

**Applied Research Programme in High Volume Transport**

**Open Call No. 3 for Research Proposals on**

# **Low Carbon Transport**

**In Low-Income and Lower Middle-Income  
Countries of Asia**

**Terms of Reference**

**October 2023**

**Reference HVT/059**



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## ACRONYMS

CV	Curriculum Vitae
EEG	Energy and Economic Growth [Applied Research Programme]
FCDO	Foreign, Commonwealth & Development Office
GHG	Greenhouse Gas
HIC	High-Income Country
HMIC	Higher Middle-Income Country
HVT	High Volume Transport [Applied Research Programme]
LCT	Low Carbon Transport
LIC	Low-Income Country
LMIC	Lower Middle-Income Country
MIC	Middle-Income Country
OPM	Oxford Policy Management
PMU	Programme Management Unit
RFP	Request for Proposal
SDG	Sustainable Development Goal
TOD	Transit-Oriented Development
UN	United Nations



## 1. Programme background

The High Volume Transport Applied Research Programme (HVT) is a seven-year, £18 million investment by the UK Foreign, Commonwealth & Development Office (FCDO) to undertake research into the complex and interrelated issues of sustainable transport development across Africa and South Asia. This new body of research aims to help inform the decisions of policymakers in low-income countries and make road and rail transport greener, safer, more accessible, affordable, and inclusive. Better informed decisions will ultimately lead to good investment decisions that will help drive economic development and poverty reduction.

HVT is delivered through a Programme Management Unit (PMU) led by DT Global, an international development consultancy. More information about the HVT Programme can be found [here](#).

HVT joined forces with FCDO's Energy and Economic Growth (EEG), managed by Oxford Policy Management (OPM) to undertake a scoping exercise that examined low-carbon transport (LCT) and energy research priorities in the low- and middle-income countries (LICs/MICs) across Sub-Saharan Africa and South Asia see Appendix B.

The objective of the scoping exercise was to facilitate transition to LCT in LICs and MICs in Asia and Sub-Saharan Africa by identifying barriers to LCT and the research needs that could enhance knowledge and capacity in the transport sector. The scoping studies identified key challenges in the transport and energy sectors, highlighted research gaps and set out a research agenda in seven thematic areas. This Open Call focuses on Asia and two themes:

- Research to enable electric two- and three-wheelers in less developed Asian countries.
- Better urban and transport planning, and peri-urban transport to reduce Greenhouse Gas (GHG) emissions and carbon reduction.

This Call is a partial relaunch of Open Call no. 2 of October 2020 with only two themes, a shorter timeframe and a lower budget. It is based primarily on the findings from the scoping studies on LCT in South Asia and draws on research gaps identified in the State of Knowledge research of HVT Part 1.

Two or three research projects up to £150,000 each may be awarded under this Call, with at least one from each theme. Project commencement is foreseen in February 2024 with completion end-October 2024.

## 2. HVT objective

The overarching goal for the HVT Programme is to increase access to affordable transport services, more efficient trade routes and safer, low carbon transport in LICs of Africa and South Asia.

The programme objective is to strengthen the evidence base for decision-making in three principal areas:

- the actions required to reduce the transport related GHG emissions, particularly in African and Asian cities and urban areas.
- the actions required to adapt transport infrastructure and services to the effects of climate change.
- the actions required to optimise the human and financial investments necessary to construct, maintain and operate the most strategic, cost effective, safe, and lower carbon transport services.



Meeting these objectives will make a valuable contribution to the global knowledge of transport in LICs.

### 3. HVT approach

Research uptake is key to achieving the HVT's objectives. The strategy for research uptake puts research users (see Section 6 below) at the centre of research and will ensure that HVT produces a body of new, high-quality research, and that this research is used by policymakers, decision takers, practitioners, and development partners with major transport financing operations in LICs.

HVT will drive uptake by influencing changes in policy through a high-level programme of engagement and through specific uptake and capacity building activities built into each research project. HVT will coordinate activities, including the preparation and dissemination of publications and interaction with stakeholders and our network, and link with existing relevant research to increase its availability and accessibility.

The HVT programme will focus on two important areas related to capacity building:

- Capacity of transport professionals and others in doing their jobs; and
- Capacity of researchers, intermediaries, and research users in strengthening the research-to-policy ecosystem.

Notes on the HVT Research Uptake Strategy which form part of the tender dossier. This document is for information only and Research Suppliers are required to formulate and propose their own strategies for research uptake and capacity building.

### 4. HVT outputs

The research outputs will be of high quality with an emphasis on ensuring that the research has clear operational relevance, will be tractable<sup>1</sup>, scalable<sup>2</sup> and reasonably conclusive<sup>3</sup>. There will be a strong practical focus on what has and has not worked and where, why and how, and on the scalability and transferability of the research outputs to LICs in Africa and South Asia.

The programme will deliver applied research that generates, validates, and updates effective policies, regulations, and practices for the planning, financing, design, construction, operation, and maintenance of HVT infrastructure and services.

### 5. Research areas to be addressed

In developing research proposals, Research Suppliers can address only one theme described in **Appendix A** that also sets out the research questions. These questions are the result of the scoping exercises carried out in December 2019, analyses of research literature reviews detailed in the scoping reports (see **Appendix B**) and validated through consultation with the main beneficiaries and stakeholders.

The list of research questions covers a variety of research topics which, taken in the wider context, includes questions that look for:

- Creative contributions to the mitigation of transport related GHG emissions and reduction in carbon.

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<sup>1</sup> The likelihood of the research output being adopted.

<sup>2</sup> The extent to which the research outputs can be expanded or go beyond its current state.

<sup>3</sup> How tangible project results are likely to be. The research must go beyond initial findings by delivering outputs that can be implemented.



- Policy, standards, and regulatory frameworks for promotion of LCT alternatives, modal shift and “quick win” measures
- Analysis of barriers that prevent the adoption of LCT technology.
- Advances in technology that allow shifts to LCT solutions, including electric two- and three-wheelers.
- Better integration of freight transport resulting in higher efficiency and shift to LCT modes
- Innovative proposals with a high technology readiness level
- Improved national and urban transport planning that reduces GHG emissions.

Research shall clearly address and quantify (by direct or indirect means) the potential reduction of transport related emission of GHG. Road and transport safety aspects, inclusion, transport efficiency and social and economic costs and benefits shall be integral part of any research. All research must clearly list and address risks (including their mitigation), and costs and benefits shall be on a life-cycle basis.

Research uptake and knowledge dissemination activities (including workshops) are an integral part of the research project and are expected to develop systems for possible future collaboration and that turn research into country practices. Capacity building strategy research and activities, including increasing technical capacity within the LCT sector and training of trainers shall be addressed in all research activities.

Such evidence-based research will demonstrate how the economic and environmental benefits of transport infrastructure and services contribute to reduction of transport related GHG support the United Nations (UN) Sustainable Development Goals (SDGs) and are aligned to FCDO’s development priorities.

## **6. Beneficiaries and recipients**

The beneficiaries are not only all transport users, transport infrastructure and service providers in the public and private sectors, civil society, and all beneficiaries of transport in LMICs but by reducing transport related GHG emissions include all living beings worldwide, especially in countries vulnerable to climate change.

The recipients of the services are relevant policymakers, transport and energy sector providers and investors, entrepreneurs, civil society, and other relevant stakeholders in these countries. Recipients also include bilateral donors, multilateral development banks, research agencies and technology providers in middle-income and high-income counties (MICs and HICs).

## **7. Research proposals**

Research Suppliers may submit only one proposal for one theme of this Call. The proposal MUST be a standalone bid containing all the information required to evaluate, award, and perform the project without reference to any other source of information.

It is expected that two or three projects may be awarded under this Call with at least one from each theme.

The technical proposal should comply with the structure set out in Section F1 of the Request for Proposal (RFP).

## **8. Scope of work**

Research proposals will address one or more of the research topics and questions listed in Appendix A. Research proposals are expected to include:



- Organisation and management structure
  - A clear description of all research partners and stakeholders involved and their respective roles and responsibilities.
- Project purpose
  - An analysis of how the research contributes not only to the reduction of transport related emission of GHG but also to greener, more accessible, affordable safe or inclusive transport in the beneficiary country(s) or region.
- Approach methodology
  - An analysis of the innovative nature and approach of the research project.
  - A description of the potential benefits and impact (environmental especially contribution to Nationally Determined Contribution (NDC), social, economic, financial, institutional, etc.) for transport infrastructure, services, freight, and passenger traffic.
  - An analysis of how exactly the research will contribute to reduction of transport impact on climate change including a comprehensible and repeatable determination of likely reduction of GHG.
  - An analysis of how the project is tractable, scalable, and conclusive.
- Road/Transport Safety & Inclusion
  - An explanation of how the research project integrates road/transport safety improvements and inclusion issues (gender, disability, vulnerable groups – the young and old in society) and the methodology for gender data disaggregation.
- Research uptake and capacity building
  - A demonstration of the skills and capacity building requirements.
  - A strategy for research uptake and knowledge dissemination during the period of research and after project completion.
  - Stakeholder mapping and the involvement of LIC stakeholders.
- Monitoring and evaluation
  - A monitoring and evaluation methodology, and output, outcome, and impact metrics to evaluate the project success. Include how metric data will be collected, assessed, and assumptions made.
- The project team
  - The experience and qualification of the project team which should ideally include experts from Asian LICs or lower middle-income countries (LMICs).
- Financial
  - The research project's value for money; efficiency and effectiveness. The financial proposal should comply with the structure set out in section F-3 of the RFP.

## 9. Guidelines on methodology

HVT is seeking applied research solutions that will transform how LCT in urban and inter-urban transport is promoted, planned, provided, used, maintained, and managed. These solutions are necessary to reshape how decision makers, governments, technology providers and others deliver LCT for transforming the lives of everyone who relies on transport in their everyday life.

New research solutions proposed by Research Suppliers must be innovative and transformational to meet the challenges set by climate change, accessibility, affordability, the NDCs, the SDGs, and for



transport to be fit for the 21st century. Research Suppliers may consider some of the following guidelines:

***Partner with research institutions***

Partnerships between academic, public, or private transport research institutions in Global South LMICs/LICs and Global North higher middle-income countries (HMICs) and HICs can enhance the chances of generating and sustaining transformational applied research.

***Include LIC stakeholders, regional bodies, donors, and multilateral development banks***

Early and continuous involvement of LIC stakeholders, regional bodies, donors, and multilateral development banks can contribute to ensuring new research recommendations are adopted and implemented by decision makers and transport providers. Such involvement can also increase a regional focus ensuring scalability and higher uptake.

***Reach out and involve other sectors***

Complementary work in other sectors, such as behavioural science research, that investigates how society perceives its transport needs, and how society uses the different transport modes, can lead to creative transport solutions.

***Global best practice where appropriate***

Consider best practice, where appropriate for LICs and LMICs, lessons learned and pilot projects from the UK and other countries especially LICs and Asian MICs and HICs.

***Road/Transport Safety, Gender, and inclusion***

Ensure all research activities address improved road/transport safety and reflect gender-equitable transport and address the transport needs of people with disabilities and vulnerable groups – the youth and older people in society. In gathering data ensure that it is disaggregated by gender.

***Consultation, participation, and a clear path to impact***

Consultation with stakeholders will help ensure that new research is successfully adopted, implemented, and sustained. This means setting out a clear plan and providing opportunities for stakeholders to participate at each stage; and identifying a strategy for research to evolve and be sustained.

## **10. Work plan and staff schedule**

Based on the reporting schedule in this Terms of Reference, the Research Supplier will prepare a work plan and include it in their proposal. The work plan should also include the human resources allocated to each activity. The work plan should clearly set out the approach to the following activities:

- An Inception Report that updates the Research Supplier’s methodology, the scope of work etc. taking account of any changes since proposal submission and the start of the contract.
- The phases for implementation of the selected research project including any activities in LICs. The research supplier clearly outlines who does what, when and where.
- The delivery of the project output which could include:
  - New and updated technical design and specifications.
  - Guidelines on policy, standards, and regulatory frameworks
- A research uptake strategy and knowledge dissemination activities:
  - Any research uptake and capacity building strategy and activities.





- A schedule of consultation meetings with the PMU, and project reports.

## 11. Reporting schedule

The Research Supplier will present the following reports:

- An Inception Report including quality assurance procedures within three weeks of the award of the contract
- Monthly report
- Draft Final Report
- Final Report that includes:
  - Research uptake strategy and capacity building report
  - If relevant, gender, poverty, and vulnerable group strategies.

Further reporting requirements will depend upon the nature of the selected projects. Research Suppliers should propose a reporting schedule that will be confirmed or mutually modified prior to contract award.

## 12. Expertise required

The HVT Programme demands innovative approaches and a clear path to research impact. The experts proposed should have the necessary professional skills and experience that will foster an innovative approach that leads to transformational research. It is highly encouraged that experts from Asian LIC or LMIC participate.

For each key expert, the Research Supplier must submit a curriculum vitae (CV) which does not exceed three pages. Evidence of relevant knowledge of transport environments and the needs of transport users and beneficiaries in Africa and/or South Asia would be advantageous. The CVs of key experts will be evaluated as described in the RFP dossier and should be submitted in the format as detailed in the RFP.

In building the multi-disciplinary research team, it is recognised that Research Suppliers may choose to form a Consortium. Such a Consortium could comprise a mix of practitioners and researchers from consultancy companies, research institutions and universities in low- middle and high-income countries. The research proposal should justify the selection of the lead organisation and describe how the lead organisation will manage other organisations in the Consortium and their experts. Where the lead organisation is an academic institution, the project management should describe how any competing responsibilities between scheduled university timetables and project deliverables and deadlines would be managed. Proposals which include partner organisations from Asian LIC or LMICs will attract higher scores under the local participation evaluation criteria.

Research project reports and outputs, and other publications must be technically and editorially high-quality publications. Therefore, Research Suppliers must include the CV of an editorial professional that can ensure high level quality assurance and report content.

The PMU has developed a reliable quality assurance system during Part 1 of the HVT Programme. This system will be further enhanced by engaging independent professionals and or organisations to ensure that all Part 2 reports and outputs are of high technical and editorial standards.



## Appendix A: Research questions to be addressed



**The research questions arise from the scoping studies in Asian countries in December 2019, analysis of the State of Knowledge studies, and consultation with stakeholders during several scoping missions to selected LICs in Asia.**

## LOW CARBON AND URBAN TRANSPORT – SHORTLIST OF POTENTIAL RESEARCH TOPICS

### **Theme 1: Boosting electric two- and three-wheelers**

Asia leads the global market in electric vehicles, China has the largest share of electric passenger cars worldwide, and in Vietnam and India two- and three- wheelers dominate private transport, taxi services and local freight. Yet markets in other Asian countries are less developed and even in the more developed countries market opportunities can vary from region to region. Insufficient infrastructure and technical capacity in LICs and LMICs still constrain customers from purchasing electric vehicles and hinder related innovation and entrepreneurship in the private sector. The focus of the Call is on research that especially impacts less developed Asian countries.

Innovative solutions are needed to promote and to increase the affordability, efficiency, and lower GHG emissions of electric two- and three-wheelers in a rapidly growing market. This means tackling barriers that include but are not limited to the following:

- Insufficient power and disruptions in supply
- High and differential cost of energy across countries
- Insufficient network of charging stations
- Awareness of potential customers and operators to the advantages of electro-mobility
- Different country manufacturing standards and regional market development
- Rationalisation of regulations, tax and insurance of two- and three- wheelers compared to combustion engine vehicles
- Adequacy of subsidies for electric two- and three-wheelers
- Insufficient skilled personnel and infrastructure for maintenance and repair of electric vehicles
- Variable availability of and expensive spare parts
- Insufficient support to domestic start-ups and access to finance.
- Integration of two- and three-wheelers into urban transport.

While not all of the above is true for each country boosting the take up of electric two- and three-wheelers will help countries to decarbonise and limit air pollution, particularly in cities in Asian LICs.

Two- and three-wheelers vehicles are generally the most affordable means of passenger transport in Asian LICs, especially in rural areas. These vehicles are the low-cost/low-quality combustion-engine that increase road congestion, emission levels, and road crashes. While some two- and three-wheelers are converted to electric by a locally available kit, many continue to use petrol; yet in India electrification is increasing rapidly. Converting two- and three-wheelers to electric is generally becoming technically easier using simple technology and requiring a low level of infrastructure requirements.

Recent electrification efforts in Asia are proceeding more rapidly with two- and three-wheelers than with cars, where two-wheelers substantially outnumber cars. In India the market for electric motorcycles is booming with the sales of battery powered two- and three-wheelers rising by over 50% in 2023, compared to the same period in 2022. This trend is reflected in recent registration levels of two- and three-wheelers reaching more than 50%. And research suggests that lifetime ownership cost is lower for two- and three-wheelers with battery swapping arrangements than for similar petrol-fuelled or home-charged wheelers. Focusing on the electrification of two- and three-wheelers would speed up decarbonisation, reduce air pollution, and benefit health outcomes.



*Potential Research Questions:*

- *How can the barriers that hinder the roll-out of electric technologies be overcome? What policy and regulation changes are necessary to breakdown these barriers?*
- *What new advances in electric technology are appropriate and affordable in Asian LICs to make two- and three-wheelers a viable, sustainable, and safe means of personal and taxi transport, and local freight transport?*
- *What are the factors that influence consumers' decision-making to purchase electric two- or three-wheelers or to convert combustion engine wheelers? To what extent are customers and transport operators aware of the different ownership models and costs, including battery swapping arrangements?*
- *What would be the impact of the usage of electric two- and three-wheelers in terms of (a) GHG reduction, (b) reduction of urban emission levels, and (c) changes in passenger and public safety? What would be the related socio-economic benefits and risks? Such an assessment should consider transport policy issues of fuel taxation, technology support, public transport investment against country economic performance, socio-demographic changes to illustrate the impacts of electrification of two- and three-wheelers.*
- *What are the quick wins from recent electrification efforts in Asia? To what extent could these quick wins be replicated in other Asian LICs to scale up conversion from petrol-fuelled to electric two- and three-wheelers or to accelerate the uptake of electric two- and three-wheelers?*
- *What are the most effective incentive schemes for large-scale adoption of electric two- and three-wheelers? What level of subsidies are affordable?*
- *What level of charging infrastructure would encourage large-scale adoption of electric two- and three-wheelers? How will home-charging be supported? What level and type of public charging infrastructure will be necessary?*
- *What are the gender differences in willingness to buy electric two- and three-wheelers? What are the specific concerns of women in using electric wheelers for personal transport, taxi services, and local freight transport?*
- *What are the optimal ways of integrating two- and three-wheelers into urban infrastructure? How viable is dedicated two- and three-wheeler in urban areas?*
- *What new business models can be developed to encourage the uptake of electric 2-3 wheelers? And/or rather than a car?*
- *How and who could start to implement any of these quick win proposals identified under this Call during the lifetime of this project?*

**Theme 2: Better urban and transport planning, and peri-urban transport to reduce GHG emissions**

Many Asian LICs lack integrated multi-modal urban transport systems. Different forms of transport often coexist and compete for limited road space but are insufficiently coordinated. Transport modes are inadequately integrated or insufficiently linked to business and commercial developments. These shortcomings lead to an inefficient use of transport, a high reliance on motorised vehicles and higher levels of polluting emissions.



Poor urban, peri-urban planning and zoning lead to horizontal developments which increase the need for integrated transport. Deficiencies in planning result from overlapping institutional responsibilities and insufficient capacity to prepare and/or implement adequate urban plans such as transit orientated developments (TODs). Such developments are gaining acceptance, in some Asian countries such as India. Therefore, appropriate urban planning and zoning can accommodate growth while optimising transport services, minimising journey times, and reducing transport tariffs.

Improved urban planning and efficient transport systems have the potential to reduce reliance on motor vehicles and hence help to reduce GHG and other emissions.

*Potential Research Questions:*

- *What examples exist of good practice in urban planning and integrated transport service that reduce GHG emissions in Asia? What will it take to implement good practice in Asian cities and urban areas? What policy changes are necessary? How can public institutions and private operators and investors work together to deliver better integrated transport services and, where viable, develop low-carbon mass transport?*
- *How can electro-mobility become a significant part of urban transport services to reduce GHG emissions and air pollution? What policy and regulation changes are necessary to enable a transition? How can public institutions learn from the private sector boom in electro-mobility and involve private operators in expanding urban electro-mobility?*
- *What are the examples of recent quick wins that reduce GHG emissions by better urban planning and integrated transport in Asia or LICs elsewhere?*
- *What is the role of pedal-assist electric bikes alongside the electrification of two- and three-wheelers in reducing GHG emissions?*
- *Who could start to implement any of these quick win proposals identified under this Call and how should this be implemented?*

## Appendix B: LCT Scoping Reports for Bangladesh, Nepal and Pakistan

HVT collaborated with FCDO's Energy and Economic Growth (EEG), to undertake a scoping exercise that examined low-carbon transport (LCT) and energy research priorities in the low- and middle-income countries (LICs/MICs) across Sub-Saharan Africa and South Asia. Below are some of the scoping study reports, however this Open Call is not limited to these countries:

### **Bangladesh:**

[transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-bangladesh/](https://transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-bangladesh/)

### **Pakistan:**

[transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-pakistan/](https://transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-pakistan/)

### **Nepal:**

[transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-nepal/](https://transport-links.com/download/country-scoping-of-research-priorities-on-low-carbon-transport-in-nepal/)