Title: Study on use of Low GWP Mobile Air-Conditioning (MAC) Systems in Electric Vehicles (EVs), Including Cars, Trucks and Transport Refrigerated Vehicles (TRUs)

Request for Proposal

1. Background

India is a Party to the Montreal Protocol since 1992 and has been implementing phase-out of production and consumption of Ozone Depleting Substances (ODSs). The production and consumption of Chlorofluorocarbons (CFCs), Carbon tetrachloride (CTC) and Halons has been successfully phased out in India as of 1st January, 2010. The phase-out of Hydrochlorofluorocarbons (HCFCs) is ongoing as per the accelerated phase-out schedule of HCFCs under the Montreal Protocol.

The HCFC Phase-out Management Plan (HPMP) is being implemented in the country. The Executive Committee (ExCom) of the Multilateral Fund (MLF) it its 91st meeting vide decision 91/45 approved the HPMP Stage-III for India. The UNDP is the lead implementing agency for implementation of HPMP Stage-II. United Nations Environment Programme (UNEP) and Deutsche Gesellschaftfür Internationale Zusammenarbeit, (GIZ) Proklima, Government of Germany are the cooperating agencies.

The Ozone Cell, MoEF&CC is the National Ozone Unit of the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, is implementing the Hydrochlorofluorocarbons (HCFCs) Phase-Out Management Plan (HPMP) Stage -III.

The United Nations Environment Programme (UNEP) is the cooperating agency, to implement the non-investment component of India's HPMP Stage-III.

India Cooling Action Plan (ICAP) was launched in 2019 to address the cooling requirement across sectors including reducing cooling demand, refrigerant transitioning, enhancing energy efficiency and advancing cooling technology options and improving access to cooling in more equitable manner

Transport air-conditioning is one of the thematic areas under the India Cooling Action Plan (ICAP), which promotes the development of low refrigerant charge, energy-efficient Mobile Air Conditioning (MAC) systems to enable the transition to non-ODS and low-GWP alternatives in alignment to India’s commitments under the Montreal Protocol and its Kigali Amendment. Globally, electric refrigerated vans and trucks (e-reefers) are emerging as a promising option to improve energy and operational efficiency, reduce emissions, and support long-term refrigerant transition objectives. In the Indian context, understanding of the feasibility, performance, and integration requirements for low-GWP MAC systems and transport refrigeration units (TRUs) in electric vehicles is still evolving. While electric vehicle adoption efforts have largely focused on transport air-conditioning, extending this focus to the refrigerated transport sector can further improve energy efficiency, reduce refrigerant-related emissions, and promote sustainable cooling.

The PMU, Ozone Cell, MoEF&CC invites proposal for carrying out the activities listed in scope of work and deliverables given in Section 3 and 4 below.

2. Objective

To study the use of low-GWP mobile air-conditioning (MAC) in India's electric vehicles including the cars, trucks and transport refrigerated vehicles (TRUs) covering the technical fit, costs,

performance, and the readiness of India's supply chain, industry, and service networks, to identify barriers, gap and actions for wider adoption.

3. Scope of Work

a. The study will involve the collection, collation, and analysis of information through desk research and field visits, covering the following areas:

i. Overview on of the global and Indian landscape of low-GWP MAC systems used in electric vehicles, including cars, trucks, and transport refrigerated vehicles (TRUs), highlighting electricity supply configurations such as battery-powered, hybrid, direct-drive, and solar-assisted systems.
ii. Identify suitable low-GWP refrigerants used in MAC systems for electric vehicles (cars, trucks, and TRUs), including an assessment of their thermodynamic performance, safety classification, operational suitability under Indian climatic conditions.
iii. Review the existing national and international guidelines, standards, and regulations related to MAC, energy efficiency, environmental performance, and safe refrigerant handling to support the transition to low-GWP and non-ODS solutions.
iv. Examine the system integration requirements for deploying low-GWP MAC systems in electric vehicles in India, including vehicle-level compatibility, operational and safety considerations, technician training, costs, and broader market readiness such as supply chains, manufacturing and service capacity, and infrastructure gaps, to identify key barriers, gaps and pathways for wider adoption.
v. Evaluate the energy-efficiency benefits, along with operational advantages and challenges, associated with the use of low-GWP air-conditioning and refrigeration systems in electric vehicles.
vi. Document global and Indian case studies to capture emerging practices, lessons learned, and enabling conditions, with a view to enhancing awareness and understanding among relevant stakeholders.
vii. Based on the findings of the study propose action for wider adoption of electric vehicles with low-GWP refrigeration system in transport and transport refrigerated vehicle sector of India.

b. Organize two (2) workshops (virtually) for creating awareness among the concerned stakeholders on how to promote the integration of EV with low-GWP refrigeration system in transport sector. The workshops will involve participation from concerned stakeholders comprising representatives from Government departments, industry associations, industry experts, RAC manufacturers, vehicle manufactures, regulatory authorities, environmental NGOs, policymakers and researchers.

4. Schedule

The duration of completion of all the activities as per the scope of work is 6 months from the date of award of the assignment

5. Timeline and reporting

- Inception report with detail methodology and a clear work plan with timelines– Within 1st month of project inception
- Mid-term report with progress update highlighting key insights, challenges, and proposed next steps – End of 3rd month.
- Final report, submission - End of 6th month

6. **Terms of Payment**

    1. 50% after signing the agreement.
    2. 30% after submission of mid-term report.
    3. 20% after submission of final report and acceptance by MoEF&CC.

7. Eligibility Criteria

a. Average Annual financial turnover during the last three years, ending 31st March, 2025, should be at least INR 10 lakhs (to be supported with financial statements / audited balance sheets of the last three financial years).
b. Minimum 3 years' experience working in the field of Montreal Protocol/ International Environmental Convention in related areas or reputed Academic / Research Institution having expertise in the area (to be supported by letter of award and contract).
c. Experience of executing at least 3 assignments of order value INR 15 lakhs in the field of Montreal Protocol/ international/ multilateral conventions for government/ PSUs, autonomous bodies, international organizations, bilateral and multilateral bodies (to be supported by letter of award and contract).

8. Submission of Proposal

The proposal will be submitted in two parts involving Technical and Financial Proposals in two separate sealed envelopes. Proposal sent by Email/Fax will not be entertained. Last date of acceptance of the duly filled and completed bids is 26 February, 2026 by 17:30 Hours at the following address:

The Director,
Ozone Cell
Ministry of Environment, Forest and Climate Change (MoEF&CC)
1st Floor 9 Institutional Area, Lodhi Road
New Delhi - 110 003

The study title and the proponent's information must be included on the envelope.

a) **Technical Proposal**

The Technical Proposal should include the following:

i. Introduction.
ii. Details of experience of similar work.

iii. Approach and Methodology.
iv. Work Plan.
v. Details of Technical Team (include one page CV each of the persons to be associated) including qualification in relevant areas

b) **Financial Proposal**

The Financial Proposals should include the total lump-sum cost in INR inclusive of all taxes, travel and other expenses related to the assignment.

9. Evaluation and Selection

Evaluation Criteria (will be applied only to those who meet the eligibility criteria and their marks)

Sr. No.	Criteria	Marks	
	Sub-criteria	Total criteria	Sub-criteria
1	Past Experience of the Firm	40	

	• Number of years relevant experience
	  o 3 –6 Years
	  o More than 6 Years
	
	• Experience of working with government/ PSUs, autonomous bodies, international organizations, bilateral and multilateral bodies
	  o 3 -6 Assignments
	  o More than 6 Assignments
			20
			10
			20
			
			20
			
			10
			20

2	Methodology, Work Plan and Understanding of TOR	20	
	• Understanding of TOR • Approach and methodology • Work plan with timelines		06 08 06
3	General profile of qualifications, experience and number of key staff	25	
	• Qualifications • Relevant experience		10 15
4	Overall financial strength of the firm in terms of turnover, profitability and cash flow (liquid assets) situation	15	
	Turnover figure for last three years • 15 - 20 lakhs • 20 - 25 lakhs • 25 lakhs and above		 5 10 15
5	Total	100	

The minimum cut o ff will be 75 (Seventy-Five) marks for technical proposal and competency.

10. **Selection Methodology**

Quality and cost based selection

a. Technical proposal -70%
b. Financial proposal -30%

Financial proposals will be opened only for the technically qualified bidders and will be given cost score based on relative ranking of prices, with 100 marks for the lowest bidder and pro-rated lower marks for higher priced offers. The total score shall be obtained by weighting the quality and cost scores and the bidder that obtains the combined highest score will be considered for award.