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Co-benefit Solutions in Asia

How can systems analysis help align climate change, air pollution, and sustainable development policies in Asia: Opportunities for collaboration

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Clean Air Solutions in Southeast Asia

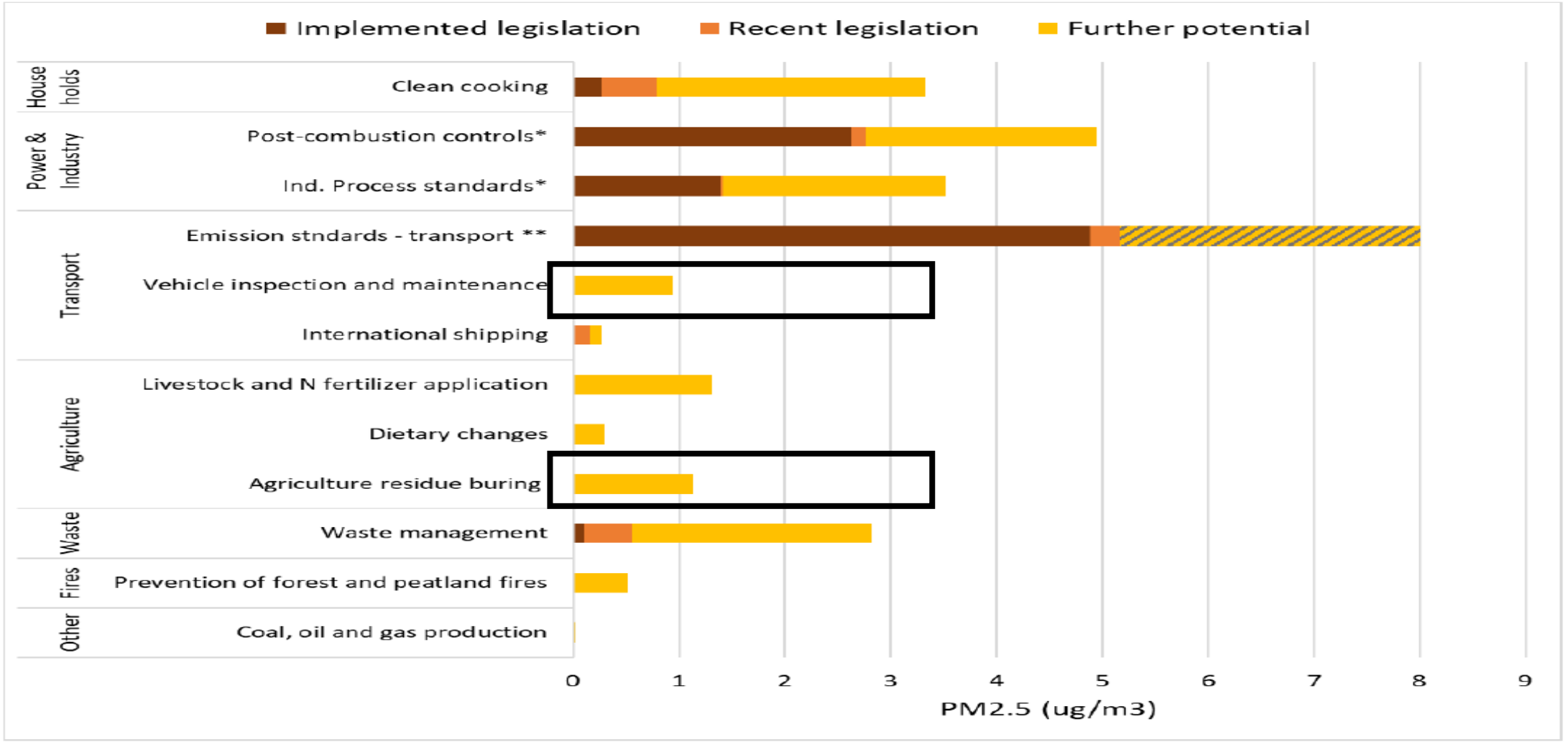


Figure 8. Impact of the priority solutions (measures with direct air quality benefits shown) on $PM_{2.5}$ concentrations in the ASEAN region by 2030; ▨ indicates maximum potential for either introduction of Euro VI equivalent vehicle emission standards or rapid electrification of vehicle fleet.

Source: IIASA 2021

Critical Question

How can we increase the feasibility of implementing these solutions?

Emphasizing Co-benefits Can Increase Feasibility

	Goal 1: No Poverty	Goal 2: Zero Hunger	Goal 3: Good Health and Well-being	Goal 4: Quality Education	Goal 5: Gender Equality	Goal 6: Clean Water and Sanitation	Goal 7: Affordable and Clean Energy	Goal 8: Decent Work and Economic	Goal 9: Industry, Innovation and Infrastructure	Goal 10: Reduced Inequality	Goal 11: Sustainable Cities and Communities	Goal 12: Responsible Consumption and Production	Goal 13: Climate Action	Goal 14: Life Below Water	Goal 15: Life on Land	Goal 16: Peace and Justice Strong Institution	Goal 17: Partnerships to active the goal
Clean Cooking	✓		✓		✓		✓		✓				✓				
Post-combustion controls			✓				✓		✓						✓		
Industrial Process Standard			✓				✓		✓		✓	✓	✓		✓		
Emission Standard-transport			✓			✓	✓				✓		✓		✓		
Vehicle inspection and maintenance			✓				✓		✓		✓	✓	✓		✓		
Maritime Shipping			✓				✓						✓	✓			✓
Livestock and N fertilizer													✓	✓	✓		✓
Dietary Change											✓	✓	✓				
Agriculture residue burning			✓						✓		✓		✓		✓		✓
Waste Management			✓			✓		✓	✓		✓	✓	✓	✓	✓		✓
Prevention of forest, peatland fires													✓		✓		✓
Coal, oil and gas production							✓		✓			✓	✓				
Rice paddies			✓			✓						✓	✓		✓		
Wastewater treat ment			✓			✓	✓						✓				
Controlling F Gases							✓					✓	✓				

Case Studies Can Increase the Feasibility

In Thailand, the Bangkok Mass Transit Authority (BMTA) has implemented inspection/maintenance programmes for buses it manages.


Social Science Research
Integrated Assessment Modelling

Feasibility Framework in 1.5 Degree Report

System	Mitigation Option	Evidence	Agreement	Ec	Tec	Inst	Soc	Env	Geo	Context
Energy System Transitions	Wind energy (on-shore & off-shore)	Robust	Medium							Wind regime, economic status, space for wind farms, and the existence of a legal framework for independent power producers affect uptake; cost-effectiveness affected by incentive regime
	Solar PV	Robust	High							Cost-effectiveness affected by solar irradiation and incentive regime. Also enhanced by legal framework for independent power producers, which affects uptake
	Bioenergy	Robust	Medium							Depends on availability of biomass and land and the capability to manage sustainable land use. Distributional effects depend on the agrarian (or other) system used to produce feedstock
	Electricity storage	Robust	High							Batteries universal, but grid-flexible resources vary with area's level of development
	Power sector carbon dioxide capture and storage	Robust	High							Varies with local CO_2 storage capacity, presence of legal framework, level of development and quality of public engagement
	Nuclear energy	Robust	High							Electricity market organization, legal framework, standardization & know-how, country's 'democratic fabric', institutional and technical capacity, and safety culture of public and private institutions

Source: IPCC 2019

Recent Research on Feasibility

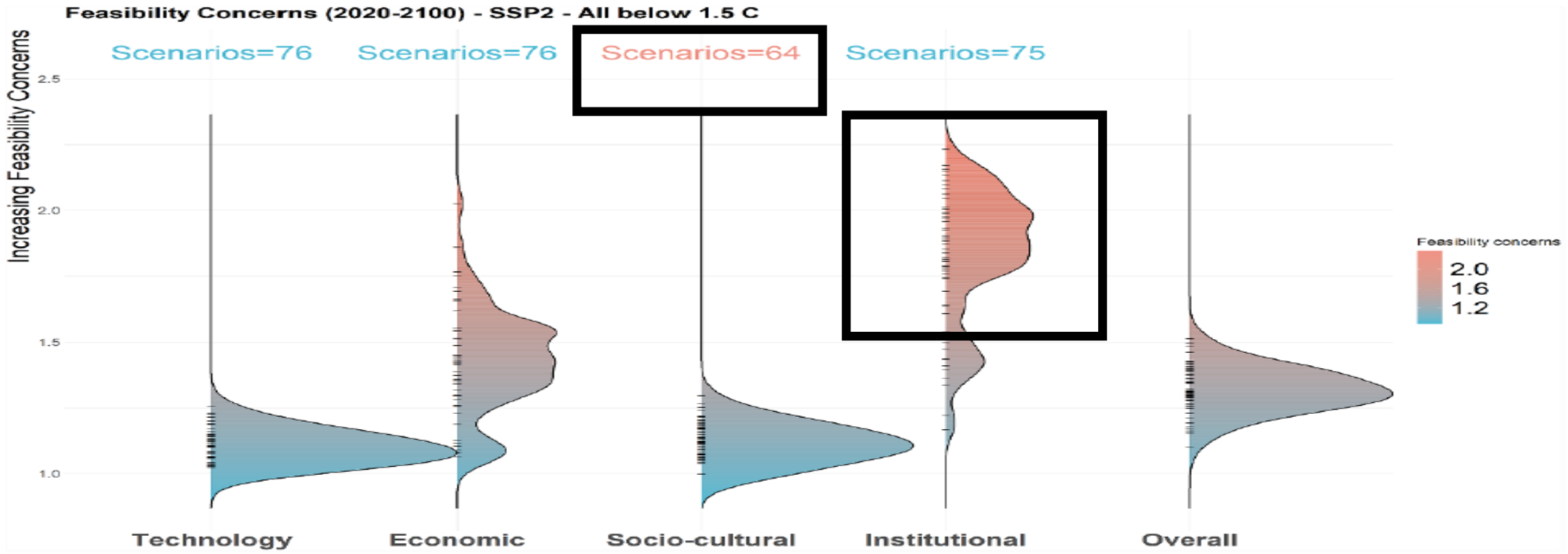


Figure 2. Distribution of feasibility concerns across the 1.5 °C pathways included in the IPCC SR1.5.
Note: Figure 2 shows the distributions of feasibility evaluations for each dimension aggregated over time using the geometric mean. These scenarios include those belonging to the 'below 1.5°C' (9 scenarios), '1.5°C low overshoot' (44 scenarios), and '1.5°C high overshoot' (37 scenarios) temperature target categories. We show the aggregation of feasibility concerns for 2°C scenarios in the SM, section 7.2.2. The count of scenarios indicates how many scenarios report at least half of the indicators for a given dimension.

Source: Brutschin, 2021

Transport Feasibility Framework
Transport to 2030
Based on Lit Review

Barrier categories	Technological	Economic	Social	Institutional/Policy
Description	• Lack of technologies	• High costs	• Lack of user acceptance	• Lack of coordination/capacity or poor policy design
Inspection and Maintenance Programmes				
Stronger Emission Standards				
Switch to Electric Vehicles				

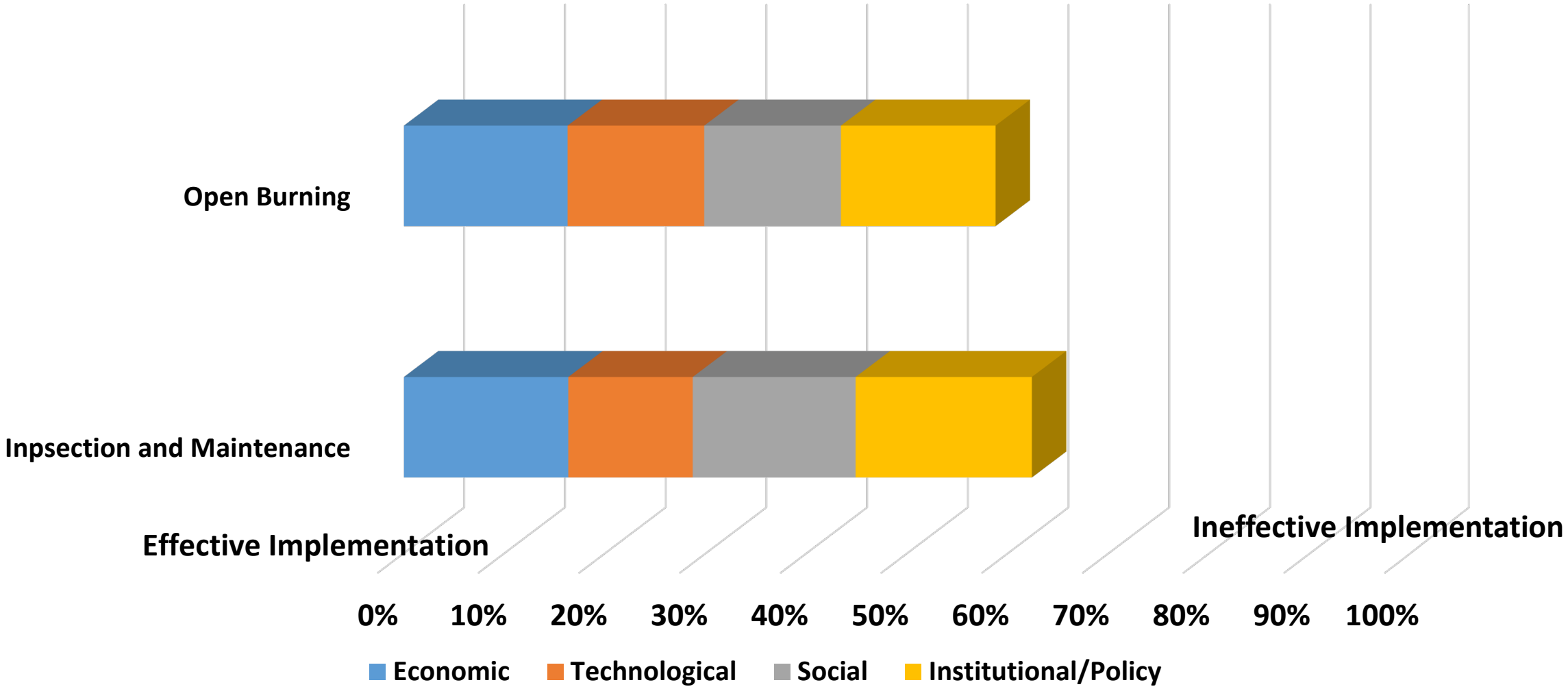
No barrier Small barrier Moderate barrier Significant barrier

Expert Survey on Feasibility (Inspection and Maintenance)

Based on your own personal experience, please assess the size of the barriers for "government officials" to implementing inspection and maintenance programs in the country/ies where you work over the next one to two decades? *

	Not a barrier (no effect)	Small (allowing between 1% to 10% of above-standard vehicles to continue to operate)	Moderate (allowing between 11% to 20% of above-standard vehicles to continue to operate)	Significant (allowing over 20% of above-standard vehicles to continue to operate)
Technological (e.g. lack of advanced technologies to carry out inspection and maintenance or within vehicles for on-board diagnostics)	☐	☐	☐	☐
Economic (e.g. high costs of repairs or purchasing more efficient vehicles)	☐	☐	☐	☐
Social (e.g. vehicle owner's limited knowledge of the benefits of a inspection and maintenance programmes, low acceptance of inspection and maintenance programmes)	☐	☐	☐	☐
Institutional/policy (e.g. poor coordination among agencies, lack of oversight	☐	☐	☐	☐

Feasibility Assessment of Open Burning and Inspection and Maintenance in Thailand



Key Messages

- Many solutions have potential to bring clean air to Southeast Asia
- Increasing the feasibility of implementation is critical
- Feasibility can be increased with careful case studies and a greater emphasis on co-benefits
- There is also potential to bring more systematic feasibility assessments into assessment modelling
- This will help to pinpoint which interventions can help overcome implementation barriers and deliver clean air to Southeast Asia