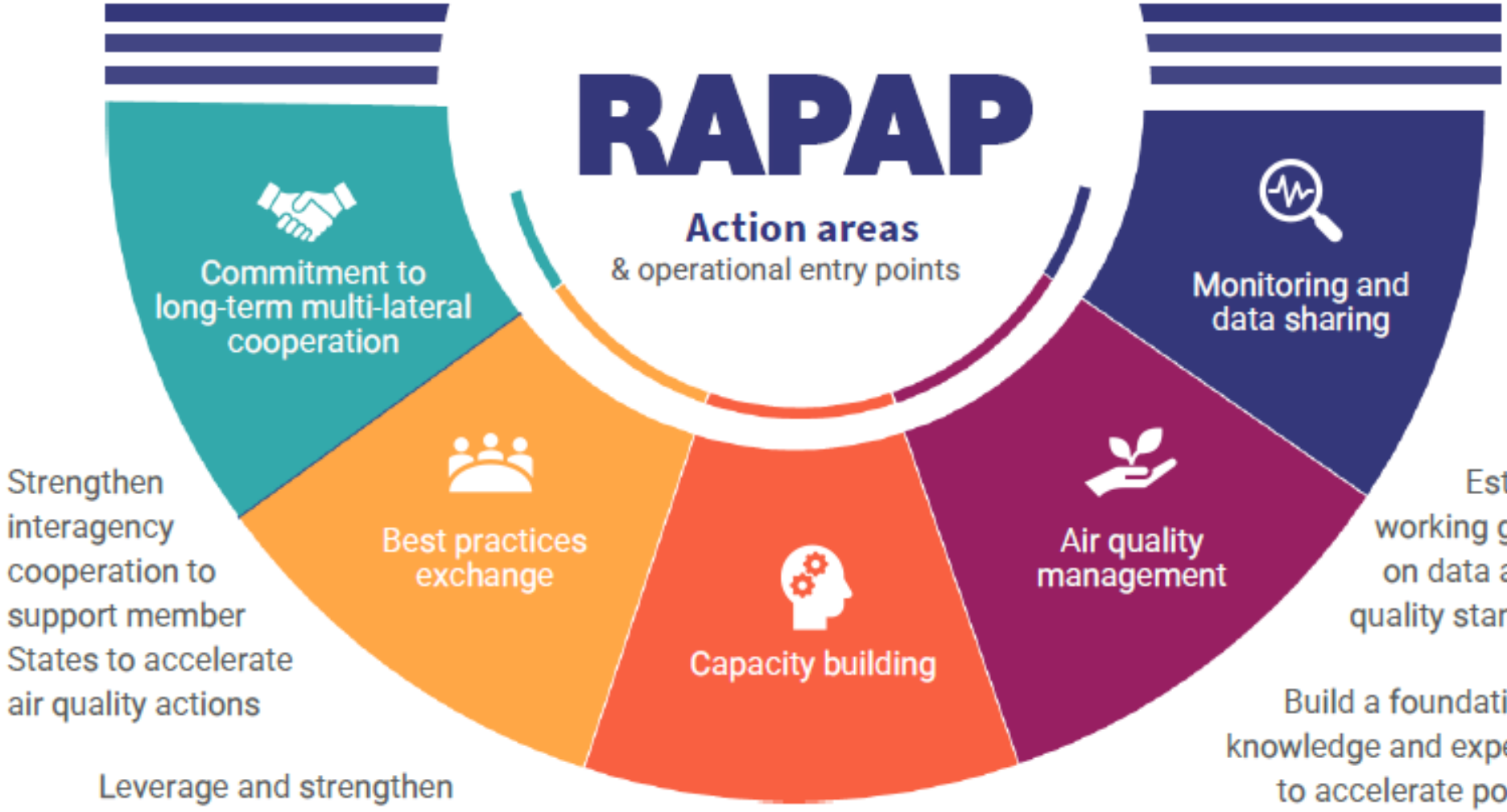
Air Pollution in Laotian Cities: an Airsheds Approach

Strengthening Regional Cooperation To Tackle Air Pollution Challenges In Asia And The Pacific

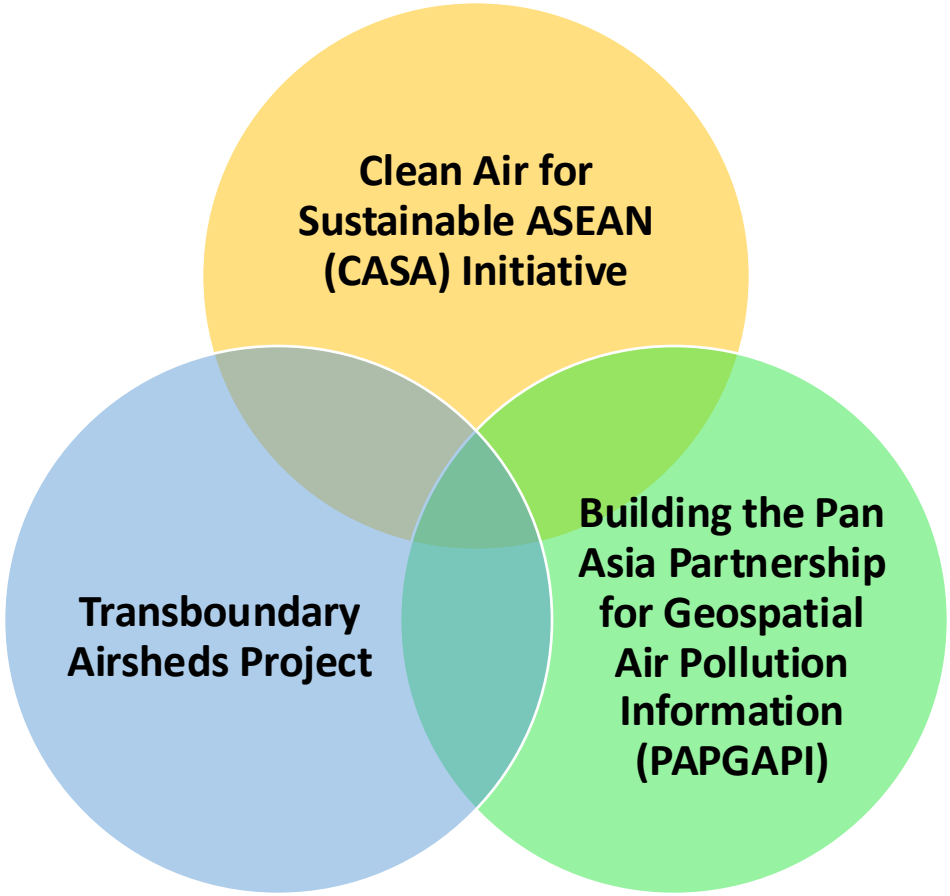


UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

Image credit: V T. Polywor


RAPAP
Action areas
& operational entry points
Commitment to long-term multi-lateral cooperation
Best practices exchange
Capacity building
Air quality management
Monitoring and data sharing
Strengthen interagency cooperation to support member States to accelerate air quality actions
Leverage and strengthen connections among existing subregional initiatives to enhance exchange of knowledge and best practices and identify key capacity gaps
Mobilize support from member States for pilot projects/initiatives and facilitate bilateral and multilateral cooperation
Link to global initiatives and networks such as the Climate and Clean Air Coalition (CCAC)
Build a foundation of knowledge and expertise to accelerate policies and practices
Establish working groups on data and air quality standards

Integration across projects needed



Trilateral Transboundary Air Quality Management Project

Similarities in Project Activities

Capacity Development Plan Laos MONRE 2024-2026

	Activities	Location	2024												2025												2026											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Online official launch of TICA-USAID-Lao PDR Trilateral Transboundary Air Quality Management Project, Policy Dissemination, and Fire Risk Map Introduction	Online	Online, 2 hrs																																			
2	Workshop on policy review and Smogathon awareness raising event (back-to-back with #3)	Vientiane, Laos			2 day																																	
3	Consultation workshop with government entities at the national, sub-national level, and non-government organizations	Vientiane, Laos			3 days																																	
4	Study visit to Thailand Pollution Control Department	Bangkok and other provinces, Thailand					5 days																															
5	Basic, intermediate, and advanced training series on air quality satellite remote sensing and data accessibility	Vientiane, Laos						4 days									4 days																					
6	Basic and intermediate training series on ground-based air quality monitoring and management	Bangkok, Thailand							5 days											4 days																		
7	Basic, intermediate, and advanced training series on satellite observations and tools for fire detection and fire risk mapping	Vientiane, Laos									3 days											4 days																
8	Co-development and upgrade of the fire and air quality monitoring tool for Lao PDR	Vientiane, Lao PDR and Bangkok, Thailand							6 months												6 months																	
9	Learning exchange and public event: Insights from Previous Haze Season and Strategies for Future Haze	Vientiane, Laos											2 days												2 days												2 days	
10	Pilot testing of the fire and air quality monitoring tool for Lao PDR	Vientiane, Laos													5 months												5 months											
11	Intermediate and advanced training series on air quality forecasting using Weather Research Forecast (WRF) model and satellite-based forecasting (GEOS)	Vientiane, Laos																						4 days									4 days					
12	Wrap-up workshop and project closing ceremony with awareness raising event	Vientiane, Laos																																			1 day	

Science-Based Local Action



AI Tools



Clean Air Measures



Compendium of Technologies

Project Context

The Asia-Pacific region is **rapidly urbanising** and will become mostly urban in the next decades.

This rapid urban expansion increases:

- Increases infrastructure development and energy consumption
- Raises demands for fossil fuel in the transport sector
- Adds to household pollution from cooking and heating/cooling
- Gives room for improper waste management

All of which unavoidably contribute to the region's worsening air pollution….

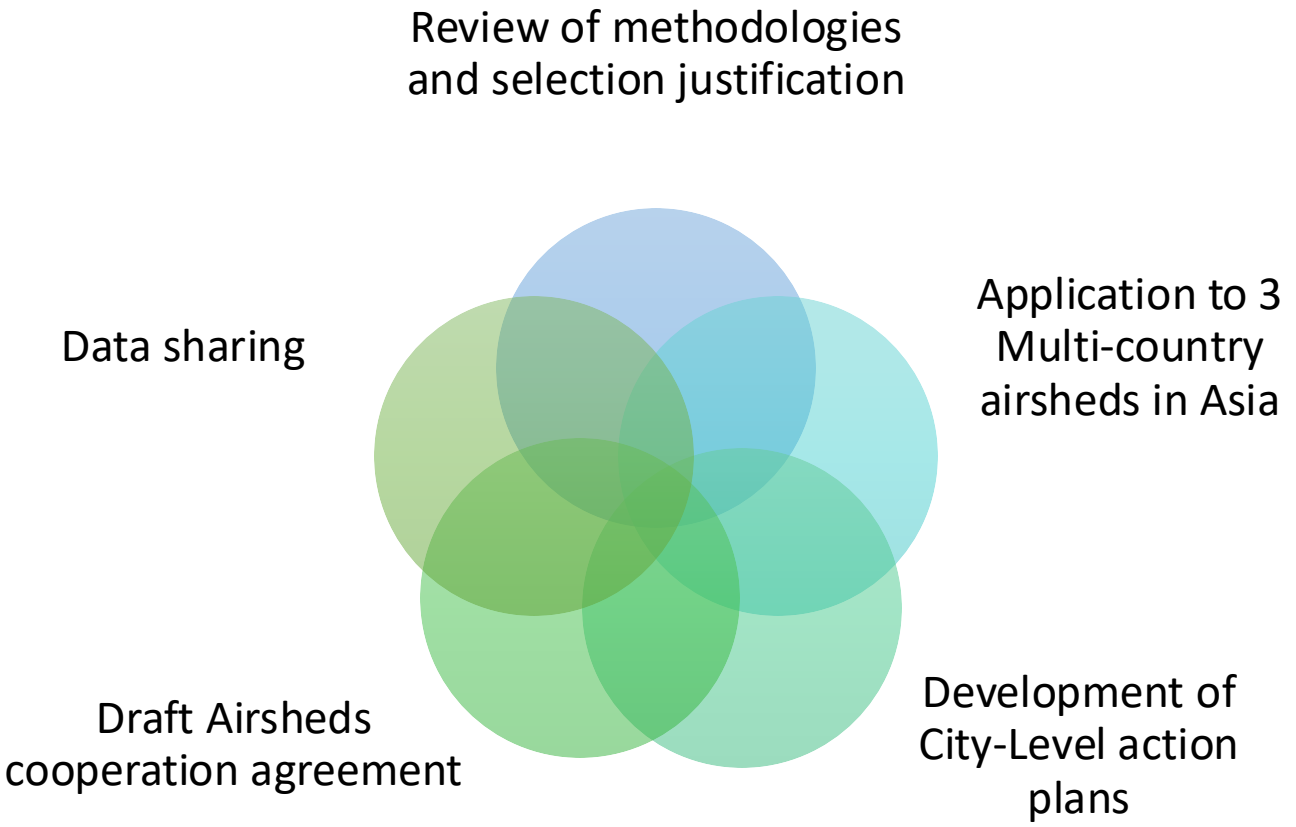


Project Goals

The project will focus on the improvement air quality in multi-country airsheds.

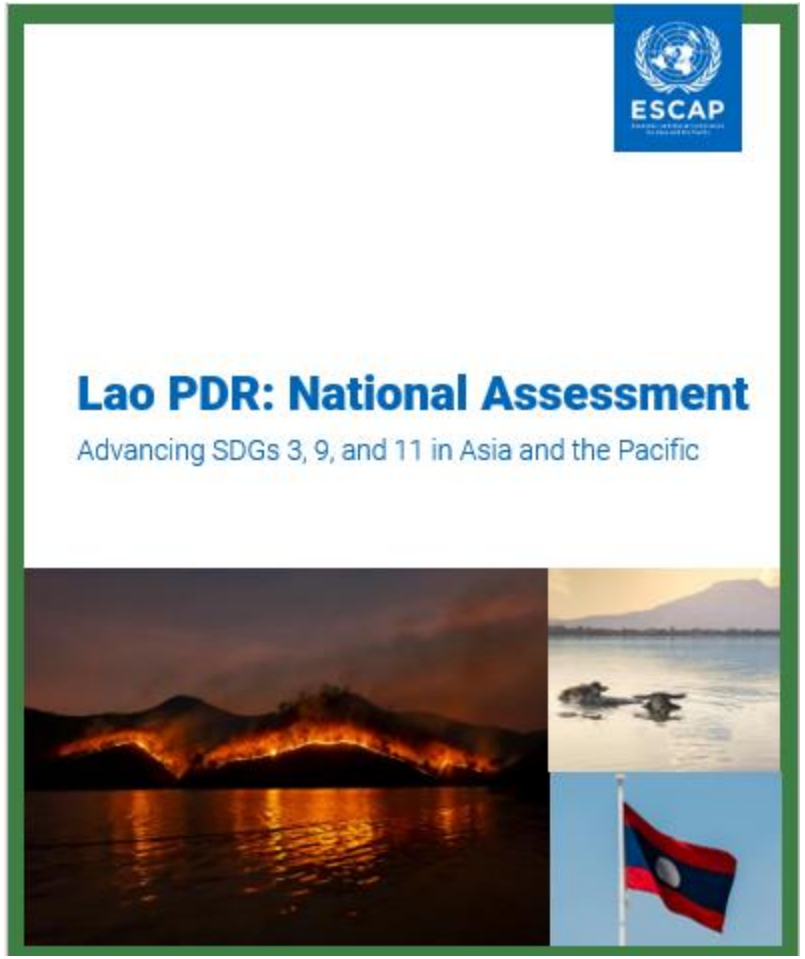
The engagement of stakeholders at all levels of jurisdiction will enhance regional cooperation and strengthen collaboration among cities/subnational authorities and national governments.

Airsheds Project: Activities 2024-2026



Invitation to Peer Review on National Study

- ESCAP has undertaken a study of the local air pollution sources and opportunities for city-level action
- Input and feedback from stakeholders in Lao PDR is highly desirable



City Action Planning

What Is A City Action Plan?

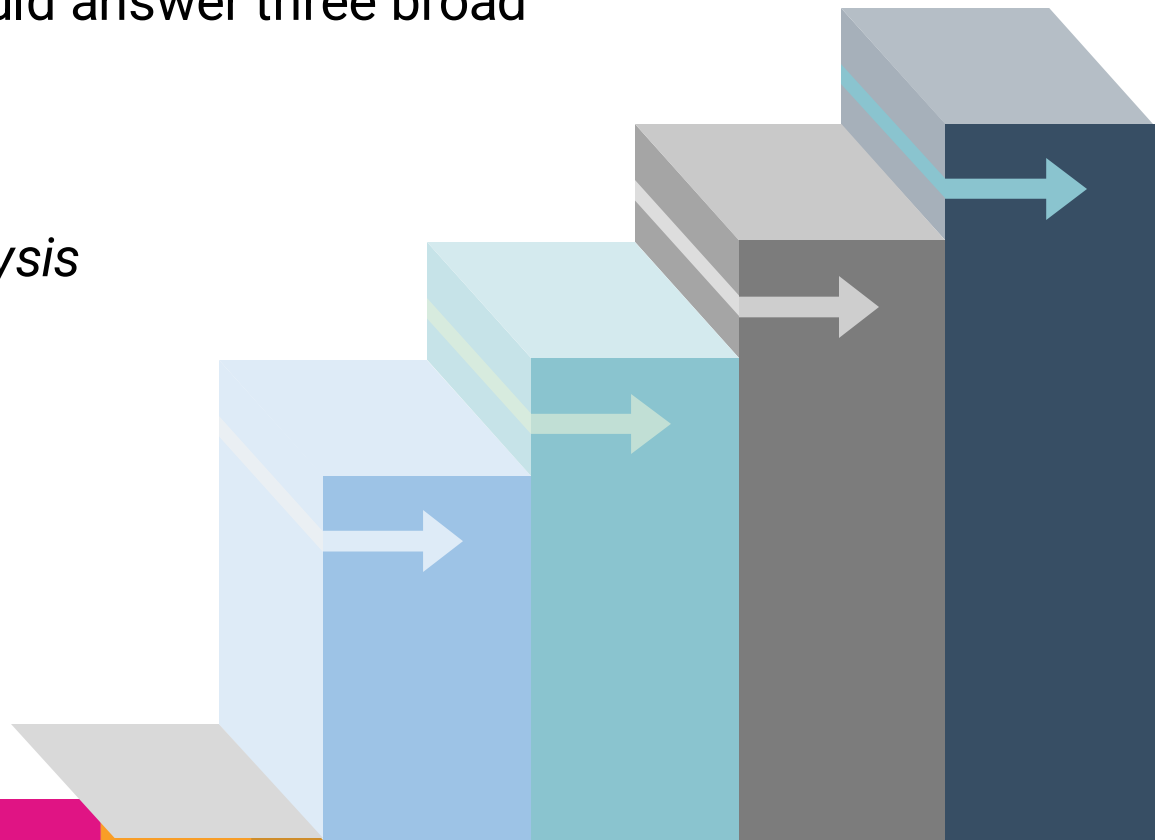
A city action plan is a policy instrument that **establishes specific goals** and details what steps must be taken in order to achieve each goal.

The process of achieving a robust City Action Plan should answer three broad questions:

1. What is the current situation?
   The science/evidence through a baseline and gap analysis

2. What can we do about it?
   Intervention Planning

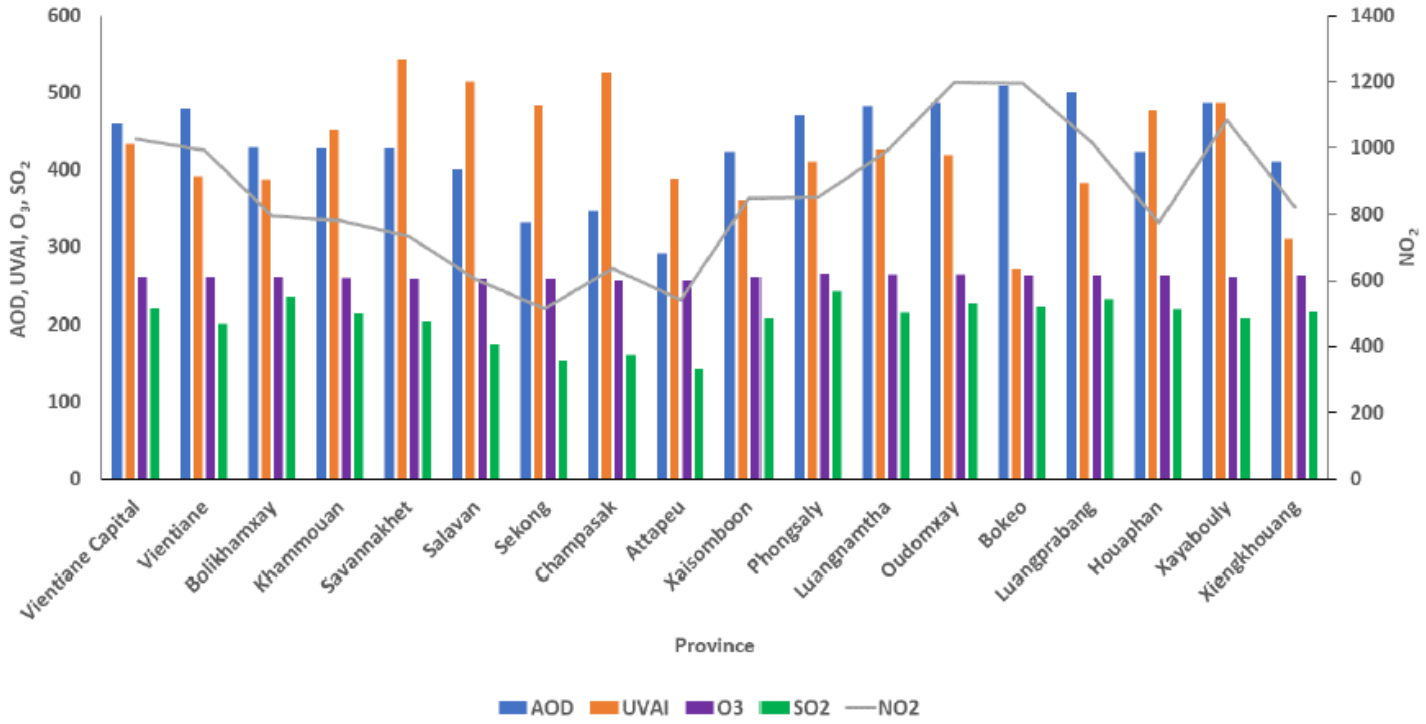
3. How do we implement it?
   Action



Lao PDR
Local Air Pollution Action

Robust Analysis Already Available

Figure 10: Study period means of each province for aerosol optical depth and the ultraviolet aerosol index; and column amounts of ozone, nitrogen dioxide and sulphur dioxide. Note that the pollution indicator values were normalised to fit onto the same graph





2023

New AI Tools Increase Accessibility

perplexity

Perplexity

The primary sources of air pollution in Luang Prabang, Lao PDR, are largely attributed to a combination of local and regional activities. Here are the main contributors:

1. **Agricultural Burning**: Traditional agricultural practices in Laos often involve burning crop stubble, which is a significant source of air pollution. This practice is prevalent in Luang Prabang and contributes to the high levels of PM2.5, especially during the dry season [2] [3] [5].
2. **Forest Fires**: The region around Luang Prabang is prone to forest fires, which are another major source of air pollution. These fires can be both natural and human-induced, often related to land clearing for agriculture [3] [5].
3. **Waste Burning**: Open burning of waste, including plastics and other materials, contributes to air pollution. This is a common practice in areas where waste management infrastructure is lacking [4] [5].
4. **Vehicle Emissions**: Emissions from vehicles are a significant source of air pollution in urban areas. In Luang Prabang, the increase in vehicles due to tourism and urbanization adds to the air quality issues [1] [4].



Localized Urban Emissions, 25 August 2024





Reducing Urban Air Pollution in Luang Prabang

Effective Projects with a $30,000 USD Budget

Luang Prabang, a historic city in Laos, faces challenges with urban air pollution. This presentation outlines several initiatives that can be implemented within a $30,000 USD budget to improve air quality and create a more sustainable urban



Pedestrianization and Smart Shuttle Services

1

Pedestrian-Only Zones

Create pedestrian-only zones

2

Eco-Friendly Shuttles

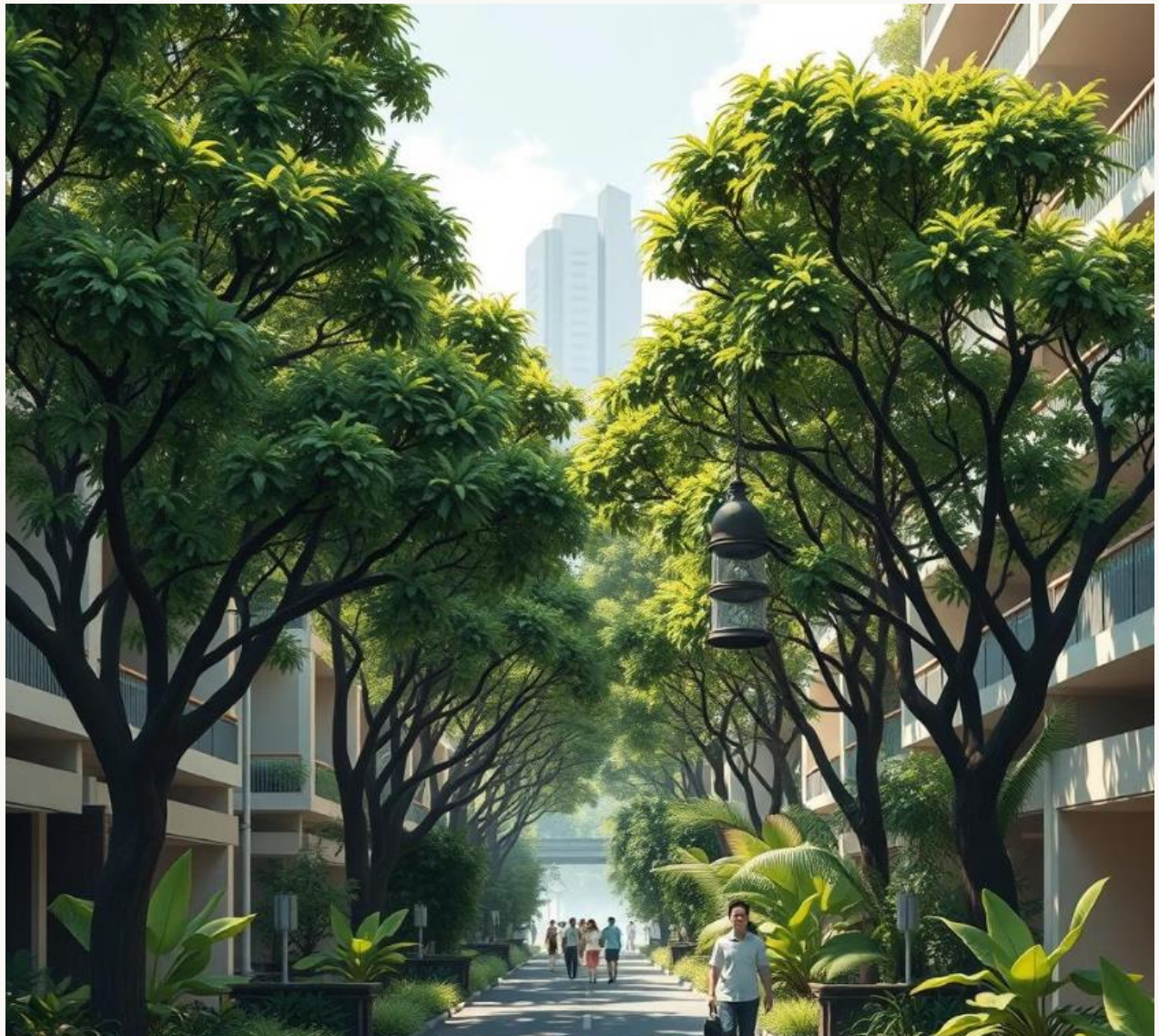
Introduce eco-friendly shuttle services

3

Traffic Reduction

Reduces vehicle traffic and associated emissions

Urban Greening



Urban Territorial Planning

Promote a green approach to to roads and buildings

Reduce Heat Islands

Greening reduces energy use for use for cooling, and increases increases climate change adaptation

Urban Pollution Reduction

Helps reduce air pollution in



Air Quality Monitoring System

1

Basic Monitoring Network

Implement a basic air quality monitoring network

2

Pollution Tracking

Track pollution levels and and identify hotspots

3

Data-Driven Decisions

Enable data-driven decision decision making



Public Awareness and Education Campaign

Comprehensive Campaign

Comprehensive campaign about air pollution sources and and mitigation

Behavioral Changes

Encourage behavioral changes to reduce pollution



AI Recommendations

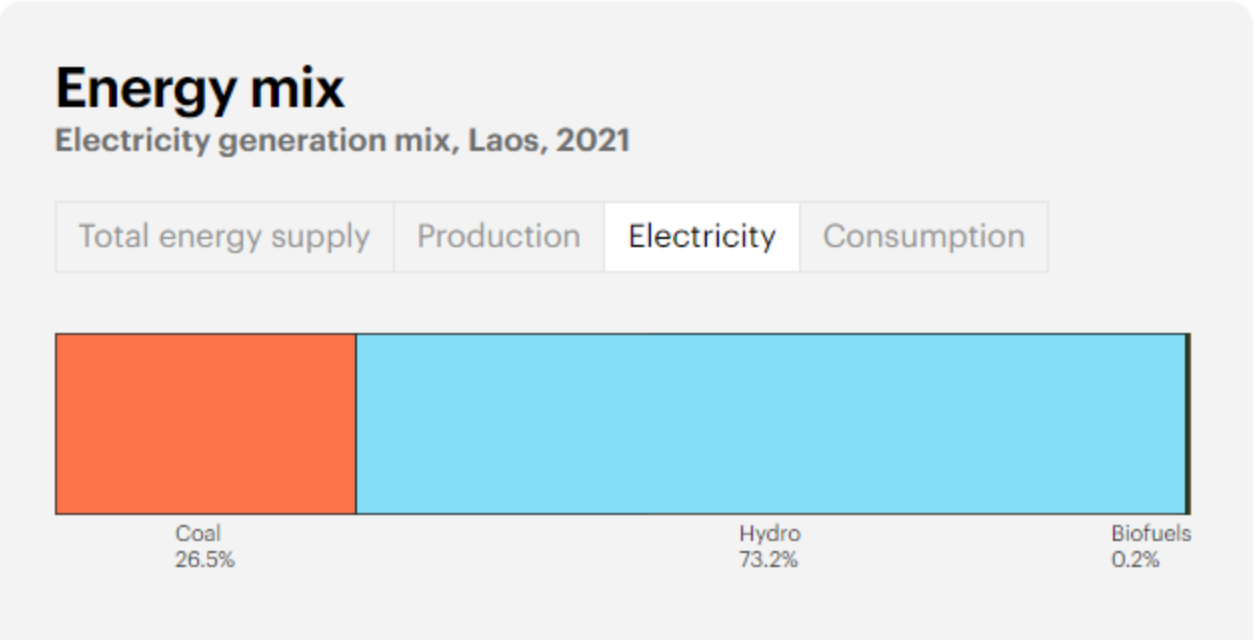
Focus on 1-2 high-impact initiatives	Balance infrastructure improvement with community engagement
Tailor choice to Luang Prabang's most pressing air pollution sources	Implement within $30,000 USD budget

Lao PDR Sustainable Energy

Because Lao benefits from a strong use of renewable energy sources for electricity generation, targeting household air quality for vulnerable households could be considered

Taking a social conscious approach, it may be justified to provide electric cooking solutions to struggling households, particularly those with at risk family members, including young children and pregnant women.

What would this look like?



Clean Cooking: Electrical Induction

Multiple protections to ensure safe usage

The built-in temperature sensor automatically triggers the protection system to stop heating if the cooker becomes overheated. When no cookware is detected on top, heating will automatically stop, accompanied by beeping and flashing LED lights. Heating will automatically resume if cookware is detected again within one minute.

- Automatic overheating protection
- Stop heating when cookware is removed
- Flashing LED lights
- Beeping alert



Distribution of air filters



Air pollution is closely related to congenital disabilities.

Filter distribution and measuring and monitoring its impacts would help mothers in the area while allowing more data collection and raising awareness on this critical topic.

Strategic Approach

- Air Filter procurement
- Local Implementation: Hospital Partnership
- Deployment and oversight by municipality



What does this mean for Lao PDR?



Phase 1
(Sept 2024 -Dec 2024)

~50-70,000k USD For Remote Sensing at the National Level

- Training
- Procurement of equipment
- Integration of satellite data into national systems



Proposed Procurement Budget

Item	Cost	Number	Sub-Total
Desktop Workstations			
CPU, dual montior, keyboard, etc.	$ 1,500.00	10	$ 15,000.00
IT Architecutre			
Server, NAS	$ 3,000.00	6	$ 18,000.00
Backup systems, storage	$ 2,000.00	2	$ 4,000.00
Software			
ArcGIS Desktop Standard Concurrent Use Perpetual License	$ 6,545.00	2	$ 13,090.00
Maintenance	$ 1,750.00	2	$ 3,500.00
Training			
Online training reference materials	$ 2,000.00	1	$ 2,000.00
Total:			$ 55,590.00

Implementation Support (Oct 2024-Dec 2026)

~30,000k USD for direct support to beneficiary cities

- Enhancing sustainable agriculture
- Protecting Vulnerable Populations
- Coordinating with Neighbors



Next Steps



Review Draft Studies



Coordinate with Cities and local stakeholders



Synchronize Schedule Across Projects



Letter of Agreement and Transfer of Funds

QUESTION AND ANSWER

UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific



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