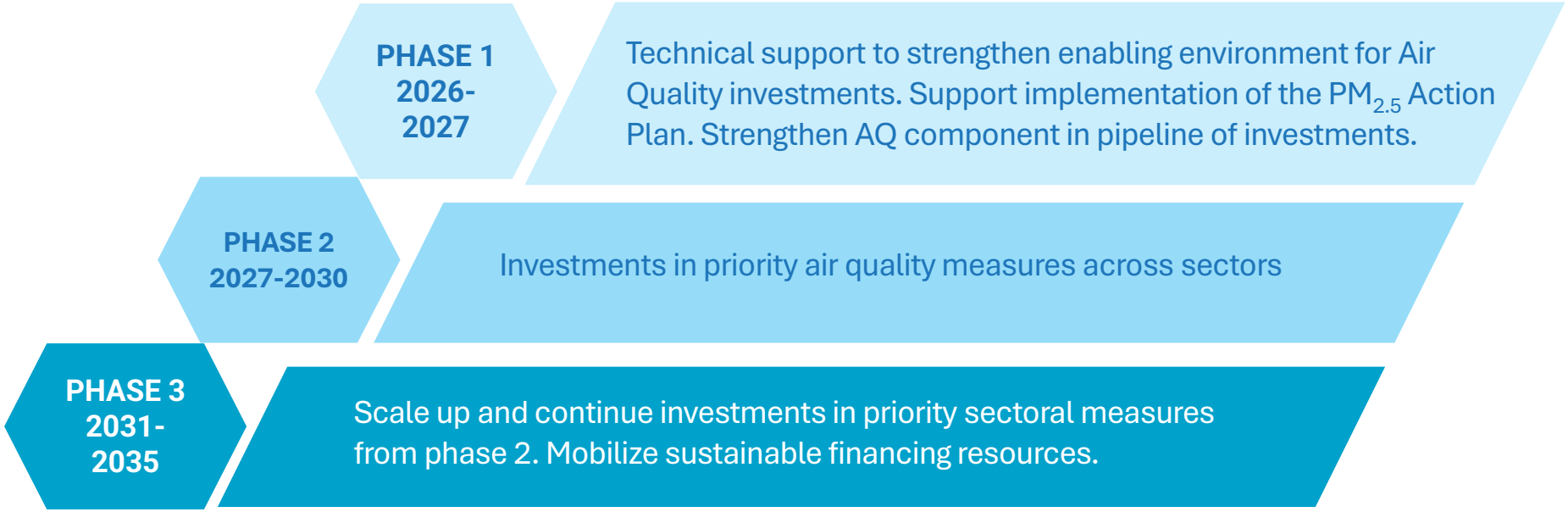
a The 2025 report of the Lancet Countdown on health and climate change
b Updated from P. Suriyawong et al. 2023. Airborne particulate matter from biomass burning in Thailand: Recent issues, challenges, and options. Heliyon.

Air Quality Policy Framework in Thailand

Source of air pollutants	Plans	Legislation	Over-arching/ multi-sector
Energy and Industry	National Energy Plan (NEP) 2024 – 2037 including draft Power Development Plan (PDP), Alternative Energy Plan (AEP), Energy Efficiency Plan (EEP) Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS, 2022) (2015-2036) Oil Development Plan (2015-2036) Thailand Smart Grid Development Master Plan (2015 -2036)	Fuel Trade Act, 2000 National Energy Policy Council Act, 2008 Energy Industry Act, 2007 Energy Conservation and Promotion Act, 2007 Factory Act, 2019 Industrial Estate Authority of Thailand Act, 1979	**Promotion and Conservation of Natural Environmental Quality Act** **Thailand Environment Quality Management Plan (2023-2027)** **Thailand's Second National Action Plan on Combating PM2.5 and Air Pollution (2025–2027)** **DRAFT Clean Air Act** Public Disaster Prevention and Mitigation Act (2020) Thirteenth National Economic and Social Development Plan (2023-2027) Energy Efficiency Development Plan 2015- 2036 Climate change Master Plan 2015- 2050 Updated Nationally Determined Contribution (2025)
Transport	Strategies for Development of Thailand's Transport System for a 20-Year Period (2018-2036) Thailand Greenhouse Gas Reduction Action Plan for Transport Sector, 2021 Electric 30@30 Vehicle Policy Thailand's Action Plan to Reduce Aviation Emission	Vehicles Act, B.E. 2522 Land Transport Act, 1979 Joint Ticket Management Act 2025	
Forestry and agriculture	Burnt Sugarcane Solving Plan, 2019 Thailand's Second National Action Plan on Combating PM2.5 and Air Pollution (2025–2027)		
Waste management & Construction	2nd National Action Plan on Waste Management (2022-2027) Waste Management Roadmap 2018-2030	Ministerial Regulation No. 67 B.E. 2563 (2020) under Building Control Act B.E. 2522 (1979)	

Note: Not exhaustive. Source: Updated from SEI, 2021

PROPOSED: Thailand Integrated Air Quality Investment Program



- **Programmatic approach** – with a 10-year planning horizon
- **Cross-sectoral coverage** – targeting key emission source sectors

Criteria for Priority Areas and Entry Points

1. Alignment with Second $PM_{2.5}$ Action Plan 2025-2027 and Forthcoming Clean Air Management Act
2. Sectors causing the highest level of exposure to air pollution (PM2.5)
3. Cities recently designated by the government as Pollution Control Zones to address PM2.5 pollution and other areas with poor air quality
4. Addressing transboundary pollution and promoting regional cooperation within airsheds
5. Opportunity for private sector engagement
6. Strong ownership/demand from public sector and/or private sector for clean air investments

PROPOSED: Thailand Integrated Air Quality Investment Program: Phase 1 (2026 – 2027)

TA support :

- TA 10537 REG: Scaling up Clean Air Actions for Better Health and Resilience
- TA10486 REG: Advancing Low Emission Zones in South East Asia
- TA-10463 REG: Southeast Asia Resilient and Water Secure Cities Facility
- TA 10546-THA: Preparing Sustainable Transport Bus Electrification Project
- TA 10079 THA: Strengthening the Bio-Circular-Green Economy
- TA-10759 REG : Accelerating Deployment of Smart Energy Systems and Grid Integration Infrastructure

→

- Support implementation of the PM2.5 action plan
- Conduct upstream diagnostic studies to inform preparation priority investments in phase 2
- Preparation of Low Emission Zones in selected cities
- Preparation of investments in bus electrification
- Sustainability-linked bonds (zero emissions vehicles)

Sovereign lending	Non Sovereign lending

- Sustainable Transport Bus Electrification Project
- Climate Resilient Agriculture Facility
- Clean Air and Heat Initiative
- Green Ports

Ongoing and proposed AQ – Related Projects in ADB Portfolio in Thailand

	Active	Under Exploration
Public sector Loans	0	3
Private sector Loans *	4	--
Technical assistance	6	1
Total	**10**	**4**

* Excludes investments in clean energy projects with potential / conditional air quality co-benefits

Key Government Agencies:

- Ministry of Finance (MOF),
  - Public Debt Management Office (PDMO)
  - Fisal Policy Office
- National Economic and Social Development Council (NESDC)
- Bangkokg Metropolitan Administration (BMA)
- Ministry of Agriculture and Cooperatives (MOAC)
- Ministry of Nature Resources and Environment (MONRE), PCD and ONEP
  - Office of Environmental Resources and Environmental Policy and Planning (ONEP)
  - Pollution Control Department (PCD)
- Ministry of Public Health (MOPH)
- Ministry of Transport (MOT)
  - Office of Transport and Traffic Policy and Planning (OTP)

Source: Accelerating Thailand's E-Mobility Transition: Policy Assessment and Action Plan 2025–2035 | Asian Development Bank

Ongoing ADB support

PROPOSED: Thailand Integrated Air Quality Investment Program: Phase 2 (2028 – 2030)

Sovereign lending

- Public transport infra, including regulations / plans

Non-Sovereign lending

- Electric motorbikes
- Clean/electric buses and trucks
- Alternatives for crop residue management (including waste-to-energy)
- EV infrastructure (including charging network)
- Green ports
- Emerging energy technologies for industries
- Clean agribusiness
- Renewable energy and battery storage

TA support

- AQ management and monitoring in THA
- Facilitate transboundary cooperation on AQM within Mekong subregion
- Implementation of PM2.5 Action Plan
- Strengthen Ag/forests – regulations, plans
- Enforcing seasonal burning ban
- Improve fire reporting system
- Preparations for sustainable financing mechanisms

Ongoing ADB support

PROPOSED: Thailand Integrated Air Quality Investment Program: Phase 3 (2031 – 2035)

Sovereign lending

- Reducing burnt areas under 2nd National $PM_{2.5}$ Action Plan
- Sanitary landfills

Non-Sovereign lending

- RE Infrastructure – solar, wind
- Clean energy and emerging technologies in industries
- Alternatives for crop residue management
- WTE plants
- Catalyzing / mobilizing sustainable financing resources

TA support:

- AQ management and monitoring in Mekong subregion
- Strengthen capacity for monitoring industrial emissions and checking compliance
- Strengthen capacity for enforcement of emission standards in new power plants
- Awareness campaign to discourage waste burning
- Strengthen capacity to monitor waste burning
- Training for local waste management authorities
- Preparatory measures for a financing facility

Air Quality Monitoring Framework for Thailand

Potential Thailand indicator (based on national targets)

Indicator	Target by 2030	Baseline	Notes
Burn scar areas*	**40% reduction relative to past 5-year average**	Average burn scar area 2018-2021: 224,600 hectares	*Based on the 2nd National Action Plan on PM2.5 and Air Pollution 2025-2027, outlook for five years Note: ASEAN Guidelines on Burned Area Mapping and Estimation in Southeast Asia is available
24-hour average $PM_{2.5}$ concentration*	**Reduce 24-hour average $PM_{2.5}$ levels ≤ 25 µg/m^3**	To be determined	
No. of days exceeding $PM_{2.5}$ standard	**40% reduction** (Note: no government target)	No. of days exceeding standard in 2024: 215 days (58% of days)	

Potential regional monitoring indicator (based on ASEAN targets)

Indicator	Target by 2030	Baseline	Notes
Achievement rate of national $PM_{2.5}$ targets with a view toward achieving WHO's annual and 24-hour **Interim Targets 3 for $PM_{2.5}$**	**100% achievement of national standard and WHO IT-3** WHO annual (15µg/m^3) and 24-hour (37.5 µg/m^3)	**THA PM 2.5 concentration** National standard: 15 µg/m^3 National average: 23.1 µg/m^3 (2023) 4x+ the WHO AQG of 5 µg/m^3 **Source:** AQ Life Index (AQLI) 2025 report	Based on the Second Roadmap for ASEAN Cooperation on Transboundary Haze Pollution Control with means of implementation

Development partners active on air quality in Thailand

- Many partners operate upstream and provide knowledge/technical assistance work, with limited involvement in the investment space
- Agriculture residue burning and transport-related emissions identified by PCD as priorities. Limited substantial initiatives for agriculture; SMEs; scope for scale up for transport.

JICA
AFD GROUPE
UK PACT
CRAES
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Food and Agriculture Organization of the United Nations
Breathe Cities
CLEAN AIR FUND
C40 CITIES CLIMATE LEADERSHIP GROUP
HTAPC Hub of Talents on Air Pollution and Climate
CANBREATHE
TEI THAILAND ENVIRONMENT INSTITUTE
ACIA
CLIMATE & CLEAN AIR COALITION TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS
EANET
UN environment programme
World Health Organization
UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific
UNDP
HEAL
THAILAND CAN
สสส

Next Steps

1. **Feedback and Discussion on Proposed Integrated Air Quality Program** from Thailand Government Representatives and Development Partners in the session

2. **Country Programming Meetings (CPM).** Follow up discussions with relevant Government Agencies during CPM planned for May 2026

BAQ 2026
BETTER AIR QUALITY CONFERENCE
11-13 MAR • BANGKOK

ASIA CLEAN BLUE SKIES PROGRAM

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ADB

Urban Resilience Trust Fund

UK International Development
Partnership | Progress | Prosperity

JFJCM
Japan Fund for the Joint Crediting Mechanism

From the People of Japan

APPENDIX 1:

ADDITIONAL SLIDES:

PROGRAMMATIC APPROACH

Beijing-Tianjin-Hebei (BTH) Air Quality Investment Program

First stage (2015–2017). Building institutional foundation for sustainable emission reduction by (i) strengthening policy and regulatory framework and (ii) developing green financing platform.

- In **2015**, ADB approved the PRC's **first** policy-based loan (PBL), which focused on policy reforms and regulatory capacity strengthening in Hebei Province. Seven more loans were issued.
- The **second** loan was approved in **2016** to scale up investment in air pollution-reduction projects in the region by enabling better access to finance, especially for SMEs.
- In **2017**, a **third** loan was approved to support deploying high-level technologies in major polluting entities across key sectors in the region.

Second stage (2018–2020). Targeting highly polluted provinces, covering new air pollutants (ground level ozone) and GHG (HFC) in the larger region (greater BTH, YRD) to support technology leap-frogging and inclusive clean energy service delivery.

- In **2018**, the **fourth** loan was approved to help Shandong Province adopt more efficient and advanced heat production and refrigeration technologies by replacing coal with cleaner sources such as natural gas, renewable energy, and waste heat recovery.
- The **fifth** loan was approved in September **2019** to pilot an innovative leveraging mechanism to catalyze private, institutional, and commercial capital for developing climate-positive infrastructure and business in Shandong Province.
- In December **2019**, the **sixth loan** was approved to accelerate a switch to cleaner fuel from coal to natural gas and biogas/biomethane for residential, commercial, and industrial use to improve air quality.

PRC: Beijing – Tianjin – Hebei Air Quality Improvement Program

Examples of Policy Actions

- Amendment of Hebei Air Pollution Prevention and Control Regulations with clear and binding provisions
- VOC emission standards for key industries issued by Hebei Provincial Government
- Increased number of monitoring equipment in Hebei environment protection department
- Issuance of natural gas expansion plan with timebound investment approach
- Action plan for accelerated decommissioning of decentralization heat only boilers and substitution by centralized combined heat and power plants.
- Policy on crop stalk utilization and prohibition of agriculture biomass burning in Hebei

Results Based Lending Example

Government Program: Henan Cleaner Fuel Switch Investment Program (2019 – 2030)

Program outcome	
Government Program	RBL
Use of cleaner fuels by 4.5 million customers by 2030	Use of cleaner fuels by 1.2 million customers by 2023
Program Expenditure	
EU 1,988.9 million (2019 – 2030)	EU 556.6 million (2019 – 2023)

Examples of Disbursement Linked Indicators:

- Number of customers connected to gas increased to 1.2 million customers by 2022
- Total length of gas distribution network pipeline of 26,880km by 2021
- 12 gas stations installed by 2021
- Atleast 50% of participants are women in 500 cleaner fuel use awareness campaigns
- Total annual biogas production of 17 million Nm3 by 2023

PRC: Beijing – Tianjin – Hebei Air Quality Improvement Program

Financial Intermediary Lending Example

Executing Agency	State owned China National Investment and Guaranty Corporation (I&G)
Financial Intermediary and Implementing Agency	I&G and Bank of Beijing

Financial products offered:

- Credit guarantee to enable commercial financing from banks
- Debt financing through entrusted loans
- Financial leasing for purchasing energy efficient industrial equipment
- Short term equity investments for low carbon technology start-ups
- 20 subloans covering 52 subprojects
- 52 subprojects: 18 renewable energy, 17 energy efficiency and emission reduction, 10 clean transport, 6 agriculture, 1 guarantee
- **Borrowers:** >15 SMEs, 6 Energy Service Companies (ESCOs), 23 financial leasing companies

Outputs:

- Establishment of Green Financing Platform and leveraging of commercial financing for pollution reduction projects
- Lowered barriers and scaled up financing for SMEs and ESCOs
- Strengthened capacity of Financial Intermediary Bank and local partner banks in new green financial products

Mongolia: Ulaanbaatar Air Quality Improvement Program

Example of Policy Actions

- Government approval of National Program for Reducing Air and Environment Pollution 2017 – 2025
- Parliament approval of (i) law on air, (ii) law on air pollution fees, (iii) law on government special funds to enable collection and use of fees for air quality improvement
- MOF submission to cabinet of draft amendment of Excise Tax Law to change fuel classification system for taxation purposes
- Government allocated budget for procuring 80,000 tons of semi-coke briquettes or lower emitting fuel
- Government issued resolution to replace inefficient polluting coal-fired heat only boilers with district heating, electricity or non-coal heating alternatives
- MOF allocation of budget for extending district heating infrastructure enabling retirement of 68 boilers

Sources

ADB. Improving Air Quality in the People's Republic of China: Lessons from the Greater Beijing-Tianjin-Hebei Region. Manila. June

- ADB. 2015. Report and Recommendation of the President to the Board of Directors: Proposed Policy-Based Loan to the People's Republic of China for the Beijing–Tianjin–Hebei Air Quality Improvement—Hebei Policy Reforms Program (Loan 3356). Manila.
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- ADB. Mongolia : Ulaanbaatar Air Quality Improvement Program. Manila.
- ADB. Mongolia : Ulaanbaatar Air Quality Improvement Program – Phase 2. Manila.

Priority measures for AQ Improvement in Thailand

Overarching Environment/ Air Quality Management

Policies/ Regulations/ Plans/ Institutional systems	❖ Support implementation of key policies: Second $PM_{2.5}$ Action Plan 2025-2027 and outlook for 5 years, Forthcoming Clean Air Management Act
Institutional and Capacity Building	❖ Improve AQ monitoring and management capacity throughout the country and Mekong subregion: equipment, digital platforms, human resources

Priority measures for AQ Improvement in Thailand

Proposed/ongoing ADB finance	Transport	Agriculture/Forests
Policies/ Regulations/ Plans/ Institutional systems	❖ Ban Euro 3 fuels ❖ Disincentivize old vehicles and accelerate fleet renewal ❖ Congestion charging ❖ Multimodal ticketing integration	❖ Policy reform on land protection and fire prevention ❖ Incentive/ disincentive scheme to reduce crop residue burning ❖ Implementation of masterplan for open burning
Capacity Building	❖ Establish comprehensive inspection and enforcement system for vehicle emission standards	❖ Strengthen enforcement capacity for burn bans ❖ Community-based forest fire prevention and landscape management ❖ Crop residue awareness for farmers and industries ❖ Integrated monitoring, enforcement, and incentive systems and improve fire reporting system
Finance	❖ Electrification of motorbikes; Bus electrification for private operators; manage port emissions	❖ Industries for alternative uses of crop residue ❖ Result-based payment for farmers making use of residue ❖ Development of farm mechanization service providers ❖ Work with food industry to reprioritise supplier contracts to reward farmers who do not burn waste
Infrastructure	❖ Public transport infrastructure ❖ Non-motorized transport (sidewalks, bike lanes) ❖ Green port investments ❖ Scale up EV charging infrastructure ❖ Scale up LEZs nationwide	❖ Farm mechanization for land preparation and crop residue management ❖ Safe and resilient roads for better market access ❖ Local biomass energy plan including power grid extensions ❖ Community-level agri waste processing and re-use infra ❖ Forest access roads for fire control, and water points

Priority measures for AQ Improvement in Thailand

Proposed/ongoing ADB finance	Energy/Industry	Urban/Waste/Construction
Policies/ Regulations/ Plans/ Institutional systems	❖ Integrate air quality into industrial permit process ❖ Guide for standardized approach on air quality monitoring and reporting	❖ Regulation on construction related emissions ❖ Guidance for dust control in construction sites ❖ Financial incentives to encourage clean construction practices ❖ Improved coordination amongst ministries on waste management
Capacity Building	❖ Strengthen capacity for monitoring industrial emissions and checking compliance ❖ Strengthen capacity for enforcement of emission standards in new power plants	❖ Awareness campaign to discourage waste burning ❖ Strengthen capacity to monitor waste burning ❖ Training for local waste management authorities
Finance	❖ Emerging technologies – small modular reactors, green hydrogen, battery storage etc.	
Infrastructure	❖ RE Infrastructure – solar, wind ❖ Renewable energy and battery storage financing ❖ Grid modernization and regional power connectivity ❖ Biomass and waste to energy solutions ❖ Industrial energy efficiency and clean technology	❖ Waste-to-energy plants ❖ Sanitary landfills

APPENDIX 2:

ADDITIONAL SLIDES:

ASSESSMENT RESULTS

Air pollution in Thailand and Mekong Subregion

Air pollution: top risk factor of premature deaths in Thailand and other GMS countries (2023)[a]

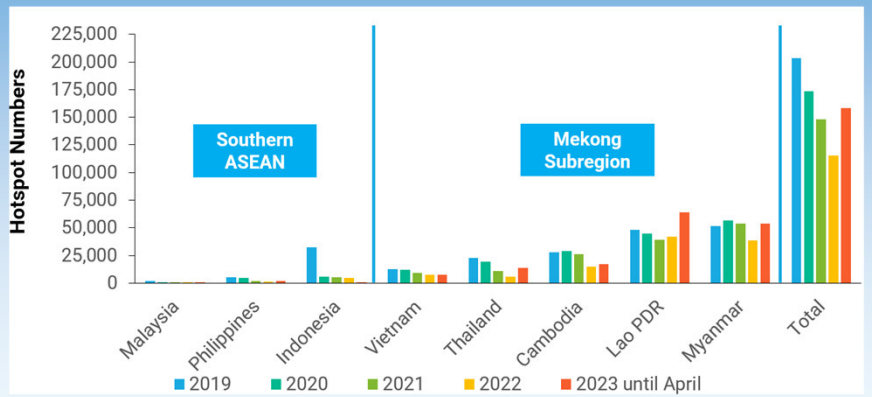
- Thailand: ~9% of all deaths
- Cambodia: ~20% of all deaths
- Lao PDR: ~21% of all deaths
- Vietnam: ~14% of all deaths

Annual $PM_{2.5}$ levels 3-5x higher than WHO guidelines, but can exceed by over 10x during seasonal episodes [c]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hanoi	49.8	45.3	63.2	51.2	31.9	27.6	16.9	25.1	30.1	51.6	65.5	85.8
Vientiane	27.5	41.1	48.6	66.4	22.6	9.8	8	7.7	9.8	26.3	29.3	34.1
Chiang Mai	25.1	36	71.6	76.8	27.3	6.6	6.2	5.3	6.2	14.4	17	24.6
Phnom Penh	39.2	37.6	48.8	30.7	18.8	11.7	11.5	13.1	11.4	10.1	15.3	14.8
Bangkok	36.1	29.5	24.3	24.4	17.2	6.5	6.8	6.1	10.8	15.7	21	28

- Exceeds by 1 to 2 times
- Exceeds by 2 to 3 times
- Exceeds by 3 to 5 times
- Exceeds by 5 to 7 times
- Exceeds by 7 to 10 times
- Exceeds by over 10 times

High number of hotspots seen in Mekong subregion[b]



Hotspots are derived from NOAA satellite representing locations with possible fires

a State of Global Air 2025
b Data from the ASEAN Specialised Meteorological Centre
c IQ World Air Quality Report 2024

Designated Pollution Control Zones to Tackle PM2.5

In September 2025, the National Environment Board approved two major Pollution Control Zone designations to tackle PM2.5 and haze

- **Pollution Control Zone: Bangkok**
- **Pollution Control Zone: Chiang Mai, Chiang Rai, Lamphun, Mae Hong Son**

Selected measures in the 2nd National Action Plan on PM2.5 and air pollution

TRANSPORT

- **Improving public transportation systems**
- **Low emission zones**, including congestion charges and feeder systems for mass transit
- Installing monitoring systems for **real-time traffic data**
- Strengthen vehicle emissions and fuel quality **standards**
- Thailand positioning as regional hub for **EV production**, with 30@30 policy and target for 50% zero EV registration by 2030.

AGRICULTURE AND FORESTRY

- Establish **zoning** for agricultural areas and **traceability systems** for agricultural products to ensure compliance with burning-free standards.
- Promote **alternative farming practices** and provide **incentives** for farmers to adopt sustainable methods.
- Promoting **mechanized harvesting** and alternative crop residue management
- Prepare **annual forest fire prevention plans** specifying areas and periods of high risk and **allocate resources**

INDUSTRY

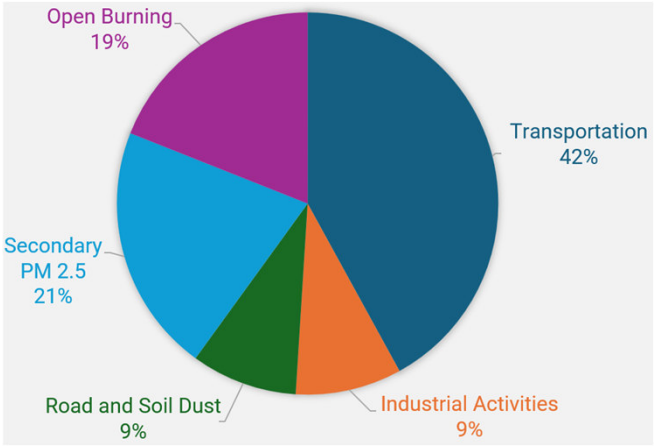
- Develop **online reporting systems** for industrial emissions and integrate with national systems
- Promote **cleaner production technologies** and energy efficiency in industries

CROSS-BORDER

- Establish a **Data Center to monitor and track air quality and haze conditions**, integrating information from neighboring countries for effective management
- Develop and promote **alternative crops and farming practices** to reduce burning and haze in border areas

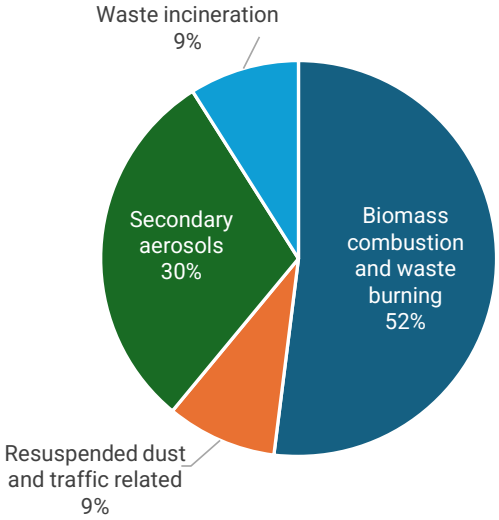
Sources of air pollution: Bangkok, Chiang Mai, Chiang Rai

Source contribution $PM_{2.5}$ Bangkok Dec-Feb period [a]



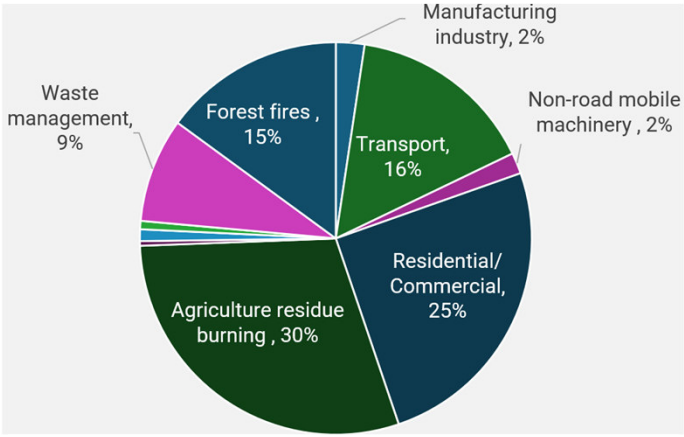
a Office of Transport and Traffic Policy and Planning (OTP) Thailand
b egis and citepa. Comprehensive Inventory Methodology Report for Chiang Mai Province, Thailand (2022)
c Duc Luong N., et al. Impact of biomass burning sources during the high season on PM2.5 pollution observed at sampling sites in Hanoi, Vietnam and Chiang Rai, Thailand (2022)

Source apportionment $PM_{2.5}$ during high pollution episode in Chiang Rai (2021) [c]



Note: PMF receptor model-based source apportionment for PM2.5 measured at sampling site in Chiang Rai.

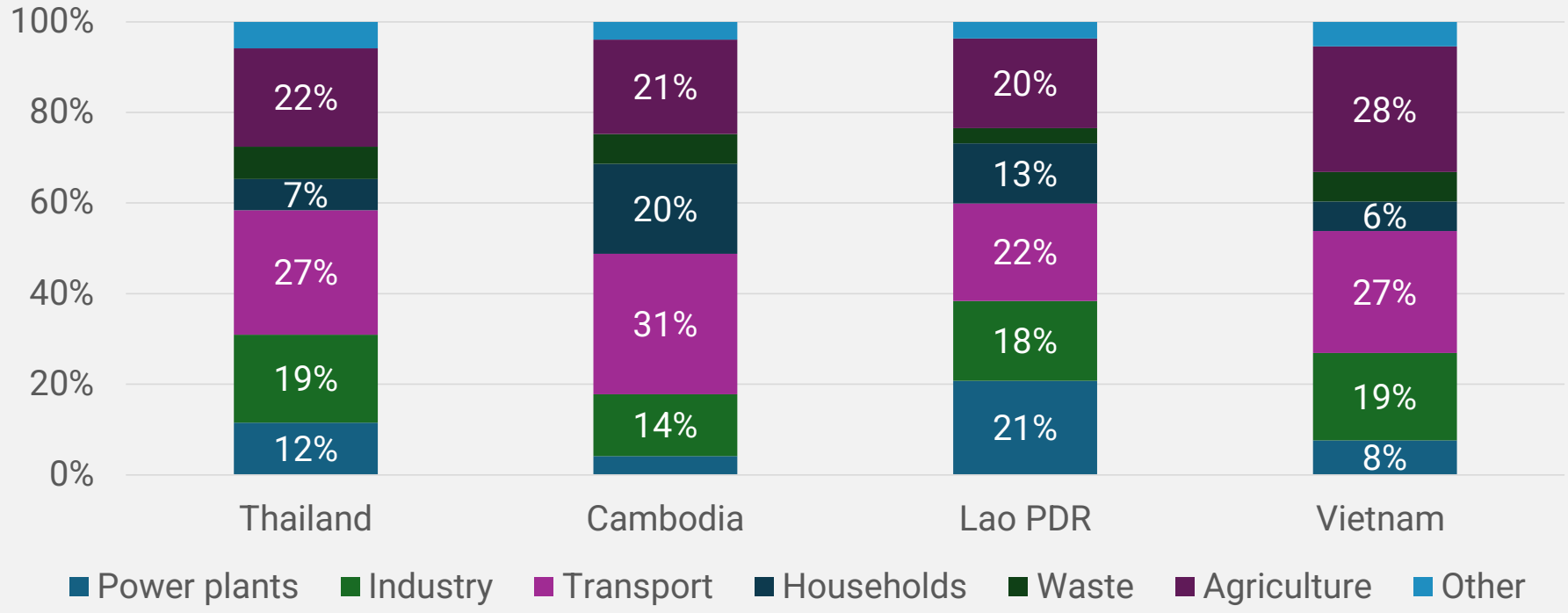
Main $PM_{2.5}$ emitting sectors in Chiang Mai Province (2022) [b]



Note: Emissions from residential/commercial sector due to wood combustion in domestic equipment, but citepa noted possible overestimation due to fuel combustion in ceramic craft villages were not reflected under industrial sector.

Key sources of air pollution – Mekong Subregion

Share of premature deaths due to outdoor air pollution from key sectors (2022)



Source: 2025 report of the Lancet Countdown on health and climate change