

Abstract

This doctoral dissertation investigates the gendered dynamics of productive energy use among micro-, small-, and medium-sized enterprises (MSMEs) across diverse African contexts, with a focus on how clean energy transitions can be effectively designed, financed, and implemented for women-owned businesses. While situated within the broader African energy access agenda, the empirical scope centres on seven selected countries, Egypt, Ghana, Kenya, Malawi, Nigeria, Tanzania, and Tunisia, chosen for their high relevance in terms of productive use in women-owned enterprises. Although global development frameworks, particularly Sustainable Development Goals (SDGs) 5, 7, and 8, prioritise gender equality, sustainable energy, and inclusive economic growth, they offer limited guidance on how to operationalise these goals in enterprise settings shaped by infrastructural gaps, financial exclusion, and gender-related constraints. Women entrepreneurs, in particular, remain peripheral in both energy policy and financing ecosystems, despite their pivotal role in sustaining local economies. This study responds to these gaps by proposing empirically grounded, enterprise-level pathways for inclusive energy transitions.

Using a multi-phased, mixed-methods approach, the research combines literature reviews, secondary data analysis, enterprise surveys, energy audits, and scenario-based techno-economic modelling with environmental impact assessments. It targets two high-relevance sectors, food processing and textiles, where women's entrepreneurship intersects with high and relatively complex energy use. By integrating the World Bank's Multi-Tier Framework (MTF) with HOMER Pro simulations, the research bridges diagnostic assessment with applied system design. A hybrid thematic framework analysis supports the evaluation of viable business models and financing mechanisms. Seven interlinked research questions guide the inquiry, focusing on gendered access patterns, technology adoption, financial architecture, and enabling conditions.

Findings reveal that many women-owned enterprises often remain below MTF tier 3, hindered by unreliable service, affordability barriers, and misaligned technologies. Configurations such as stand-alone solar PV, PV-battery-diesel hybrids, and thermal systems powered by LPG or biomass waste can raise access to tier 4 or 5, but introduce trade-offs in capital cost, complexity, and maintenance. Case studies show that viable business models frequently involve anchor enterprises or cooperative structures, supported by financing strategies like results-

based funding, concessional loans, equipment leasing, or pooled capital, yet gender-responsive finance remains fragmented and underdeveloped.

This exploratory study, while not statistically generalisable, provides rare, empirically grounded insight into enterprise-level energy access realities. It contributes to the scientific and policy discourse by identifying context-sensitive, gender-responsive pathways to accelerate inclusive, clean energy transitions for MSMEs across diverse African settings.