

ABSTRACT

Disrupting the Energy-Poverty nexus: Creating social value in energy systems for sustainable futures in marginalized communities.

Nearly 2 billion people globally do not have adequate access to modern energy services, despite decades of interventions. Traditional energy poverty and access research, based on the paradigms of technology centrality and economies of scale, has had marginal impact on the magnitude of this problem. Although this field has progressed from an efficiency and optimization focus towards a sustainable development, decarbonization and energy justice paradigm, there is still a fundamental disconnect between infrastructure and its translation to social benefits. The more recent socio-technical systems approach and scholarship underscores the significance of social arrangements, politics, and cultural dimensions in energy systems. However, a discontinuity looms between technology and socio-technological arrangements, which limits translatory design in energy access; meaning that limited value is created in marginalized communities from the energy system. Hence, there is an urgent need to bridge this gap through evidence-based and contextual design. My research seeks to generate evidence and proposes a methodological approach to identify value creation possibilities of energy services. It utilizes a grounded approach in exploring mechanisms through which energy access improves economic and non-economic well-being of households and communities; while identifying potential burdens, risks, and anticipating environmental, political and other externalities that can undermine positive change. The results are then used as inputs for designing a multi-criteria intervention to complement the organizational, technological, and financial variables. This is supplemented by a computational (agent-based) model, to generate a variety of possible pathways from the interactions between variables. My research would supplement design choices for each variable category and build anticipatory capability in business models and policy. Empirical experimentation and data collection for my research has been done through a two-year engagement at a community in rural Brazil, with subsequent validation studies conducted in India, Nepal and the Philippines.