

Project Background

MECS is focused on the possibilities of changing the current widespread use of polluting fuels for cooking in Africa and Asia, to transition to modern energy based clean cooking. Clean for us means low kitchen emissions, safe for the user and their family, and low environmental impact.

From a user point of view, modern energy-based cooking includes the lower levels of kitchen emissions associated with higher tier solutions such as electricity, biogas, ethanol, briquettes, and even LPG. From a global point of view, Greenhouse gas emissions from the combustion of woodfuels for cooking is said account for 2% of global emissions, equivalent to those from the international aviation sector. However, 50% of black carbon emissions come from household woodfuel use and 27-34% of global woodfuel harvesting is defined as unsustainable¹. While LPG is good from the kitchen point of view, as a fossil fuel it may not be the best from a global climate view².

Over the last couple of years there has been a considerable expansion of interest in the role of hydrogen within the transition to a low carbon future.

Hydrogen created using surplus (renewable) energy has been discussed for the last several decades and as the use of renewables increases so too does the discussion around Hydrogen. Most recently, [we have noticed increased stirrings of interest](#) in the potential of hydrogen as a low carbon alternative to fossil fuel based cooking fuels and a potential medium to long-term solution to the global clean cooking challenge.

Scope of Work

MECS is seeking a consultant/s to conduct a review of the current and future potential of using hydrogen as a cooking fuel.

To date there has been no comprehensive analysis of the **technical feasibility** of large-scale adoption of hydrogen for cooking (particularly green hydrogen), the availability of hydrogen-based appliances and their useability or the likely affordability of different approaches to the use of hydrogen for cooking.

The review of current and future potential of this fuel should include an analysis of the following;

- (i) Potential for scaling of green hydrogen production in different geographies (spatiality of cost). At a minimum this needs to be by geographic region.
- (ii) Economics of electric cooking versus use of electricity to generate hydrogen for cooking,
- (iii) Technological readiness of hydrogen stoves,
- (iv) Potential for transition of existing LNG or LPG cooking systems to adopt hydrogen,

¹ Each of these statistics is based on relatively old and incomplete data and at various times have been questioned – there is a huge need to reassess what the actual contribution of global use of biomass based cooking is to climate change. These doubts on the data do not affect the reason for the consultancy.

² LPG is said to contribute less emissions than biomass cooking from unsustainable sources, however these debates often do not take into account the carbon used to get the LPG to the last mile.

- (v) The economics of green hydrogen production as part of off-grid solar home and mini-grid development,
- (vi) Potential for carbon financing of green hydrogen-based cooking,
- (vii) Life-cycle considerations for hydrogen-based cooking

We expect the report to undertake a review of the current status of hydrogen and also be forward looking (i.e. not to be dependent on current costs in the analysis).

Deliverables, budget, and duration

The research is expected to commence no later than **1st October 2022**. All deliverables must be completed and delivered no later than **31st January 2023**. These dates are non-negotiable. The consultant should demonstrate in their response to these ToRs how the work can be completed within the time available.

The total budget is a maximum of £15,000 (ex VAT where applicable).

Payment is contingent on successful completion of all deliverables.

Deliverable	Payment value
Contract signing	20%
At 8 weeks – presentation on findings to date	20%
At 16 weeks - a final report addressing points i- vii	60%

Communication and Reporting

The contractual requirements will be managed by the MECS Programme Manager of Loughborough University. All meetings and appointments to discuss the overall progress of the project against the contract will be agreed and arranged in advance and at mutually convenient times. Any significant changes to the approved research plan and timelines have to be discussed and approved in advance.

Loughborough University reserves the right to request the consultant/organisation to make revisions to the deliverables if they do not meet the required quality. The consultant/organisation will be required to make these revisions at no additional costs to Loughborough University.

Responding to these ToRs

Each submission will be evaluated based on the following combination of price and quality;

Quality	Score
Appreciation and understanding of the task.	5%
Quality of proposal and methodology	50%
Skills, expertise and experience of consultant/organisation team members including evidence of similar work completed	10%
Proposed management of the activities including Gantt chart	5%
Price and costs	30%
Total	100%

The University will accept the quotation which is the best value for money i.e. a balance between cost and quality. Shortlisted organisations may be invited to an interview (online) to finalise selection.

Responses should be a maximum of 8 pages (plus up to 3 CVs, 2 pages each).

Proposals should be sent to MECS (mecs@lboro.ac.uk) with the subject '**Hydrogen Transitions**'. All proposals must be received by 23:59 GMT on **23 August 2022**.

Ethical considerations

All research must be in line with the Code of Practice for research, Promoting good practice and preventing misconduct (UK Research Integrity Office, 2009).

The UK Research Integrity Office (UKRIO) is an independent charity, offering support to the public, researchers and organisations to further good practice in academic, scientific and medical research. Its confidential advice service is available to free of charge to individuals (members of the public, research participants, patients, researchers, and students) and subscribing organisations. Their advice service can be [accessed here](#).

At a minimum, participants must not be subjected to physical, social, legal or psychological harm. Due consideration and ethical steps must be taken into safeguarding all participants, especially the vulnerable. A detailed Participation Information Sheet explaining the full scope of the study, what confidentiality entails, and that no participants will be forced into participating, must be provided at recruitment. Participants are to be made aware that participation is fully voluntary and there are no repercussions if they choose to no longer participate in the study at any point in time. Participants should, ideally, sign a consent form which includes consent for the use of photographs and videos.

Confidentiality must be maintained at all times. With regards to confidentiality and privacy of participation, participants must be informed that their anonymity will be maintained in any outputs and that all identifiable markers will be removed from any data sets that are published. Additionally, due consideration must be made to ensure that participants are safeguarded during the research process in line with the local government issued guidelines around COVID-19.

The consultant will be responsible for securing any research or ethical permissions needed from local authorities in each of the field work locations. There may be additional ethical, or research clearance needed for this kind of user centric design research in the chosen country.

MECS is funded by UK Aid through the Foreign Commonwealth and Development Office. It is a partnership between researchers, innovators, policy makers, and ESMAP drawing on their expertise and relevant work from around the world to co-construct new knowledge with practitioners and the private sector. It is led by Loughborough University, UK.