



# Flexible Research Fund: Grant Specification Document



## PLEASE ENSURE YOU HAVE READ:

- **GUIDANCE DOCUMENT**
- **FREQUENTLY ASKED QUESTIONS**

Note: This material has been funded by UK aid from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies.

The Climate Compatible Growth (CCG) Flexible Research Fund (FRF) provides research funding to respond to new and emerging research opportunities and demands. This is the first FRF call run by the CCG programme, this new competition enables the CCG programme, funded by the Foreign and Commonwealth Development Office (FCDO) and delivered by Loughborough University, to fund research that will provide tangible and impactful benefits in CCG countries, the call topics are tailored to focus on four of CCG's current priority countries: India, Lao PDR, Vietnam, and Ghana.

This call includes six topics. Each proposal should only focus on one of these topics. Please read the details carefully, which include research questions and requirements, indicative timescales, budgets, and countries. All successful projects will be integrated into the CCG research programme and hosted by one of our research work streams. The call topics are as follows:

- 1. Green Hydrogen in India**
- 2. Energy Efficiency in Lao PDR**
- 3. Macroeconomic Implications of Transitions to Low-Carbon Energy in Vietnam**
- 4. Climate Change and Low-Carbon Transport in Vietnam**
- 5. Financing the Energy Transition in Ghana**
- 6. Cooling in Vietnam and Lao PDR**

# Topic 1: Green Hydrogen in India

## Overview

India announced the 'National Green Hydrogen Mission' in 2021 and expressed its intent to become a global hub for the production of green hydrogen. Currently, most hydrogen is produced by fossil fuels. To meet its green hydrogen goals, the Indian government has allocated around £2 billion of incentives for green hydrogen, most of which is for producing green hydrogen and electrolysers. The government wants production capacity for green hydrogen to reach 5 million tonnes per year by 2030. It claims that this would cut around 50 million metric tons of carbon emissions and generate tens of thousands of jobs.

To produce green hydrogen at this scale, the Indian government estimates that 125 GW of additional renewable energy capacity will be required. Furthermore, state priorities do not always completely align with central government goals. For example, Northern regions of India (Punjab, Haryana) have lower renewable energy potential and no easy access to ports. This is not ideal for the production and export of green hydrogen. On the other hand, coastal states such as Gujrat, Maharashtra, and Tamil Nadu are geographically well situated to harness offshore wind power to produce green hydrogen.

## Research Questions

The CCG programme seeks interdisciplinary research that can provide evidence-based insights for the design and implementation of India's green hydrogen policies. Research funded under this call must also consider the wider economic, political, and institutional framework in India. We particularly welcome proposals that focus on one or more Indian states or regions (which are smaller than a state). Proposals should focus on a minimum of two out of the following three groups of questions:

1. What is the potential global demand for green hydrogen, and how much of this demand could be met by Indian production? What are the implications for the electricity system in India?
2. What is the scope for green hydrogen clusters in India? What are the suitable locations for clusters? What are the potential social and economic benefits and impacts?
3. How could green hydrogen be financed in India? What policy, institutional, and other changes at national and state levels are required to establish an 'enabling environment' for investment? How does this differ for applications such as fertiliser production, 'green steel', and long-distance freight transport?

## Key Stakeholders

An essential requirement of research funded on this topic is that it is carried out in close cooperation with key Indian stakeholders. This means proposals should also include a clear plan for consultation with stakeholders, working with them from the start to discuss assumptions and methods and to communicating results clearly. Proposals should also include plans for capacity building where appropriate. Stakeholders may include:

1. Government agencies: Ministry of New & Renewable Energy (State level), Ministry of Environment, Skills development corporations (State level)
2. Research Institutions: CSIR labs, Indian Institutes of Technology, leading state-level universities

3. Civil society

**Integration with the CCG Research Programme**

This research would be hosted by CCG's workstream on 'Advanced Geospatial Modelling' which is led by Mark Howells (Loughborough University/Imperial College) and Stephanie Hirmer (University of Oxford). It will also be related to CCG's workstream on 'Policies for Climate Compatible Growth' led by Dr Julia Tomei (University College London).

**Budget and Duration**

We expect to fund one or two projects under this topic that cover all or some of the tasks listed above. The total budget available under this topic is up to £150,000. Projects should run 12–18 months.

## Topic 2: Energy Efficiency in Lao PDR

### Overview

Research into opportunities for improving energy efficiency in Lao PDR across different sectors is crucial to advancing the country's low-emission growth agenda. In 2016, the Lao PDR government published its 'National Policy on Energy Efficiency and Conservation', proclaiming its intention to reduce energy consumption by 10% compared to business as usual by 2030. In 2018, the four highest energy consuming sectors included the residential sector (41% of total energy consumption), followed by transport (33%), industrial (14%), and commercial (12%). The residential sector consumed two main types of energy: electricity and biomass. Therefore, promoting household energy efficiency and energy saving would have a substantial effect on emissions as well as have a significant impact on household expenditures.

Additionally, improving energy efficiency in industry has become a particular focus point of the government's green growth agenda in recent years, owing to the sector being a key driver of economic growth in the country. In 2019, the government released its 'National Green Growth Strategy', in which 'the design and implementation of financial mechanisms that provide industrial entrepreneurs access to efficient, environmentally friendly, energy and raw material-saving modern technologies' was foregrounded as a priority. This, in turn, led to the creation of the 2022 'Lao Green Industry Policy' for sustainable economic development which is currently being championed by various ministries of the Lao Government.

However, improving energy efficiency in Lao PDR faces barriers such as limited public awareness and information about its benefits, policy and regulatory gaps, technical capacity and skills shortages, limited availability and affordability of energy-efficient technologies, limited information on energy consumption patterns, and market dynamics that favour conventional energy sources. Overcoming these obstacles will require concerted efforts from various stakeholders and targeted interventions to promote energy-efficient practices and technologies.

### Research Questions

**We invite research proposals that aim to inform implementation of effective energy efficiency measures in Lao PDR, with proposals focussing on the industrial or residential sectors being strongly encouraged.** Proposals for research on this topic should include one or more of the following:

1. **Assessment of Potential for Energy Efficiency Savings in Lao PDR:** A comprehensive assessment identifying and quantifying the potential energy efficiency savings within the industrial and/or residential sectors in Lao PDR. Proposals that identify opportunities for cross-sectoral resource efficiency improvements and resource circularity, such as agrowaste to energy opportunities, are particularly encouraged.
2. **Analysis of Barriers to Energy Efficiency Adoption in Lao PDR:** Research should explore the barriers that hinder the widespread adoption of energy-efficient practices across different

## FRF Grant Specification August 2023

sectors. Proposals should aim to identify policies and other actions that could overcome these challenges, facilitating the implementation of energy-saving measures.

- 3. Evaluation of Feasibility and Impact:** Research should evaluate the technical and financial feasibility of implementing energy efficiency measures, particularly in small and medium-sized enterprises (SMEs). Additionally, studies exploring the potential impact of energy efficiency programmes on the competitiveness of the industrial sector are strongly encouraged.

Researchers should align their proposals with Lao PDR's environmental goals and low-emission ambitions wherever relevant. Moreover, we encourage proposals that prioritise skills transfer and knowledge sharing among different stakeholder groups, particularly those that engage industry actors. Researchers should consider innovative strategies for empowering businesses, policymakers, and communities with the expertise and understanding required to embrace energy-efficient practices effectively.

### Key Stakeholders

An essential requirement of research funded on this topic is that it is carried out in close cooperation with key Laos stakeholders. This means proposals should also include a clear plan for consultation with stakeholders, working with them from the start to discuss assumptions and methods and to communicating results clearly. Proposals should also include plans for capacity building where appropriate. Stakeholders may include:

- Ministry of Industry and Commerce
  - Department of Industry and Handicraft
- Ministry of Energy and Mines
  - Department of Energy Efficiency and Promotion
  - Department of Energy Policy and Planning
- Ministry of Planning and Investment
- Development Research Institute
- National University of Laos
- Global Green Growth Initiative
- Industrial private sector actors in Lao PDR
- Agricultural private sector actors in Lao PDR

### Integration with the CCG Research Programme

This research would be hosted by CCG's workstream on System Design which is led by Adam Hawkes (Imperial College), and it may also have relevance to CCG's Sector Interactions research workstream under Jonathan Cullen (University of Cambridge).

### Budget and Duration

We expect to fund a single project under this topic that covers all or some of the tasks listed above. The budget is up to £150,000 and should run 12–18 months.

## Topic 3: Macroeconomic Implications of Transitions to Low-Carbon Energy in Viet Nam

### Overview

In its 2022 'National Strategy for Climate Change until 2050', Viet Nam committed itself to reaching net zero emissions by the middle of the century. Over 80% of global emissions and GDP are subject to such a commitment. Viet Nam's strategy also contains an interim target of a 43.5% reduction in GHG emissions (relative to business as usual) by 2030 and an absolute cap on energy sector emissions.<sup>1</sup>

Although over a third of Viet Nam's electricity comes from clean hydroelectricity, much of the rest is generated from coal. Viet Nam's energy transition will therefore require substantial investment and structural change. However, there is also the anticipation, expressed in the country's 2012 'Green Growth Strategy', that the transition to clean energy may unlock valuable side-benefits in the form of new investment opportunities, green jobs, air quality improvements, and better natural resource management.

While these risks and opportunities have been articulated in official documents and donor reports, a solid evidence base about the macroeconomic implications of Viet Nam's energy transition is still lacking.

### Research Questions

We are inviting research projects to contribute to this evidence base. The expectation is that better information about the economic impacts of the net zero transition will help build consensus around the energy transition and assist decision makers in developing their strategies.

Research under this topic should address one or more of the following areas. (There is no expectation that a single project would cover all of them):

- a. **The economy-wide impact of Viet Nam's energy decarbonisation strategy.** What are the implications of the energy transition on key macroeconomic indicators like employment, competitiveness, growth, and the fiscal balance? What are the economic multipliers of clean energy investment?
- b. **The sectoral impacts of the energy transition.** What are the investment needs associated with the switch to clean sources of energy supply? What are suitable policy frameworks and financing strategies (e.g. private investment, MDB finance, taxation, debt) for sectors and/or companies with the highest emissions? What is the risk of asset stranding in high-carbon sectors and associated economic risks?
- c. **The socio-economic impacts of a shift away from coal in the power sector.** What are the implications of the transition for the cost of energy and affordability among different income groups?

Applicants are invited to identify the most appropriate analytical methods to carry out their research. Proposals may use different data sources, including macroeconomic statistics, fiscal data, labour market statistics, or household surveys. However, other approaches and data can be appropriate and may be suggested.

## FRF Grant Specification August 2023

### Key Stakeholders

An essential requirement of research funded on this topic is that it is carried out in close cooperation with key Indian stakeholders. This means proposals should also include a clear plan for consultation with stakeholders, working with them from the start to discuss assumptions and methods and to communicating results clearly. Proposals should also include plans for capacity building where appropriate. Potential government stakeholders include:

- Ministry of Finance
- Department of Science, Education, Natural Resources and Environment, Ministry of Planning and Investment (MPI)
- Central Institute for Economic Management, MPI
- Department of Planning, Ministry of Industry and Trade (MOIT)
- Institute of Energy, MOIT
- Climate Change Response Center, Department of Climate Change, Ministry of Natural Resources and Environment (MONRE)
- Institute for Strategy, Policy on Natural Resources and Environment (ISPONRE), MONRE
- United National Development Programme
- Hanoi University of Science and Technology
- National Economics University
- Center for Research on Energy and Environment

### Integration with the CCG research programme

Projects will be hosted by CCG's workstream on 'Economics and Policy' (led by Sam Fankhauser, University of Oxford) and in particular the projects on climate and energy policy (led by Sugandha Srivastav, University of Oxford). Projects would also have significant links with the workstream on 'Policies for Climate Compatible Growth' (led by Julia Tomei, University College London) and involve close cooperation with the CCG partnership team.

### Budget and duration

We expect to fund up to 2 projects under this topic. The maximum budget for individual projects will be £100,000. Projects can be up to 18 months long.

## Topic 4: Climate Change and Low-Carbon Transport in Viet Nam

### Overview

Viet Nam is the 7<sup>th</sup> largest emitter of CO<sub>2</sub> in the Asia-Pacific Region. Currently 18% of GHG emissions come from transport, and this is set to increase. In 2022 Viet Nam had over 72 million registered motorcycles and 5.8 million registered cars. Car registrations increased by 12.2% per year between 2014 and 2022, while motorcycle registrations grew by 7.3% per year over the same period. It is estimated that by the end of 2022 there were around 4,000 electric cars. It is also estimated that 10% of the 2.8 million two-wheelers bought in 2021 were electric two-wheelers (E2W). Viet Nam is now the largest market for E2W in the world after China. VinFast, a local manufacturer, is the largest supplier in Viet Nam.

At COP26 the Prime Minister, Pham Minh Chinh, pledged that Viet Nam would strive to achieve net zero emissions by 2050. As part of this, a major investment programme will be undertaken. By 2030 the policy will promote the production and adoption of electric vehicles; the building of new electric railways and a plan to replace old rolling stock with new stock powered by green electricity; the conversion of inland watercraft to adopt electricity or other forms of green energy; ensuring that all fossil fuel buses are replaced with green public transport; and that Vietnamese shipping complies with current conventions to reduce greenhouse gases.

In 2019 a substantial study was undertaken for Viet Nam by the World Bank and GIZ. Volume 1<sup>1</sup> calculated the Marginal Cost of Abatement of reducing CO<sub>2</sub> emissions for different measures in the transport sector. This analysis will help to identify the most cost-effective measures for emissions reduction. The modelling of emissions was based on the World Bank's EFFECT model (Energy Forecasting Framework and Emissions Consensus Tool), that is freely available. Volume 2<sup>2</sup> investigated the vulnerabilities of the transport network to natural hazards and identified measures to build resilience. Viet Nam is very susceptible to climate risk because of its long coastline, highly populated low-lying river estuaries, and exposure to extreme weather events. A cost-benefit framework was used to identify priority measures.

### Research Questions

The Vietnamese government is keen to build on the work undertaken by the World Bank and GIZ to address climate change issues, and to explore further how investment in the transport sector might be prioritised. Proposals are invited that address the following key questions:

1. What are the potential roadmaps for reducing emissions from the Vietnamese transport sector and what are the macroeconomic implications? How should policies and measures to reduce emissions be prioritised?
2. What are the costs and benefits of measures to reduce emissions from the transport sector?
3. How can priority projects and measures be financed? What policy, regulatory, and other changes are required to facilitate investment in e-mobility?

It is important that any proposed work takes into account and builds upon the existing research literature. For example, several studies have considered modal choice and the purchase of EVs<sup>3,4,5,6,7</sup>.



## FRF Grant Specification August 2023

### Key Stakeholders

An essential requirement of research funded on this topic is that it is carried out in close cooperation with key Vietnamese stakeholders. This means proposals should also include a clear plan for consultation with stakeholders, working with them from the start to discuss assumptions and methods and to communicating results clearly. Proposals should also include plans for capacity building where appropriate. Stakeholders may include:

- Ministry of Transport (MOT)
- Ministry of Industry and Trade (MOIT)
- Electricity of Vietnam (EVN)
- Vietnam Automobile Manufacturers' Association (VAMA)
- VINFAST (A Prominent Vehicle Manufacturer)
- Vietnam National University, Hanoi (VNU)
- National Economics University, Hanoi (NEU)
- University of Transport and Communications, Hanoi (UTC)
- Hanoi Transport Corporation
- Ho Chi Minh City (HCMC)

### Integration with the CCG research programme

The work will be hosted by CCG Transport workstream (led by Holger Dalkmann) or CCG's Systems Design workstream (led by Adam Hawkes, Imperial College)

### Budget and duration

We expect to fund a single project under this topic that covers all the tasks listed above. The budget is up to £130,000 and should run 12–18 months.

## Topic 5: Financing the Energy Transition in Ghana

### Overview

In order to reduce its carbon emissions, diversify its energy mix, and promote sustainable development, Ghana needs to attract substantial investment to finance its energy transition. According to Ghana's most recent Nationally Determined Contribution (NDC) submission to the UNFCCC in 2021, between \$9.3bn and \$15.5bn was required at the time. Since then, Ghana has defaulted on its debt repayments in late 2022 and is now in the process of restructuring its debt to meet International Monetary Fund requirements.

Against this background, research is required to investigate the challenges, strategies, and opportunities associated with financing the energy transition in Ghana. The scope includes research both on the sources of finance as well as policy options that are available to support investment in Ghana and reduce the transaction, capital and operating costs associated with introducing new technologies. By providing an improved understanding the financial landscape and identifying potential funding sources, research funded under this call topic should provide valuable insights for policymakers, investors, and stakeholders involved in the country's sustainable energy transformation.

### Research Questions

Research funded under this call should build empirically on existing literature, through primary in-country research and fieldwork. It should lead to a stronger evidence base on financing challenges and barriers including the impacts of public debt, and policy options to address these challenges. In addition to providing more general insights, proposals should also include analysis of specific investment projects – and draw generalisable lessons from them. Where appropriate, proposals can also draw lessons from other low- and middle-income countries.

Proposals should address one or more of the following questions:

1. What are the barriers to financing a transition to clean, affordable energy in Ghana, and how can they be overcome? How has Ghana's debt default and restructuring affected the availability of finance?
2. What is the potential role of public and private finance from national and international sources? What changes to policies and strategies are required?
3. What conditions are necessary for clean energy projects to be 'bankable'? What lessons can be learned from successful and unsuccessful projects?
4. What is the scope for using specific public funding schemes such as the District Assemblies Common Fund to finance clean energy projects?

### Key stakeholders

An essential requirement of research funded on this topic is that it is carried out in close co-operation with key stakeholders in Ghana. This means working with them from the start, ensuring that assumptions and methods are discussed with them, and results are clearly communicated. Proposals should also include plans for capacity building where appropriate. Stakeholders may include, for example:

## **FRF Grant Specification August 2023**

- Ministry of Finance
- Ghana Energy Commission
- Ministry of Energy
- UNDP Ghana
- Ghana Public Utilities Regulatory Commission

### **Integration with the CCG research programme**

Projects funded on this topic will be hosted by the CCG workstreams on 'Economics and Policy' (led by Sam Fankhauser, University of Oxford) and Investment Pipelines (led by Alex Money, University of Oxford).

### **Budget and duration**

The CCG programme may commission more than one project, depending on the complementarity of projects proposed. The indicative maximum budget for a single project is £100,000. Projects should be up to 18 months long.

## Topic 6: Cooling in Viet Nam and Lao PDR

### Overview

Global climate change has brought with it a range of impacts that are expected to affect many different regions and sectors. One of these impacts is the expected increase in cooling degree-days (CDD) for urban areas. CDD is a measure of the degree-days above a certain threshold temperature at which cooling is required in buildings to maintain a comfortable indoor temperature. As global temperatures rise, cities and urban areas are expected to experience more days when cooling is required, increasing the number of CDD which can lead to lower productivity, increased morbidity, and increased mortality. This is expected to have significant impacts on countries like Viet Nam and Lao PDR, where a substantial portion of the population lives in urban areas. If temperatures rise by 2°C, it is estimated that Viet Nam will see a 16% increase in CDD, from around 2,400 CDD to 2,800 CDD, while Lao PDR will see a 19% increase, from around 2,600 CDD to 3,100 CDD. This increase in CDD poses several challenges for these countries.

Rapid urbanisation brings about various challenges that need to be addressed to ensure sustainable development. One major challenge is the increase in the percentage of the population living in urban areas. In Viet Nam, for instance, the urban population is expected to rise to 57% by 2050. In Lao PDR, urbanisation is also likely to increase in the next decade. The increase in urbanisation leads to the heat island effect, which exacerbates the number of CDDs.

As the middle class continues to grow in Viet Nam, there will be an increase in the use of cooling appliances such as air conditioners. This increase in electricity load requirements puts additional stress on the power sector, leading to increased CO<sub>2</sub> emissions. Furthermore, the use of high global warming potential (GWP) refrigerants in air conditioners (AC) further increases emissions. It is therefore essential for policymakers and stakeholders to address these challenges and encourage sustainable cooling alternatives. Investment in energy-efficient appliances and renewable energy sources can help reduce the electricity load requirements and hence, decrease CO<sub>2</sub> emissions. The adoption of low GWP refrigerants such as natural refrigerants can also contribute to reducing emissions.

### Research Questions

We invite research proposals that aim to inform implementation of cooling measures in Lao PDR and Viet Nam. Proposals for research on this topic should focus on at least two of the following questions:

1. **What should a national roadmap for sustainable cooling look like?:** This would involve conducting research into the current state of space cooling in both Viet Nam and Lao PDR, and developing a plan for promoting sustainable practices around cooling that can be adopted by both individuals and businesses. This would involve identifying the most effective ways to reduce energy consumption and carbon emissions, while also ensuring that people have access to the cooling they need to live and work comfortably.
2. **How can national supply chains for sustainable cooling equipment be developed?** Research is required to understand national capacity for developing, manufacturing, testing and installing sustainable cooling equipment. It should also explore options for

## FRF Grant Specification August 2023

strengthening national supply chains and capabilities, including learning lessons from other countries.

3. **What policies and regulations are required to support sustainable cooling?** Research is required to explore the role of policy instruments and mixes to support sustainable, more efficient cooling including labelling, standards regulations and financial incentives for businesses and households.

### Key stakeholders

An essential requirement of research funded on this topic is that it is carried out in close cooperation with key stakeholders. This means proposals should also include a clear plan for consultation with stakeholders, working with them from the start to discuss assumptions and methods and to communicating results clearly. Proposals should also include plans for capacity building where appropriate. Stakeholders may include:

- The Vietnamese Ministry of Industry and Trade (MOIT)/Lao Ministry of Industry and Commerce (MOIC): Policy drafting, database management, awareness training, market surveillance, monitoring of the Standards and Labels (S&L) programme, and sanctions.
- The Ministries of Science and Technology (MOST): Energy efficiency standards development, Minimum Energy Performance Standards (MEPS), and testing labs.
- The Ministries of Finance (MOF): Incentives and supporting policies, procurement guidelines, and customs clearance.
- Provincial People's Committees: Oversee market surveillance and sanctions.

For dissemination, network, trainings, etc., the EEN-Vietnam Energy Efficiency Network (<https://vsse.vn/en/een-vietnam/>) is famous and collaborates with many international organisations and enterprises.

### Integration with CCG

Depending on the project, this research would be hosted by CCG's workstream on Sector Interactions (led by Jonathan Cullen, University of Cambridge), or Policies for CCG (led by Julia Tomei, University College London). It may also have significant links with other workstream in CCG.

### Budget and duration

We expect to fund up to two projects under this topic that cover the questions above (up to one project per country). The budget will be up to £100,000 per project, and the duration should be up to 18 months long.