

BRIEF ACTIONABLE RESEARCH AGENDA ON:

Sustainable Energy Transitions

EfD

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■ Sustainable Energy Transitions, with emphasis on gendered and intersectional aspects, lies at the core of a low carbon society. The implications of energy interventions, policies, and transitions is part of a larger initiative to identify the most promising research issues to support an actionable low-carbon transition in the Global South.

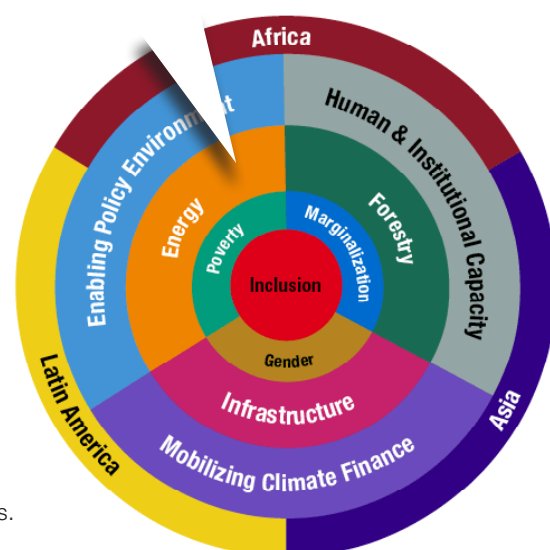
Aim: There is an urgent need to identify ways to overcome the challenges to inclusive and sustainable energy access in developing countries, so that a low-carbon transition will improve outcomes for women, youth, and other marginalized populations.

Background: Economic development is tied to energy. Globally, 800 million people still do not have access to electricity, 600 million of whom live in sub-Saharan Africa. Many more have only intermittent access. Although renewable electricity generation may now be cost-competitive with carbon-intensive technology, it may not be on an equal footing, due to financing challenges, vested political interests in fossil fuels, and the existing infrastructure of current technologies and distribution systems.

The ideal would be for developing countries to “leapfrog” over the fossil fuels that powered industrialization in developed countries. However, it is not clear that clean technologies can meet development needs. At present, providing grid electricity for all who need it will increase emissions. Off-grid solutions are not a complete solution. Local “mini” hydro-electric power generation depends on reliable rainfall, and solar charging is only adequate for lighting, phone charging, and television.

In addition, 33% of the global population lacks any access to clean cooking technology. Many others combine the use of clean fuels with dirty ones. Traditional stoves burn solid fuels, including biomass (wood or dung) and charcoal. These fuels are called “the killer in the kitchen” because women and children breath in harmful particulate matter. They also are responsible for substantial carbon emissions. Charcoal production, in particular, is responsible for forest degradation. Other households use kerosene, which is also harmful to health.

One common alternative is to redesign traditional stoves to become more efficient. Such stoves use less wood, cook faster, and release less smoke. More modern stoves that use liquified natural gas or petroleum (LNG or LPG) are relatively clean, and can be considered a step up the “energy ladder.” However, the cost of buying, fueling, and maintaining these LPG/LNG stoves is prohibitive for most households. As a result, even those households that own modern stoves may continue to use both clean and dirty fuels. Despite decades of development efforts to promote clean stove use, serious obstacles remain, including supply



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chains, information, and financing. Also, stoves have to be culturally suitable for local cooking practices. In addition, gendered household dynamics can affect women's ability to make decisions about buying and using cleaning cooking technology.

Access to both electricity and improved cookstove technologies can have significant impacts on women and girls, who spend hours a day collecting fuel, instead of earning income or going to school. Similarly, lack of access to electricity stifles households' ability to adopt labor-saving domestic appliances that would particularly aid women, who typically spend disproportionate amounts of time providing unpaid domestic work and caregiving because of deeply held social norms about appropriate gender roles, and a lack of alternative livelihood opportunities. Non-white, rural, poor, and ethnic minority populations face higher vulnerability in these regards. Overall, environmental and energy injustices also have roots in racial and ethnic discrimination, unequal distribution of income, and geographical location.

The need for economic development is tied to the need for energy development as well as the need for greater empowerment of women and other marginalized people; and the need for energy development is tied to the need to address climate change and other environmental issues. This virtuous circle requires moving beyond binary energy access, and securing reliability and affordability conditions for the adoption of appliances that help reduce inequities within a household. Proposed policy mechanisms need to advance goals feasibly, taking into account that existing interest groups in both public and private sectors seek to protect their status and power, and may hinder a low-carbon transition. Research needs to address these interconnections, not just individual problems in isolation, in order to avoid unintended consequences.

Opportunities for High-Impact Research

Unsolved questions involve the relationship between low-carbon energy development and empowerment of marginalized people; what policy tools across public, private, or non-profit sectors can effectively promote an equitable transition to a more sustainable energy system; and identifying the tradeoffs among improved energy access goals and other objectives, including environmental and equity objectives.

Research on sustainable energy is more likely to have high impact if it looks at the



Images: unsplash

interconnections among sustainable energy, economic development, and improving conditions for women, poor people, and other marginalized peoples. For instance, is access to a guaranteed minimum of energy services necessary for economic advancement of poor and marginalized communities? If so, how can that energy be provided to those communities in affordable and environmentally sustainable ways?

Many energy issues, such as encouraging the use of cleaner cookstoves, involve local factors, such as availability of suitable fuels and social and cultural norms. This means that solutions must be specific and local, not general. The impacts of proposed solutions, such as switching from one fuel to another, will also vary with local conditions. Research is needed to examine why there is so much variation, both in practical solutions and in the impacts of activities, to understand when research findings are potentially generalizable, and when they may stay inherently local.

Electricity can be generated through centralized facilities that supply power through a grid, or through local, off-grid production. The conditions that determine the preferability of one approach compared to the other include not only costs of generation and transmission, but also the structure of energy markets, regulatory policies for these markets, the environmental impacts of generation, and the ability to attract investment for greener alternatives. Research can contribute to understanding what policies may lead to the appropriate forms of efficient and sustainable energy access.

The energy transition and infrastructure development interact in ways that can either enhance or limit the development of both. For instance, greater digitalization can improve the operation of energy production facilities, but it requires reliable internet access. Lack of roads and reliable transportation inhibits market access, which discourages investments, including sustainable energy development. There may also be relationships between conflicts and natural disasters and the energy transition. Conflicts and disasters lead to rising prices, which are likely to hamper an energy transition, while a failure to transition may exacerbate both natural disasters and conflicts. Research can provide insights into ways to address the low-carbon transition in the context of both infrastructure development and disasters.

Link to HLRA:
<https://bit.ly/3zyfp1P>

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