INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROPOSED LOAN IN THE AMOUNT OF US$350 MILLION EQUIVALENT TO INDIA

FOR THE

UTTAR PRADESH CLEAN AIR MANAGEMENT PROJECT

P510253

DRAFT ENVIRONMENT AND SOCIAL SYSTEMS ASSESSMENT

JUNE 2024

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LIST OF ACRONYMS

AAQM	Ambient Air Quality Monitoring
ACEO	Additional Chief Executive Officer
ACS	Additional Chief Secretary
AEZ	Agro-Ecological Zones
APR	Annual Program Report
AQM	Air Quality Management
ATMA	Agricultural Technology Management Agency Scheme
BC	Black Carbon
BS	Bharat (Emission) Standard
CAAQM	Continuous Ambient Air Quality Monitoring
CAQM	Commission for Air Quality Management
CBG	Compressed Biogas
CEED	Centre for Environment and Energy Development
CEEW	Council on Energy, Environment and Water
CEM	Continuous Emission Monitoring
CGD	City Gas Distribution
CH_4	Methane
CMIE	Centre for Monitoring Indian Economy
CO_2	Carbon Dioxide
CPCB	Central Pollution Control Board
CPF	Country Partnership Framework
CSS	Centrally Sponsored Schemes
DLIs	Disbursement-Linked Indicators
DLRs	Disbursement-Linked Results
DoEFCC	Department of Environment, Forest, and Climate Change
EEF	Enhanced Efficiency Fertilizer
E&S	Environmental and Social
ESSA	Environmental and Social Systems Assessment
FC	Finance Commission
FFC	XVth Finance Commission
GAINS	Greenhouse Gas-Air Pollution Interactions and Synergies
GDP	Gross Domestic Product
GIZ	Gesellschaft für Internationale Zusammenarbeit

GoI	Government of India
GoUP	Government of Uttar Pradesh
GRAP	Graded Response Action Plans
IAs	Implementing Agencies
IGP	Indo Gangetic Plan
IoR	Institutes of Repute
IPF	Investment Project Financing
IVA	Independent Verification Agency
LPG	Liquified Petroleum Gas
MAC	Marginal Abatement Cost
MT	Metric Tons
M&E	Monitoring and Evaluation
MOEFCC	Ministry of Environment, Forest, and Climate Change
MRV	Monitoring, Reporting, and Verification
MSME	Micro, Small & Medium Enterprises
NACs	Non-Attainment Cities
NCAP	National Clean Air Program
NCDs	Non-Communicable Diseases
NCR	National Capital Region
NKN	National Knowledge Network
PAP	Program Action Plan
PDO	Program Development Objective
PforR	Program for Results
PM	Particulate Matter
PMU	Program Management Unit
PMUY	Pradhan Mantri Ujjwala Yojana
PNG	Piped Natural Gas
SAAPs	State Air Action Plans
SOA	Secondary Organic Aerosol
SPM	Secondary Particulate Matter
SRLM	State Rural Livelihood Mission
TERI	The Energy Resources Institute
UCAP	UP Clean Air Plan
ULB	Urban Local Bodies

UP	Uttar Pradesh
UPPCB	Uttar Pradesh Pollution Control Board
VOC	Volatile Organic Compound
WB	World Bank

EXECUTIVE SUMMARY

1. Air pollution in India is multi-sector and linked to a wide range of economic activities where investments in the control and management of emissions have lagged economic development and growth. Integrated solutions aligned with a clean air transition across multiple sectors of the economy with related investments and behavioural changes are required. While the transportation sector has long been recognized as a high pollution emitter, especially in large urban areas, nationwide poor agricultural practices are an overlooked and significant contributor to $PM_{2.5}$ too stemming from over-application of fertilizers, poor management of animal waste, and crop residue burning.

2. Addressing air quality challenges rests with changing many practices within urban, industrial, households, energy, transportation, and agricultural/rural areas that contribute to poor ambient air quality across a wider airshed. One of the most significant sources of $PM_{2.5}$ in India is "secondary" emissions that form when gases from various sources mix to create $PM_{2.5}$, and then travel far away from the original source, often crossing the boundaries of states. Almost 50 percent of the $PM_{2.5}$ emissions affecting Indian cities are secondary particulate matter (SPM), making air pollution a sub-regional, national, and even an international challenge for some Indian states.

3. UP, the most populated state in India and of the IGP (around 230 million people, ~17 percent of India's total population) has until now been most determined in developing a multi-sectoral state air action plan, advocating for regional AQM cooperation, and applying airshed management. Findings from air quality modelling supported through the Bank analytics using cost-effectiveness analysis identified four priority sectors that contribute to air pollution in UP. The highest contributing sectors from this analysis are (i) residential cooking, (ii) agriculture sources, (iii) transportation, and (iv) medium and small Industries. The GoUP, with technical assistance from the World Bank, has developed a comprehensive UCAP that prioritizes actions to reach Air Quality ug/m^3 targets in the 2024 to 2030 timeframe throughout the state of UP based on a scientific evidence base.

4. The proposed Uttar Pradesh Clean Air Management Program will support the GoUP to implement its ambitious multi-sector statewide UCAP and bolster institutional mechanisms needed to enable such implementation. The World Bank financed program for results "P" will support a specific slice of the UP's Clean Air Plan "p" focused on high priority measures for air pollution reductions and foundational enabling work that will enhance the strength and impact of the government capability longer into the future. The UCAP program relies on the convergence of funds from various devolved central and state programs for the reduction of air pollution.

Three Program result areas proposed for PforR support are:

5. **Result Area 1: Strengthening State Capabilities for Air Quality Management and Planning.**
   Strengthening of GoUP systems for increased efficiency in planning and monitoring of effectiveness and coherence of various central, state, city, and panchayat-level schemes to support the convergence of AQM and climate change goals are required, which will in turn help crowd in a broader diversity and range of finance from donors and the private sector. The primary accountability for the work under Results Area 1 lies with the DoEFCC and the UPPCB. Work under Results Area 1 builds directly on UP's ongoing program to respond to NCAP targets and guidance set out by the MoEFCC and its CPCB and also considers directions and guidance by Delhi and Surrounding Jurisdictions CAQM,

applicable to 17 western UP districts; other legal Decisions of the Green Tribunal; and other legal requirements of the state. Two PforR Disbursement-Linked Indicators (DLIs) identified under this results area focus on outcomes to provide an essential backbone for a more robust scientific and evidence-based AQM system for the state. Expansion of the network and dedicated work on the state emissions inventory are both critical to help government decision-makers prioritize actions and keep the public and all stakeholder informed on priorities for clean air. This results area will also help increase staff trained for work on AQM and build institutional capacity for nested airshed management planning with cost-effectiveness tools. It will expand stakeholder and citizen engagement programs to increase awareness, behaviour change, and incentives for stakeholder-driven R&D and solutions. Strengthening the air quality monitoring infrastructure will build a foundation for spatially and statistically representative measurement systems through an integrated monitoring infrastructure, including expansion of the Continuous Ambient Air Quality Monitoring (CAAQM) network, the National Manual Air Monitoring Program (NAMP) network, a manual and a real-time source apportionment network, and 'Supersites'. A network on universities will be activated to help develop the next generation of practitioners while expanding local monitoring capacity. Activities include expanded measures for road dust, construction, and MSME emission control and monitoring, interconnected with a centralized monitoring and surveillance system using IT tools and devices such as Pan-Tilt-Zoom (PTZ) cameras and smart meters.

6. **Result Area 2: Advancing Sector Interventions.**

Implementing a multisectoral pollution reduction strategy is key to reducing air pollution in UP. It is critical to analyze key sectors and actions through a cost-effectiveness analysis and other means of prioritization to use resources optimally. While current air pollution reduction measures are largely focused on sources within the cities, the Program recognizes the need to expand efforts geographically throughout the state while introducing a project implementation and monitoring framework to ensure proper, on-ground implementation. Background analysis and consultations identified four most cost-effective sector measures to achieve substantive reductions in $PM_{2.5}$ concentrations in UP:

7. **Result Area 3: IGP Airshed Cooperation**. Work under this RA will promote inter-state knowledge sharing and dialogue to help stimulate development of common solutions. This will be done in part by pioneering programs on topics that will generate benefits for both the reduction of intra- and inter-state emissions to encourage airshed learning, replication, and common approaches with other IGP states. Under this RA UP has selected to focus on accelerating UP's vehicle scrapping program through financial and policy incentives to remove the oldest most polluting heavy-duty vehicles first and work progressively to accelerate scrapping of next oldest diesel models. Since Heavy duty vehicle emissions in UP stem from other neighbouring states at an equal level to those generated from within UP, work will be undertaken for this topic in parallel at the airshed level with other states to promote more harmonized programs and emission control policies. Knowledge sharing On Clean cooking while emissions generated from within UP alone are large, Bihar faces similar challenges with high emissions that spill over into UP and vice versa. H

8. The Department of Environment, Forest, and Climate Change (DoEFCC) is the nodal agency in UP's administrative structure for air quality management and will be the nodal agency for the proposed program. The state will establish the Uttar Pradesh Clean Air Management Project Authority (UP CAMPA) as a Special Purpose Vehicle (SPV) embedded in the DoEFCC to implement the program. A UP-CAMPA-Chief Executive Officer (CEO) will be appointed by the Government and will be responsible for the management, coordination, and M&E of the program. The DOEFCC UPCAMPA SPV will work closely with

all sector departments primarily responsible for different DLIs.

9. An Environmental and Social Systems Assessment (ESSA) was conducted to determine the GoUPs capacity and systems to manage the E&S effects under this Program. Technical documents were reviewed, multiple consultations with the IAs were undertaken, consistency with the core principles and exclusion of activities ineligible for PforR financing were confirmed. Overall, the Program's activities offer multiple environmental benefits such as a reduction in air pollution, better health and quality of life, climate co-benefits and increasing adoption and use of cleaner technologies across sectors. The applicable legislation crosscutting and those relevant to sectors support sound environmental health and safety management to address any of the impacts of the Program.

10. The environmental risks associated with the program have been rated as Moderate. These include (i) scrapping of vehicles which leads to generation of several waste streams including hazardous wastes i.e. batteries for which sound management of recyclable materials is critical (ii) worker health and safety in vehicle scrapping centers and industrial enterprises (iii) E-vehicles require battery changes which can have negative environmental impacts if not properly managed in the long term if recycling and recovery is not handled adequately (iv) inadequate infrastructure and supervision for collecting and storing manure which is directly left in the open causes contamination of the air and surface water (v) The installation and operation of biogas digestors may have long-term operational impacts if not managed properly, these include the disposal of sludge, odour control, and combustion risks (vi) Construction of small scale infrastructure impacts the surrounding environment with dust, noise, soil contamination and waste and (vii) in-appropriate use of monitoring equipment procured. All these risks were assessed as minor, localized, generic, and reversible and can be mitigated effectively. The respective departments have the capacity to manage these limited construction-related impacts with the support of external consultants as necessary. The Program will not support construction of large new infrastructure (such as vehicle scrapping facilities, large boilers, and landfills) nor does it support activities that may lead to heavy emissions or to generation and discharge of large volumes of waste and wastewater. The UPCAMPA Structure will help in bridging gaps in environment management capacity and good practices in the DOEFCC and implementing departments and aligning with the sector experiences. There are some gaps in capacity, and environmental management for which recommendations for strengthening systems have been made in the Program Action Plan in Chapter V.

11. The social risks and impacts of the project investments are expected to be low, reversible, localized and most of them are expected to be managed through the mitigated strategies built into the project design as well as additional management measures. The project is not expected to lead to land acquisition and land requirements, if any, are expected to be met from the existing government premises or public lands. In the absence of information about the exact locations on which new infrastructure for air quality monitoring, testing laboratories and offices will be created, there is likely risk of such lands not being unencumbered and may potentially have presence of squatters or encroachers, who may get displaced during infrastructure development. The scale of construction supported by the project is of moderate scale and is not expected to deploy large labour workforce for prolonged durations. Most of the labour used will be local and in largely urban and peri-urban areas and is not likely to lead to labour influx and its related SEA/SH risks. There are likely OHS risks for workers engaged in construction activities, vehicle scrapping, brick- kilns, EV charging facilities, apart from CHS risks for those operating cook-stoves, decentralized bio-gas plants and using EVs. While the project's intent to mainstream stakeholder

engagement will contribute to increased general awareness and positive behaviour change around pollution reduction and air quality improvement, there are risks of women, smallholders, small dairy farmers, members of poor households from getting excluded from receiving benefits of investments proposed under result area 2 if effective measures to ensure their inclusion and for grievance redressal are not in place. The shifts towards cleaner and efficient energy sources and solutions are also likely to adversely impact the livelihoods of those engaged in the traditional or business as usual value chains – domestic fuelwood suppliers, workers in traditional brick-kilns, single truck owners and hired drivers.

12. The ESSA concluded that the underlying legal and operating systems for environment, health and safety management support the program and are adequate to manage environment and social risks arising from the project financed results areas. However, there are some gaps and capacity strengthening measures identified are part of the assessment which are addressed in the Program Action Plan (see Annex 5 below) including a full-time program environmental specialist and a social specialist; occupational health and safety monitoring and training of the program activities; an environmental audit of vehicle scrapping facilities to help capture any gaps; Occupational health and safety management in the construction and maintenance of biogas digestors at household level and livestock shelters; and development of an environmental and social screening checklist for use in planning for investments to ensure no direct, indirect or residual risks to the environment and sensitive receptors, an assessment of the livelihoods related impacts on brick-kiln workers, fuelwood suppliers and single truck owners/ drivers and incorporation of safe work related labour obligations for contractors in the bids floated by DoE and UPPCB. As the environmental sector/DoEFCC is not integrally connected with the sector departments, the SPV structure will help bridge these gaps. These recommendations shall be further detailed in the Operation Manual. It will be important that the project undertakes a project wide assessment of livelihoods losses that may result owing to energy transitions attributable to project investments and propose measures for the restoration of the livelihoods or incomes lost. This will help in either prioritizing the selection of those impacted while providing project benefits, engaging them in the new value- chains or for linking them with other beneficiary-oriented scheme and programmes of the government.

13. The ESSA findings will be discussed with the project and community stakeholders at a State level ESSA Disclosure and Stakeholder Consultation Workshop, to be convened by the client within 3 months of project effectiveness. After the Disclosure Workshop, an addendum to the ESSA on Stakeholder Consultations will be prepared and disclosed.

I INTRODUCTION

A. ENVIRONMENT AND SOCIAL SYSTEMS ASSESSMENT: PURPOSE AND OBJECTIVES

1. The air pollution challenge in India is multi-sector and linked to a wide range of economic activities where investments in the control and management of emissions have lagged economic development and growth. Several measures have been taken by the Government of India (GoI) over the past decade to improve air quality, but more is needed to shift to an "airshed" approach and deeper mobilization of integrated sector actions. Uttar Pradesh is one of the first state in India to pioneer airshed management and has actively worked with the World Bank and technical partners for the development of an UP Clean Air Plan (UCAP). Findings from air quality modelling supported through the Bank analytics with cost-effectiveness analysis identified four priority sectors that contribute to air pollution in UP. The highest contributing sectors from this analysis are (i) residential cooking, (ii) agriculture sources, (iii) transportation, and (iv) Medium and Small Industries. The government of Uttar Pradesh has requested the Bank to help implement its ambitious shift to an airshed management approach and the present operation is being developed to support this. Implementation of the Clean Air Project in UP will create substantial co-benefits in Greenhouse Gas (GHG) emissions reductions - particularly Black Carbon (BC), Carbon dioxide (CO_2) and Methane (CH_4). World Bank is supporting GoUP in the development of UCAP, one of the first state action plans in India underpinned with rigorous analytics, as a response to NCAP and forms the boundary of their state government program for clean air.

2. **An Environment and Social Systems Assessment (ESSA) was carried out in line with Program.** This was undertaken to (a) identify the possible benefits, risks, and environmental and social impacts applicable to the interventions of the Program; (b) review the policy and legal framework related to the management of the environmental and social impacts of Program interventions; (c) assess the institutional capability regarding environmental and social management systems within the Program system; (d) assess the performance of the Program system with respect to the basic principles of the PforR instrument and identify gaps; and (e) submit recommendations and Program Action Plans (PAPs) to address gaps and improve performance during the Program's implementation.

3. This is a Program for Results (PforR) lending operation. Implementation of activities under the Program will rely on the existing national and state legal framework and institutional systems that the counterpart uses to manage environmental and social safeguards issues. The purpose of this Environmental and Social System Assessment (ESSA) is to provide a comprehensive review of relevant environmental and social safeguards systems and procedures in Uttar Pradesh state, identify the extent to which the state systems are consistent with the PforR Bank Policy and the PforR Bank Directive and recommend necessary actions to address eventual gaps as well as opportunities to enhance performance during implementation.

4. The ESSA covered an assessment of Department of Environment, Forest and Climate Change, State of Uttar Pradesh which is a crucial department in leading and coordinating with other sector departments for the implementation of UPCAMP project. The ESSA identified opportunities for strengthening the existing institutional, operational, and regulatory systems and capacities pertaining to environment and

social issues in all sectors (agriculture, industry, household coking, transport) pertaining to delivery of project.

5. This ESSA assesses or considers the extent to which the Program's environmental and social management systems are adequate for and consistent with six core environmental and social principles (hereafter, Core Principles), as may be applicable or relevant under PforR circumstances. The Core Principles are listed below and further defined through corresponding Key Planning Elements in Chapter III.

- **Core Principle 1: Environmental and Social Management.** Environmental and social management procedures and processes are designed to (a) avoid, minimize, or mitigate against adverse impacts; (b) promote environmental and social sustainability in program design; and (c) promote informed decision-making related to a program's environmental and social effects.
- **Core Principle 2: Natural Habitats and Physical Cultural Resources.** Environmental and social management procedures and processes are designed to avoid, minimize, and mitigate any adverse effects on natural habitats and physical and cultural resources resulting from the program.
- **Core Principle 3: Public and Worker Safety.** Program procedures ensure adequate measures to protect public and worker safety against the potential risks associated with (a) construction and/or operations of facilities or other operational practices developed or promoted under the program and (b) exposure to toxic chemicals, hazardous wastes, and otherwise dangerous materials.
- **Core Principle 4: Land Acquisition**. Land acquisition and loss of access to natural resources are managed in a way that avoids or minimizes displacement, and affected people are assisted in improving, or at least restoring, their livelihoods and living standards.
- **Core Principle 5: Indigenous Peoples and Vulnerable Groups**. Give due consideration to the cultural appropriateness of, and equitable access to, program benefits, giving special attention to the rights and interests of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities and to the needs or concerns of vulnerable groups.
- **Core Principle 6: Social Conflict.** Avoid exacerbating social conflict, especially in fragile states, post-conflict areas, or areas subject to territorial disputes.

6. An additional purpose of this ESSA is to inform decision-making by the relevant authorities in the borrower country and to aid the World Bank's internal review and decision process associated with the **Uttar Pradesh Clean Air Management Program (UPCAMP, P510253)**. The findings, conclusions, and opinions expressed in this document are those of the World Bank and the recommended actions that flow from this analysis will be discussed and agreed with counterparts in Department of Environment, Forest and Climate Change, State of Uttar Pradesh and will become legally binding agreements under the conditions of the new loan.

B. ESSA METHODOLOGY

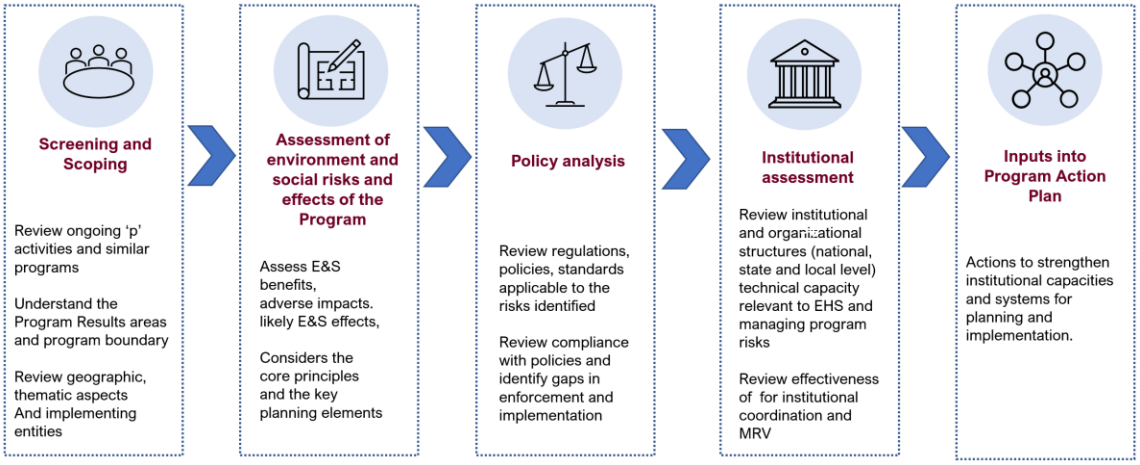
7. The ESSA refers both to the process for evaluating the acceptability of a borrower's system for managing the Program's environmental and social risks in the operational context and to the final report that is an output of that process.

8. The World Bank team prepared this ESSA report that provides an overview and analysis of state of Uttar Pradesh government's including sector departments (Transport, MSME, Agriculture, and Rural) and Department of Environment, Forest and Climate Change policies and regulatory frameworks for understand the impact of UPCAMP project on environmental and social aspects. The ESSA discusses relevant environmental and social national legislations and several state level environment regulations which are also considered prior to implementing activities in any state.

9. The methodology focused on the understanding the Program activities, benefits, and risks associated with various activities, environmental and social conditions, the existing institutional mechanism at various levels for implementation, management, policies, and regulatory aspects. It also focused on understanding the gaps and recommending an action plan to not only address the gaps but also ensure sustainable environmental and social effects under the Program.

10. The following tasks were involved in shaping the report.

Figure 1. Methodology Adopted for ESSA



11. During the appraisal mission, the draft ESSA, and its findings—benefits, risks, gaps, and recommendations (environmental and social)—will be shared with DoEFCC, UP. A consultation will be undertaken to gather feedback and the report will be updated accordingly for final disclosure. Details of stakeholders consulted in the state are presented in Table 10. The methodology for ESSA preparation is presented in figure 1.

12. The ESSA findings will be discussed with the project and community stakeholders at a State level ESSA Disclosure and Stakeholder Consultation Workshop, to be convened by the client within 3 months of

project effectiveness. After the Disclosure Workshop, an addendum to the ESSA on Stakeholder Consultations will be prepared and disclosed.

C. ORGANIZATION OF ESSA REPORT

13. **Chapter I: Introduction** presented the overall Program context and the details of the Government's program. This Program would support scope and results areas of the World Bank-financed PforR, the Program implementation arrangements, and identification of environmental and social effects of Program activities.

14. **Chapter II: Program Description and Potential Environmental and Social Effects** introduces the ESSA and its methodology. Potential environmental and social effects discuss results area-wise environmental effects (benefits, risks, and opportunities to manage these).

15. **Chapter III: Assessment of Environmental and Social Management Systems and Implementation Capacity** discusses the guidance on environmental and social management in the PforR Policy of the World Bank. It also discusses the systems, regulatory aspects, gaps, and proposed actions to bridge the gaps through a systematic description of environmental and social effects to be considered for each of the ESSA's six Core Principles It presents an assessment of the adequacy and consistency of the Program's environmental and social management systems and related implementation capacity against the Core Principles and Key Planning Elements.

16. **Chapter IV**: **Consultation and Disclosure** describes the key formal and informal consultations undertaken as part of the ESSA process, important input and recommendations received, and how and when the ESSA was disclosed.

17. **Chapter V: Conclusions and Recommendations** lists environmental and social inputs for mitigating impacts risks and enhancing environmental and social benefits and management. This section also discusses the actions that the ESSA team recommend addressing the system and capacity gaps and shortcomings identified, which are grouped into two categories: (a) those that have been mainstreamed into Program design and (b) those that are to be included in the PAP.

II PROGRAM DESCRIPTION AND POTENTIAL ENVIRONMENTAL AND SOCIAL EFFECTS

A. PROGRAM CONTEXT

18. **The air pollution challenge in India is multi-sector and linked to a wide range of economic activities where investments in the control and management of emissions have lagged economic development and growth.** Integrated solutions aligned with a clean air transition across multiple sectors of the economy with related investments and behavioural changes are required. While the transportation sector has long been recognized as a high pollution emitter especially in large urban areas, nationwide poor agricultural practices are an overlooked and significant contributor to $PM_{2.5}$ too stemming from over-application of fertilizers and poor management of animal waste. Addressing air quality challenges rests with changing many practices within urban, industrial, households, energy, transportation, and agricultural/rural areas that contribute to poor ambient air quality across a wider airshed. One of the most significant sources of $PM_{2.5}$ in India are "secondary" emissions that form when gases from various sources mix to create $PM_{2.5}$, and then travel far away from the original source, often crossing the boundaries of states. Almost 50% of the $PM_{2.5}$ emissions affecting Indian cities are secondary particulate matter (SPM), making air pollution a sub-regional, national, and even an international challenge for some Indian states.

19. **Several measures have been taken by the Government of India (GoI) over the past decade to improve air quality which have been a good start, but more is needed such as a shift to an "airshed" approach and deeper mobilization of integrated sector actions.** In January 2019, MoEFCC launched the National Clean Air Program (NCAP) to consolidate fragmented air quality management (AQM) efforts into one national program with an ambitious goal: Compared to 2017, 20%–30% reduction in $PM_{2.5}$ and PM_{10} concentration by 2024. The program's target was increased in 2022 to a reduction of 40% by 2026. It has initially focused on 132 Non-attainment Cities (NACs) where air pollution standards are not being met and has more recently begun broadening the approach to the state level. In 2020 the XVth Finance Commission (FFC) allocated INR 12,139 crores (1.6 billion US$) in first of its kind performance-based fiscal transfers for air pollution to India's 42 mega-cities for the next 5 years (2021-26). Sixteen (40%) of these mega-cities lie in the IGP (Indo Gangetic Plain) with seven alone in UP. In August 2020, the Commission for AQM for the National Capital Region (NCR) and adjoining areas (CAQM) was established to coordinate, regulate, and manage poor air quality for Delhi and 5 surrounding states and urban territories*1*. This was India's first shift toward multi-sector, multi-jurisdictional airshed management to tackle air pollution. A National Knowledge Network (NKN) to complement NCAP implementation has been formed with India's Institutes of Repute (IoR) to help strengthen institutional and human resource capacity for AQM across India.

20. **Under India's federated structure there are a range of institutional responsibilities and accountabilities for AQM at the central, state, city, and increasingly regional level that require strong vertical and horizontal cooperation and coordination.** In India, the central level defines national policy, regulation, guidelines and manages central financing schemes, while the states hold the responsibilities for designing and implementing their own plans, mobilize the bulk of the financing through coordination and convergence of central and state funding schemes, undertake reporting and monitoring of results to the center, and coordinate with all local bodies across the state (cities, UAs, districts, blocks, panchayats). Both the state and local bodies work with the private sector. Non-Attainment Cities (NACs) are responsible

for their own plans and implementation structures through recently established air cells, and with the introduction of FFC grants these requirements have further encouraged the largest cities to expand to a wider focus on urban agglomerations. The Commission for Air Quality Management (CAQM) for Delhi and surrounding jurisdictions is India's first regional institution with regulatory and coordination powers for multi-jurisdictional airshed management, replacing the central pollution control board functions for air quality management for the Delhi NCR in particular.

21. **There is an emerging consensus that a regional air quality management approach is required for India's entire Indo-Gangetic Plain, building on a coordinated set of State Air Action Plans (SAAPs).** As air pollution levels in the IGP are the highest in India and emissions mix and travel across a nearly 2000 km wide plain, it has become increasingly clear that a broader sub-regional airshed management approach must be used to solve the air pollution problems. On average, about 74 % of the sources that generate $PM_{2.5}$ concentrations in IGP cities originate from outside these cities. Typically, among the IGP states, over 50% of the $PM_{2.5}$ concentrations in each state originates from sources outside its borders. Given complex atmospheric connections over the plains there is scientific evidence and a growing political demand for the need for stronger work at the state level and beyond. However, substantive socio-economic differences exist between the IGP states and challenge development of sub-regional AQM policies so far. Haryana, Delhi, and Chandigarh in the West are 3 of the top 5 Indian states/UTs with the highest GDP per capita. On the other hand, Uttar Pradesh in the Centre has the second lowest GDP and Bihar further to the East the lowest GDP of any state in India. This dichotomy requires special attention in the design of air pollution control strategies.

22. **UP is one of the first states in India to pioneer airshed management and is actively working with the World Bank and technical partners for the development of an UP Clean Air Plan (UCAP).** It is also one of the first states in India to work on "nesting" AQM plans for vertical coordination across different administrative levels. The World Bank has concurrently supported the development of a tailored air quality planning tool for the entire IGP sub-region (from Punjab to West Bengal) to enable integrated airshed planning across IGP (*IGP AQMmod)*. A special *AQMmod* module for UP has been established as part of this to help generate analysis on cost-effectiveness and prioritization for investments required to reduce air pollution throughout UP. This provides a common evidence-based platform for better decision making in UP and for coordination with UP's neighbouring states across the shared airshed sub-region. **Findings from air quality modelling supported through the Bank analytics integrated with cost-effectiveness analysis has pointed to 5 highest priority sectors and sub-sectors within them that contribute to air pollution in UP.** The top three priority sectors are **residential cooking**, **transport, and agriculture**. Residential cooking emissions are the largest source of $PM_{2.5}$ air pollution generated from within UP (around 48%) primarily due to the use of solid fuels and traditional cook-stoves. It also contributes to significant black carbon (BC) emissions. The PMUY ("*Ujjwala Scheme*") in UP has provided around 17 million connections to rural households to access LPG cylinders since 2017. However, challenges remain with limited access and affordability of LPG refills, which results in PMUY beneficiaries continuing to use dirty biomass-based fuels like fuelwood and animal dung. While air pollution from biomass-based cooking is high throughout the state, it is particularly high in concentration in eastern UP (reaching about 40mg/m^3). **Implementation of Uttar Pradesh Clean Air Management Project (UPCAMP) will aim to strengthen systems for airshed management and contribute to the implementation of selected priority measures to reduce air pollution under UCAP.**

23. **Implementation of UPCAMP with Government of Uttar Pradesh will lead to ambitious shift to an airshed management approach and the present operation is being developed to support this.** The program design will draw significantly on the key lessons from implementation of NCAP in UP to date by addressing key challenges around insufficient financing and capacity, working toward results focused and timebound targets, and strengthening the multi-sector approach at the state-wide level. Several key lessons that the program will address are the need to move away from ah-hoc measures to more scientifically and evidence-based AQM; the need to move beyond the city-by city approach to work on AQM at the entire state (and beyond) level; and for the full consideration of both urban and rural primary and secondary $PM_{2.5}$ emission sources.

B. THE GOVERNMENT OF INDIA'S PROGRAM

24. **Regarding air pollution, the Central Government is implementing National Clean Air Programme (NCAP) as a first long-term, time-bound, national level strategy to tackle the air pollution problem across the country comprehensively**. The original targets to achieve 20% to 30% reduction in PM_{10} and $PM_{2.5}$ concentrations by 2024 keeping 2017 as the base year for the comparison of concentration. This is now extended to 2026 with a 40% reduction target over 2017. Under the NCAP, city specific action plans for all the non-attainment cities (NACs) are prepared that highlight the major reasons of air pollution in the respective NACs. City action plans for 111 NACs – now expanded to 132 NACs - have been prepared and approved for implementation. These action plans focus on city specific short/medium/long term actions to control air pollution from sources such as vehicular emission, road dust, burning of biomass/crop/garbage/Municipal Solid Waste, construction activities, industrial emission, etc. All sources addressed are within the boundaries of the NAC.

25. **Major measures under the NCAP being taken by the Government to curb air pollution are:** Strengthening of air quality monitoring network; develop City Action plan based on Source Apportionment Studies; establish emission inventories; identification of hotspots; environmental regulatory activities; establishing Air Quality Management cells at urban local bodies (ULBs); supporting Public Grievance Redressal Portals to enable citizens to flag air quality issues in the city for appropriate actions; preparation of Emergency Response Systems, Graded Response Action Plans (GRAPs) to prevent air pollution emergencies; introduce more frequent compliance verification of emission norms; and establish awareness and capacity building programs. Three national and state level committees have been constituted: (i) Steering Committee, (ii) Monitoring Committee and (iii) Implementation Committee for overall guidance and direction for effective implementation of the NCAP, reviewing the proposed city interventions, and to evaluate progress made. UP's efforts on implementing the NCAP was recently recognized by the National Government as three of their NACs achieved the top three positions amongst 47 million-plus cities in the first edition of the *Swachh Vayu Survekshan* (Clean Air Survey) – that ranked cities based on actions taken to reduce air pollution. Under the NCAP, finance has been sanctioned and released to the NACs. This includes US$ 85.6 million or Rs. 696.7 crore from 2019 to 2021 for initiating actions such as expansion of monitoring network, construction and demolition waste management facilities, non-motorized transport infrastructure, green buffers, mechanical street sweepers, composting units etc.

C. BANK FINANCED PROGRAM: SCOPE, OBJECTIVES, AND KEY RESULTS AREAS

26. **The GoUP, with technical assistance from the World Bank, has developed a comprehensive UCAP that prioritizes actions to reach Air Quality ug/m^3 targets in the 2024 to 2030 timeframe throughout the state of UP based on a scientific evidence base**. UCAP provides a prioritized strategy for meeting AQ reduction targets throughout the state in both urban and rural areas. The current City Clean Air Action Plans (CAAPs) under the NCAP do not identify and outline regional emissions beyond city jurisdictions. UCAP estimates that city-based sources only account for 30-40 percent of pollution sources in the cities, while substantive air pollution sources (around 40 percent) come from outside the states indicating that IGP states must also cooperate with each other**.** The CAAPs for the 17 NACs are integrated into the UCAP to ensure complementarity between city and state-wide AQM. The broad objectives set for UCAP include: (i) Reach Air Quality targets in the 2024 to 2030 timeframe throughout UP, set for achieving WHO interim target 1 of 35 µg/m^3 for $PM_{2.5}$ and (ii) outline most cost-effective sectors and largest opportunities for sub-sector interventions, through source-wise prioritization (including through leverage of existing policies, programs, and institutions) to reach clean air commitments and targets.

27. The Program for Results Finance Instrument is proposed because it directly aligns with the ongoing government multi-sector program under implementation that is being progressively strengthened over time. Both the national level (NCAP) and corresponding state level (UCAP) programs rely heavily on the horizontal convergence of funds. The PforR instrument is ideal to help strengthen the government implementation systems that need to remain in place for the long-term.

28. **The proposed PforR Program will support the GoUP to implement its ambitious multi-sector statewide UCAP and bolster the underlying institutional mechanisms needed to enable such implementation**. The proposed "P" program will focus selectively on result areas and measures with a combination of technical interventions related to strengthening AQM planning, monitoring, and stakeholder engagement, sector investments, and strengthening institutions and state capacity for results. The proposed Program "P" will help GoUP achieve selected investment outcomes within the top five most cost-effective sectors for largest reductions in $PM_{2.5}$ concentrations, through a focus on effective geographical coverage; spending better; and moving toward a system of accountability for results. The government UCAP "p" program includes work already under implementation as well as a subset of priorities under new clean air program (UCAP) in terms of its sectors, scope, measures, and timeframe (to 2030). It will reflect a wider range and diversity of actions inclusive of but beyond the top 5 and link with UP state's many subordinated clean air plans including micro-, city-, and urban-agglomeration level plans.

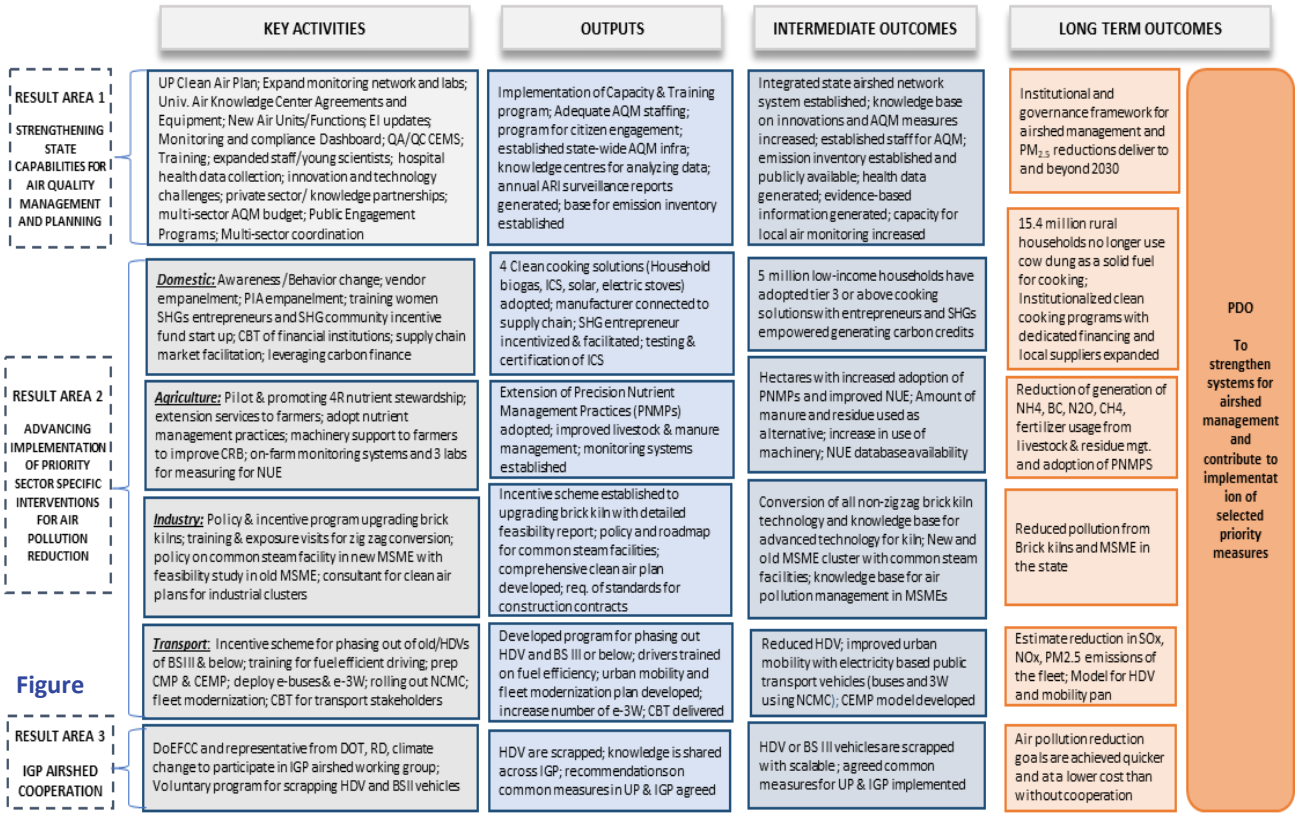
PROGRAM DEVELOPMENT OBJECTIVE(S)

29. The "Program" aims to strengthen systems for airshed management and contribute to the implementation of selected priority measures to reduce air pollution under UCAP.

PDO LEVEL RESULTS INDICATORS

30. **Achievement of the PDO will be** assessed based upon three results areas: (i) Strengthening State Capabilities for Air Quality Management; (ii) Advancing implementation of priority sector interventions for air pollution reduction; and (iii) IGP Airshed Cooperation. The state capabilities results area focuses on

strengthening Uttar Pradesh's core air quality management functions that require the expansion of infrastructure for data collection, analysis, and decision-making, and establishment of systems for horizontal coordination for multi-sector convergence of priority air pollution prevention and mitigation actions and mobilization of finance. Program measures have been prioritized based on a capacity- and institutional assessment and gap analysis and recommendations elaborated through the UCAP development process. Program actions for the result area (ii) sector measures have been prioritized based on a deep technical understanding of air pollution sources throughout the state, and a cost-effectiveness analysis that reviewed ~1100 control measures for actions that could reduce the most air pollution for the lowest unit cost. From this ~250 cost-effective options emerged which were then discussed and screened for implementation feasibility and needs with sector departments considering the baseline situation, sector capacities and experience. Figure 2 illustrates the program Theory of Change.



Figure

2. Program Theory of Change

THREE KEY RESULT AREAS

Result Area 1: Strengthening State Capabilities for Air Quality Management and Planning

31. **Strengthening state capabilities for AQM planning and operations is a priority for effective AQM in UP.** Strengthening of GoUP systems for increased efficiency in planning and monitoring of effectiveness and

coherence of various central, state, city, and panchayat-level schemes to support the convergence of AQM and climate change goals are required, which will in turn help crowd in a broader diversity and range of finance from donors and the private sector. The primary accountability for the work under Results Area 1 lies with the DoEFCC and the UPPCB. Work under Results Area 1 builds directly on UP's ongoing program to respond to NCAP targets and guidance set out by the MoEFCC and its CPCB and also considers directions and guidance by Delhi and Surrounding Jurisdictions CAQM, applicable to 17 western UP districts; other legal Decisions of the Green Tribunal; and other legal requirements of the state. Two PforR Disbursement-Linked Indicators (DLIs) identified under this results area focus on outcomes to provide an essential backbone for a more robust scientific and evidence-based AQM system for the state. Expansion of the network and dedicated work on the state emissions inventory are both critical to help government decision-makers prioritize actions and keep the public and all stakeholder informed on priorities for clean air. This results area will also help increase staff trained for work on AQM and build institutional capacity for nested airshed management planning with cost-effectiveness tools. It will expand stakeholder and citizen engagement programs to increase awareness, behaviour change, and incentives for stakeholder-driven R&D and solutions. Strengthening the air quality monitoring infrastructure will build a foundation for spatially and statistically representative measurement systems through an integrated monitoring infrastructure, including expansion of the Continuous Ambient Air Quality Monitoring (CAAQM) network, the National Manual Air Monitoring Program (NAMP) network, a manual and a real-time source apportionment network, and 'Supersites'. A network on universities will be activated to help develop the next generation of practitioners while expanding local monitoring capacity. Activities include expanded measures for road dust, construction, and MSME emission control and monitoring, interconnected with a centralized monitoring and surveillance system using IT tools and devices such as Pan-Tilt-Zoom (PTZ) cameras and smart meters.

Result Area 2: Advancing Sector-specific Interventions for Air Pollution Reductions

32. **Implementing a multi-sectoral pollution reduction strategy is key to reducing air pollution in UP**. It has been critical to analyse key sectors and actions through a cost-effectiveness analysis and other means of prioritization to use resources optimally. While current air pollution reduction measures are largely focused on sources within the cities, the Program recognizes the need to expand efforts geographically throughout the state while introducing a project implementation and monitoring framework to ensure the proper, on-ground implementation. Background analysis and consultations identified 4 the most cost-effective sector measures to achieve substantive reductions in $PM_{2.5}$ concentrations in UP:

a. **Reducing air pollution through progress on universal access to clean cooking.** Residential biomass burning for cooking is the single largest contributor to PM2.5, and 25 million rural households still burn solid fuels Recognizing this challenge from an air pollution perspective, GoUP has developed a sub program under UPCAMP to promote and help non-LPG users adopt clean cooking practices. Four specific solution programs be deployed: (i) improved biomass cookstoves (tier 3) targeting 3.5 million households; (ii) biogas digesters (tier 4) for households targeting 0.5 million households; and (iii) hybrid solar and electric induction (tier 5), targeting 0.5 million households for each solution. As several elements in the clean cooking program are new, a dedicated program and budget line for DoEFCC as the implementing department is being established, and DOEFCC will be the project implementing entity. DoEFCC will leverage carbon finance through empanelment of PIAs. The UPSRLM program will be utilized as service delivery platform for cooking technology distribution and after sales service. The program will invest in creating an entire market ecosystem around clean cooking.

b. **Reducing air pollution through improved agriculture and livestock management practices**. To effectively manage ammonia and nitrous oxide emissions from excess usage of fertilizers and balance NUE, will include intervention on adoption of 4R nutrient stewardship in selected districts with customized pilots on rate, time, place, and form of fertilizer for different cropping system through Precision Nutrient Management

Practices (PNMPs). Key activities will include (I) identifying demonstration clusters / plots, participating lead farmers (group of farmers), technologies to promote good agriculture practices, PNMPs with special focus on increased availability of slow and control release fertilizers, nano fertilizers, and nitrogen inhibitors applied in different crop stages in consultation with technical partners and department of agriculture. In addition, the project will promote on-farm monitoring system for NUE through available technologies and practices and establishing 3 monitoring labs at SAUs for spatial and temporal capture to NUE. To manage methane and black carbon emissions from livestock and crop residue burning, an extension service to framers will be provided to adopt livestock and manure management practices and access to farmers to machinery and other equipment to improve crop residue management.

c. **Reducing air pollution in the transport sector.** Measures to reduce air pollution from transport sector include increasing the modal share of public transport by expanding the electric bus fleet (e-buses and e-3wheelers) in two model cities i.e., Lucknow and Varanasi which complements the ongoing UP EV Policy and converge with the GOI schemes (FAME -II, PM E-Bus Sewa). In addition, the project will also support good practices in training and capacity building of drivers, staff of various public and private operators, integrated planning of passenger and freight transport which are replicable and scalable across the state.

d. **Promoting cleaner technology in industries** Interventions to curb industrial air pollution focus on reductions from the brick sector and boilers, which contribute significantly to air pollution. This includes incentivization of cleaner and resource-efficient technologies in brick manufacturing sector for conversion of up to 8,646 kilns to zig-zag technology. It will further provide incentives and strengthen knowledge base to promote mechanized, resource-efficient brick making and demonstrate state-of-the-art tunnel kiln technology through the UP MSME Promotion Policy 2022. Interventions will also facilitate development of comprehensive clean air management plans for industrial clusters and facilitate introduction of common steam facilities to reduce dependence of MSMEs on polluting individual boilers by supporting policy actions and detailed feasibility studies.

RESULT AREA 3: IGP AIRSHED COOPERATION TO AMPLIGY RESULTS AND IMPACTS

33. **Analysis for Uttar Pradesh shows significant air and pollutant exchange both from UP to other states and from other neighbouring states to UP.** As the largest state at the canter of the IGP, UP has a lot to gain by working closely with other states to accelerate emission reductions and lower of costs. While some long-range transport topics like thermal power and large industry stacks require airshed wide solutions, other topics where UP can still do a lot at home are also important for cooperation. Two most important topics are for the acceleration of scrapping oldest Heavy-duty trucks with low fuel standards, and on the promotion of clean cooking. Heavy duty vehicle emissions come into UP from other neighbouring states at an equal level to those generated from within UP particularly from the western airshed states of Punjab, Haryana, and New Delhi. A program of cooperation with these three states would yield significant additional air pollution reductions for UP. On Clean cooking the emissions generated from within UP largely dominate, however UP's eastern border with Bihar is heavily impacted by household emissions with similar challenges as UP. It is therefore in UP's interest to especially join hands with Bihar on this topic. Activities under this RA include participation in developing an IGP plan and activating technical thematic working groups that will deliver higher emission reductions than working along **The DoEFCC together with relevant sectors are primarily responsible for this results area**. Both should actively participate together in technical meetings so that the sector and AQM issues are equally well considered. Two DLIs are proposed under this RA: One DLI focused on heavy duty truck scrapping, an another focused on reaching agreement on common measures with neighbouring states. Given the IGP

airshed is transboundary too this extends to UPs participation in international IGP meetings and especially working on cooperative agreements with Nepal which borders UP to the north.

DISBURSEMENT-LINKED INDICATORS

34. **Program resources will be disbursed based on the achievement of [10] DLIs.** These DLIs (table 1) have been selected to incentivize and measure progress on the most important institutional, human resource, and management system state capacity reforms and together with specific priority cost-effective clean air measures. Program resources will be channelled through the Government of UP's Finance Department to implementing entities involved in the Program. Table 1 details the DLIs and their allocated funding from IBRD and the ESMAP Clean Cooking Fund.

Table 1. Disbursement-Linked Indicators and Allocated Financing

Result Area	DLI	Responsible Agency	Allocated Amount (US$, millions)	
			World Bank	ESMAP Grant
1. Strengthening State Capabilities for Air Quality Management and Planning (US$50 million)	1 Increased human resource capacity for airshed management	DoEFCC/UPPCB	15	0.00
	2 Expanded Systems for evidence based airshed management decisions expanded	DoEFCC/UPPCB	45.000	0.00
2. Advancing implementation of priority sector specific interventions for air pollution reduction (US$266 million)	3. Number of households using clean cookstoves to meet cooking needs increased	Rural Development Department (RDD)	100.000	5.00
	4. Number of hectares with increased fertilizer (nitrogen) use efficiency introduced	Department of Agriculture (DOA)	45.000	0.00
	5. Volume of animal manure, agriculture residue waste used for alternative productive uses and diverted from mismanagement and burning	Department of New and Renewable Energy (UPNEDA)/RDD	20.000	0.00
	6. Number of Brick kilns transitioned to improved air pollution control and resource efficiency technology	Department of MSME (DMSME)	38	0.00

	7. Number of SMEs demonstrate successful transition to cleaner production means and improved air pollution control	DMSME/UPPCB	10.000	0.00
	8. Good practice models of improved urban mobility for clean air	Department of Transportation (DOT)	30.000	0.00
3. IGP Airshed Cooperation	9. Number of heavy-duty vehicles (BS III and below) scrapped and taken off the road	DOT	44	0.00
	10. Common measures with other IGP states	DoEFCC	3.000	
IBRD IPF			*29.125*	*4.0*
Front end fee	*(0.25% of IBRD loan amount)*		*0.875*	*0.0*
Total			**350.00**	**10.00**

35. **The achievement of all DLIs will be reviewed and confirmed by the independent verification agency (IVA).** The program SPV will be responsible for reporting on achievement of the Program DLIs, each of which includes several disbursement-linked results (DLRs). An independent firm will be contracted by the Government of UP to conduct third party verification for all Program DLIs to be submitted as part of an Annual Program Report (APR).

ALIGNMENT BETWEEN THE GOVERNMENT PROGRAM AND THE PFORR PROGRAM

PROGRAM EXPENDITURE FRAMEWORK

36. **Program Expenditure Framework (PEF):** Tables 3 summarize the program expenditure at the level of **small 'p'** for the six-year period for UPCAMP. The expenditure framework comprises of the Air Quality schemes that are funded exclusively by GoUP through State specific schemes, convergence with National level Programs (State funded portion of the CSS schemes), and the central transfers (in the form of Finance Commission Grants – FFC).

Table 2. Program Boundaries and Expenditure Framework

	Uttar Pradesh Clean Air Management Plan - UCAP ('p')	Program supported by the PforR ('P') is a subset of UCAP	Specific features aligning with the Medium-Term Program
Objective	To reach air quality $PM_{2.5}$ targets in the 2024 to 2030 timeframe throughout UP through source-wise prioritization.	To strengthen airshed management systems and improve air quality outcomes.	The 'P' Program funds a subset of the highest contributing sectors to $PM_{2.5}$ in selected geographic areas, enhances state capabilities, and supports collaboration across India's IGP states.
Duration	2021–30	2024–30 (April 1 to March 31)	The P will span the outer 6 years of the government plan.
Geographic coverage	The State of Uttar Pradesh	Actions are both statewide and focused on specific districts across UP, dependent on applicable sub-measures.	The 'P' focused on a subset of districts with the highest exposure to $PM_{2.5}$ concentration from the highest contributing sectors.
Results areas	UP's air quality landscape; source contributions (residential and commercial, large industry, medium and small-scale industry, agriculture fertilizer, livestock manure, crop residue burning, transport, waste, power plants, road dust, and construction); $PM_{2.5}$ control strategies under current policies, with additional policies and contributions from other states; prioritization by sector contributions, geographic origin and exposure, and cost-effectiveness; climate co-benefits; and a recommended action plan. UCAP also sets out gap filling needs for strengthening air management	**Result Area 1**: Strengthening State Capabilities for Air Quality Management and Planning **Result Area 2**: Advancing Sector Interventions **Result Area 3**: IGP Airshed Cooperation	'P' supports the convergence of state budget funds to help implement selected interventions in the highest contributing sectors and to strengthen the state systems for AQM evidence-based airshed management planning. 'P' is designed to help activate and transform 'p' to a higher impact, higher result, and stronger convergence system. Sector interventions under 'P' focus on scalability both within UP and in other IGP states to amplify benefits to the UP population.

	Uttar Pradesh Clean Air Management Plan - UCAP ('p')	Program supported by the PforR ('P') is a subset of UCAP	Specific features aligning with the Medium-Term Program
	and monitoring systems and skills development.		
Overall financing of 6 years	US$2873.87 million	US$728.54 million	Both 'p' and 'P' include a combination of the state portion of CSS, state-sponsored schemes, and FFC Grants

Table 3. Summary of Program Expenditure Framework (distributed by funding sources) for FY 2023-2029

Sector	Department	Scheme	FY24-25	FY25-26	FY26-27	FY27-28	FY28-29	FY29-30	FY24-30	PEF	DLI
			Fig in Million (INR)							Fig in Million (USD)	
Transport	Urban Development	Urban Transport Fund	INR 3,128.90	INR 3,490.91	INR 3,894.81	INR 4,345.44	INR 4,848.20	INR 5,409.14	**INR 25,117.39**	**$ 313.97**	$ 30.00
	Transport	Subsidy on electric vehicles	INR 2,000.00	INR 2,000.00	INR 2,000.00	INR 2,000.00	INR 2,000.00	INR 2,000.00	**INR 12,000.00**	**$ 150.00**	$ 23.00
MSME	Industry (Small Industries and Export Promotion)	UP MSME Promotion policy 2022	INR 1,000.00	INR 1,000.00	INR 1,000.00	INR 1,000.00	INR 1,000.00	INR 1,000.00	**INR 6,000.00**	**$ 75.00**	$ 27.00
Agriculture	Agriculture	Food and Nutrition Security (state share)	INR 1,025.63	INR 1,025.63	INR 1,025.63	INR 1,025.63	INR 1,025.63	INR 1,025.63	**INR 6,153.76**	**$ 76.92**	$ 65.00
		National Mission on Agri. Extn & and tech. (state share)	INR 981.87	INR 981.87	INR 981.87	INR 981.87	INR 981.87	INR 981.87	**INR 5,891.23**	**$ 73.64**	
Clean Cooking	Rural Development	NRLM - village entrepreneur ship program (state share)	45.46	50.73	56.59	63.14	70.45	78.60	**INR 364.97**	**$ 4.56**	$100.00
	New and Renewable Energy (UPNEDA)	National Bio Energy Program	200.00	200.00	200.00	200.00	200.00	200.00	**INR 1,200.00**	**$ 15.00**	
Institutional Strengthening	Environment, Forest and Climate Change	Revenue budget	INR 212.08	INR 229.05	INR 247.37	INR 267.16	INR 288.53	INR 311.61	**INR 1,555.80**	**$ 19.45**	$ 75.00
	UP Pollution Control Board	NCAP funds	INR 2.30	INR 2.55	INR 2.83	INR 3.15	INR 3.49	INR 3.88	**INR 18.20**	**$ 0.23**	
									Total	**$ 728.77**	**$320.00**

D. PROGRAM IMPLEMENTATION ARRANGEMENTS

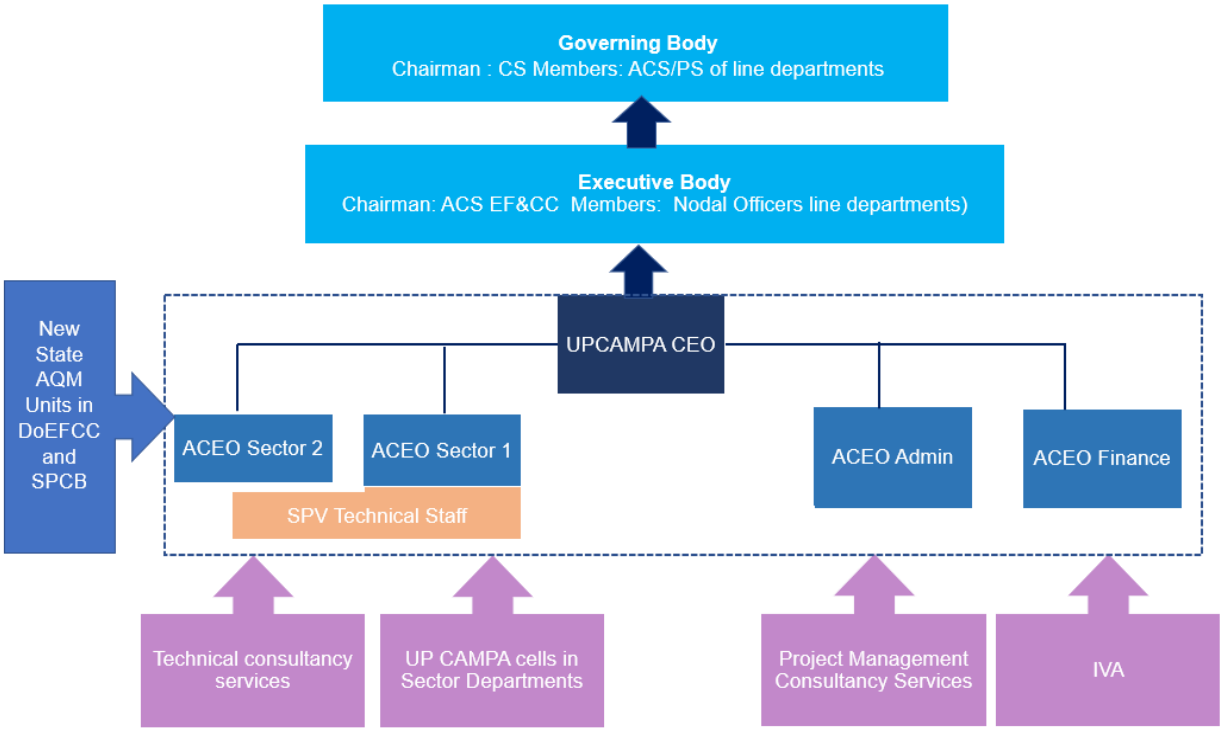
37. **The Department of Environment, Forest, and Climate Change (DoEFCC) is the nodal agency in UP's administrative structure for air quality management and will be the nodal agency for the proposed program.** The Uttar Pradesh Pollution Control Board (UPPCB), which remains in charge of air quality monitoring and regulation, comes under this administrative structure. The state has established the Uttar Pradesh Clean Air Management Project Authority (UP CAMPA) as a Special Purpose Vehicle (SPV)

embedded in the DoEFCC. **The Program will be governed and implemented by a three-layer SPV structure** described in Figure 3. First, at the apex level, an already established and functional **Governing Body** (a multi-department committee chaired by the Chief Secretary, with representation from each of the state departments and Principal Secretary, Finance) will facilitate interdepartmental coordination, and provide strategic directions for program implementation, approve annual plans, and conduct monitoring. Learning from other multi-sector program implementation experience in India, to facilitate high-level coordination and program budgeting, and expenditure, the Principal Secretary-Finance will be part of the Governing body to facilitate financing of key activities in results areas, department / Implementing Agency budgets, review expenditure, and fund flow arrangements particularly in a timeframe to inform the annual and semi-annual budget review process. Second, at the operational level, an Executive body, chaired by the Additional Chief Secretary - Environment, containing full time nodal officers from the sector Departments, will be responsible for achieving the results agreed under the program.

38. Third, to support day-to-day program implementation, an UP-CAMPA-CEO will be appointed from the DoEFCC and will be responsible for the management, coordination, and monitoring and evaluation (M&E) of the program. The CEO will be supported by Additional CEO (A-CEO) for Finance, Admin, and the Sectors and the SPV will collaborate and coordinate with all departments and IAs (horizonal coordination) through UP CAMPA Cells in Agriculture, Transport, MSMEs, Urban and Rural Development Departments. Project management consultancy services will support the SPV for day-to-day program implementation.

39. Technical staff for procurement, finance, environment, and social functions will also be responsible for the delivery of the IPF component. The staff will also report to the CEO. They will also be responsible, either directly or through coordination and oversight, for ensuring compliance with the relevant fiduciary, environmental and social (E&S) assessment findings, Program Action Plan (PAP) requirements, grievance redressal, labor management, procurement, and financial management. The DoEFCC would hire an Independent Verification Agency (IVA) to verify the DLIs and results under the program. Each of the IAs will have a role in the implementation of interventions and achievement of results under the Program.

Figure 3. Proposed Institutional Arrangement under UP-CAMP



E. DESCRIPTION OF PROGRAM ACTIVITIES AND IDENTIFICATION OF ENVIRONMENTAL AND SOCIAL EFFECTS

40. As required by PforR financing Bank Policy, an ESSA has been conducted by the World Bank during Project preparation. It was prepared in collaboration with Department of Environment, Forest and Climate Change, Govt. of UP to assess potential adverse risks and impacts associated with the Program, and adequacy of the environmental and social systems of the program implementing and operating agencies, to identify specific measures to strengthen environmental and social systems and to outline the steps to be followed by the borrower to mitigate potential adverse impacts associated with the Program. An initial environmental and social screening of all NCAP and UCAP activities was undertaken during the early stages of the dialogue. The purpose of the screening was to: (i) identify activities likely to have significant adverse impacts on the environment and/or affected people (those activities are not eligible for financing and should not be included under the Program); and (ii) determine the priority areas for further attention during the environmental and social system assessment.

41. The ESSA emphasizes appropriate institutional arrangements and coordination, systems, and capacity for the overall management of environmental and social risks and social inclusion aspects under the Program. Activities that are likely to have significant adverse impacts on the environment and/or affected people will be excluded.

ASSESSMENT OF ENVIRONMENTAL EFFECTS

42. This section describes the activities to be implemented under each of the results areas followed by a discussion of the potential environmental and social effects that could arise from each activity. The sections below summarize the environment and social risks of the Program, followed by the environmental and social effects grouped under each results area.

ENVIRONMENTAL AND SOCIAL SCREENING

43. As per the World Bank Guidance on 'Program for Results Financing Environmental and Social Systems Assessment', the proposed PforR operation was screened to determine whether, from an environmental and social perspective, the proposed Program is suitable and eligible for PforR financing. The first step in the screening exercise was to identify any activities within the Proposed program of expenditures that, under the exclusionary principle of the policy, should be excluded because of their inherently high risk. The second step was to review the proposed Program activities to determine whether the potential environmental and social effects (which may not meet the policy's criteria for exclusion) include unacceptable adverse risks.

LIST OF EXCLUDED ACTIVITIES

44. The following activities are excluded from support under the proposed PforR Program, these could fall under the category of activities that are judged to be likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or affected people.

- Establishment of vehicle scrapping facility
- Major/ Large scale centralized industrial boiler plants/systems.
- New Landfill/ dumpsites
- Any electric vehicles using lead acid batteries.
- Construction of new buildings or any construction beyond the existing footprint of buildings
- Activities involving asbestos containing materials (AC roofing sheets, AC pipes, and so on) such as construction, demolition, and dismantling.
- Any activity that may lead to potential involuntary resettlement will be excluded (screened out) from the Program boundary.
- Any activity involving land acquisition.

ENVIRONMENTAL BENEFITS AND OPPORTUNITIES

45. The Program will result in several benefits and opportunities for better environment, health, and safety performance. This includes systemic benefits such as (i) better transparency on environmental/air quality data (ambient and industry) and implications on people based on environmental health risk (ii) boosting manpower in DoEFCC for better management of air pollution, and stakeholder engagement, (ii)

institutional development and the better investment planning has the potential to deliver significant environmental benefits e.g., curb solid waste burning. Traditional cooking methods which produce high levels of indoor air pollution, will be replaced with clean cookstoves; efficiencies in small and medium industrial enterprises, dust mitigation practices scaled up, old and polluting heavy duty trucks scrapped and off the road or replaced with new and cleaner fuel trucks, increased number of electric transport modes available for public transport.

46. In the rural areas, efficiencies in fertilizer application, and productive reuse of crop residue will have a positive implication on soil health and nutrient losses. Alternative sources of energy such as biogas, bioCNG generated through livestock manure management practices can power household stoves and transport modes. The program is overall beneficial to human health, environmental quality, and climate change.

LIKELY ENVIRONMENTAL EFFECTS

47. The Program investment activities will have localized, reversible, and minor risks to environment, worker safety and the public. These impacts are not within eco-sensitive or culturally sensitive areas. All of these can be mitigated through management measures for which the systems were found to be satisfactory. There are some gaps for which recommendations for strengthening systems have been made in the Program Action Plan. The Program will not create an additional environmental impact as will support neither construction of large new infrastructure nor the extraction of natural resources. It does not include any activities that may lead to heavy emissions or to generation and discharge of large volumes of waste. The Program activities do not require Environmental Impact Assessments as per the regulatory system, but environmental considerations are managed through contractors getting permits and consents from the SPCB as required. These are simple, standard, and well-established regulatory requirements.

48. The environmental sector /DoEFCC are not integrally connected with the sectoral environmental issues and the sector departments. Therefore, their expertise is not reaching the sectors. Also, their own expertise is not aligned with the sector experiences being adopted, and the performance being achieved. The SPV Structure will help in bridging these gaps between the environment department and the sectors. While most of this infrastructure (Small scale infrastructure such as AQM monitoring stations, offices, e-vehicle charging etc, retrofitting kilns) across the state will take place in existing facilities, it may involve excavation, and levelling, and generation of localized waste which needs to be dealt with using appropriate contractual agreements on environment health and safety management. It is also critical that DoEFCC has adequate agreements for Extended Producer responsibility for e-waste management in place to minimize environmental impacts from adopting advanced technologies and data systems.

49. Environmental risks associated with the program include (i) scrapping of vehicles which leads to generation of several waste streams including hazardous wastes such as batteries and the sound management of recyclable materials (ii) worker health and safety in vehicle scrapping centers and brick kilns (iii) E-vehicles require battery changes which can have negative environmental impacts if not properly managed in the long term if recycling and recovery is not handled adequately (iv) inadequate infrastructure and supervision for collecting and storing manure which is directly left in the open causes contamination of the air and surface water (v) The installation and operation of biogas digestors for manure and crop residue may have long-term operational impacts if not managed properly, these include

the disposal of sludge, the need for wastewater treatment, odour control, and other impacts associated with the operation and maintenance of such as fire and explosion (vi) environmental impacts of dust, noise, soil contamination and localised waste generator relating to conducting small scale infrastructure improvements .

Table 4. Environmental Effects from Program Activities

Key Areas Relevant to EHS and OHS	Potential Environmental Affects	Level of Concern	Government Policies and Systems to Address These Risks	Institutional Responsibilities
Implications for environmental quality	Fugitive emissions (dust, odour noise) construction and demolition waste) from minor civil works	Low	Environment Protection Act 1986 The Air (Prevention and Control of Pollution) Act 1981, Amended 1987 and Rules Construction and Demolition Waste Management Rules 2016	Regulated by SPCB- through permits and licenses for construction of civil works, and regular inspection.
	Solid and plastic waste generation	Low	Solid Waste Management Rules, 2016 Plastic Waste Management Rules 2016	Regulated by SPCB- through permits and licenses for construction of civil works, and regular inspection.
	Liquid waste (Wastewater; chemicals)	Low	Water (Prevention and Control of Pollution) Act, 1974	Regulated by SPCB- through permits and licenses for construction of civil works, and regular inspection.
	e-Waste	Low	E-waste (Management) Rules, 2016	OEMs collect back e-waste and channelize for collection/disposal; producer will arrange end-of-life disposal. Collection centers established by producer.
	Hazardous Waste	Moderate	The Hazardous and Other Waste Management Rules, 2016 Guidelines for Environmentally Sound Facilities for Handling, Processing and Recycling of End-of- Life Vehicles (ELV)	Regulated by SPCB- through permits and licenses for construction of civil works, and regular inspection.
	Emissions	Moderate	MoEFCC Emission Standards for Brick Kilns	Regulated by SPCB- through permits and licenses for construction of civil works, and regular inspection.
Health and Safety – Community and Workers	Occupational health and safety of workers	Moderate	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 The Occupational Safety, Health, and Working Conditions Code, 2020	Labour Commissionerate

Key Areas Relevant to EHS and OHS	Potential Environmental Affects	Level of Concern	Government Policies and Systems to Address These Risks	Institutional Responsibilities
	Life and Fire Safety in buildings/ offices	Low	National Building Code (NBC) of India, 2016, 'Fire and Life Safety	Chief Fire Officer for obtaining clearances and compliance.

Table 5. Environmental Effects by Results Areas

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
RA#1: STRENGTHENING STATE CAPABILITIES FOR AIR QUALITY MANAGEMENT AND PLANNING			
Establish AQM units and Integrated Air Information Center, upgrade manual monitoring stations (MMSs) and Continuous Ambient Air Quality Monitoring stations (CAAQMs) Strengthen AQM Knowledge Centres at select academic Institutions, support development of software for AQM monitoring across departments. QA/QC studies on operational efficiency of CEMS, setting up of Technology challenge fund on innovative air pollution measures Training needs assessment and training of staff in DoEFCC and implementing dept.	Setting up an air quality monitoring programs, offices, and knowledge centres often requires the installation of monitoring stations, offices, labs etc across a region or city. While most of this infrastructure will take place in existing facilities, it may involve excavation, and levelling, and generation of localized waste. Some AQM strategies, such as operating air quality monitoring stations, implementing pollution control technologies, and running enforcement programs, setting up new offices, require energy inputs. It is important to ensure that energy for AQM operations is sourced sustainably, such as from renewable sources to the extent possible. The adoption of advanced technologies for air pollution monitoring such as installation and maintenance of monitoring equipment may have localized environmental impacts. It is important to carefully assess the life cycle environmental impacts of these technologies (considering e-waste etc) for widespread implementation. It is crucial to have appropriate e-waste management	Explore energy-efficient technologies and consider renewable energy sources for powering the monitoring infrastructure. Follow e-waste management practices in place to minimize environmental impacts. Careful consideration of the monitoring station locations and implementing measures to minimize localized pollution and disruption to communities. Training of manpower and experts and robust analysis frameworks to ensure proper interpretation and appropriate decision-making based on the AQM collected data.	Better Transparency on environmental/air quality data (ambient and industry) collected within districts and communicate implications for people based on environmental health risk. Dedicated AQM staff in DoEFCC and SPCB with clear roles and responsibilities for AQM will assist in better management of air pollution, and stakeholder engagement. Establishing a state-wide AQM Infrastructure that addresses primary and secondary sources.

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
	practices in place to minimize environmental impacts. CEMS systems often rely on enforcing regulations and policies to ensure compliance with air quality standards. This can result in potential environmental trade-offs, as certain companies may resort to cost-cutting measures that could compromise environmental sustainability in other areas. Air quality monitoring programs generate a vast amount of data that needs to be interpreted and used for decision-making. Accurate data analysis is needed to have policies and actions. It is crucial to have trained experts and robust analysis frameworks to ensure proper interpretation and appropriate decision-making based on the collected data.		
RA#2: ADVANCING SECTOR-SPECIFIC INTERVENTIONS FOR AIR POLLUTION REDUCTION			
CLEAN COOKING Supply of Improved Cookstoves (tier 3); Cookstoves using pellets (tier 4); cookstoves using household biogas (tier 4); Hybrid solar and electric induction (tier 5).	Sustainability of clean cookstove programs relies on the adoption and sustained use of the improved stoves by households. However, behavioral change can be challenging to achieve, and if households revert to traditional cooking methods or misuse the stoves, the expected	UPCAMP to strengthen Cookstove and battery recycling including refinancing for replacement and enhanced incentives for manufacturers for collection of	Traditional cooking methods produce high levels of indoor air pollution, primarily from the smoke emitted during combustion. Clean cookstoves reduce indoor air pollution and

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
Cookstove technology criteria and vendors for empanelment under each of the four business models Training and developing SHGs and local Entrepreneurs on clean cooking business models and how to leverage their existing program with finance and credit products to facilitate clean cooking supply chain development and jobs. SHG Community Incentive Fund Start-up and Results Based Grants (through SLRM) for Clean Cooking funded to incentivize SHG entrepreneurs. Supply chain market facilitation among stakeholders for each of the 4 business models by existing RD programs	environmental benefits may not be realized. The use of cylinders for bottling; and new improved cookstoves can create waste management challenges if proper infrastructure for refilling or recycling gas cylinders and stoves is lacking. Risk of lead contamination from improper disposal/ recycling of storage batteries used in Solar cookers.	old cookstoves and expired batteries. Mass awareness/behaviour change communication program on clean cooking for delivery with Self Help Groups (SHGs); Anganwadis and ASHA workers. An annual environment audit by independent third parties will be undertaken to assess the adequacy of the use of new cookstoves, and mechanisms for ensuring proper replacement of parts, and recycling of batteries and spare parts.	associated health risks for households.
MSME Brickiln upgradation to resource efficient technology designed and rolled out in select pollution hot spots**.** Knowledge sharing sessions on India's early experiences with conversions to tunnel kiln brick making**.** Policy on development of common steam facilities for all new, greenfield MSME clusters designed.	Traditional brick kilns often expose workers to harsh working conditions. Workers in these kilns face health and safety risks from high temperatures, exposure to coal ash and silica dust, and heavy physical labor. Brick kilns generate various types of waste, including ash, sludge, and kiln dust, which can have negative environmental impacts if not properly managed in the long term.	The conversion to more resource efficient kiln technologies can reduce worker exposure to these hazards by improving ventilation systems, reducing the intensity of physical labor, and implementing better safety measures. This can lead to improved occupational health and safety for the workers.	Reduction in Particulate Matter pollution from Brick kilns and MSMEs in the state Zig zag technology changes the way coal is loaded to redirect the air flow, which leads to better, more efficient fuel combustion and increases energy efficiency. A zig zag kiln can reduce the coal needed by 20 per cent.

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
Incentive program for adoption of clean fuel (PNG) and better air pollution control devices in MSMEs designed. Training and awareness program on good practices for dust control in construction and at industrial site to be deployed through DoEFCC Stakeholder Engagement Program DoEFCC to deploy training and awareness program on cleaner technologies through their Stakeholder Engagement Program	Although the individual MSME units are expected to have relatively small environmental impacts due to their size of operations, it is also to be noted that these industries generally do not use the most energy efficient or advanced clean technologies due to various reasons including the challenges related to the awareness of current cutting edge technologies, availability of these technologies for such small scale operations, reluctance of technology vendors to service such small scale operations as the transaction costs are relatively higher for small ticket clients and lack of after sales service and the associated costs and access to finance to procure. Moreover, the management and workers require capacity building and customized training to operate new and improved technologies.	Zig Zag conversion projects often include improved waste management systems to minimize the release of these wastes into the environment. Proper handling, treatment, and disposal of waste can prevent contamination of soil and water resources, protecting both the environment and human health. Include an environmental compliance report as part of the condition to disburse subsidy to the enterprises/ industries.	Knowledge base for upgrading to more advanced technology for brick kiln sector increased. Greater number of MSMEs relying on common steam facilities and reduced use of individual boilers A higher share of construction permitted in UP is applying good dust mitigation practices.
TRANSPORT Preparation and implementation of a program/scheme for disposing/phasing-out / replacement of HD trucks of BS III & below replacing with the new trucks (BS VI & above) Drivers training on fuel efficient driving & clean operation and maintenance.	The elimination of old HD trucks through environmentally safe disposal needs to be ensured. Improper dismantlement, reuse, recycling, and disposal of vehicle parts/wastes/ batteries may result in adverse environmental impacts of soil, air, and water, as well as health. impacts on plant workers involved in dismantling vehicles.	To mitigate this risk, the DLI related to replacing old requires evidence that the trucks were disposed of in official. dismantling enterprises. The activities supported under the Program do not include any construction/upgrading of dismantling.	Old and polluting heavy duty trucks scrapped and off the road or replaced with new and cleaner fuel trucks, positive impacts on air quality and safety.

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
Preparation of Comprehensive Mobility Plan (CMP) combining Electric Mobility Planning (CEMP), Freight management planning (FMP), and route rationalization plan for public transport & IPT for 2 cities (Lucknow & Varanasi) Deployment of e-buses for intracity transport in 2 cities on Gross Cost Contract (GCC) Preparation of fleet modernization plan, scheme & program for induction of the electric 3wheeelers (e-3W). Deployment of electric three wheelers in 2 cities with women as beneficiaries Capacity building and training of UPSRTC, department of transport, directorate of urban transport, Bus SPVs, metro corporations. Operationalization of a State level Unified Metropolitan Transport Authority (UMTA) with enhanced capacity and control over the urban transport fund budget allocation to oversee urban mobility in the metropolitan areas.	At present, there are over 30 licensed vehicles. dismantling enterprises in UP. The compliance with the latest standards/technical specification will be assessed through audit in this program. Vehicle scrapping produces a significant amount of waste, including metals, plastics, glass, and other non-recyclable materials, contributing to landfill wastes. Expanding electric vehicle and bus charging infrastructure can require land use changes, construction impacts, and increased energy demand for infrastructure development- such as new parking spaces for charging stations, optimize the placement of charging stations to reduce congestion and demand for public spaces.	enterprises. There is already a process in place to verify scrapping of HDVs. When the official scrapping facilities receive a vehicle, they issue a certificate of deposit. When the vehicle is scrapped, the facility issues a certificate of scrapping against the vehicle registration, which is connected to the central portal of government of india (VAHAAN) to verify the vehicle is scrapped. Encourage the use of certified recycling facilities to maximize the recovery of valuable materials from end-of-life vehicles. Scrapping facilities should implement measures to ensure proper waste sorting, recycling, and disposal, reducing the amount of waste sent to landfills. Promote the proper recycling and disposal of fluids, such as oil, coolant,	Increased number of electric transport modes available for public transport- reduction in pollution, road dust, and vehicle fitness improved.

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
		and brake fluid, through certified recycling programs. Introduction of pedestrian alert systems and other devices on electric vehicles and buses to enhance safety. Raise awareness among road users about the new electric vehicles. Introduce an environmental screening mechanism for selection of sites for e-vehicle infrastructure development.	
AGRICULTURE Increase availability of slow and control release fertilizers and nitrogen inhibitors in select areas Provide extension services to farmers to adopt efficient fertilizer use based on soil testing and improved varieties**.** Provide access to farmers to modern livestock and manure management practices, to store manure. **.**	Livestock waste management in rural areas and cow sheds is mostly handled by individual farmers and is not normally supervised by the departments/ officials. There is inadequate infrastructure for collecting and storing manure. Waste is directly left in the open and causes contamination of the air and surface water. Management of organic manure, disposal of sludge, the need for wastewater treatment,	The activities supported under the Program will address this issue by focusing on livestock waste management practices. This should be supported through active supervision by department officials, and capacity building programs to the farmers to reduce pollution levels from livestock waste storage.	Best practices in improved fertilizer, livestock and manure management extended to farmers. Efficiency of fertilizer application minimizes nutrient losses to the environment and have positive effects on crop productivity. Alternatives to crop residue burning, including biogas

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
Promote on-farm monitoring system for NUE through available technologies and practices	odor control, and other impacts associated with the operation and maintenance of biogas facilities and pipelines. The potential risks associated with the biogas facilities are fire and explosion. There are no risks associated with the adoption of slow and control release fertilizers and nitrogen inhibitors. Nitrogen-based fertilizers release ammonia which contributes to the formation of secondary (PM2.5), this reduction will have a positive impact on air quality. The Program will support the adoption by farmers of environment-friendly, slow-release formula fertilizers based on the results of soil testing and nutrient needs.	Adverse environmental impacts and risks can be adequately avoided, minimized and mitigated with good management practice and mitigation measures in accordance with State regulations. This needs to be supported with training and capacity building for operators of the biogas plants. Fertilizer use efficiency these can be complemented with precision agriculture, proper timing and placement of fertilizers, soil testing, and nutrient management planning. Additionally, adopting sustainable agricultural practices like organic farming, crop rotation, and cover cropping can reduce the reliance on synthetic fertilizers and minimize their environmental footprint	production reduce air pollution, and soil degradation Odour management through improved practices and storage of manure

Program Activities/Inputs	Risks	Mitigation/Risk Management	Benefits/Opportunities
RA#3: IGP AIRSHED COOPERATION			
DOT to develop a program for scrapping most polluting BS-III and below HDVs UP DOT and UP DoEFCC designate and fund technical and government official representatives for participation in IGP Airshed technical ***dialogues*** on long range emissions from transportation. UP DOT Plan/Program established for scrapping heavy duty vehicles for non-BS, BSI, BSII HD Vehicles through a graded incentive based on vehicle age and fuel type. Driver training on fuel efficient driving and clean operations and maintenance UP organises inter IGP State dialogues to motivate IGP States to agree upon development for regional airshed action plan for IGP under the support of World Bank and consortium of technical institute	As this Results Area will mainly finance technical assistance activities, knowledge sharing and human resource capacity the environmental risks are low. The objectives of the studies, working groups and governance arrangements will positively impact environmental parameter on air quality, public health, and fuel quality.	The success of these initiatives depends on effective policy design, implementation, and enforcement. Additionally, monitoring and evaluation are critical to assessing the actual environmental impacts and adjusting strategies as needed. Implementing a vehicle scrapping program also involves managing the disposal of scrapped vehicles. Proper recycling and disposal practices are essential to prevent environmental contamination and ensure that hazardous materials are handled safely.	Improvement in data collection, monitoring, reporting, and knowledge sharing on air quality management issues Awareness, orientation and capacity building of Environment Departments/Pollution Control Boards of IGP.

ASSESSMENT OF SOCIAL MANAGEMENT SYSTEMS

50. This section describes the activities to be implemented under each of the results areas followed by a discussion of the potential environmental and social effects that could arise from each activity. The sections below summarize the environment and social risks of the Program, followed by the environmental and social effects grouped under each results area.

SOCIAL BENEFITS AND OPPORTUNITIES

51. The operation is expected to result in improved air quality in select sectors and pollution hotspots, energy efficiency and cost saving, reduction in emissions, dust and air pollution, long term climate benefits, reduction in household level health expenditure which will lead to improved health and overall wellbeing of the state's residents and those living in the Indo- gangetic plains. It will also contribute to mitigation of any adverse CHS impacts related to the intervened sectors. The program is also expected to improve public awareness about air quality issues through awareness generation, proactive public disclosure of air quality related information for improved transparency. Access to efficient cooking solutions at the household level is expected to contribute to the health of women members of the household, , including those belonging to tribal communities and overall time saving for use in other productive engagements, while the interventions in the agriculture and animal husbandry sectors is likely to improve farm level efficiencies, enhanced farm and livestock productivity and alternate uses of crop residue resulting in likely improvements in incomes. In addition, shifting to cleaner energy by micro-enterprises which will be incentivized by the project is expected to result in reduced OHS risks for workers, reduction in production costs and improved incomes for the enterprise owners, while project investments in the transport sector are expected to improve public transport infrastructure leading to improved mobility for commuters and income earning opportunities for the women owners of electric three-wheelers.

52. LIKELY SOCIAL EFFECTS: The social risks and impacts of the project investments are expected to be low, reversible, localized and most of them are expected to be managed through the mitigated strategies built into the project design as well as additional management measures. The project is not expected to lead to land acquisition and land requirements, if any, are expected to be met from the existing government premises or public lands. In the absence of information about the exact locations on which new infrastructure for air quality monitoring, testing laboratories and offices will be created, there is likely risk of such lands (especially in the transport sector) not being unencumbered and may potentially have presence of squatters or encroachers, who may get displaced during infrastructure development or create restrictions to access. The scale of construction supported by the project is of moderate scale and is not expected to deploy large labour workforce for prolonged durations. Most of the labour used will be local and in largely urban and peri-urban areas and is not likely to lead to labour influx and its related SEA/SH risks. There are likely OHS risks for workers engaged in construction activities, vehicle scrapping, re-configuration of brick- kilns, creation of EV charging facilities, apart from CHS risks for those operating cook-stoves, decentralized bio-gas plants and using EVs. While the project's intent to

mainstream stakeholder engagement will contribute to increased general awareness and positive behaviour change around pollution reduction and air quality improvement, there are risks of women, smallholders, small dairy farmers, members of poor households from getting excluded from receiving benefits of investments proposed under result area 2 if effective measures for their inclusion and grievance redressal are not in place. The shifts towards cleaner and efficient energy sources and solutions are also likely to adversely impact the livelihoods of those engaged in the traditional or business as usual value chains –domestic fuelwood suppliers, workers in traditional brick-kilns, single truck owners and hired drivers.

The scale of livelihoods related adverse impacts will emerge from the type and location of the interventions proposed, especially in the transport and industry sectors. Once the scale and sites are clear, it will be important that the project undertakes a project wide assessment of livelihoods losses that may result owing to energy transitions attributable to project investments and propose measures for the restoration of the livelihoods or incomes lost. This will help in prioritizing the selection of those impacted by the operation for providing project benefits, engaging them in the new value- chains or for linking them with other beneficiary-oriented scheme and programmes of the government.

Table 7. Social Risk Screening

Proposed Investments/ activities	Potential Social Risks	Mitigation Measure/s
RA#1: STRENGTHENING STATE CAPABILITIES FOR AIR QUALITY MANAGEMENT AND PLANNING		
Establish AQM units and Integrated Air Information Center, upgrade manual monitoring stations (MMSs) and Continuous Ambient Air Quality Monitoring stations (CAAQMs) Strengthen AQM Knowledge Centres at select academic Institutions, support development of software for AQM monitoring across departments QA/QC studies on operational efficiency of CEMS, setting up of Technology challenge fund on innovative air pollution measures Training needs assessment and training of staff in DoEFCC and implementing departments	Establishment of units, upgradation of Information and Knowledge Centers will require setting up of new offices, construction of buildings likely to be situated within existing premises. However, since exact sites are not known at this stage, these sites may not be encumbrance free leading to risk of displacement of squatters and encroachers on these public lands. Occupational Health and Safety (OHS) risks for workers engaged in building (offices, labs, monitoring stations) construction, facility upgradation and installation of equipment. Low awareness among community members about importance of air quality and its relation to well-being.	All potential sites need to be screened for adverse resettlement impacts, including physical and economic displacement. Ensure effective contract management to ensure worker safety and fair working conditions. Code of Conduct for workers to prevent SEA/SH risks and training of workers on safe practices. Public awareness generation around issues of poor air quality and its adverse health impacts. Support to resettlement of persons displaced owing to setting up of new AQM infrastructure and buildings.
RA#2: ADVANCING SECTOR-SPECIFIC INTERVENTIONS FOR AIR POLLUTION REDUCTION		

Proposed Investments/ activities	Potential Social Risks	Mitigation Measure/s
CLEAN COOKING Supply of Improved cook stoves using pellets/ household biogas /Hybrid solar and electric induction. Setting criteria for cook stove technology, vendor empanelment, establishing testing protocol for vendor cook stove product testing Train and support SHGs and entrepreneurs on clean cooking business models, market facilitation; leverage existing program with finance and credit products (Community Incentive Fund, Results Based Grants) to incentivize the supply chain.	Switch to household level clean cooking solutions has been challenging and unsustainable in the past, owing to cultural, supply chain and technological reasons. Risk of social benefits of this project component not being sustained beyond the project cycle. Community Health and Safety (CHS) risks for beneficiaries, especially women, in case of poor O&M. Risk of exclusion of women headed or poor- vulnerable households owing to low affordability in a market based delivery model or sub-optimal targeting of financial incentives. Risk of livelihood losses for headload/ fuelwood suppliers to targeted households owing to switch to cleaner sources	Effective public awareness and behaviour change campaigns addressing the cultural and behavioural issues to prevent slippage to traditional methods. Ensure adequate incentives and credit support for SLRM- SHG networks and frontline workers to work as a viable and sustained delivery model. Adoption of cook stove models which are safe and simple to use and maintain by members of vulnerable communities. Ensure inclusive measures to support economic access for poor and vulnerable households and effective targeting**.** Project wide assessment of livelihoods losses owing to energy transitions attributable to project investments and adoption of measures for their livelihood'**s** restoration.
MSME Brick-kiln technology upgradation designed and rolled out in select pollution hot spots and knowledge sharing on technology conversions**.** Policy on development of common steam facilities – CSF for MSME clusters; design incentive program for adoption of clean	Higher OHS risks for brick kiln workers due to shift to new technology and for workers operating the CSFs in MSME clusters as well as the energy receiving units. Potential loss of livelihoods for traditional brick kiln workers if new technology requires lesser worker deployment as compared to traditional methods.	All potential sites need to be screened for any adverse E&S impacts, including economic displacement. Training and awareness of brick kiln workers to adapt to new technology and safety measures to minimize OHS risks**.** Project wide assessment of livelihoods losses owing to energy transitions attributable to project investments and adoption of measures for their livelihood'**s** restoration.

Proposed Investments/ activities	Potential Social Risks	Mitigation Measure/s
fuel (PNG) and better air pollution controlling devices. Training and awareness on good practices for dust control in construction and industrial site, cleaner technologies through engagement with stakeholders	Risk of exclusion of micro- enterprises in the clusters owing to inability to afford switching or pollution controlling costs	Training and awareness of workers engaged in CSFs, client units to adapt to new technology and minimize OHS risks. Ensure inclusive measures to improve clean energy access for micro-enterprises
TRANSPORT Preparation and implementation of a program for disposing/phasing-out /replacement of old HD trucks and drivers training on fuel efficient driving, operation, and maintenance. Preparation of Comprehensive Mobility Plan (CMP) and route rationalization plan, including induction of e-buses for intra-city transport, electric three wheelers with women as beneficiaries, roll-out of National Common Mobility Card (NCMC) for 2 cities. Capacity building and training of government stakeholders in transport sector and Operationalization of State level Unified Metropolitan Transport Authority (UMTA) to oversee urban mobility in metropolitan areas.	Livelihood loss for single truck owners identified for phase out and drivers of fleet operators. OHS risks for workers engaged in vehicle scrapping. Risk that mobility plans may not adequately consider needs of women, people with disabilities (PWD) or other vulnerable commuters (migrant workers and daily wage workers, domestic workers) SEA/SH risks for women operators of 3-wheeler EVs EV charging and associated infrastructure may require spaces within existing public or private facilities that are not unencumbered. OHS risks related to installation of charging stations, EV maintenance and CHS risks due to thermal runway or poor battery use, maintenance, or disposal. Exclusion of poor and vulnerable from the NCMC pilot/ roll-out due to low awareness	All potential sites need to be screened for any adverse E&S impacts, including economic displacement. Project wide assessment of livelihoods losses owing to energy transitions attributable to project investments and adoption of measures for their livelihood's restoration. Training and awareness of workers engaged in scrapping facilities, EV battery charging stations on safe practices. Comprehensive mobility planning to ensure consultations with all stakeholders, including those from vulnerable groups and women, to incorporate their mobility needs. Stakeholder engagement strategies to include a) awareness and sensitization of commuters on GBV and SEA/SH issues, b) awareness of women drivers on SEA/SH risk prevention and referral pathways, c) awareness and orientation of EV drivers on safe driving and battery O&M, d) public awareness on benefits of NCMC.

Proposed Investments/ activities	Potential Social Risks	Mitigation Measure/s
AGRICULTURE Increase availability, extension services for adoption of Nano fertilizers and nitrogen inhibitors in select areas t**hrough** promotion of 4R nutrient stewardship and Precision Nutrient Management Practices (PNMPs) Provide farmers access to modern livestock and manure management practices. Increase access to farm machinery, equipment to improve crop residue management and promote adoption of alternatives to crop residue burning and promote on-farm monitoring systems for nitrogen use efficiency	Exclusion of small agri /dairy farmers and vulnerable farmers (tribal, women, small & marginal) a) due to inability to pay for more efficient fertilizers & related Ag-inputs, modern AH, and manure management practices, accessing machinery and equipment for crop residue management (due to unviability or low affordability), b) from adopting alternate crop residue management practices due to low awareness. Adverse impact on farm productivity owing to shift to new nutrient management system or due to changes in traditional farming practices. Adverse CHS impacts of household level biogas plant's O&M and transport/ supply of CBG by farmers to neighbouring industries and communities	Build measures and incentives to ensure inclusion of smallholders and small dairy farmers**.** Agricultural extension support**s** and handholding as well as farmer's capacity building to ensure no adverse impacts on farm and dairy productivity due to changed practices**.** Stakeholder engagement and project strategies to include awareness and capacity building on handling of decentralized bio-gas plants and their safe transportation**.**
RA#3: IGP AIRSHED COOPERATION		
UP DOT and UP DoEFCC designate and fund technical and government official representatives for participation in an IGP Airshed technical working group on long range emissions from transportation**.** DoEFCC to participate in an IGP working group on AQM, including a	No adverse social impacts assessed, since these largely relate to improved coordination mechanisms and studies for improved air quality management and its governance.	Better coordination among agencies and improved diagnostics is likely to improve accountability around AQM

Proposed Investments/ activities	Potential Social Risks	Mitigation Measure/s
governance process around state emission inventories. UP Department of Rural Development and Department of Environment Forest and Climate Change to designate both technical and government official representatives to participate in an IGP Airshed technical working group on clean cooking		

III ASSESSMENT OF ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEMS AND IMPLEMENTATION CAPACITY

A. INTRODUCTION

53. This section provides a summary assessment of whether the Program's environmental and social management systems are adequate for and consistent with the Core Principles and Key Planning Elements contained in the PforR Policy, as relevant to the Program. It also assesses whether the involved institutions have the requisite capacity to implement these systems' requirements. An in-depth description and analysis of the Program's systems and implementation capacity and gaps are in annex 2.

54. As noted earlier, the PforR Policy requires the proposed Program to operate within an adequate environmental and social management system that can manage environmental and social effects (particularly adverse impacts and risks) identified during the ESSA process. This includes (a) an adequate legal and regulatory framework and institutional setting to guide environmental and social impact assessment and the management of environmental and social effects and (b) adequate institutional capacity to effectively implement the requirements of the system.

55. **This section assesses whether the Program's environmental and social management systems are consistent with the Core Principles and Key Planning Elements contained in the PforR Policy and whether the involved institutions have the requisite capacity to implement these systems' requirements**. Both elements (for example, Program systems and capacity) are necessary toward ensuring that the environmental and social effects identified in Chapter II are effectively managed. Through both analyses, the ESSA team has identified gaps in both areas, which are addressed in Inputs to the PAP and Supplemental actions.

56. Program systems constituted by the rules and "arrangements within a Program for managing environmental and social effects," including "institutional, organizational, and procedural considerations that are relevant to environmental and social management" and that provide "authority" to those institutions involved in the Program "to achieve environmental and social objectives against the range of environmental and social impacts that may be associated with the Program." This includes existing laws, policies, rules, regulations, procedures, and implementing guidelines, and so on that are applicable to the Program or the management of its environmental and social effects. It also includes interagency coordination arrangements if there are shared implementation responsibilities in practice.

57. Program capacity is the 'organizational capacity' of the institutions authorized to undertake environmental and social management actions to achieve effectively 'environmental and social objectives against the range of environmental and social impacts that may be associated with the Program'. This ESSA has examined the adequacy of such capacity by considering, among other things, the following factors:

- Adequacy of human resources (including in training and experience), and other implementation resources allocated to the institutions.
- Adequacy of institutional organization and the division of labor among institutions
- Effectiveness of interagency coordination arrangements where multiple agencies or jurisdictions are involved.

- The degree to which the institutions can demonstrate experience in effectively managing environmental and social effects in the context in projects or programs of similar type and magnitude.

58. This ESSA examines and discusses only those aspects of the proposed Program's environmental and social management systems and related capacity that the ESSA team found to be relevant considering its identified environmental and social effects. This section provides a summary assessment of the Program's systems and capacity as they relate to each of the Core Principles and Key Planning Elements. The text and tables below clarify the instances in which one or more of the Core Principles or Key Planning Elements are not relevant to the Program and are thus inapplicable. More in-depth discussion and analysis of the Program's systems and capacity are found in annex 2.

59. Overall, the applicable environmental regulatory environment is comprehensive to address underlying environmental and social risks, and noteworthy strengths are Environmental Protection Act 1986; Air (Prevention and Control of Pollution) Act, 1981 (to take measures to mitigate air pollution) and Water (Prevention and Control of Pollution) Act, 1974 (to prevent and control water pollution by regulating the discharge of pollutants into water bodies) and the Occupational Safety, Health and Working Conditions Code, 2020:

60. Some of the key environmental laws and regulations include the Environment Protection Act (EPA) of 1986, the Water (Prevention and Control of Pollution) Act of 1974, the Air (Prevention and Control of Pollution) Act of 1981, and the Forest (Conservation) Act of 1980, among others. They aim to protect and improve the quality of air, water, and land, as well as safeguard biodiversity. These laws establish the regulatory framework for pollution control, environmental impact assessments, waste management, and conservation of natural resources. While the legal framework is comprehensive, its implementation has faced challenges. Improving enforcement mechanisms by the UPPCB, and enhancing public participation are key areas that require continuous attention and improvement to achieve better environmental outcomes, that will be done through the Program.

61. Environmental regulations, for air and water pollution, waste management, are institutionalised for management all MSME, industrial and biogas plants ensuring sound environmental management of these facilities. Agriculture policies promote a circular economy approach through sustainable practices for managing crop residues for various purposes like composting, bioenergy, and fodder ensuing that surplus agriculture waste is not burned. The government has also mandated periodic fitness testing for commercial vehicles at authorized testing centers and fitness certificates are required for all vehicles on the road.

62. There are also policy-based incentives and guidelines that support better environmental outcomes in each sector linked to the project results these include:

- **Agriculture:** Nutrient-Based Subsidy (NBS) Scheme. Under this scheme, the government provides subsidies based on nutrient content rather than specific fertilizers. It promotes the balanced use of fertilizers by considering the nutrient requirements of different crops and regions. The NBS scheme aims to encourage the use of secondary and micronutrients along with major fertilizers. The government of India has encouraged the use of organic and biofertilizers as an alternative to chemical fertilizers. The National Project on Organic Farming (NPOF) and the National Program on Organic Production (NPOP) promote the production and use of organic inputs. The Fertilizer control order also defines standards for organic and biofertilizers. The government provides subsidies and financial assistance for the production,

promotion, and use of organic and biofertilizers. Various schemes like the National Mission for Sustainable Agriculture (NMSA) support organic farming practices.

- **Transport:** The government has mandated periodic fitness testing for commercial vehicles at authorized testing centers. Fitness certificates are required for vehicles to operate legally on Indian roads. All vehicles, including both old and new, undergo regular emission testing and obtain a valid Pollution Under Control certificate ensuring that vehicles comply with the prescribed emission norms. The Central Pollution Control Board (CPCB) in India has issued guidelines and regulations for the management and disposal of end-of-life vehicles. These regulations aim to promote environmentally friendly dismantling, recycling, and disposal of vehicles. Guidelines for authorized scrap dealers and dismantlers who handle the scrapping and recycling of vehicles ensure that the process is carried out safely and in an environmentally responsible manner.
- **MSME:** MSMEs are required to obtain environmental clearances before commencing operations, especially if they fall under industries classified as highly polluting or having potential environmental impacts. In industrial clusters where multiple MSMEs are located, the establishment of Centralized effluent treatment plants is encouraged. These treatment plants help in the centralized treatment and disposal of effluents generated by MSMEs, ensuring compliance with environmental standards. MSMEs generating hazardous waste need to comply with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. These rules provide guidelines for the collection, storage, transportation, treatment, and disposal of hazardous waste generated by MSMEs. MSMEs are encouraged to implement environmental management systems (EMS) such as ISO 14001. These systems help MSMEs in identifying and managing their environmental impacts effectively and promoting continuous improvement in environmental performance.

- **Clean cooking:** Government of India has made several efforts in approaching both rural and urban population with clean cooking solutions. The Pradhan Mantri Ujjwala Yojana (PMUY) provided subsidized LPG cylinders to semi-urban and rural households in entire nation. Uttar Pradesh has alone has provided 17 million LPG connections in the state. After success of Ujjwala, focus has been now shifted to electric cooking and is a key pathway to Mission LiFE (Lifestyle for Environment), an India-led global mass movement to nudge individual and community action to protect and preserve the environment. Launched by Prime Minister Narendra Modi at the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow in 2021. Other than this, schemes like National Biogas and Organic Manure Programme (NBOMP) provides financial assistance to beneficiaries for installation of biogas digestor (2-4 m3) in their household. Indian Oil Corporation Ltd. (IOCL) is providing Surya Nutan, an indigenous indoor solar cooking system design, developed and patented by IOC R&D Centre. Pilot trial of 50 numbers of Surya Nutan in 5 different cities (i.e., Leh, Lakshadweep, Gwalior, Udaipur, and Delhi-NCR) of India with varying solar radiation intensity and cooking habits are in progress. Energy Efficiency Services Limited (EESL) plans to initiate market-based interventions for electric and solar Induction cooking solutions by leveraging carbon financing for a financially and environmentally sustainable market model.

- **Green Financing:** Financial institutions and banks in India offer green credit and preferential loans to MSMEs engaged in environmentally friendly practices or adopting eco-friendly technologies. These incentives help MSMEs in implementing green initiatives and reducing their environmental footprint. The Ministry of Micro, Small and Medium Enterprises (MSME) promotes sustainable manufacturing practices among MSMEs. It provides guidelines,

workshops, and training programs to create awareness and encourage MSMEs to adopt cleaner production techniques and resource-efficient practices. The MoEFCC and CPCB promote the adoption of Zigzag Firing Technology in brick kilns. This technology optimizes the firing process, reducing fuel consumption and emissions. It involves a specific pattern of placing bricks in the kiln, allowing for more uniform heat distribution and improved combustion efficiency.

63. Overall, the national and state level policies were found to be adequate to address the social risks related to the project investments, including those for ensuring occupational safety for workers and fair working conditions, grievance redressal and access to information. These prominently include the Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996, Minimum Wages Act, 1948, Payment of Wages Act, 1936, Payment of Gratuity Act, 1972, Workmen's Compensation Act, 1923, Maternity Benefit Act, 1961, Inter-State Migrant Workmen (Regulation of Employment & Conditions of Service) Act, 1979, Motor Transport Workers Act, 1961 and the Right to Information Act, 2005.

64. Relevant policies and procedures of the implementing agency and the participating institutions were largely found to be supportive of people's participation, transparency, promoting equity and aimed at avoidance of resettlement, although there are gaps that may need to be filled. Some of the relevant schemes and their social intent is discussed below:

- **Agriculture:** Developed as part of the National Mission on Sustainable Agriculture (NMSA), the *Paramparagat Krishi Vikas Yojana* (Traditional Farming Improvement Programme) aims to support and promote organic farming, reduction in dependence on fertilizers and agricultural chemicals, improvement in soil health and yields to promote production of Organic foods. This is encouraged through demonstration, dissemination and adoption of eco-friendly, low- cost technologies and through partnership with public agricultural research system. The scheme targets rural youth, smallholders, traders and consumers for promotion of organic farm products.
- **Transport:** The Uttar Pradesh EV Subsidy Scheme provide fixed incentives for scrapping of conventional four and two wheelers as well as purchase of EVs for which a fixed incentive is provided to owners (one per vehicle) and fleet operators (ten per operator) and is applicable to 2W, 3W and 4 Wheelers (excluding trucks). The UP EV Policy promotes expansion of 3W for use in passenger and freight transport and incentivises both scrappage and purchase. However, the eligibility criteria for buyers have not been clearly defined and no preference has been provided for BPL households, People with Disabilities (PwDs) or women buyers. These schemes also do not provide any special (additional) incentive or support for single truck owners of end of life vehicles (BSI or BSII) scrapped.
- **MSME**: Uttar Pradesh Industrial Investment & Employment Promotion Policy 2022 aims at creating land banks for industrial use by pooling of available non-agricultural, barren and uncultivable land after meeting the village requirements, simplifying land use management, unlocking land owned by government/ state public sector and development of web-based platform for private parties (including farmers) interested in lease or sale of encumbrance free

land for industrial purposes. Service providers in industrial clusters are provided space on annual lease.

- **Clean cooking:** The Pradhan Mantri Ujjwala Yojana provides access to clean energy in the form of LPG connections targeting poor households across the country with women members of the households as its primary beneficiary. However, scheme is challenged by issues of sustainability and supply- chain bottlenecks. Ministry of Drinking Water & Sanitation's Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) scheme aims to support villages in effectively managing their cattle, agricultural and other organic waste/residue, contributing to income and energy savings and in the process also create livelihood opportunities, enhance farmer's incomes and promote entrepreneurship among SHGs and rural youth by targeting dairy farmers, members of dairy cooperative societies and farmers collectives. The National Biogas and Manure Management Program (NBMMP) promotes adoption of biogas technology for efficient waste management and clean cooking through people's participation, awareness campaigns and technical- financial support to bio-gas plant installation. National Rural Livelihoods Mission (NRLM) also supports women's collectives to establish enterprises promoting clean cooking products and solutions by using their existing 3-tier cooperative structure for market facilitation and delivery.

B. PROGRAM SYSTEMS: LEGAL, REGULATORY SYSTEMS AND FRAMEWORKS

65. The GoI and the state government have enacted a range of laws, regulations, and procedures relevant to managing the environmental and social effects of the proposed Program. Table 8 lists legal instruments that manage the pollution streams, wastes, wastewater, infrastructure, labor, OHS, community/public health and safety, and building safety (life and fire safety) related aspects relevant to the Program results areas.

Table 8. GoI EHS Policies Applicable to the Program

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
Environment Protection laws/ pollution prevention			
1	Environment Protection Act 1986	The Environment (Protection) Act was enacted in 1986 with the objective of providing for the protection and improvement of the environment. It empowers the Central Government to establish authorities [under section 3(3)] charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems that are peculiar to different parts of the country. The Act was last amended in 1991.	Relevant to the program as this act has mandate of preventing pollution in all its forms. The program focusses on air pollution as of the main challenge in Uttar Pradesh state and program supports for an implementation program both in strengthening all sectors and institutional capacity of the state.

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
2	The Air (Prevention and Control of Pollution) Act 1981, Amended 1987 and Rules	To provide for the prevention, control, and abatement of air pollution in India	Relevant to all the sectors that are dealt with such as biomass burning in residential sector, NOx and Sox produced from transport, roadside dust emissions, disposal of municipal waste and leading to unnecessary waste burning, excessive fertilizer use in agriculture sectors leading to formation secondary particulate matter, agriculture residue burning, emissions from power plants, emissions from MSME using technology leading to non-cleaner production.
3	Water (Prevention and Control of Pollution) Act, 1974:	This act addresses water pollution by regulating the discharge of pollutants into water bodies, setting up standards for water quality, and establishing central and state pollution control boards to monitor and enforce compliance.	Brick kilns, biodigesters and small-scale enterprises all generate slurry and wastewater discharges that could contaminate water bodies. The policy sets the standards and monitoring protocols for effluent management
4	National Ambient Air Quality Standards (NAAQS)	To combat air pollution, it is required to identify the pollutants, its source of emission and investigate the effects of living and the environment. The Central Pollution Control Board has notified the revised National Ambient Air Quality Standards Gazette of India, Extra-ordinary Part-II Section 3, sub section (ii), dated Nov 18, 2009	Relevant as the program aims to achieve the proposed target of 35ug/m3 for Uttar Pradesh which is below set national standard of 40 ug/m3
5	Solid Waste Management Rules, 2016	Apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.	Waste generated in urban and rural areas will be managed though SWM interventions. Storage, transport, handling, recycling/reuse, disposal of solid wastes including packaging materials under all Program activities.
6	Plastic Waste Management Rules 2016	All institutional generators of plastic waste shall segregate and store the waste generated by them in accordance with the Solid Waste Management Rules and hand over segregated wastes to authorized waste processing or disposal facilities or deposition centers, either on its own or through the authorized waste collection agency.	Relevant as one of the sectors dealt is treating municipal waste in planned manner and waste burning which will include plastic waste.
7	E-waste (Management) Rules, 2016	Applies to every manufacturer producer, consumer, bulk	Relevant as it is applicable for consumers or bulk consumers. The disposal of E-

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
		consumer, collection centers, dealers, e-retailer, refurbisher, dismantler, and recycler involved in manufacture, sale, transfer, purchase, collection, storage, and processing of e-waste or electrical and electronic equipment listed in Schedule I, including their components, consumables, parts, and spares which make the product operational but shall not apply to (a) used lead acid batteries as covered under the Batteries (Management and Handling) Rules, 2001 made under the Act; (b) micro enterprises as defined in the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006); and (c) radioactive wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and rules made thereunder.	wastes to be done at the specified collection centers and reported annually. applicable to all programs, where e-waste is generated including electrical/electronic equipment. As per rules, the manufacturer must collect back e-waste and channelize for collection/disposal; producer (seller of the assembled product under own brand) shall arrange end-of-life disposal under extended producers' responsibility and create awareness on this; collection centers established by producer/dealer (lighting agencies/dealers) can also collect e-waste on behalf of dismantler, refurbisher, and recycler including those arising from orphaned products.
8	Construction and Demolition Waste Management Rules 2016	The rules shall apply to every waste resulting from construction, re-modelling, repair, and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.	Relevant for any small-scale civil works carried out to ensure that dust generated from construction and demolition waste is managed appropriately at each work site.
Transport			
9	Motor Vehicle Act, 1988	An Act to consolidate and amend the law relating to motor vehicles.	Relevant as there will be change in existing HDV fleet and public buses to cleaner emission (BS VI or better) buses and trucks replacing an old fleet which is scrapped. This law would regulate the new fleet on the road including updating Number of
10	Voluntary Vehicle Fleet Modernization Program (V-VMP) and Vehicle Scrappage Policy:	The V-VMP is a policy aimed at incentivizing the replacement of old, polluting vehicles with new ones. Under this program, vehicles older than 15 years are eligible for voluntary scrapping, and vehicle owners receive incentives or discounts when purchasing new vehicles.	Interventions under the project will be consistent with the policy objectives and will aim at incentivising further to achieve good air quality outcomes.

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
		The Indian government announced a new Vehicle Scrappage Policy in 2021 to promote the scrapping and recycling of old vehicles. The policy primarily targets commercial vehicles such as trucks and buses. It proposes mandatory fitness testing for vehicles aged 20 years for personal vehicles and 15 years for commercial vehicles. Non-compliant vehicles will be liable for higher fees and penalties.	
11	THE MOTOR TRANSPORT WORKERS ACT, 1961	Provides for the welfare of motor transport workers, regulates the conditions of their work, including hours of work and their health-provision of canteen, restrooms, medical and first-aid facilities, daily and weekly rest, prohibition of child labour, compensatory leave in motor transport undertakings with more than 100 workers.	Applicable, as the project will support capacity building of workers for safe driving, scrapping of polluting vehicles and switch to EVs that are operated by these workers. Compliance with provisions of this act will be monitored.
Agriculture/ Rural			
12	The National Policy for Management of Crop Residue, 2014:	This policy aims to promote sustainable and environmentally friendly practices for managing crop residues, especially the residues from paddy and wheat crops. It encourages the use of residue for various purposes like composting, bioenergy, and fodder.	Interventions under the project will be consistent with the policy objectives and incentive structures.
13	Uttar Pradesh State Bio-Energy Policy,2022	Under this policy, Bio-Energy units will be established by the construction, operation, and ownership through private investors/developers based on attraction by various facilities and incentives provided by the state government.	The policy is relevant to the management of the Bio-Manure obtained as a by-product from Bio-CBG plants can be distributed as organic manure produced by Bio Energy units.
14	Environmental Guidelines for Compressed Biogas/ bioCNG plants	BioCNG plants need to comply with national and local regulations related to air and water pollution control. This includes monitoring and controlling emissions from biogas production, storage, and utilization processes. Adequate	Biogas facilities in India need to comply with various environmental regulations, such as those related to air and water pollution, waste management, and environmental impact assessments These regulations are enforced by the Ministry of Environment, Forests and

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
		measures should be taken to minimize air pollutants, such as methane, volatile organic compounds (VOCs), and odorous gases. Wastewater generated during the process should also be treated before discharge.	Climate Change (MoEFCC) and State Pollution Control Boards (SPCBs). State Renewable Energy Development Agencies (REDA) are responsible for implementing these policies.
Occupational Health and Safety			
15	Factories Act 1948	Provides regulations for the safety, health, and welfare of workers in factories, including provisions for cleanliness, ventilation, lighting, and drinking water. Requires factories to take measures to prevent accidents and ensure the use of safety devices and protective equipment.	Applicable for labour employed in larger enterprises such as vehicle scrapping facilities- Sets limits on working hours, overtime, and employment of young workers. Mandates the appointment of safety officers and constitution of safety committees in certain cases. Provides for the inspection and enforcement of safety standards by factory inspectors
16	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	Regulates the working conditions and welfare of construction workers. Requires the registration of construction workers, provision of welfare measures, and safety training.	Relevant for worker welfare and safety. the act Mandates the establishment of safety committees and the adoption of safety measures at construction sites. Provides for the inspection and enforcement of safety standards by inspectors. State has a functional BOCW Welfare Board and offers a host of schemes related to maternity and girl child support, scholarships; skilling support; critical illness treatment, death and disability assistance, family pension and schemes to create awareness on entitlements and benefits. The Board tracks schemes access through a Labour Management Information System- LMIS.
17	The Occupational Safety, Health, and Working Conditions Code, 2020	This is a recently enacted comprehensive code that consolidates and modernizes existing labor laws related to occupational safety, health, and working conditions. It covers various aspects, including safety, health, welfare, working hours, leaves, and social security for workers in all establishments	Relevant for worker welfare and safety The code provides for the appointment of safety officers, constitution of safety committees, and the establishment of occupational safety and health advisory boards. It also introduces provisions for the protection of workers in hazardous occupations and enhances penalties for non-compliance with safety standards
18	MoEFCC Emission Standards for Brick Kilns	The MoEFCC and CPCB have set emission standards for brick kilns to limit air pollutants released during the brick-making process.	Brick kilns are required to obtain environmental clearance from the relevant authorities before establishing or expanding their operations. This

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
		These standards specify the maximum allowable concentrations of pollutants such as particulate matter (PM), sulphur dioxide (SO2), nitrogen oxides (NOx), and carbon monoxide (CO).	clearance process ensures that environmental considerations are considered, including air pollution control measures, waste management practices, and compliance with emission standards.
19	Right to Information Act, 2005	Provides a practical regime of right to information for citizens to secure access to information under the control of public authorities.	Provides framework for disclosing information to the public including air quality data, financial information, and environmental clearances. The act (a) sets out obligations of public authorities with respect to provision of information; (b) requires designating a Public Information Officer; (c) sets out process for any citizen to obtain information/disposal of request, and so on; (d) provides for institutions such as Central Information Commission/State Information Commission.
20	The Hazardous and Other Waste Management Rules, 2016	The Hazardous and Other Waste Management Rules, 2016 provide for generation, collection, treatment, transport, import, storage, and disposal of hazardous wastes. Improper storage, handling, transportation, treatment, and disposal of hazardous waste result in adverse impact on ecosystems including the human environment.	Relevant to program for disposal of hazardous waste streams particularly from vehicle scrapping facilities.
Important Guidelines relevant to the Program			
1	XV-FC Technical and Operational Guidelines	The operational and fiscal guidelines are intended for urban agglomeration cities. NCAP non-attainment cities follow the guidelines of the XV-FC. This provides the target for forty-two urban agglomeration (million plus population) cities based upon performance-based grants based on improvement in air quality for period FY 2020-21 to 2025-26 under Million-Plus Cities Challenge Fund (MPCCF) and Rs. 12,139 crores have been allocated.	Relevant to the program as Uttar Pradesh state contains seven urban agglomeration cities (Agra, Allahabad, Ghaziabad, Kanpur, Lucknow, Meerut, Varanasi) which is part of the program and is part of result area 2.
2	CPCB Guidelines for Environmentally Sound	The CPCB has issued guidelines to ensure the environmentally sound management of end-of-life	Relevant to all vehicle scrapping facilities linked to vehicle scrapping under the project. The guidelines

Sl. No.	Applicable Act/ Regulation/ Policy	Objective and Provisions	Relevance to the Program and Key Findings
	Facilities for Handling, Processing and Recycling of End-of-Life Vehicles (ELV)	vehicles in India. These guidelines aim to minimize the environmental and health risks associated with the handling, processing, and recycling of ELVs. The guidelines outline measures for the treatment and disposal of various waste streams generated during ELV processing. These include the management of non-metallic waste, plastics, rubber, glass, and fluids. Treatment methods should focus on recycling, recovery, and safe disposal to minimize waste generation and its impact on the environment.	emphasize the need for authorized collection centers and storage facilities for ELVs. These facilities should adhere to safety and environmental standards to prevent any potential hazards or pollution. ELVs should be dismantled and shredded in designated facilities. The guidelines provide recommendations for safe dismantling practices, including the removal of hazardous materials such as batteries, fuel, and oil. Shredding should be carried out using appropriate technologies to maximize resource recovery and minimize environmental impact. The guidelines also highlight the proper management of hazardous materials found in ELVs, such as lead-acid batteries, mercury switches, and airbags.
3	Guidelines for Continuous Emission Monitoring Systems	The Central Pollution Control Board (CPCB) in India has developed guidelines for Continuous Emission Monitoring Systems (CEMS). These guidelines provide a framework for the installation, operation, and maintenance of CEMS in industries to monitor and control their emissions effectively.	These guidelines aim to ensure accurate and reliable monitoring of emissions from various industries and facilitate compliance with environmental regulations.

C. PROGRAM CAPACITIES: INSTITUTIONAL AND ORGANIZATIONAL ASSESSMENT

ENVIRONMENT AND SOCIAL

Table 9. Institutional Capacity Gaps on EHS and Social Risk Management

Institution	Government Program Institutional Capacity for EHS	Capacity Gap Analysis
Rural Department / SRLM	State Rural Livelihoods mission Swachh Bharat (Rural)	SRLM recognizes the significance of natural resource management in rural livelihoods. It promotes activities such as watershed management, soil and water conservation, afforestation, and sustainable agricultural practices, and enterprises such as (clean cookstoves, energy devices, biomass pellets) SRLMs focus on building the capacity of community institutions, including SHGs, this includes training and awareness programs on sustainable resource use, conservation practices, and climate change adaptation strategies. The SRLM program encourages

Institution	Government Program Institutional Capacity for EHS	Capacity Gap Analysis
		convergence with other government programs and initiatives related to environment. This helps in leveraging resources, sharing knowledge, and implementing integrated approaches to address environmental challenges at the grassroots level. Their Capacity can be expanded to include risks and impacts in associated with the operations of SHG enterprises for clean cookstoves and pellets. Their capacity to access microfinancing can be increased by greater visibility on business lines/ operations that are environmentally friendly. SRLM works entirely through women's collective to ensure the economic and political empowerment of women. However, their capacities will need to be augmented to ensure targeting of project based incentives to vulnerable and poorest households.
MSME	MSME Sustainable (ZED) Certification Entrepreneurship Skill Development Programme (ESDP)	Given that the environmental effects are overall positive, the program is also supporting interventions that are already underway (conversion to zig zag kiln) The MSME department collaborates with various agencies and organizations to promote energy efficiency and cleaner production in the sector, consistent with project results areas. It is already conducting energy audits, awareness programs, and capacity building activities to help MSMEs adopt energy-efficient technologies and practices. The assessment concluded that (i) foundational environment management training and capacity building for staff involved with operationalizing of solid waste management investments was needed and (ii) application of an environmental and social screening checklist in the planning phase to ensure that site selection does not result in any risk to the environment and human health.
UPNEDA	National Biogas and Manure Management Programme (NBMMP) Bio Energy Program	UPNEDA plays a crucial role in identifying suitable sites for renewable energy projects/ Biogas project and facilitating their development. The agency conducts feasibility studies, resource assessments, and site surveys to determine the viability of renewable energy projects. It also assists project developers in obtaining necessary approvals and clearances from relevant authorities.

Institution	Government Program Institutional Capacity for EHS	Capacity Gap Analysis
		UPNEDA conducts training programs and workshops to build the capacity of various stakeholders, including government officials, industry professionals, and local communities. These capacity-building initiatives aim to enhance awareness and understanding of renewable energy technologies, energy conservation, and environmental sustainability and are relevant to the project result areas. Occupational health and safety in management of biogas plants is one area where UPNEDA can build up capacity and awareness. The assessment concluded that UPNEDA will have a planning and supervisory role in the project, but since they would not be implementing investments no separate capacity on EHS would need to be built. Largely their core functions are consistent with positive environmental outcomes.
Agriculture Department	Paramparagat Krishi Vikas Yojana (PKVY) Rashtriya Krishi Vikas Yojana (RKVY) National Project on Organic Farming (NPOF) Pradhan Mantri Krishi Sinchai Yojana (PMKSY) Biogas Development and Utilization Program National Mission for Sustainable Agriculture (NMSA)	Given that the nature of environmental effects is positive and intrinsically embedded in the Program, there is no need for a separate environmental cell or independent stream of environmental management activities. Though there are no environmental risks, there are opportunities to integrate the environmental management in the capacity building – occupational health and safety in management of livestock waste and biogas plants. In terms of environmental performance, the Department of Agriculture is clearly. committed to promote environmentally responsible practices, e.g., the Department is supporting organic farming and similar initiatives to reduce the use of fertilizers and chemicals in agriculture. The assessment concluded that their environment capacity is adequate for the typology of investments to be conducted. While the focus of all major agriculture and dairy programmes is on smallholders and small dairy farmers, level of awareness and access to benefits is lowest among them. Capacities of agri- extension cadres will need to be improved to support improved awareness, adoption of NUE-based Package of Practices

Institution	Government Program Institutional Capacity for EHS	Capacity Gap Analysis
		and efficient manure management among marginal and women farmers.
Transport Department/ UPSRTC	Motor Vehicle Act, 1988 Voluntary Vehicle Fleet Modernization Program (V-VMP) and Vehicle Scrappage Policy	The assessment concluded that no addition cell or unit was needed for EHS management within Transport. The SPV capacity along with the inhouse capacity in DoT were found to be. satisfactory. DoT has in-house capacity in the sector as most high-risk transport projects require EIA and EMP. The ongoing initiatives on EHS capacity building, with the current World Bank Project requires to be continued, and modules of environmental management training should be integrated with all capacity building initiatives through the Program period. Development and implementation of vehicle scrapping program, will be supported through a detailed environment audit to ascertain if corrective actions are needed for EHS management. Application of an environmental and social screening checklist in the planning phase of electric vehicle infrastructure was needed to ensure that site selection does not result in any risk to the environment and human health, and resettlement related adverse impacts The department will need to create capacities on stakeholder engagement and inclusion to ensure development of inclusive mobility plans that address the needs of vulnerable category of commuters, creating awareness on SEA/SH and GBV related risks for women drivers and passengers and for adopting more inclusive measures aimed at PwDs, BPL and women in the State EV policies.
Urban Development	Swachh Bharat Mission Finance Commission Solid Waste Management Grants	The nature of investments is on technical assistance and here will be no civil works or subprojects. A separate environmental cell/ PMU will be established under the project to ensure necessary manpower for investment planning and design and to ensure AQM outcomes. The assessment concluded that (i) foundational environment management training and capacity building for staff involved with operationalizing of solid waste management investments was needed and (ii)

Institution	Government Program Institutional Capacity for EHS	Capacity Gap Analysis
		application of an environmental screening checklist in the planning phase to ensure that site selection does not result in any risk to the environment and human health.

Adequacy and capacity of Environment management systems

66. The majority of implementing agencies of the Program do not have experience with the implementation of World Bank operations. However, as the program intended result areas are largely consistent with positive environmental outcomes and have low- moderate effects. The environmental sector /DoEFCC are not integrally connected with the sectoral environmental issues and the sector departments. Therefore, their expertise is not reaching the sectors. Also, their own expertise is not aligned with the sector experiences being adopted, and the performance being achieved. The SPV Structure will help in bridging these gaps between the environment department and the sectors. The establishment of the UPCAMP SPV/ authority will close many capacity gaps in the management of multi sector EHS systems (with the full-time environmental specialist in place) between environment and the sector departments.

67. There is no separate environmental cell or division in the departments that will be associated with the Program activities. Environmental effects are generally managed within the functions at the various levels of the Department. The UPCA cells established in the implementing entities/ departments can mainstream, EHS and OHS monitoring and training. Overall, in terms of environmental performance, the Departments (Agriculture, MSME, Transport and Rural) are clearly committed to promote environmentally responsible practices. Their capacity was found to be adequate and can be further strengthened as outlined in the PAP and POM.

SOCIAL

Adequacy and capacity of social management systems

68. The implementing agency and most of the participating institutions (other than rural development and to some extent agriculture departments) have low capacities related to social risk management and limited experience of engaging with communities on social issues. These include capacities for ensuring inclusive measures within project interventions, stakeholder and citizens engagement, participatory planning, gender, and social inclusion. The project will need to engage with vulnerable groups of stakeholders like small agriculture and dairy farmers, women members of marginalised and poor households, migrant brick- kiln workers, single truck owners and truck drivers as well as commuters using public transport for intra as well as inter- city travel. To ensure that the social risks and effects flagged in the ESSA are mitigated, reasonable capacities will need to be incorporated within DoEFCC and the participating institutions. The project will need to deploy a full-time social development specialist in the PMU- UPCAMP SPV, assess the capacity gaps and undertake regular training of the staff and consultants of the IA and the participating institutions on identified themes.

69. **Grievance Redressal Mechanism**

The state has a robust grievance redress mechanism (GRM) that is being used by most of the departments and agencies of the state. Since 2018 the Integrated Grievance Redressal System (IGRS) of the Government of Uttar Pradesh integrates the several portals/ software that were independently being used by different agencies of the state and has led to the creation of a unified grievance redressal system. The IGRS also integrates the Samadhan portal (http://samadhan.gov.in) of the state government that preceded the IGRS. Under IGRS any grievances, information or suggestions can be sought or registered through a) the toll-free CM Helpline no. 1076 which is managed through a centralised call center*1*, b) petitions submitted during public interaction with the CM, c) petitions received by various public offices and civil servants as physical letters, e-mails and fax, d) requests received during the Samadhan Day organized at the sub-divisions, e) requests received at the Common Service Centers and Lokwaani Centers, f) grievances received through the national grievance portal-CPGRAMS and g) grievances directly registered by citizens on the portal or through the *Jansunwai Samadhan Android Application*.*2*

70. All grievances received as letters and petitions during Samadhan Day are to be necessarily uploaded on the Samadhan portal within a fixed timeframe by the concerned agency/ office. Once the grievances are registered on the portal, they are automatically directed to the First Level Grievance Officer (L-1) of the concerned department, who either accepts the grievance or returns it if it is not related to the department. Once accepted, a 14-digit unique grievance ID is generated by the portal and sent to the registered mobile no. of the aggrieved, to enable them to track their grievance on the Samadhan portal. Based on the nature of grievance, it is directed to the L-1, L-2, L-3, or L-4 level Grievance Officers and pending grievances at these levels are periodically tracked by each Head of Department (HoD). In addition, a senior officer of each department has also been made the Nodal Officer for the IGRS with overall responsibility for the department's performance and coordination with State IGRS Cell. Once redressed, it is mandatory for the grievance officer to upload information on action taken on the portal. The call center then seeks feedback on the resolution from the aggrieved. The grievance is 'closed' only after the latter is satisfied with the nature of information or resolution provided. If they are not satisfied, the grievance is sent back to the L-1 Grievance Officer. In case of dissatisfaction, the grievance is escalated to the higher levels, till L-4.
71. The main responsibility of L-3 and L-4 officers is to review the status of grievances received by the department and ensure timely redress of pending grievances. HoDs review the grievance status on a weekly or monthly basis and it is monitored periodically by State IGRS Cell at the Chief Minister's Office. A centralized dashboard is also maintained on which the real-time status of grievance redress at the state level is maintained. The portal also generates monthly reports that

1 *This helpline is also integrated with other state level helplines like UP 100, UP 102, UP 108, UP 1090 and UP 1912 for seamless operation.*

2 Govt Order No 01/2016/01/34 PG-05/2016 of January 2016 and GO No 12811-78-1-2018-66IT/2017TC of October 2018.

reflect the department and officer-wise performance and rankings and are send to the HoDs to ensure accountability.

72. So far about 45,467,750 grievances have been received under the IGRS, of which 45,065,839 have been redressed and 401,620 are pending.*3* Within the last one-year (October 2022 to September 2023) DoEFCC has received 11,200 grievances of which 10,894 have been resolved and closed while 142 are pending resolution. Out of these unresolved grievances, 93 are pending resolution at L1 level, 36 at L2, 12 at L3 and 1 at the L4 level.
73. In addition to IGRS, the state Pollution Control Board (SPCB) also operates its own grievance redressal system (http://www.uppcb.com/public_grievances.htm.) through which it receives complaints against industries and individuals. Upon receiving public complaints, the SPCB scrutinizes these complaints and takes necessary action as appropriate. SPCB also has a citizen's charter which commits to, among other things, reviewing and redressing public grievances, bringing transparency in its functioning, and ensuring people's participation. Under IGRS a total of 2150 grievances have been received by UPPCB, of which 2130 have been redressed and 20 are pending resolution at different stages.*4*
74. All grievances received physically at the government offices, outside the Samadhan Day, are registered in office level complaint registers that are redressed and their status is periodically monitored by the respective Heads of Departments. The current statewide GRM is robust, enjoys widespread public awareness, has high political ownership and was found to be effective. The same will be utilized by the project for receiving grievances and feedback related to the project.
75. The DoE has a 4-member Internal Complaints Committee (ICC) constituted under the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) – POSH Act, 2013 and has been freshly reconstituted in October 2023. In the period October 2022- September 2023 no related complaints have been received by DoE. Under the project, the ICC members will be oriented on the key provisions of the Act, their roles and responsibilities and will also be trained on securing the complainant's identity, ensuring anonymity and confidentiality of complaints, investigations and supporting individuals in reporting incidents of GBV, SEA/SH and ensuring tested referral pathways. DoE wide trainings will also be supported to create awareness and sensitize the staff about the Act, its key provisions, and responsibilities of staff members.
76. **Management of Workers-** Uttar Pradesh Clean Air Management Project Authority (UPCAMPA) SPV and its PMU Directorate will serve as the project implementation arm of the Authority. UPCAMPA SPV is expected to hire a large pool of technical and staff and will be staffed with personnel and experts drawn on deputation from State departments and on contract-basis (post retirement and from the market) apart from other support staff. While the DoEFCC staff and the civil servants are governed by GoUP service rules, the conditions of work and terms of recruitment of workers and consultants hired by the DoE are spelt in their respective contracts. At present very brief contracts are provided to the contractual staff hired by DoE and do not clearly spell out the

3 *Data as on 13th October 2023.*

4 *Data as on 25th October 2023*

terms and conditions of their engagement.[5] The SPV will need to ensure that all specialists and support staff contractually hired have clearly laid out terms and conditions of work spelling out the applicable emoluments and benefits, work hours, leave entitlements, travel allowances, grievance redress mechanism, apart from provisions to ensure non- discrimination and safety at workplace. The SPV will also need to have in place an HR policy that ensures inclusive hiring, transparent procedures for separation or termination of contract, smooth staff onboarding and orientation, clear roles and responsibilities at different levels and positions, standard contract templates for consultants, Office Code of Conduct along with provisions for periodic sensitization of workers on GBV and SEA/SH related topics.

77. In addition to the SPV, UPCAMP also plans to provide to some participating institutions and departments human resource in the form of project support units and UPCAMP Cells to support technical and administrative work related to the project. While these subject matter specialists and consultants will be hired directly by the respective departments, for the purpose of uniformity, SPV will need to define and share with the participating institutions the experience and pay-scales of these consultants, the standard terms and conditions for their engagement.

78. DoE is presently understaffed and is challenged by high staff vacancy. Against a total of 66 approved positions in the DoE, about 32 positions are vacant at present. About 10 out of the 34 filled posts are occupied by female staff. Among the 9 technical and managerial positions (Group 'A' and 'B') that are occupied, 3 have women staff members. The project will need to ensure that the SPV also has adequate women's representation across the SPV hierarchy, including in decision-making roles.

79. While the project will not entail large scale construction, moderate scale works will be undertaken for setting up AQM Stations, revamping existing AQM infrastructure of different institutions, installation of testing equipment and machinery, manual monitoring infrastructure, setting up of super-sites and mini-supersites across the state. This will involve engagement of workers for construction, installation of plant, machinery and equipment and also primary supply workers providing these equipment and component for clean cooking solutions including solar cookers. There are adequate legal safeguards at the national and state level to ensure safe and fair working conditions for workers. The state has a BoCW Welfare Board that looks after the welfare of construction workers and links them to relevant schemes and entitlements- including maternity and child benefit, access to loans, pension, health assistance and insurance and disaster relief. GoUP also has a statewide Labour Management Information System (https://uplmis.in) that tracks the number of labourers registered in the state, accessing different schemes and provides a helpline to support workers in distress.

80. Apart from minor civil works and supply of testing equipment that are commissioned directly by DoE and UPPCB, most civil works are undertaken through other executing departments and entities like State Public Works Department (SPWD) or Uttar Pradesh Jal Nigam (UPJN). Review of sample tender documents of UPPCB for similar works like 'Supply of testing equipment and supply-installation-operation of Continuous Ambient Air Quality Monitoring Stations' (CAAQMS)

5 Existing contracts only mention the salary, the fact that no other monetary benefits, earned & medical leave or pension would be available to the incumbents; entitlement to travel and dearness allowances for local and outstation travel (without mentioning the details of such allowances).

shows that only broad community and occupation health and safety related legal provisions are covered in bid documents. These provisions only relate to fencing/barricading, putting up of signages, contractor's liability for 'personal injury, death or disability of workers', statutory insurance of Contractor's personnel and provision for manufacturers and subcontractors to meet similar liabilities and overarching provisions to abide by all national laws and regulations without specifying the obligations.[6]

81. However, such provisions are specified in much greater detail by other executing agencies, including contractor's liability for OHS and CHS, compliance requirements under specific national labour laws, including minimum wage payment, need for labour license/ registration, labour group insurance, boarding and lodging arrangements for workers, compliance with Contract Labour Regulation & Abolition Act, responsibilities of Principle Employer, provision of safety equipment and materials, regular health check-ups, obtaining safety work-permits, facilities for labour at worksites.[7]

82. DoE will need to ensure that labour requirements and contractor's responsibilities related to terms of work, health and safety, compliance with labour laws, prevention of forced or child labour, workers Code of Conduct, prevention of GBV and SEA/SH risks at worksites and presence of a GRM for workers are clearly spelt in their works requests to executing agencies. They will also need to undertake due diligence to ensure that such responsibilities are actually outlined in the bid documents and contracts.

83. One of the clean cooking solutions proposed to be offered under the project will be incentive based adoption of solar cookers. About 100,000 households are planned to be reached through these solar cookers. The *Surya Nutan* model of Solar Cookers that will be adopted under UPCAMP is indigenously designed, developed, and patented by Indian Oil Corporation and promoted by Energy Efficiency Services Limited EESL (both are Public Sector Undertakings). The cost of solar panels for these cookers is expected to be a much smaller part of the proposed investment of USD 6 million on this sub-component.

84. India has a growing supply chain around clean energy and solar solutions, which aims to improve self-sufficiency and reduce dependence on exports. Government of India has recently entered the

[6] Tender Sample No 1 - E-Tender Specification No. 55-56/EDC(Bh)/2023-24 Supply of testing equipment for Works pertaining to Purvanch Al Vidyut Vitaran Nigam Ltd (DISCOM), VARANASI and Tender Sample No 2- NO. UPPCB/293/CAAQMS/ 2019-20 UPPCB International Competitive Bidding For supply, installation, commissioning, operation & maintenance services of Continuous Ambient Air Quality Monitoring Stations (CAAQMS).

[7] Tender Sample No 3- Tender Document No: ST-01/EMCC-II/JTPS/2023-24 of Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (State Power Generation Corporation) on Biennial Contract For Mechanical Maintenance (Preventive & Routine, Bd & Oh) And Operational Support Of Equipment Of Main Plant Boiler & Aux, Tg & Aux And Bop (Excluding Major Overhauls Of Boiler And Turbine) at 2x660 MW Jawaharpur Thermal Power Station, Malawan

partnership for *Resilient and Inclusive Supply Chain Enhancement* (RISE)[8] to strengthen and diversify the supply chain for clean energy products and incentivize production of solar and wind power equipment. This is in addition to the Product Linked Incentive (PLI) Scheme which supports similar products. However, in light of the recent concerns regarding the usage of forced labour in the manufacture of solar panels, and in line with India's legislation on Bonded Labor System (Abolition) Act, 1976 and Article 23 of Indian Constitution prohibiting traffic in human beings and similar forms of forced labour, DoE would require its contractors and suppliers to prohibit use of forced labor in the supply of solar cookers. It will also need to include in its contracts the requirements that their solar panel suppliers neither have nor will engage or employ forced labor.

D. ASSESSMENT OF CORE PRINCIPLES

CORE PRINCIPLE 1 - ENVIRONMENTAL AND SOCIAL MANAGEMENT

Program environmental and social management systems are designed to (a) avoid, minimize, or mitigate adverse impacts; (b) promote environmental and social sustainability in the program design; and (c) promote informed decision-making relating to a program's environmental and social effects.

Summary findings: Consistent

85. The current regulatory systems under the Environment (Protection) Act, 1986, are comprehensive cover air, water, and waste management) and The Forest (Conservation) Act, 1980, The Wildlife Protection Act, 1972 and The National Green Tribunal (NGT) Act, 2010 empowers the government to take measures for protecting and improving the environment. It provides the legal framework for controlling pollution and conserving natural resources. It empowers the central and state pollution control boards to take measures to improve air quality, regulate emissions from industries, and enforce emission standards.

86. The environment regulatory framework (laws and regulations) - environmental, forests and pollution control acts and rules - were assessed and found to be adequate to manage the environmental effects of the Program activities. Most activities under the project have low and moderate environmental effects they do not require EIA. However, environment specific capacity building activities is presently insufficient and nodal environmental officers are expected to ensure compliance with required environmental standards. The national and states governments have well-developed environment legislations. However, the implementation setup to address environmental challenges of UPCAMP needs to be further strengthened through monitoring and supervision by UPPCB.

87. The national policy framework and state systems are largely adequate to manage social risks emerging from the project investments. Inter-agency coordination mechanisms around AQM are in place in the state to ensure accountability and role clarity for different agencies. DoE has some experience of conducting annual, state-wide campaigns a) to create environmental awareness among

[8] RISE partnership is an initiative of World Bank and G-7 for enhanced collaboration on diversification of supply chain for clean energy products and tackling climate change.

school children, rural communities and community institutions and b) also around Mission LIFE. This will be further bolstered by the Social Behaviour Change Communication campaign to be supported by UPCAMP under the clean cooking component for improved engagement and outreach among community stakeholders, especially women. GoUP's Integrated Grievance Redressal System (IGRS) is robust and was found to be effective in addressing citizen's grievances in a time-bound and accountable manner. DoE's systems for handling GBV, SEA- SH grievances in in place, but will need to be further strengthened to ensure systematic redressal and referrals. Social capacities of DoE and participating institutions are limited and would need to be improved through periodic trainings and refreshers.

Key gaps and recommendations:

- Non-compliance with the environmental permits, exceeding discharge limits, (particularly for transport and industry), poor monitoring and enforcement by government authorities, and improper technology selection may impact the environment.
- The Program also includes spending on financial assistance related to incentives for adopting household biogas, adoption of zig zag technologies in brick kilns, scrapping of old heavy-duty vehicles and purchase of electric vehicles. Currently there is no EHS criteria/procedures used for approving and monitoring of these financial assistance packages.
- There is no mechanism for environment or social screening conducted on detailed project reports and other feasibility studies for early determination of impacts and alternative analysis.
- There are risks of small-marginal agriculture and dairy farmers, single truck-owners, brick-kiln workers, and women belonging to vulnerable communities being excluded from access to project benefits.
- Regular trainings of concerned staff and consultants of DoE and participating institutions on social and gender inclusion and stakeholder engagement will be needed during the project cycle. This will include use of participatory approaches, especially for urban mobility planning, design of value-chains for improved cook-stoves and agri-dairy extension services.

CORE PRINCIPLE 2 - NATURAL HABITATS AND PHYSICAL CULTURAL RESOURCES

Program environmental and social management systems are designed to avoid, minimize, and mitigate adverse impacts on natural habitats and physical cultural resources resulting from the program. Program activities that involve the significant conversion or degradation of critical natural habitats or critical physical cultural heritage are not eligible for PforR financing.

Summary findings: Consistent

88. The Program activities do not include environmental effects on natural habitats or cultural heritage sites. There is clearly no significant conversion or degradation of critical natural habitats or physical cultural heritage is envisaged. National laws such as The Forest Conservation Act, 1980 regulates the diversion of forest land for non-forest purposes. The Ancient Monuments and Archaeological Sites and Remains Act (or AMASR Act) provides for the preservation of ancient and historical monuments and archaeological sites and remains of national importance. In the unlikely case of any such environmental effects, the respective Departments were found to be competent in addressing the regulatory requirements. The consistency to this principle was confirmed.

Key gaps and recommendations:

- As part of the ESSA recommendations, an environmental screening checklist should be developed and utilized in investment planning where any civil works is involved to ensure no direct, indirect, or residual risks to the environment and sensitive receptors.

CORE PRINCIPLE 3 - PUBLIC AND WORKER SAFETY

Program procedures ensure adequate measures to protect public and worker safety against the potential risks associated with (a) the construction and/or operation of facilities or other operational practices under the program; (b) exposure to toxic chemicals, hazardous wastes, and otherwise dangerous materials under the program; and (c) reconstruction or rehabilitation of infrastructure located in areas prone to natural hazards.

Summary findings: Consistent

89. India has established a comprehensive management and supervision system for work safety. This system ensures the screening of safety issues and occupation hazards, assessment of work safety and hazard during operations, design, and construction. There is government organisational set up with the Labour Commissionerate and the Uttar Pradesh Pollution control board to manage environment, occupational health and work safety management and supervision with established laws, regulations, procedures, and enforcement arrangement. The regulatory systems include the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Factories Act 1948 and The Occupational Safety, Health, and Working Conditions Code, 2020.

90. These acts provide for better safety, health, and welfare of workers in factories, including provisions for cleanliness, ventilation, lighting, and drinking water. They require factories and worksites to take measures to prevent accidents and ensure the use of safety devices and protective equipment. Other attributes relevant in the policies include (a) limits on working hours, overtime, and child labour (b) the appointment of safety officers and constitution of safety committees (c) inspection and enforcement of safety standards by factory inspectors.

91. While the systems are in place, the enforcement needs to be strengthened by the Departments as well as the Pollution Control Boards. Worker and public safety are generally managed through provisions in the bid / contract documents that the respective Departments – having civil works. The provisions are made part of agreements with contractors and will be monitored. However, there are several other options on the rural side such as livestock waste management, and biogas production that also need awareness, monitoring and supervision on occupational health as safety.

92. The DoE is understaffed and the contracts of consultants currently hired by the Directorate do not spell out the terms and conditions of employment. The contracts and Letter of Appointments of consultants and subject specialists need to clearly specify the terms, conditions of engagement, emoluments and benefits apart from work hours and leave entitlements.

93. The project will only utilize existing vehicle scrapping facilities, and these facilities ensure safe disposal of such vehicles along with protection of environment. However, there are several other factors relating to environment and human health and safety in the recovery and recycling of hazardous waste materials (batteries and auto parts) and their transport to landfills. This needs to be

regularly monitored. With this further strengthening, consistency to this core principle was also ensured in the Program design.

94. The bidding documents for civil works, procurement of AQM equipment and testing facilities need to clearly spell out the worker related obligations of the contractors and also ensure compliance with forced and bonded labour related labour laws.

Key gaps and recommendations

- Environment health and safety standards, and procedures for vehicle scrapping centres need to be regularly monitored and audited to ensure recovery and recycling of wastes takes place in an environmentally sound manner.
- Occupational health and safety management in the construction of biogas digestors at household level as well as in livestock shelters require regular monitoring and training of safety measures for human health.
- Given the OHS and CHS risks related to different sectors identified by the assessment, DoEFCC will also need to develop safety protocols, ensure clearly outlined obligations of the contractors/ sub- contractors in the tender documents related to worker safety as well as Workers Code of Conduct to mitigate any potential SEA/ SH risks. The projects monitoring mechanism will need to regularly monitor the compliance with the protocols and safe practices to mitigate any risks to the project workers and the adjacent communities.

CORE PRINCIPLE 4 - LAND ACQUISITION

System and capacity assessment: Avoid or minimize land acquisition and related adverse impacts: Avoid or minimize displacement, and assist the affected people in improving, or at the minimum restoring, their livelihoods and living standards.

Summary findings: Consistent

95. All project related physical interventions are planned to be undertaken on existing lands, land pools or within the premises of existing government offices and academic- research institutions. Land for Common Steam Facilities (CSF) within select industrial clusters will be provided on lease to the service providers. Land for creating depot infrastructure and charging facilities for e-buses will be provided by the Urban local bodies and development authorities from their existing land pools and no land acquisition is foreseen. Space for setting up 3-wheeler EV charging and battery swapping facility will also be provided by local governments or will be created within existing public spaces. The project will not support creating of vehicle scrapping facilities and will only incentivize the scrappage.

Key gaps and recommendations

- Since the actual sites for physical intervention are not known at this stage, impacts on non-titleholders, encroachers, and squatters are not clear. While the industrial clusters are ring-fenced that prevent unauthorized occupation, the status of land-pools available with the local bodies in the cities of Lucknow and Varanasi, where EV infrastructure will be created for the transport sector, is unknown.
- For all activities requiring creation of expansion physical infrastructure, an environment and social screening will be undertaken by the executing agencies in consultation with the concerned IAs.

This will ensure that all infrastructure development leading to land acquisition or displacement is screened out.

- In case of sites that are unencumbered, IAs in coordination with the local bodies will need to ensure that occupants of these lands are resettled following the World Bank guidance.

CORE PRINCIPLE 5 - INDIGENOUS PEOPLES AND VULNERABLE GROUPS

System and capacity assessment: Give due consideration to the cultural appropriateness of, and equitable access to, program benefits, giving special attention to the rights and interests of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities and to the needs or concerns of vulnerable groups.

Summary findings: Consistent

96. As per the last Census (2021) the Schedule Tribe (ST) population of Uttar Pradesh was 1.1 million, which is about 0.56 percent of the total population of the state. The project will have a statewide footprint with some select works related to AQM, transport and industries focussed on Noida-Ghaziabad, Lucknow, Varanasi as well as select industrial clusters located across the state. No direct interventions in areas with ST population are planned as part of the project. Interventions related to clean cooking solutions are expected to benefit the tribal communities owing to higher dependence on forest-based biomass for household use.

Key gaps and recommendations

- The project will need to ensure that beneficiary selection under the clean cooking and transport sector is inclusive and there are specific social criteria in place for targeting tribal communities as beneficiary households/ entrepreneurs and their inclusion in women's collectives engaged in the cook-stove supply chain.
- For securing higher engagement of ST women and their collectives in the cook-stove supply chain, the project may need to explore linking entrepreneurs belonging to scheduled tribes to additional concessional finance, incentives, marketing, and skill development assistance available through State Finance and Development Corporation and National Scheduled Tribes Finance and Development Corporation (NSTFDC).[9]

CORE PRINCIPLE 6 - SOCIAL CONFLICT

System and capacity assessment: Avoid exacerbating social conflict, especially in fragile states, post-conflict areas, or areas subject to territorial disputes.

Summary findings: Consistent

97. UPCAMP will be implemented across select locations within the state and the project footprint does not include any areas that are considered fragile or disputed. The nature of program investments is such that they are not likely to lead to or exacerbate social or resource conflicts.

9 *Schemes like Adivasi Mahila Sashaktikaran Yojana (AMSY), Tribal Forest Dwellers Empowerment Scheme, Margin money and Micro-credit schemes (MCS) for ST SHG members and ST entrepreneurs.*

IV CONSULTATION AND DISCLOSURE OF DRAFT ESSA

A. SUMMARY OF DISCUSSIONS AND MULTI STAKEHOLDER CONSULTATION WORKSHOP

98. To develop a better understanding of implementation practices, procedures, standards, and the approach for this Program, in the period from January- September 2023, the Bank team carried out meetings with various stakeholders, including technical staff in Departments, private sector and independent experts. These initial stakeholder consultation meetings informed key ESSA findings, contributed to formulating the ESSA Program Action Plan, and impacted the design of the Program.

99. The consultative workshops were instrumental in securing information to support the major findings and recommendations emerging from the ESSA process. DoEFCC, participating state officials, and other stakeholders contributed to the emerging recommendations of the draft ESSA report A summary of the consultations with MSME, Clean cooking, Agriculture and Transport Sectors is included in Annex 5,6,7 and 8.

Table 10. List of Departments, Agencies Consulted

Sl. No.	List of Departments
1	Department of Transport
2	Uttar Pradesh State transport Corporation
3	Department of MSME
4	Department of Rural Development
5	Department of Environment Forests and Climate Change
6	Department of Panchayati Raj,
7	UP New and Renewable Energy Agency
8	UP Food and Civil Supplies Department
9	Department of Animal Husbandry.
10	Directorate of Urban Transport
11	UP Industries Development Corporation
12	Indian Oil Corporation Ltd
13	State Nodal officer- Gobardhan Scheme
14	Energy Efficient Services Ltd
26	HCL Foundation
27	Finovista
28	Renew Power
29	National Thermal Power Corporation
30	National Bank for Agriculture and Rural Development

B. DISCLOSURE

The draft ESSA report has been on World Bank webpages on Nov 6, 2023 after review and dsicussions with the DoEFCC. **V CONCLUSIONS AND RECOMMENDATIONS**

A. INTRODUCTION

100. The ESSA concludes that the Program has a moderate environmental risk. Based on the assessment of the environmental and social management system applicable to the proposed Program, it is concluded that (i) there is an existing policy framework to mitigate environment, social, and occupational health and safety risks and (ii) institutional set up on environmental and social management and capacity systems to address the environment, health and safety are well aligned to the proposed activities under the Program, but need further training and capacity building for

enforcement. The program intended result areas are largely consistent with positive environmental outcomes and have low- moderate effects. The PforR offers opportunity to strengthen environmental performance in the different sectors through the multisector approach, and integrated planning. The systems are principally well-aligned with the core principles and key planning elements as defined in the Bank Policy for PfoR.

101. There remain certain gaps from the perspective of actual implementation of such systems identified through this ESSA, based on which the following recommendations are proposed to Program Action Plan or DLI.

Environment Gaps

- The environmental sector /DoEFCC is not integrally connected with the sectoral environmental issues and the sector departments. Therefore, their expertise is not reaching the sectors. Also, their own expertise is not aligned with the sector experiences being adopted, and the performance being achieved. The SPV Structure will help in bridging these gaps between the environment department and the sectors. The establishment of the UPCAMP SPV/ authority will close many capacity gaps in the management of multi sector EHS systems (with the full-time environmental specialist in place) between environment and the sector departments.
- There is no separate environmental cell or division in the departments that will be associated with the Program activities. Environmental effects are generally managed within the functions at the various levels of the sector Departments. Overall, in terms of environmental performance, the Departments (Agriculture, MSME, Transport and Rural) are clearly committed to promote environmentally responsible practices. The UPCAMP cells attached in each of the implementing departments/Agencies can mainstream environment and occupational health and safety monitoring and training of the program activities and that will contribute to organizational strengthening.
- Environment health and safety standards, and procedures for vehicle scrapping centres need to be regularly monitored and audited to ensure recovery and recycling of wastes takes place in an environmentally sound manner. An environmental audit of these facilities (on sample basis) will help capture if there are any gaps in the environment health and safety processed and organisational structure.
- Occupational health and safety management in the construction of biogas digestors at household level as well as in livestock shelters require regular monitoring and training of safety measures for human health. The Implementing agency (UPNEDA) should strengthen capacity to provide this training.
- The Program also includes spending on financial assistance related to incentives for adopting household biogas, adoption of resource efficient technologies in brick kilns, scrapping of old heavy-duty vehicles and purchase of electric vehicles. DoEFCC needs to establish EHS criteria/procedures for approving and monitoring of financing incentives.
- There is no mechanism for environment screening conducted on detailed project reports and other feasibility studies to early determination of impacts and alternative analysis. An environmental screening checklist should be developed and utilized in investment planning for investments to ensure no direct, indirect, or residual risks to the environment and sensitive receptors.

Social Gaps

- The social capacities within DoE and some of the participating institutions are weak owing to their largely technical mandates. Some institutions like Directorate of Environment, State Pollution Control Board, Department of Transport and Industry have limited public interface and mandate for public engagement, while other departments like Agriculture, Rural and Urban Development have rich experience of engaging with communities. DoE capacities will need to be augmented through staff capacity building and by placing a social development expert within the SPV, who will also be responsible for handhold and guiding other departments for ensuring engagement and inclusion in sector interventions.

- There are no screening mechanisms in place within the DoE and most participating institutions to screen interventions and sites for possible social impacts. Such screening also does not take place during DPR preparation that could help assess risks or gaps, identify vulnerabilities and inform the planning process to build appropriate mitigation measures. The project will adopt a risk screening approach, where all major activities with a physical footprint will need to be preceded by a robust E&S risk screening.

- The capacities of some institutions for facilitating community participation are currently weak. While DoE has some experience of engaging with communities for awareness generation through periodic campaigns, they will need higher capacities to bring air quality related awareness and discussion within public discourse on a continuing basis. Similarly, for comprehensive mobility planning DoT will need improve capacities to closely engage with commuters (and the larger community) to ensure that their needs are incorporated in those plans; for ensuring better adoption of changed NUE based PoPs and manure management practices, field staff of DoA and Animal Husbandry departments will need capacity support to closely work with farmers.

- Current procedures of most participating institutions do not sufficiently address the needs of vulnerable and marginalized social groups. Needs of migrant brick- kiln workers, owners and drivers of BSI & BSII single trucks, women drivers and commuters and those with disabilities and women headed households need to be incorporated while developing DPRs for these sectors.

- The project does not entail land acquisition and is not expected to lead to physical displacement, as physical sites/ locations will be identified from within existing government lands. However, since these locations are unknown at this stage, there is possibility of some of these lands not being unencumbered. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR, 2013) does not recognize the resettlement rights of non-titleholders, encroachers and squatters. If present, such informal occupants will need to be provided resettlement support in line with the World Bank policy.

DoE hires consultants and subject matter specialist from the open market by advertising for positions and hiring consultants following due process. However, as per existing practice, limited information is provided to incumbents on the terms of their engagement, benefits, leave and other entitlements through these Letters of Appointments and contracts. For greater transparency, and in line with national labour laws, DoE will need to provide detailed contracts that spell out the conditions of engagement more clearly. Similarly, all tenders and works rolled

out by DoE directly or through executing agencies will need to ensure that all relevant provisions of national labour laws and contractor's obligations related to occupational health and safety, labour rights, workers conduct and entitlements are clearly spelt out in the bidding document.

B. RECCOMENDATIONS FOR PROGRAM EXCLUSIONS

LIST OF EXCLUDED ACTIVITIES (BASED ON ENVIRONMENTAL AND SOCIAL RISK)

102. The following high-risk activities will be excluded from support under the proposed PforR Program expenditure.

- Establishment of vehicle scrapping facility
- Major/ Large scale centralized industrial boiler plants/systems.
- New Landfill/ dumpsites
- Any electric vehicles using lead acid batteries.
- Construction of new buildings
- Activities involving asbestos containing materials (AC roofing sheets, AC pipes, and so on) such as construction, demolition, and dismantling.
- Any activity involving land acquisition.
- Any activity that may lead to involuntary resettlement and physical displacement.

C. RECOMMENDATIONS TO BE INCLUDED IN THE PROGRAM ACTION PLAN AND PROGEAM OPERATIONS MANUAL

103. The assessment identified certain areas for improvement of the implementation of the environmental and social systems, which can be addressed through the following recommendations:

Table 12. Recommended Environmental and Social Actions for PAP

Action	By	Timeline	Indicator for completion
Appoint, on a Full-time basis, qualified environmental, social, specialists, to strengthen environmental and social capacity of UPCAMP SPV	DoEFCC	Within 3 months of the effectiveness date	Designation of qualified staff, with defined scope of work (including the preparation of E&S guidance, monitoring the implementation of E&S actions, and reporting protocols).
Environment, Health, and occupational safety audit of vehicle scrapping facilities to assess conformity to national standards with corrective recommendations to be implemented through the program.	DoEFCC, UPPCB	Within 24 months of the Effective Date	Completion of audit/assessment and recommendations for improvement to be implemented throughout the program. (on sample basis)

Action	By	Timeline	Indicator for completion
Undertake a project wide assessment (covering all sectors of UPCAMP) of livelihood or income related impacts, including the employment generated as well as losses attributable to project and adopt or facilitate measures for livelihoods restoration.	DoEFCC	Completion of the assessment within Year One of effectiveness Implementation of proposed measures through the project cycle	Submission of Assessment Report by DoECC Submission of Completion Report by DoEFCC and Reports of the IVA and AMs of the World Bank Missions
Bidding documents for construction and procurement of AQM related equipment need to clearly specify the labour management related obligations of the Contractor-Supplier, including their responsibility to ensure non-usage of forced- bonded labour by their primary suppliers	DoEFCC	With Year One of implementation	Tenders and Bidding documents prepared and floated by the DoEFCC

Table 13: Recommended Environmental and Social Actions for Program Operations Manual

Action	By	Timeline	Description of Activity
DoT needs to follow EMP and procedures for approving and monitoring of vehicle scrapping program	DoEFCC	Within 6 months of the effectiveness date	Prepare and adopt EMP based on design of the vehicle scrapping program.
Monitoring and supervision of livestock waste/ manure manaement biogas facilities for compliance with national EHS policies	DOA/ UPNEDA	Continuous	UPNEDA to conduct regular monitoring of biogas facilities, and examine OHS requirements.
Include standard clauses in all construction contracts for dust mititgation and control in Industry sector.	DoMSME DoHeavy Industry UPPCB	Within 9 months of the effectiveness date	Inclusion of standard clauses on suste mititgation and control in contracts will be linked to environment permits/ consents.
BioCNG plant operators should ensure the safety and well-being of their workers. This includes providing personal protective equipment (PPE), implementing safety protocols, and conducting regular safety audits to	DoEFCC	Within 12 months of the effectiveness date	UPPCB to preapre a guideline for basic orientation training on health and safety for operation of biogas plants.

Action	By	Timeline	Description of Activity
minimize occupational hazards.			
Selection and inclusion of energy efficient devices and applicances for all offices and program supported infrastructure	DoEFCC	As UPCAMP-A offices are refurbished.	UPCAMP SPV to include clauses on adoption of new energy efficinet devices in new offices, and contracts.
Ensure universal access to all public offices to be rehabilitated under the PforR.	DoEFCC	Prior to the commencement of establishing new offices, labs etc.	Included in the PfoR Action Plan
Prepare guideline for all OEMs for clean cookstoves to undertake certified recycling of the project after life.	DoEFCC	Within 12 months of the effectiveness date	Include stove recycling clause as part of OEM participating in the clean cooking program
Provide additional training on OHS and communication including with women and vulnerable workers.	During Program implement ation	UPCAMP SPV environment specialist and social specialist	Included in the PfoR Action plan.
Capacity building of DoE and SPV staff on E&S issues, including on social inclusion, participation and stakeholder engagement	DoEFCC-UPCAMP SPV	During Program implementation	UPCAMP SPV to prepare a training calendar in consultation with state training institutions and report completion in periodic E&S progress reports

ANNEXURES

ANNEX 1: LIST OF DOCUMENTS REVIEWED

1. National Clean Air Program (NCAP)
2. XV-FC Technical and Operational Guidelines
3. National Ambient Air Quality Standards (NAAQS)
4. National Biomass Cookstoves Initiative (NBCI)
5. Uttar Pradesh bio-energy policy 2023
6. National Biogas and Manure Management Programme (NBMMP)
7. State Rural Livelihoods mission
8. Swachh Bharat (Rural)
9. Swachh Bharat Mission
10. Finance Commission Solid Waste Management Grants
11. Pradhan Mantri Ujjwala Yojana (PMUY)
12. Saubhagya Scheme or Pradhan Mantri Sahaj Bijli Har Ghar Yojana
13. National Policy for Management of Crop Residues (NPMCR)
14. National SO2 and NOx emission standard norms by MoEFCC
15. MoEFCC Notification on Brick Kilns 2018
16. Motor Vehicles Act 1988
17. Voluntary Vehicle Fleet Modernization Program (V-VMP) and Vehicle Scrappage Policy
18. Bharat stage emission standards
19. MSME Sustainable (ZED) Certification
20. Entrepreneurship Skill Development Programme (ESDP)
21. Plastic Waste Management Rules, 2016-amendment 2022
22. Swachh Bharat Mission - Urban & Rural
23. New Emission Standards for Power Plants under Environment Protection Act 1986
24. Galvanizing Organic Bio-Agro Resources Dhan (Gobardhan) scheme
25. Sustainable Alternative Towards Affordable Transportation (SATAT) Scheme
26. National Food Security Mission
27. Paramparagat Krishi Vikas Yojana (PKVY)
28. Rashtriya Krishi Vikas Yojana (RKVY)
29. National Project on Organic Farming (NPOF)
30. Pradhan Mantri Krishi Sinchai Yojana (PMKSY)
31. Biogas Development and Utilization Program
32. National Mission for Sustainable Agriculture (NMSA)
33. Agricultural Technology Management Agency (ATMA) Scheme
34. PM PRANAM Scheme, 2023

ANNEX 2: DESCRIPTION OF ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM AND CAPACITY AND PERFORMANCE ASSESSMENT

Institution	Roles and Responsibilities	Gap analysis
State Level Institutions		
Department of Environment Forests and Climate Change	• Leading UPCAMP program and coordination with different sectoral departments for implementation of interventions/DLI • Formation of a coordination committee and SPV start-up • Budget Tracking IT System • Development of a stakeholder/Citizen Engagement Program • Sector AQM expenditure monitoring and results management systems established	• Air quality falls under poor category in UP and no state program is initiated to curb the same apart from NCAP program at national level. Therefore, a need of state level air quality program will lead to development of state air action plan and focused actions on air quality to deal with varied sources from different sectors.
Directorate of Environment	• Capacity building and strengthening of staff by identification and mapping of an expert for each sector. • Training programs on GAINS, sectoral discussions, technical discussion on AQM monitoring. • Toolkit to trigger behavior changes and implementation. • Collaborating with the AQM Working Group and academic/technical institutes and implement training and capacity-building initiatives to create a specialised workforce to address air pollution-related challenges and manage/oversee district-wise source apportionment and Inventorisation studies	• Insufficient Staffing: There is a significant shortage of staff, hindering the effective implementation of air quality management initiatives in UP. • Lack of Sector Experts: Insufficient expertise in various sectors, such as industry, transportation, and agriculture, limits the state's ability to address specific pollution sources adequately. • Absence of Dedicated State Unit: The lack of a dedicated and capable state unit for evidence-based multi-sector air quality management in UP results in a capacity gap. • Staffing Shortage at UPPCB and UP Directorate of Environment: Both organizations suffer from staffing shortages, which prevent them from forming a dedicated team for comprehensive airshed management, affecting their ability to tackle air pollution effectively.
UPPCB	• Leading establishment of AQM monitoring infrastructure including a state-wide network in 75 districts • Coordination with sectoral departments to update the emission inventory timely and in collection of data from different sectoral departments.	• The monitoring network falls short of covering rural areas in UP, indicating capacity gaps in expanding coverage, equipment maintenance, and data reliability.

Institution	Roles and Responsibilities	Gap analysis
	• Provide periodic target vs achievement reports, as needed, on the abatement of air pollution, to Bihar stakeholders, implementation agencies, as well as to the CPCB. • Operation and enhancement of the AQ monitoring network to ensure quality data. • Producing reports to track Action Plan success. • Regulatory enforcement of environmental laws, permits, inspections, and actions. • Monitoring air, water, and noise quality for compliance and concerns. • Environmental Impact Assessment (EIA) for project impacts and mitigation. • Formulating and implementing pollution control measures and standards. • Collaborating with government, NGOs, and stakeholders for collective solutions and coordination with central bodies like the CPCB.	• The absence of a state-of-the-art air laboratory hinders source apportionment, monitoring data analysis, and Comprehensive Clean Air Plan (CCA) development. • Inefficient coordination among departments creates a capacity gap in ensuring seamless data flow and data quality assurance. • There is a capacity gap in achieving data accuracy and translating it into actionable insights for informed decision-making. • A capacity gap is evident in terms of legal expertise, work force, and resources necessary for robust regulatory enforcement to combat air pollution effectively
State Level AQMC	• Leading and coordinating quarterly meetings with sector departments to regularly understand the status and update of various actions implemented by each department at state level including 75 districts. • Ensure implementation of all feasible control measures, at grassroot levels, based on the target settings and priority	• The existing state AQMC, led by the Secretary of Environment, focuses solely on executing and implementing action plans in 15 non-attainment cities in Uttar Pradesh, indicating a capacity gap in broader air quality management. • The absence of a dedicated Special Purpose Vehicle (SPV) unit slows down decision-making processes, affecting the state's responsiveness to air quality challenges.
State Agriculture Department	• In accordance with the suggested efforts to limit the generation of secondary PM via NH_3 emissions from fields, it is the department's obligation to restrict residue burning with stringent restrictions and encourage sustainable agricultural practises in the state.	• Limited capacity to deal with air pollution specific challenges and solutions related to agriculture sector. • Strengthening of policies related to generation of secondary particulate matter is needed.

Institution	Roles and Responsibilities	Gap analysis
	• Ban residue burning by promoting alternate business models and subsidized farm machinery. • Promote organic farming practices with incentivized schemes. • Scale-up Climate Resilient Crop Production to assess the potential of genetically modified rice crop with less water requirements, to reduce NH_3 emissions from fields.	• Lack of coordination amongst department, example UPNEDA or animal husbandry department for convergence of bio-energy policy in an efficient manner
State Rural Development and Panchayati Raj Department	• Development of DPR in coordination with AQM working group and other sector departments to understand the overlapping of actions etc. • Providing sector-specific inputs to the overall clean cooking policy and program implementation strategy for Uttar Pradesh led by the nodal department (DoEFCC) • Enabling access to finance for interventions through existing government schemes/programs of their specific departments • Providing guidance on developing guidelines and criteria to select program implementation partners (i.e., enterprises, service providers and financiers) at the district level. • Supporting implementation of ecosystem development activities like awareness generation, quality assurance, monitoring and evaluation, capacity building and gender integration among other aspects	• No state level targets /plan to provide rural households using solid fuels with clean cooking solutions. • Lack of two-tiered institutional mechanism focusing on (i) policy and program strategy design led by state-level government agencies, and (ii) program implementation at the district level with participation from service provider, financiers, and enterprises.
State Urban Department	• Development of DPR in coordination with AQM working group and other sector departments to understand the overlapping of actions etc. • Urban departments will have a separate environmental cell/ PMU established. • The PMU will ensure necessary work force for investment planning and design to ensure AQM outcomes.	• Need of foundational environment management training and capacity building for staff involved with operationalizing of solid waste management investments.

Institution	Roles and Responsibilities	Gap analysis
State Transport Department	• Development of DPR in coordination with AQM working group and other sector departments to understand the overlapping of actions etc. • Establishing sufficient automated fitness facilities and PUCs, combined with phasing out older/more polluting vehicles from the state's major cities, to ensure the fitness of all motorized vehicles plying in the state. • Implement the Scrapping Policy for diesel-based cabs to shift towards CNG. • Establish Automated Fitness Centre for E-rickshaw and CNG autos. • Timely enforcement of the Electric Vehicle policy with instalment of charging stations • Improve public transportation facilities with increased number of city buses (CNG) • Strengthen PUC (maintenance and audits) • Install Emission Monitoring System for HDV at the tolls or weight bridges.	• The SPV capacity along with the inhouse capacity in DoT were found to be satisfactory. • DoT has in-house capacity in the sector as most high-risk transport projects require EIA and EMP • The ongoing initiatives on EHS capacity building, with the current World Bank Project requires to be continued and modules of environmental management training should be integrated with all capacity building initiatives through the Program period. • Development and implementation of vehicle scrapping program, should be supported with an environmental management plan, as this presents several risk factors to environment and human health. Current policies and guidelines are adequate, but implementation of the policies needs strengthening.

Institution	Roles and Responsibilities	Gap analysis
State MSME Department	• Ensure compliance under Emissions Standards, Effluent Standards and Waste utilization. • Retrofit all the old machineries. • Shift industries towards low carbon and cleaner technologies. • Subsidize the installation of energy and resource-efficient technologies to improve performance. • Organize capacity-building program for the stakeholder personals and industrial workers. • Periodic reporting of emission data to UPPCB • Assess the potential for the development of an eco-friendly industrial area (with paved roads, clustered development of similar MSMEs, centralized CETP)	• UP MSMEs struggle with limited affordable credit, constraining their growth. • Skills Shortage: Capacity gap in skilled labor and management impairs productivity and innovation. • Outdated Technology: Obsolete tech hinders competitiveness and efficiency. • Infrastructure Gaps: Inadequate logistics affect supply chains. • Regulatory Challenges: Complex regulations impede compliance and business operations.
UPNEDA	• UPNEDA plays crucial role in identifying suitable sites for renewable energy projects/ Biogas project and facilitating their development. • The agency conducts feasibility studies, resource assessments, and site surveys to determine the viability of renewable energy projects. • It also assists project developers in obtaining necessary approvals and clearances from relevant authorities. • UPNEDA conducts training programs and workshops to build the capacity of various stakeholders, including government officials, industry professionals, and local communities. These capacity-building initiatives aim to enhance awareness and understanding of renewable energy technologies, energy conservation, and environmental sustainability and are relevant to the project result areas.	• Occupational health and safety in management of biogas plants is one area where UPNEDA can build up capacity and awareness. • UPNEDA faces limited financial resources, hindering its ability to invest in renewable energy projects and infrastructure development. • Capacity gap in recruiting and retaining technical experts for project planning and implementation. • Limited public awareness and engagement in renewable energy adoption and sustainability practices.
District and Sub-District Level Institutions		

Institution	Roles and Responsibilities	Gap analysis
District Level NCAP committee	• The implementation of all the proposed control measures based on targets under UPCAMP at the grassroots levels, to identify potential drawbacks/limitations of any mitigation activity and pinpoint the individual gaps within the implementation of UPCAMP in each district	• Limited capacity and key counterpart absence in managing specific actions related to air pollution in all districts in the state. • No coordination amongst all districts of state except for 15 NACs
Rural Local Bodies / Gram Panchayats	• Coordination with district level committee and sector nodal departments for implementation of targets/actions assigned under stipulated timeline. • Report regular updates to nodal departments on action implementation	• Limited Financial Resources: Rural local bodies in UP face budget constraints, impeding infrastructure development and public service delivery. • Capacity gap in personnel with the required administrative and governance skills. Inadequate rural infrastructure, including roads, sanitation, and healthcare facilities. • Technology Adoption: Slow adoption of digital tools and technology for efficient governance. • Challenges in engaging and empowering local communities in decision-making and development initiatives.
SHG Federations and Village Organisations	• Coordination with district level committee and sector nodal departments for implementation of targets/actions on clean cooking program assigned under stipulated timeline. • Report regular updates to nodal departments on action implementation	• SHG Federations and Village Organizations face resource constraints, hindering their capacity to provide financial support and livelihood opportunities to marginalized communities. • Capacity gaps in providing training and skill development programs to empower members economically and socially. • need for capacity building to enhance governance, financial management, and sustainability of these grassroots organizations. • Challenges in linking SHGs with markets and value chains, affecting income generation and economic growth. • Capacity gaps in robust monitoring and evaluation systems to track the impact and effectiveness of their initiatives.

ANNEX 3: EHS RISKS ANALYZED AS PART OF SECTOR PROGRAMS

Sector	Schemes / Policies	EHS issues
Urban	Swachh Bharat Mission Finance Commission Solid Waste Management Grants	• Uncovered construction activity. • Open storage and carriage of construction materials • Open dumping of C&D waste and Municipal Solid Waste • Fires at Legacy waste dumpsites and Landfills • Open Burning of Waste including Plastic • Older Public Transport Fleet
Agriculture	Paramparagat Krishi Vikas Yojana (PKVY) Rashtriya Krishi Vikas Yojana (RKVY) National Project on Organic Farming (NPOF) Pradhan Mantri Krishi Sinchai Yojana (PMKSY) Biogas Development and Utilization Program National Mission for Sustainable Agriculture (NMSA) **PM PRANAM**	• Stubble burning • Overuse of fertilizer • Manure storage and management • Fertilizer Use Efficiency
Domestic/Clean Cooking	State Rural Livelihoods mission Swachh Bharat (Rural) Bio-energy program	• Use of solid fuels leading to indoor and ambient air pollution in rural areas • Time consuming activity in collection of fuelwoods by women • Gender disparity and behavioural change • Severe effects on health of both women and child
Transport	Motor Vehicle Act, 1988 Voluntary Vehicle Fleet Modernization Program (V-VMP) and Vehicle Scrappage Policy	• Older Polluting Vehicles • Road paving and dust management • Functional scrapping facility
MSME	MSME Sustainable (ZED) Certification Entrepreneurship Skill Development Programme (ESDP)	• Health and safety of workers working in polluting brick kiln running on old technologies. • Individual boilers in MSMEs leading to greater effect on air pollution. • Limited responsibility of industry owners on health and safety of workers in MSME • Lack of air pollution control devices in MSME • MSME running on DG sets emitting higher level of air pollution

Sector	Schemes / Policies	EHS issues
Biogas	National Biogas and Manure Management Programme (NBMMP) Bio Energy Program	• Generation of secondary particulate matter from gases such as ammonia through cow dung. Therefore, use of cow dung in conversion of biogas is recommended. • Stubble burning • Use of fuelwood in traditional cookstoves can be converted by implementing biogas model in individual household

ANNEX 4: WORLD BANK SECTOR IMPLEMENTATION EXPERIENCE IN UTTAR PRADESH

Table 14 Implementation Experience of Program States

Sector	Project	Remarks on E&S Management in ICR
Agriculture	Uttar Pradesh sodic lands reclamation III project (P112033)	Environmental safeguards: The project was classified as category B in accordance with the WB's environmental safeguard policy classification, and the following policies were triggered: Environmental Assessment (OP 4.01); Natural Habitats (OP 4.04); and Pest Management (OP 4.09). Against this backdrop, the government had prepared an ESMF providing appropriate mitigation actions. Under the ESMF, a specific Wetland Management Plan was implemented to prevent draining of natural wetlands. An Environmental Manager was in place throughout the project and regularly monitored and reported on safeguards compliance. Environmental safeguards compliance was satisfactory overall, and no significant adverse impacts were observed.
Water	Uttar Pradesh Water Sector Restructuring Project (P050647)	The Social and Environmental Management Plan (SEMP) was undertaken at the time of preparation and, in conjunction with the Basin Social and Environmental Assessment (SEA), laid out the issues and targets for the project as described in the PAD. The project made significant progress on the key issues through building awareness of environmental issues and improving the knowledge base and institutional capacity within the department and through the water user associations (WUAs) among the farmers. For irrigation and drainage reform, the SEA and SEMP outlined issues related to limited knowledge of integrated pest management, soil fertility and nutrient management, lack of attention to drainage, lack of diversification and little modernization of tools and techniques.

Sector	Project	Remarks on E&S Management in ICR
		Consultation and rehabilitation issues were also identified. Generally, most of these aspects were adequately covered within the project with numerous studies, plans, demonstrations, and training materials being developed
Health	India: Uttar Pradesh Health Systems Strengthening Project (UPHSSP) (P100304)	The Environment and Social Action Plan was developed and implemented by the project to ensure improved access and uptake of preventive, curative and essential public health services. Overall safeguards were assessed to be Moderately Satisfactory in 12 and Satisfactory in four out of 16 Implementation Status and Results (ISR). Aside of complying with both national guidelines for management of bio-medical waste, the project also met Bank's policies for environment assessment (EA), which were assessed to be Moderately Satisfactory in 12 of 16 missions and the remaining four were Satisfactory. The EA was assessed to be Moderately Satisfactory was on account of delayed and slow implementation of the environment action plan and due to frequent change of leadership that had resulted in delay of decision making related to implementation of EA activities that were beyond the control of DOHFW. The project undertook interesting innovations for handling bio-medical waste management using technology for effective monitoring and creating an accountability system starting from source of collection (District Hospitals) to destination (Common Treatment Facility).
Rural	National Rural Livelihoods Project (P104164)	An Environmental Assessment (EA) identified and triggered key safeguard policies: Environmental Assessment (OP 4.01), Forests (OP 4.36), Natural Habitats (OP 4.04) and Pest Management (OP 4.09). The NRLP falls in the environmental screening category B as per Bank's Operational Policy (OP) 4.01. The EMF assessed eligibility of SHG primary federation activities and producer collectives through a regulations list and incorporation of good natural resources management practices through environmental guidelines. The ESMF framework applied included the institutional arrangements at the national, state, district and sub-district levels that were implemented and provided capacity-building activities for project staff, community institutions and partners at all levels to address social needs and risks.

ANNEX 5: SUMMARY OF STAKEHOLDER MEETINGS ON CLEAN COOKING

Timeline – Discussions conducted between April 2022 – June 2023

Stakeholders: A meeting with various stakeholders including Department of Environment, UP, Working Group members from UPCAMP and representatives from the World Bank and Rural Development Department, Panchayati Raj, Animal Husbandry, Food and Civil Supplies, UPNEDA, research institutions (ICAR), public sector enterprises, and social enterprises working in the clean cooking sector

Summary:

1. **Introduction to UPCAMP and the Clean Cooking Program:**
    - The meeting began with an overview of the UPCAMP project and the importance of a clean cooking program to curb air pollution from residential and commercial sources.
    - Mr. Ashish Tiwari highlighted the fact that residential and commercial burning is the largest contributor to $PM_{2.5}$ pollution in the state and hence clean cooking needs to be promoted across the state.
    - It was also highlighted that different clean cooking solutions such as improved biomass cookstoves, biogas, and solar cookstoves can be promoted in Uttar Pradesh but a comprehensive strategy needs to be developed.
2. **Considerations in preparation of DPRs and designing pilots.**
    - Discussions held on (a) contributions of clean cooking to air pollution in Uttar Pradesh as per the initial findings of the cost effectiveness analysis (b) Current government data on clean cooking accessibility (urban and rural households) (c) a technical study funded by the World Bank Managed ESMAP Fund to support a state strategy and recommend business models for clean cooking adoption.
    - The mission held detailed discussions on the study methodology and data sources for the study. The rationale for support from UPCAMP stems from the fact that residential biomass burning accounts as the number source of primary $PM_{2.5}$ in UP, and while the Pradhan Mantri Ujjwala Yojana (PMUY) scheme has successfully connected millions of rural households to LPG, there remains the need to find clean cooking solutions for non-LPG households that still rely on traditional cooking methods from an air pollution management perspective.
    - Discussions focused on four business models that could be supported or considered for pilots through UPCAMP (a) improved biomass cookstoves using market led distribution models (b) expansion of biomass pellet cookstoves through technical and entrepreneurial capacity support for a supply chain of pellets; (c) biogas scale up through community biogas plants; and (d) electric cookstoves for households with electricity.
3. **Discussion on biogas-based solutions**
    - Representatives from ICAR highlighted that biogas can be a good alternative to replace solid fuels provided some of the challenges of availability of feedstock and management of Fermented Organic Manure (FOM) or slurry can be addressed.
    - The Banaskantha model was also discussed where in a 40 tonne CBG plant is being operated by the Banaskantha dairy. The biogas in currently being used as a fuel for vehicles but pipelines are also being installed to households.
    - A community level biogas plant (with capacity to process 1 to 10 tonnes daily feedstock) may be most suitable for Uttar Pradesh. A 10-tonne biogas plant can fulfil cooking needs of about 300 families.
    - According to details shared by the Department of Animal Husbandry, Uttar Pradesh currently has about 6880 cow shelters with about 500 large cow shelters having more than 500 animals. There are about 492 registered cow shelters that are already producing vermicompost. These cow shelters would be ideal to pilot a community biogas solution.

- It was also highlighted that financial incentives to establish 500 CBG plants across India were announced in the Financial Budget for FY 2022-23.
- Feasibility studies need to be done to assess the feedstock availability and demand for Fermented Organic Manure (FOM) before establishing any biogas plant. Other factors such as temperatures, adulteration of waste, etc may also affect the output and operation of the plant.
- Capacity building of beneficiaries will be critical to ensure operation and maintenance of biogas plants. The Skill Council for Green Jobs has created a training module for the operation and maintenance of biogas plants. UPNEDA can take a lead in capacity building a training for potential community institution members identified to run the community biogas plants.

4. **Discussion on the solutions for improved cookstoves**
   - Representatives from SRLM highlighted that SRLM has initiated the Prerana Ojas programme to promote clean energy solutions on similar lines as BRLPS-Jeevika in Bihar.
   - SRLM has also entered a partnership with TERI for the programme.
   - Representatives from TERI highlighted the need for identifying sources and channels for viability gap funding for the cookstoves.
   - Representatives from SRLM suggested that they have a cadre of Vidyut Sakhis (Community Resource Persons) who can help in initial handholding of enterprises run by women entrepreneurs. However, SRLM needs financial and technical support for developing materials for marketing and demand generation, viability gap funding for the products, and behaviour change communication.
   - Representatives from SRLM also suggested that they can provide a more detailed document on the current gaps in the implementation of the program and the support needed.
   - The financial incentives that need to be provided to end users may vary according to income levels of the households. For example, the poorest of the poor households may need a full subsidy to purchase an improved cookstove while middle income and (relatively) higher income households can afford to pay some amount for the cookstoves. Developing the exact financing model for end users will also need some hit and trials through pilots.
   - Uttar Pradesh currently has 7.2 lakh SHGs covering about 1.18 crore households. The state government has undertaken the Mission Antyodaya Survey to identify deprived households in the State.
   - It was highlighted that the other schemes that can be leveraged for clean cooking in the State are the Gram Panchayat Development Plans and the Clean Energy District programme for Unnao District.
5. **Discussion on solar PV based solutions**
   - Representatives from EESL India highlighted the economics of a solar-based induction cooking solution. The induction cooktop requires two 1KW panels and currently costs about INR 80,000 with the battery cost itself being about INR 35,000. The batteries need to be replaced every 3 to 4 years.
   - EESL is piloting some models without batteries to reduce the cost of the cooktop. Subsidy of about 40% (INR 32,000) can be availed through MNRE and about 25% (INR 20,000) can be generated through carbon credits over the life of the cooktop.
6. **Discussion on next steps:** As per the recent discussion in development of DPR, it has been decided that state would pilot and implement three methods as discussed above with different financing models as described below:
   - **Improved biomass cookstoves:** DoEFCC will develop and register a carbon project for clean cookstoves (ICS) in different geographies of UP and will be the coordinating and managing entity. The projects would be registered as a program of activities (PoA) combining multiple project activities with a common objective into a single program. The DoEFCC as the implementing department would empanel eligible partner organizations and select players for sub-projects for specific geographic regions of the

state through an auction process, awarded to a player that can introduce the highest cost savings to beneficiaries. The partner organization would be responsible for end-to-end implementation of the activities for a specific clean cooking project (supplying technology, setting up distribution networks, providing after-sales service to issuance of carbon credits and cost of manufacturing/distributing the clean cooking technology). The last-mile distribution of the clean cooking technology would be undertaken via the existing women SHG network defined under the SRLM. Bulk of the financing is being brought by the partner organizations (described further in Annex 3). The business model would be piloted tested with 50,000 households and scaled up after 1.5 years based on lessons learned.

- **Household Biogas systems:** will be delivered using the current subsidy regime under the National Biogas and Manure Management Programme (NBMMP) that gives provisions for small scale biogas plants ranging from 1-25 cubic meters. The project will utilize the subsidy of approximately USD 170 (14350 INR) for each biogas system ranging from 2-4 cubic meter biogas per day along with upgrades of compatible improved cook stoves. The target districts/households will be shortlisted based upon two criteria; (i) Number of households with more than 3 livestock to produce feed for biogas digestor; (ii) [2]Number of districts ranging below 50% threshold of using cleaner fuel (LPG and improved stoves) as per NFHS data.
- **Electric induction and hybrid solar cooking**: Electric induction cooking will be promoted selectively to target districts/households following three main criteria: (i) districts ranging below 50% threshold of using cleaner fuel (LPG and improved stoves) as per NFHS data; (ii) districts having electricity connection/access to at least 95 percent of households; (iii) households with per capita income criteria ranging from 305 USD - 610 USD and 610 USD – 915 USD. As per the above three eligibility criteria, 40 districts were shortlisted, based on meeting the above 3 criteria. 1 percent of the households in these 40 districts (circa 160,000) will be the target beneficiaries/households for these clean cooking technologies. The project would provide a 30 percent subsidy on the cost of an electric cookstove (estimated cost is 61 USD). The estimated expenditure for this subcomponent is approximately 2.8 M USD. Existing programs by EESL (Energy Efficiency Services Limited, Ministry of New and Renewable Energy) and Indian Oil Corporation Limited (IOCL) to promote wider adoption of electric induction and solar cooking technologies are being implemented in UP through a subsidy from Ministry of New and renewable energy. *As a next step, the mission recommends DoEFCC establish agreements with EESL and IOCL about utilizing their implementation framework and business models for solar and electric cooking technologies including on additional targets household/beneficiary for UPCAMP. Draft MOUs or letters of agreements should be shared with the Bank by project appraisal.*

Workshop on ADVANCING SUSTAINABLE, CLEAN, AND AFFORDABLE COOKING UNDER THE MISSION LIFE AND GO ELECTRIC CAMPAIGN

Date: Tuesday, May 30th, 2023, Time: 09:30 AM to 14:00 PM

Venue: Camellia & Garden Grille, Hilton Garden Inn, Vibhuti Khand, Gomti Nagar, Lucknow – 226010

AGENDA TOPIC: Technologies, Policy, and Financing Options for Clean Cooking in India

BACKGROUND:

Residential biomass burning is the largest source of ambient air PM2.5 pollution in UP. This is due to the use of solid fuels such as wood, charcoal, dried animal dung, and crop residues with limited affordability for LPG cylinders. The ambient air quality model developed by IIASA being used for the UCAP has estimated that addressing residential sector air pollution sources in Uttar Pradesh can reduce up to 9.6 µg/m3 PM2.5 exposure by 2030. Therefore, a significant part of the UPs deadly air pollution can be solved by directing resources to tackling household emissions.

While the government of India has made noteworthy progress in expanding access to LPG and electricity into rural areas, through Pradhan Mantri Ujjwala Scheme, (17 million connections in UP), the full transition to alternatives like LPG, for low-income households will take more time. The experience to date indicates that low-income households often continue to use multiple fuels even once improved fuels are available and therefore require intermediate low-cost transitional options that can meet important health and development objectives. LPG remains the most effective clean cooking solution for the long term but until challenges of affordability and accessibility can be overcome, improved/ clean cookstoves continue to offer a viable solution for the near term.

TECHNOLOGIES AVAILABLE AND TO BE EXPLORED:

Technology	**Factors that may limit rapid scalability**	**Indicative cost of technology adoption*10***	**Parameters to be considered for effective use**
LPG	• Lack of affordability especially for low-income households (despite existing PMUY subsidy). • Lack of delivery mechanisms in disconnected rural areas. • Lack of awareness about government schemes and processes for obtaining new connections.	The upfront cost for an LPG cylinder connection is about INR 4,000. An average household of 4-5 members is likely to consume 8-9 cylinders every year thus incurring a recurring cost of about INR 10,000 annually.	
Advanced biomass cookstoves (with processed fuels such as pellets or briquettes)	• Incompatible design of cookstoves withstanding considerations like the ease of usage for women and diversity of cooking habits and taste/preferences of Indian households • Lack of enforcement of specifications and standards for cookstoves leads to poor quality of products. • Prevalence of low-quality cheaper solutions (such as Tier-2 cookstoves) which have higher emissions and have created distrust about the technology among end users. • High costs of advanced cookstoves that can burn pellets as compared to traditional cookstoves. • Poor after-sales service.	The cost of an advanced cookstove may be between INR 1,500 to 3,500. The cost of pellets available in the market is INR 17 to 18 per Kg but can be reduced if manufactured at scale; Consumption may vary widely across households (average may be 3.5 to 4 kg per day).	• Standardized technologies that meet the global standards for Tier 3 or above cookstoves (both forced and natural draft) with low ash-content • Certifications regarding quality (such as BIS standards/ISO standard TR 19867-3:2018) • Suited for varied fuel types - cow dung, firewood, and biomass pellets
Biogas	• High capital expenditure with limited financing options from financiers • Lack of availability of sufficient land at the	The capital cost of a household size biogas plant (2-5m^3) is about INR 52,500. The annual operational cost may be about INR 4,000-INR 6,000 depending	• Technology application according to local feedstock availability • Scale of biogas plants - Community biogas

10 *Indicative costs based on current market estimates. Actual costs may be lower based on factors such as scale of the programme, potential for carbon financing, etc.*

	household level to set up a biogas plant. • Poor design and construction often lead to lower efficiency and higher breakdowns. • Lack of availability of feedstock especially during periods of droughts or other weather-related events. • Operating a biogas plant can be labor intensive and requires regular upkeep. • Lack of awareness about the application of biogas for cooking.	on feedstock availability and maintenance. The capital cost of a community biogas plant providing biogas to 300 households could be between INR 75 lakhs to INR 1 crore.	plants ($10m^3$ to $30m^3$ capacity) instead of household biogas plants
Electric/ Induction cookstoves	• High upfront costs compared to traditional cookstoves. • Need for separate cooking utensils and lack of suitability for cooking certain type of food items. • Lack of reliable electricity supply especially in rural areas. • Lack of awareness about the availability and usage of the technology.	An induction stove may cost about INR 2,700 to INR 4,000. The average annual cost of electricity for a household using an induction cookstove will be around INR 6,000.*11*	• Higher energy efficiency with low consumption of electricity • Easy to use for different cooking styles. • More safety features to suit unreliable electricity supply. • Higher durability and product warranty
Solar cookstoves	• High cost of technology for low-income households • Unreliable due to dependency on weather conditions (makes it unsuitable for use during cloudy weather or monsoon seasons) • Increased cooking time	The cost for a household solar PV panel induction cookstove can be from INR 12,000 to INR 23,000.*12* Other Solar PV based induction cookstoves are currently sold at INR 80,000 and batteries may need to be replaced (costing around INR 30,000) after 4-5 years.	• Technology with higher energy efficiency to cook on minimal sunlight conditions. • Ensuring portability • Ease of usage in areas with poor electricity access

FINANCING OPTIONS:

CHALLENGES IN PROVIDING AFFORDABLE FINANCE IN THE CLEAN COOKING SECTOR:

Challenges in financing at the end user level	**Challenges in financing at the enterprise level**
Lack of information on credit worthiness and high default rates	Diverse set of small manufacturers with lack of standardization or quality control across products
Lack of mechanisms to aggregate demand and hence high cost of lending	Lack of assured demand for products

11 *Cost calculations based on assuming a 1500 Watts induction cookstove running for 2 hours every day.*

12 *Based on cost of 'Surya Nutan' cookstoves developed by Indian Oil Corporation Limited.*

Small ticket size of the product	Limited market information

FINANCING SOLUTIONS

Type of technology	Financing Options	Mechanism for financing	Questions/follow up
Clean Cookstoves	**Consumer financing for clean cooking solutions:** A dedicated credit line can be setup to enable low-cost consumer financing to users. This credit line can be accompanied by a technical assistance (TA) facility for enterprises/service providers **(TA: *Providing credible customer leads to FIs, building local capacities, Supporting marketing/distribution of the solution)***	The World Bank, through a government loan, can help setup a dedicated credit line for clean cooking solutions that can enable FIs (Development Finance Institutions or multilateral development banks) to give low-cost credit options to end users	Can Food and Civil Supplies manage this using the beneficiary lists of existing govt programs (BPL families, MNREGA workers) For non-Ujjwala households (not even getting the LPG cylinder subsidy, so a similar subsidy may be considered)
		The credit line can be routed through NABARD and other government institutions for on-lending to FIs. The credit line can also be levered as a part of NABARD's SHG-Bank linkage program through an interest subvention	Confirm if government funds can be directed into NABARD program without W. Bank for an added subvention (compare to the cost of LPG cylinder subsidy)
	Enterprise financing for manufacturers and distributors: assured credit to fund working capital requirements and business development activities along with an interest subsidy and a partial first loss default guarantee (FLDG) can scale up manufacturing	The World Bank can provide a dedicated credit line (revolving credit facility) to a designated financial institution (such as SIDBI or IREDA) for setting up a working capital facility/fund.	Confirm if there an existing UP program under MNRE that can introduce the dedicated credit facility?

Biogas	**Enterprise financing for manufacturers and distributors:** assured credit to fund working capital requirements and business development activities along with an interest subsidy and a partial first loss default guarantee (FLDG) can scale up manufacturing. This revolving credit facility can be used to provide working capital to distributors and manufacturers of Tier 3 and above clean cooking solutions, biogas plant developers, and decentralized biomass processing units.	The World Bank can provide a dedicated credit line to a designated financial institution (such as SIDBI or IREDA) for setting up a working capital facility/fund. New National Biogas and Organic Manure Program (NNBOMP) has subsidies of 17,000-70,400 plant + GoUP has an additional subsidy of 50 lakhs under the Gobardhan scheme implemented by the UP-Panchayat Raj Dept	How to involve Animal Husbandry Department to work on feasibility studies based on proximity to livestock/leverage existing cowsheds for development of community biogas plants and understanding supply chain of biogas to households?
Solar Cooking	GoUP Fixed One Time Capital Subsidy; +matching IOC Subsidy; Pilot consumer incentives for the Surya Nutan- Solar Powered Indoor Cooking Solution – Hybrid Solar/Electric		

ADDITIONAL TOPICS FOR CONSIDERATIONS:

1. Behaviour Change Communication

What to do	How to do (Funding Mechanism)
1. Target segment (women, male, rural households, and urban households for **primary survey** on user pain points on usage of clean cooking solutions and **message framing** targeting end users 2. **On-Ground Implementation and Delivery Channels**: Utilize various delivery vehicles, including both above-the-line (mass media, etc.) and below-the-line (targeted field level marketing) activities. 3. **Monitoring and evaluation:** collecting end user data through surveys on the use of clean cookstoves and fuels before and after the campaign as well as monitoring behaviours and attitudes.	Leverage IEC funds under the UPSRLM /Dept Rural Development; Funds of Dept o Panchayat Raj; and Poshan Abhiyan and Integrated Child Development Scheme under Women and Child Development Dept

2. **Measuring impacts from clean cooking solutions and cost-effectiveness of co-benefits monitoring:**
    - **For pollutants**: Evaluation through GAINS model, updating emission inventory, time to time data collection, sample survey etc.
    - **Adoption of clean cooking solutions**: Leveraging monitoring and evaluation via an integrated approach to monitoring and evaluation that combines user-level and community-level mechanisms. For example: community institutions under UPSRLM such as Village Organizations can be empowered to take up community-level monitoring, especially in rural areas where continuous monitoring is essential.
    - **For gender via gender integration**: Potential sources of resources that can be leveraged for gender integration activities are women empowerment funds under UPSRLM and Uttar Pradesh Skill Development Mission for training and entrepreneurship development.

ANNEX 6: SUMMARY OF STAKEHOLDER MEETINGS ON MSME

Timeline – Discussions conducted between April 2022 – June 2023

Stakeholders: A meeting with various stakeholders including Department of Environment, UP, Working Group members from UPCAMP and representatives from the World Bank and Infrastructure & Industrial Development, public sector enterprises, and social enterprises working in MSME sector

Summary:

1. **Key challenges facing MSMEs Sector**
    - Key challenges in UP in managing air pollution are associated with the use of dirty fuel (primarily coal and pet-coke), resource/energy inefficiencies, inadequate implementation of Air Pollution Control Devices (APCD), and poor operation, and maintenance of boilers.
    - Several actions are currently being taken to curb air pollution from MSMEs, including in clusters in 10 districts of UP. Under directions of the CAQM, more than 1100 units in the NCR part of UP have converted to using PNG.
    - VAT to be reduced, 12.5% currently, on steam. Bring down the rate to 5% like in Gujarat.
    - Land is an issue. Requires 3-6 acres of land for 2 boilers.
    - Industrial Policy, for above 50 cr projects there is capital subsidy and SGST relaxations. For above 200 cr projects, capital subsidy is increased further and the reimbursement under SGST. Centres of Excellence also in the industrial policy (incentive structure provided in the industrial policy]
    - Industries to shift to hydrogen-based system in the next 10 years. In the interim, industry requires subsidy on solar.
    - NCR region has banned coal as fuel for industries but some of the coal categories like “metallurgical coal” are less polluting.
    - In NCR, biomass and PNG are being promoted as options. Biomass for industries is more commercially viable than PNG. However, the guidelines/norms on pollution control are more stringent in the NCR for biomass and PNG and need to be complied with.
    - Paper and pulp industries, large industries, biomass is being used. The choice on the use of ‘community broilers’ and ‘biomass/PNG’ depends on the size of industry.
    - Enforcement is very important for the NCR region, however, in the rest of UP these guidelines do not exist (?) and norms are not properly enforced.
2. **Key issues in Brick Kiln Sector:**
    - Unorganized sector; migratory labour
    - Very old technology dating back to 1860’s
    - Only in 1995/96, there was a change in policy to replace the iron chimneys by a fitted (?) chimney/fixed technology

- GoI came out with a new technology – the zig zag technology. Zig zag is more emission efficient, quality efficient.
- Shifting to zig zag requires skilled and trained labour; no training institute, the unskilled workers learn from others
- In NCR, coal has been banned but brick kiln requires coal, so this is an outstanding issue. Use biomass instead of coal.
- This is a sector that employs large labour force.
- Encourage use of "red bricks" rather than hollow brick in construction
- Bring out a policy in the construction and housing sectors to use bricks made with zig zag technology.
- Total ban on coal is not feasible for zig zag technology. Use a phased approach to banning of coal for zig zag adoption.

3. Solutions suggested by stakeholders in MSME:

- Product Diversification (Perforated bricks, fly ash bricks, hollow bricks)
- Zig zag Technology adaption
- Capacity building training program for fireman, Pass the drawing for zig zag.
- Forced/ induced draught.
- Use of internal fuel *(parali)* to make it more perforated. Giver better insulation for bricks also reduce overall weight of bricks too.
- For long term, Tunnel Kiln pilot and communization of sector can be thought off.
- Establishing Community Boilers (Approx. 1 acre land required for 60 Ton)
- Gas / biomass burners where coal is banned. Boiler feeder can also be run on municipal waste. In addition, they have been doing fuel plantation of king grass, a kind of bamboo.
- APCS technology mandate
- Filter for large biomass plants: ESP
- APCS technology for all
- Promotion of PNG uptake, where pipelines are there.
- Solar technology in long term

4. Recommendation and next steps for development of DPR:

- Recommended areas for interventions to reduce air pollution from MSMEs in UP identified include i) shifting away from dirtiest fuels to cleaner alternatives; ii) developing common steam facilities to replace more polluting standard boilers and baby boilers; iii) promotion of resource/energy efficiency practices; iv) ramping up real-time monitoring of pollution; and v) clean energy as a service to the clusters.

- Strategies to enable such interventions include i) incentives (monetary and non-monetary) to overcome cost and access barriers to cleaner fuel and equipment for MSMEs; ii) developing trained, skilled workforce to ensure adequate operations and maintenance of boilers and APCDs, and iii) deployment of virtual monitoring system around clusters along with smart metering for APCDs and Pan-Tilt-Zoom (PTZ) cameras.

- **Promoting Cleaner Technologies in MSMEs.** Discussions with the Department of Environment discussed the draft DPR for industries sector covering: i) technology conversion for brick kilns; 2) promoting cleaner technology investment in MSMEs; 3) promotion of common steam boiler systems and 4) introduction of air action plans for industrial clusters.

- **Technology Conversions for brick kilns:** MoEFCC, through a notification in February 2022 has, among other steps (e.g., use of cleaner fuels like PNG, Biomass, conversion of vertical shaft kilns), mandated conversion of traditional and highly polluting Fixed Chimney Bull's Trench Kiln (FCBTK) to Zig-Zag kins. For brick kilns located within 10 km of non-attainment cities, the conversion to Zig-Zag kilns needs to be completed by 2023; the rest are required to convert by 2024. Estimated saving from these conversions can result in around 20 -25% reduction in energy consumption and around 50% reduction in black carbon emissions and particulate matter pollution. It has been identified as a technology of choice for the brick industry in UP. Despite this, only about 13% of brick kilns in the state have

completed conversion to zig-zag kilns. One of the major hurdles for conversion to Zig-Zag kilns has been found to be due to high upfront costs. A total of **10,242 kilns** will be targeted under the program for conversion with incentives of approximately USD 3000 from the IBRD, and USD 6000 from the UP MSME Technology Upgrade Scheme (2019). This amounts to about 25% of investment costs of around USD 40,000 (on average) required for Zig-Zag conversions.

- **Air Action Plans for industrial clusters and supporting pollution intensive MSMEs to adopt best available technology***:* The UP State Industrial Development Agency (UPSIDA) will be supported to prepare Air Action Plans for targeted industrial clusters by establishing PMUs on air pollution management and for development of air action plans fo*r* 5 – 7 targeted industrial clusters. Their role will include overseeing feasibility analysis and implementation of a resource efficient and circular production methods in these clusters. Pollution intensive MSMEs to adopt best available technology using the UP MSME Investment and Employment Promotion Policy Scheme*. The subsidy percentage and any additional enhancements to the policy needed is to be confirmed by DOEFCC after further discussion with the MSME Department*.
- **Demonstration of new clean technologies:** A new policy will be introduced by UPSIDA to mandate adoption of common steam facilities for any new greenfield industrial cluster in the state. In addition, a detailed feasibility study for setting up common steam facilities in existing brownfield projects will be carried out financed by IPF, with $250,000 earmarked for this study. Vendors establishing common steam facilities in an industrial cluster would be provided with support from the Uttar Pradesh Investment and Employment Promotion Policy for Common steam facilities for industrial clusters which provides fiscal assistance of up to 50% of the project cost (up to USD 60,000) for a common facility serving a minimum 10 MSMEs. The program will help support piloting and adoption of up to four (4) new more highly efficient and cleaner brick kilns, based on advanced Tunnel Kiln technology – which is the mainstay for brick manufacturing in Europe and parts of Southeast Asia but not yet demonstrated in UP. Under the project, around 25% of the capital cost of the project, up to USD 300,000, will be provided as subsidy for up to four selected tunnel kiln projects.

ANNEX 7: SUMMARY OF STAKEHOLDER MEETINGS ON TRANSPORT

Timeline – Discussions conducted between April 2022 – June 2023

Stakeholders: A meeting with various stakeholders including Department of Environment, UP, Working Group members from UPCAMP and representatives from the World Bank and Directorate of Urban Transport, UPSRTC, Department of Transport.

Summary: Discussions focused on understanding the transport department's existing interventions for reducing air pollution. In addition, preliminary discussions were also held with key stakeholders to understand the challenges and ongoing initiatives for air pollution reduction including the Uttar Pradesh State Road Transport Corporation (UPSRTC), Directorate of Urban Transport (DoUT), Uttar Pradesh Metro Rail Corporation Limited (UPMRCL), Traffic Directorate, and Uttar Pradesh Motor Truck Association. Information has been summarized in a draft technical assessment report. Discussions reviewed the international Avoid-Shift-Improve (ASI) Framework to highlight potential interventions including: (i) travel demand management to reduce demand for motorized transport, (ii) strengthening availability, reliability and service quality of public transport along with improving first and last-mile connectivity, (iii) shift to cleaner and efficient fuels including implementation of the state electric vehicles policy, mainly focusing on the transition to electric mobility with charging infrastructure, (iv) developing/ enhancing non-motorized transport infrastructure; (v) fleet modernization program to phase out old and polluting vehicles; (vi) traffic management to reduce congestion; (vii) improve and strengthen inspection and maintenance of ongoing vehicles; (viii) institutional integration and capacity building. Some of these measures in the program design may be addressed outside of PforR DLIs but can be considered in the Program Action Plan and the IPF funded activities. To complete the Technical Assessment for the priority Transport sub-sectors, the team highlighted the data gaps and shared with the working group a format/template for detailed data/information requirement with DoUT and the Transport Department.

Next Steps: As per discussions, follow interventions were decided for piloting and implementation.

- **Reducing Transportation and Road Dust Emissions:** Draft DPR on transportation and road dust prepared with the support of TERI team and agreed on interventions focused on i) acceleration of the heavy-duty vehicle fleet change (see RA3); ii) Piloting urban electrification and urban mobility models iii) and implementing programs on road dust control and monitoring.
- **Urban Mobility and Electrification in Model Cities.** The program will support Lucknow city to implement its Comprehensive Electric Mobility Plan (CEMP) while improv. as a model city for improved urban mobility planning for the implementation of eBuses, only Lucknow will be considered as model city while e3W including freight vehicles will be included in Lucknow as well as Varanasi. The mission agreed that charging stations will also be part of project funding and only lithium battery-based vehicles will be considered under the program. Interventions proposed for electric vehicles will align with the approved Comprehensive Electric Mobility Plan (CEMP) for Lucknow. The Budget line of the existing EV policy of UP under the aegis of Transport Department will be used for these interventions. Considering the complexity involved, it was agreed to drop the proposal for implementation of UMTA under the program.
- **Road Dust Control and Monitoring.** Given the significant contribution of resuspended road dust in overall PM2.5 concentrations, the mission discussed the constitution and functions of 'Dust Management Cells' that have been set up under the directions of the Commission for Air Quality Management in Delhi NCR and Adjoining Regions. 17 such cells were established by the Government of UP. Under the program, strengthening of these cells will be targeted to support implement actions that help reduce contribution of road dust. These actions would include enhanced monitoring of road dust, implementation of MRS audit system in smart cities, capacity building and training programs for MRS Audit operations workers, and the development of an app for monitoring MRS Audit operations in all districts of Uttar Pradesh. Additionally, "wall-to-wall" surfacing of road shoulders with bricks to address hyper-local sources of dust will be planned in coordination with the ULBs. The mission also discussed with UP State Industrial Development Authority to ensure proper maintenance of approach roads connecting industries – which are often in a poor state and lead to significant dust resuspension as heavy vehicles ply on the same.

ANNEX 8: SUMMARY OF STAKEHOLDER MEETINGS ON AGRICULTURE

Timeline – Discussions conducted between April 2022 – June 2023

Stakeholders: A meeting with various stakeholders including Department of Environment, UP, Working Group members from UPCAMP and representatives from the World Bank and Department of Agriculture, Department of Panchayati Raj, Department of Animal Husbandry.

Summary:

To manage NH_3 emission from agriculture (secondary PM control), the following interventions were discussed:

- *For fertilizer use*, increasing nitrogen use efficiency (NUE) through piloting in 18 districts in UP's 9 agro-ecological zones, development of more comprehensive field experiment and standardized NUE calculation, conduct field monitoring of impacts of farmer field schools, and demonstration of best technologies and services for each ego-climatic zone. The area coverage initially to be experimental and based upon monitoring of impact around the 3rd or 4th year, area coverage may be increased substantively in each agro-ecological zone.
- *For livestock and manure management* it was proposed to pilot efficient manure management strategies focusing on diet and health, storage, and treatment etc. (Pilots for livestock and manure management in the same districts as for NUE in 9 agro-ecological zones). It was also suggested to establish capacity building initiatives, and to ensure linkages with biogas generation through viable business models while promoting community benefits. For management of secondary PM due to crop residue burning, recommendations focused on leveraging crop residues such as sugarcane bagasse for biogas production and pilots to improve the supply chain of crop residues. DoEFCC also suggested including measures on *afforestation*. As forests reduce air pollution concentrations by avoiding emissions from energy sources and limiting secondary pollutant formation (cooling effects), and by directly absorbing air pollutants to leaf and branch surfaces, GoUP suggested complementing afforestation drives by establishing decentralized nurseries to ensure quality planting material.

Next Steps

Improving Agriculture and Livestock Management Practices: Discussion were held with the Department of Environment and working group on: (i) Program interventions to promote Integrated Nutrient Management (INM) practices for improvement of Agronomic Nitrogen Use Efficiency (AgNUE), and (ii) interventions to measure ammonia (NH3) and other associate green-house gas emission reductions at the pilot farmer field level. The mission discussed in detail needs for preparation of the Detailed Project Report (DPR) for Agriculture and key TORs required for appraisal readiness with assigned WG and TERI team members. As an input to the DPR, the mission presented information on approaches for measuring and implementing agronomical nitrogen use efficiency (AgNUE) in cropping systems. The suitability of a Nitrogen-balance approach in evaluating the resource and environmental performances of Nitrogen inputs in cropland at the field, airshed, and watershed levels spanning one growing season and multiple seasons was discussed. The mission also discussed tools, instruments, and models to assess and measure Nitrogen and Ammonia levels in the field, including nitrogen analyzers, leaf area meters, continuous emissions monitoring systems, and passive air samplers. Processed-based models such as Denitrification-Decomposition (DNDC) that have been previously validated for India's cropping systems by researchers and used to capture AgNUE were discussed.

It was highlighted the importance of promoting the adoption of integrated nutrient management (INM), an approach for optimizing nutrient availability and utilization in agricultural systems by combining various sources of nutrients. It was agreed that the program should establish a scientific research group (SRG) comprising scientists from renowned agricultural universities/institutes to develop INM tools, adoption protocols, fertilizer recommendations, and strengthen the extension system is the first key step to implementing INM for UP. Other activities under the Program include: 1) Digital soil mapping for precision soil nutrient assessment and budgeting; 2) Promote crop rotation and diversification with legumes; 3) Judicious application of inorganic fertilizers including slow release (nano fertilizers) and nitrification inhibitors (e.g., neem coated fertilizers); 4) Utilize organic nutrient sources; and 5) Aligning fertilizer recommendations to National/State Soil Health Card Program. The Department of Agriculture highlighted the government scheme that could be brought under the

program as the National Food Security Mission (NFSM)[3], with identifying approx. 1 lakh hectares across 18 districts in 9 agro-ecological zones within Uttar Pradesh. The additional interventions needed to improvise AgNUE would be supported through the project under the TA component (including set-up of SRG, hiring of key technical partners, capacity building, amongst others).

Next Steps: *It was agreed with DoE, Department of Agriculture (DoA) on the need for further work on the DPR for agriculture including: 1) clarifying the use of IPF versus PforR for agriculture activities; 2) Reaching agreement on the total area to be taken under AgNUE pilots and scale of project support (including development of package of practices for different cropping systems), 3) Elaboration of Monitoring systems to be developed at both (i) on-farm levels; and (ii) centralized levels at program level under Results Area 1 (RA1), 4) Identification of key State Agricultural Universities and Technical Agencies (such as IRRI, NRRI, etc.) to help represent the diversified cropping systems in UP (including development of key ToRs), 5) Efficient sequencing of DLI targets to ensure the fund release process supports the completion of key interventions*.

Livestock Interventions: The program will also target cow shelters (concentration of 5000-1000 livestock) to improve livestock waste management and will subsidize the construction of the biogas plants (up to 2 tons) while addressing comprehensive emissions and waste management systems for slurry and wastewater. The biogas offtake will be used within the shelters or fed into the grid. The program will utilize the exiting subsidy framework of Gobardhan scheme to subsidize the cost of the biogas plants.