

EVI-SICEE-RESEARCH BRIEF-15

BRIDGING THE GENDER AND YOUTH SKILLS GAP IN MALAWI'S CLEAN ENERGY TRANSITION

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By Ann Kingiri¹, Mourine Chepkemoi¹, Wycliffe Amakobe², Joyce Gathaci¹, Daniel Musyoka¹ and Maxon Chitawo³

Design and layout by Yvonne Gitu

¹African Center for Technology Studies, Nairobi, Kenya

²Network of African National Human Rights Institutions, Nairobi, Kenya

³Mzuzu University, Mzuzu, Malawi



BOX 1: KEY MESSAGES

- Although multiple actors (government, non-governmental organizations (NGOs), and development partners) are active, capacity-building efforts remain uncoordinated, short-term, and insufficiently scaled to meet national workforce needs.
- A coordinated, gender-responsive clean energy skills and innovation ecosystem is urgently required.
- Clean energy Innovation ecosystem remains weak and underutilized, limiting enterprise growth and technology commercialization.
- More than half of respondents report inadequate business competencies, limiting entrepreneurs' ability to scale enterprises, manage finances, access markets, and attract investment.
- Over 60% of women, youth, and men perceive insufficient technical competencies, confirming that weak Science, Technology, Engineering, and Mathematics (STEM) foundations and limited vocational exposure are constraining access to installation, manufacturing, and system design roles.
- Technical, Vocational, Educational Training (TEVET) institutions are not fully aligned with emerging clean energy technologies such as solar PV systems, mini-grids, and clean cooking solutions, creating a persistent shortage of qualified technicians.

OVERVIEW

Malawi's clean energy sector is expanding rapidly as the result of national energy reforms, donor funding and increased participation of the private sector. Nonetheless, the energy transition has served to marginalize women's and youth engagement at the structural level such that participation in key value chain segments including design, engineering, manufacturing, system installation, innovation and leadership remains limited. A major constraint is the persistent skills gap in STEM and other technical fields, which continues to undermine women and the youth. This research brief informed by the survey findings undertaken in Malawi shows that most entrepreneurs experience technical shortcomings across groups. In particular, 72% of adult men, 65% of youth, and 62% of adult women said they have insufficient technical skills to develop clean energy enterprises. Stated in the brief are the various evidences suggesting limited access to STEM education and vocational training. World Bank (2023) emphasises that such limitations hamper participation in new green industries throughout Africa.

In addition, women and youth will be further excluded from key segments of the energy economy unless there is intentional investment in gender-responsive technical training, innovation ecosystems, and enterprise upgrading pathways. A huge challenge is the fragmentation and weak coordination of capacity-building systems. Malawi has many actions spearheaded by TEVET institutions, nongovernmental organizations (NGOs) and development partners, but these remain project-based and unevenly implemented.

Key informant interviews indicated that trainings and demonstrations are common, but may not be sustained or systematically scaled, limiting their impact over time. As a government official noted, “demonstration projects help people see the actual working of technologies”, highlighting reliance on short-term awareness rather than a structured pipeline for skills development. The brief calls for a national gender-responsive clean energy skills and innovation ecosystem, strengthened TEVET integration, optimized innovation hubs, structured apprenticeships, and gender-responsive financing to ensure women and youth move beyond last-mile participation into leadership and innovation roles.

BOX 2: METHODOLOGY AND APPROACH

This brief is part of an International Development Research Council (IDRC) funded project entitled “Evidence for Informing Scaling and Impact in Youth and Women-led Clean Energy Enterprises (EVI-SICEE) in Africa”, which is implemented by a consortium led by African Centre for Technology Studies (ACTS). In 2025, ACTS alongside Mzuzu University undertook a study to assess the state of women and youth entrepreneurship in Malawi’s clean energy sector. The study adopted both quantitative and qualitative methods with an initial scoping study that informed the subsequent development of data collection tools. Utilizing these tools, a broad survey was carried out covering 905 clean energy entrepreneurs across Malawi. Four main cities which are representative of the regional hubs were selected namely Lilongwe in the Central region, Mzuzu in the North; and Zomba and Blantyre cities in the South. A total of 79% of the respondents were men and 21% were women. Half of the respondents consisted of male youth, followed by men who are adults (29%), female youth (14%), and adults who are women (6.5%). Interestingly, most respondents were the sole owners of clean energy enterprises as co-partners were only 3%, while 24% were employees and agents at 8%. The assessment also included key informant interviews to enrich the qualitative aspect of the study. A workshop for stakeholders validated the findings. This research brief therefore combines findings from the various data sources from Malawi.

EXPLORING THE CONTEXT

A skills, innovation and enterprise development ecosystem that is responsive to gender refers to the interrelated institutions, policies, financing mechanisms, training systems, incubation programmes, innovation hubs and market actors which together promote the development of knowledge, enterprise and employment, while also addressing structural hinderances faced by women and youth (CE4DEV, 2026). This ecosystem requires strengthening in Malawi since women are concentrated in lower-value segments of the energy sector, while youth often remain idle and lack access to technical skills training, financing, mentoring, and business support services. Without conscious effort, the inequalities that exist have the potential to be reproduced in clean energy sectors in the country (REIAMA, 2025).

As Malawi aims to boost the adoption of renewables such as solar, mini-grids, clean cooking technologies, bioenergy, and productive-use energy applications, TEVETA (2026) notes the recognition that energy transitions must also be backed by investment in human capital, innovation systems and gender-responsive and inclusive enterprise development ecosystems. According to the World Bank (2026), investing in women and youth will ensure that they don't just benefit from clean energy activities and technologies but also become innovators, entrepreneurs, technicians and leaders in the green economy. Projects such as the Accelerating Sustainable and Clean Energy Access Transformation (ASCENT) Project and the Accelerating Renewable Energy and Clean Cooking for Economic Development (ACRE) Project aim to increase energy access, support institutional capacity building, promote productive use of energy and enhance renewable energy research and development (Government of Malawi, 2026; ASCENT Malawi, 2026).

THE IMPORTANCE OF SKILLS DEVELOPMENT FOR ENERGY TRANSITION IN MALAWI

As renewable energy supplies increase, the need for a variety of technical and non-technical skills will continue to grow. This includes skills for solar installation; mini-grid operation; productive use of energy technologies; clean cooking technologies; energy auditing; electrical engineering; digital marketing; enterprise management; and maintenance services. Nevertheless, the clean energy sector in Malawi still suffers significant shortages of skilled personnel who are able to support the scale-up of renewable energy technologies (TEVETA, 2026). The TEVET systems currently in place do not sufficiently match the emerging labour market needs in renewable energy value chains, creating a gap between the demand of the industry and the capabilities of the workforce.

The evidence from this study shows that skills constraints are among the most significant constraints prohibiting women and youth from engaging in higher-value clean energy activities. According to the survey findings, 72% of adult men, 65% of youth, and 62% of adult women agreed that women and youth lack necessary technical skills for manufacturing, installing, repairing and servicing clean energy technologies (Figure 1).

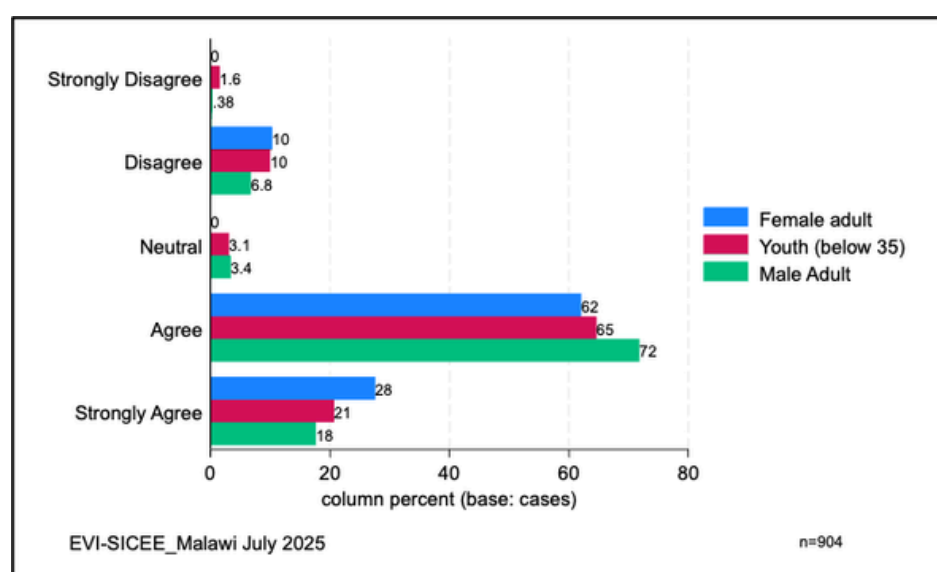


Figure 1. Women and youth technical skills gap

Strong agreement was particularly pronounced among adult women (28%) and youth (21%), reflecting a widespread recognition that technical skills deficits continue to constrain enterprise growth and market participation.

The concerns are reinforced by qualitative findings. In the entire sector, the government stakeholders pointed towards the shortage of qualified technicians.

" We require a greater number of technicians proficiently trained in installing, maintenance and energy systems"(Ministry 1, KII).

The results imply that although clean energy markets are growing, the skills ecosystem has not developed sufficiently to meet the workforce needs of the sector. Failure to invest in technical training, apprenticeship programmes, and certification systems, may contribute to a large number of women and youth settling for the low-value distribution and sales jobs as opposed to the high-value technical and engineering roles.

GENDER-RESPONSIVE CAPACITY BUILDING AS A DRIVER OF ENTERPRISE GROWTH

Capacity building emerged as a key success factor of enterprise resilience, technology adoption and business sustainability. Evidence from the global clean energy transitions suggests that women and youth require a set of technical, managerial, leadership, and entrepreneurial skills to establish and grow their clean energy enterprises (World Bank, 2024). Technical skills alone can't guarantee business growth. Increasingly, business planning, customer engagement, digital literacy, financial management, leadership, innovation management, and climate literacy are having huge impacts on growth. Studies show that targeted capacity-building interventions improve enterprise productivity, technology adoption rates, and customer satisfaction, and enhance the prospect of business survival. The impact is especially significant among women-led enterprises that often face structural barriers to accessing formal training opportunities (SEforALL, 2024). The Malawi study strongly supports this perspective According to entrepreneurs who participated in the survey, training to improve the confidence and performance of women, youth, and entrepreneurs has great potential.

"Most of our agents are women and youth. With training, they become confident distributors and promoters of clean cooking" (Producer 4, KII).

Equally important is technical competence, which ensures continuous delivery of services and sustained use of technology.

"We assess the client's needs, design a system, install it, and train users" (Seller 1, KII).

From the demand side, other reports further note that ongoing technical support and user training increase consumer satisfaction and long-term use of renewable energy technologies (IEA et al., 2024; World Bank, 2024; UNDP, 2023).

However, women represent less than one-third of the renewable energy workforce, and their role in technical activities continues to be under-represented globally, often occupying administrative and support functions (IRENA, 2023). Nonetheless, targeted initiatives can help women join technical jobs traditionally defined by men.

“Women receive targeted training in briquette production, gasifiers, and small-scale clean-cooking technologies”(Ministry 2, KII).

By addressing labour shortages in the clean energy sector, this type of approach can help empower women, enhance productivity, and make energy transitions more inclusive (AfDB, 2022).

LACK OF BUSINESS AND ENTREPRENEURIAL SKILLS

It is now understood that both technical skills and business skills are important for enterprise growth. This study has demonstrated the importance of the later. Thus, to be effective, energy entrepreneurs need competencies in business plan development, financial management, stock procurement and management, pricing, marketing, customer relationship management, negotiation and investment readiness. According to the survey results, 65% of adult men, 64% of youth, and 57% of adult men perceive that women and youth entrepreneurs lack the required business skills (Figure 2).

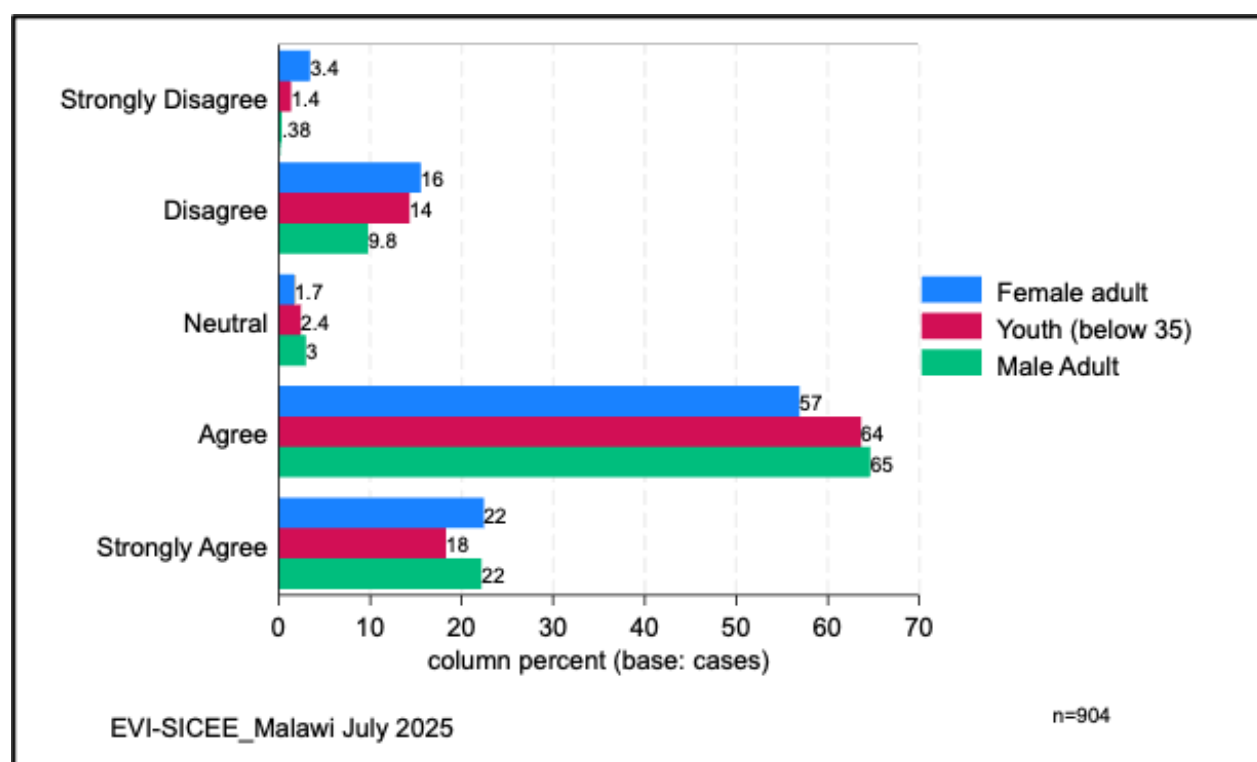


Figure 2. Business skills gap for women and youth

Further, a number of clean energy entrepreneurs are aware of market opportunities but lack the managerial and strategic means to convert them into ongoing business growth. Therefore, it is critical to strengthen entrepreneurial ecosystems through mentorship programmes, business coaching, peer-learning platforms and enterprise development services to improve enterprise survival rates and scale-up women and youth-led businesses.

INNOVATION ECOSYSTEMS AND INCLUSIVE CLEAN ENERGY ENTREPRENEURSHIP

According to OECD (2022), innovation ecosystems are essential for the fast-tracking energy transitions that enable entrepreneurs to develop, test, commercialize and scale innovative technologies and business models. A competent innovation ecosystem includes the presence of the university, research institution, incubation centre, accelerator, investors, government and private sector that generates knowledge, transfers technologies and develops enterprises (World Bank 2024).

Countries with strong innovation ecosystems see greater renewable energy technology uptake, new business creation and the generation of green jobs. On the contrary, weak innovation ecosystems often restrict the chances of entrepreneurs accessing mentorship, commercialization, technical expertise, investment networks, and innovation financing (UNDP, 2023; IRENA, 2023).

There is still relatively low business innovation in clean energy in Malawi. According to survey results, just 13% of entrepreneurs have enrolled in a business incubation programme (Figure 3). Most clean energy start-ups have no structured mentorship, investment-readiness support, networking opportunities or commercialization assistance.

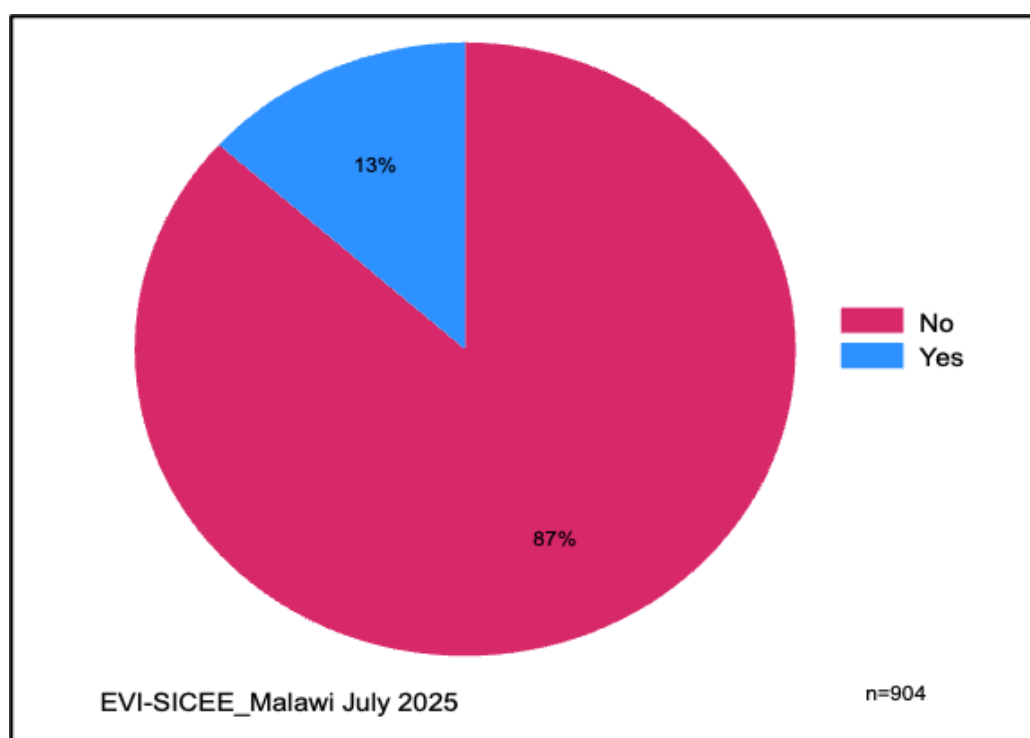


Figure 3. Business support through incubation hubs

The low participation rates represent a missed opportunity because incubation programmes have a proven track record of improving start-up survival rates, innovation capacity, business performance and investor readiness (World Bank, 2023). Expanding clean energy-focused incubation and acceleration initiatives can thus enrich Malawi's innovation ecosystem and promote inclusive entrepreneurship focusing on women and youth.

ACCESS TO BUSINESS DEVELOPMENT AND ENTERPRISE SUPPORT SERVICES THROUGH INCUBATION PLATFORMS

Business development services are key enablers of enterprise growth. They help entrepreneurs enhance their business performance, access financing, identify markets, strengthen governance systems and build management capacity (OECD, 2022). Nevertheless, such services are not equally accessible, especially to women, youth and rural entrepreneurs.

Despite Malawi's E-hub, growth accelerator Malawi, and Zantchito programmes, it offers several entrepreneurship support initiatives now only limited due to demand. Figure 4 shows that the survey reveals a significant level of dissatisfaction with access to business support services. 46% adult men and 45% adult women report limited access to this service.

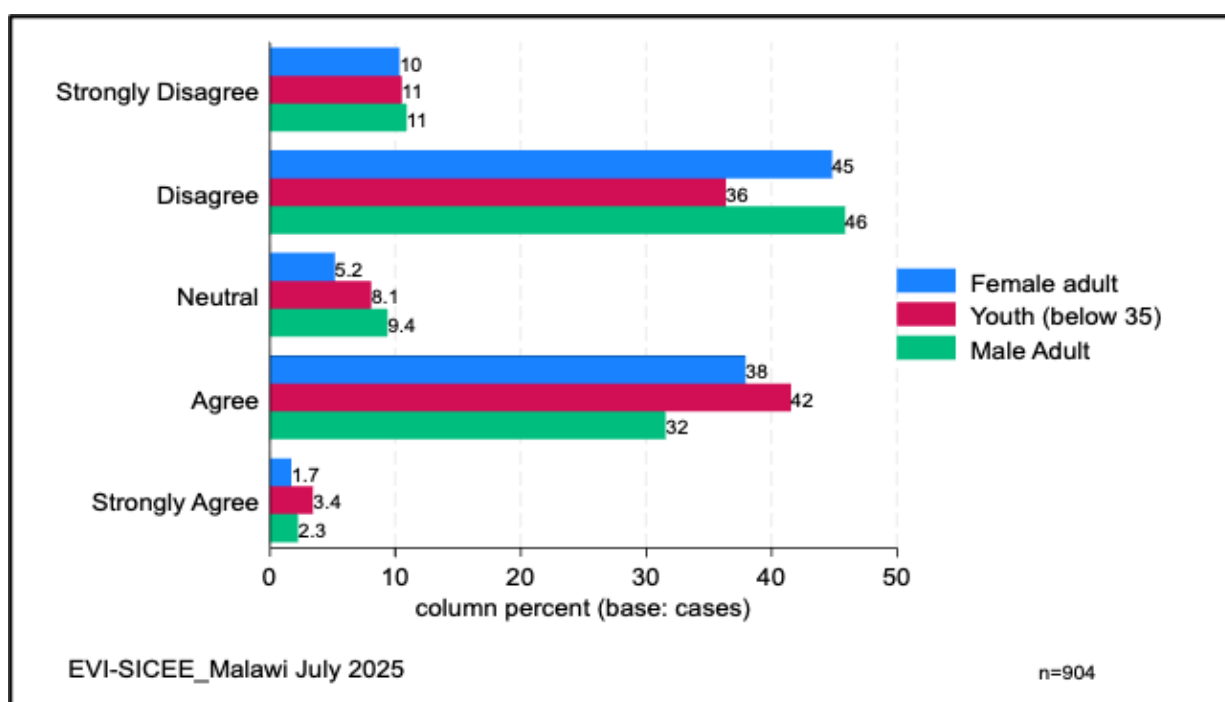


Figure 4 Respondents' perceptions on Clean Energy Enterprises (CEEs) access to business support

These findings corroborate broader evidence which indicate that entrepreneurship support systems in developing economies are often concentrated in urban centres and overlook rural entrepreneurs (World Bank, 2023;2026). Women and youth led enterprise, on account of weaker professional networks, mobility, caregiving and lower awareness of available opportunities, often face extra hurdles (SEforALL, 2024).

Strengthening the decentralized business development services and integration of digital advisory platforms will considerably enhance accessibility and inclusiveness in the clean energy enterprise ecosystem.

INCLUSIVENESS OF BUSINESS INCUBATION SYSTEMS

Business incubator systems have emerged globally to effectively support innovation entrepreneurship and enterprise growth. Incubation programmes provide entrepreneurs with the mentorship, training, networking, investor connections, and technical assistance to overcome early-stage business challenges, improving their chances of surviving (World Bank, 2023).

Nonetheless, available evidence is increasingly showing that access to incubation services is not always the same for everyone (AfDB, 2022). In particular, women, rural entrepreneurs, and those outside formal educational institutions participate comparatively less.

The patterns are reflected in the findings. Youth occupy 75% of the entrepreneurs receiving incubation support, while adult male and female occupy 17% and 8.3% respectively (Figure 5). Results show that present incubation models might unintentionally favour younger, more educated and digitally connected entrepreneurs.

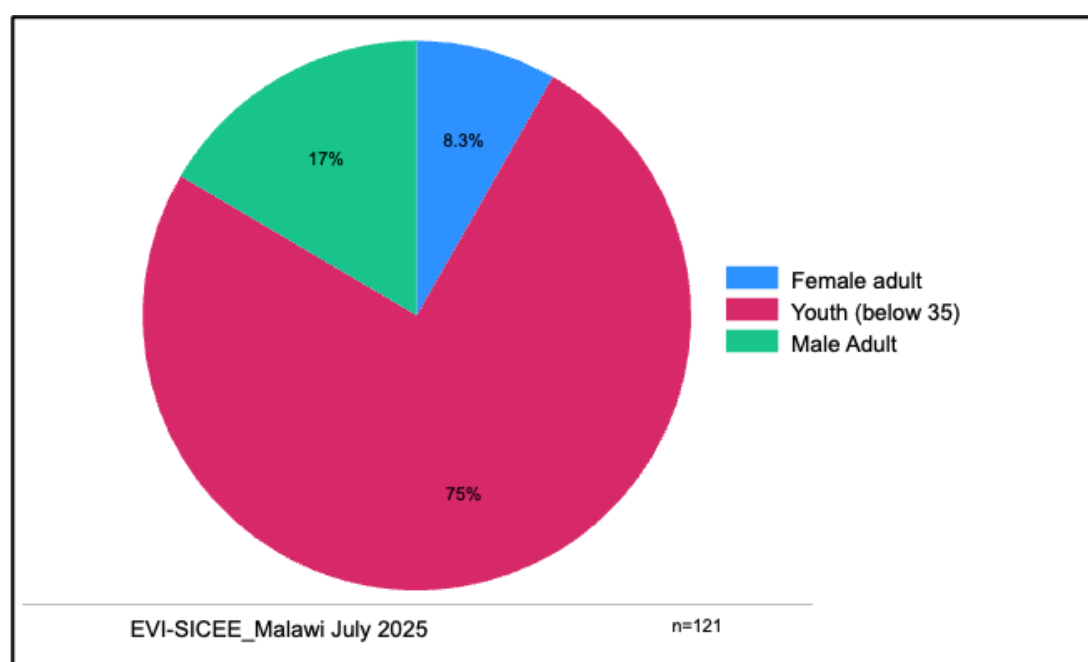


Figure 5. Gender distribution of those who received support through business incubation hubs

Studies show that taking into account gender dynamics in incubation enables a much higher participation of women entrepreneurs through solutions for mobility, caregiving, language, gender norms and access to professional networks (UN Women & UNIDO 2023). To ensure wider participation of women and rural entrepreneurs, and to co-create innovative solutions to the specific challenges faced by them, inclusive systems of incubation should have flexible delivery mechanisms, localized outreach, targeted recruitment strategies and partnerships with community-based organizations.

MARKET AWARENESS AND OPPORTUNITY RECOGNITION

According to OECD (2022) and the World Bank (2023), market awareness is an important determinant of entrepreneurial success as it enables entrepreneurs to spot newly emerging demand, assess competition, learn what customers prefer, and design viable business strategies. In fast-changing sectors, like renewable energy, access to market intelligence is particularly important because of the established technologies, policy incentives, and consumer preferences.

Survey results show that entrepreneurs are fairly aware of market opportunities. According to Figure 6, adult women (67%), youth (64%), and adult men (62%), entrepreneurs know about the opportunities in the clean energy sector.

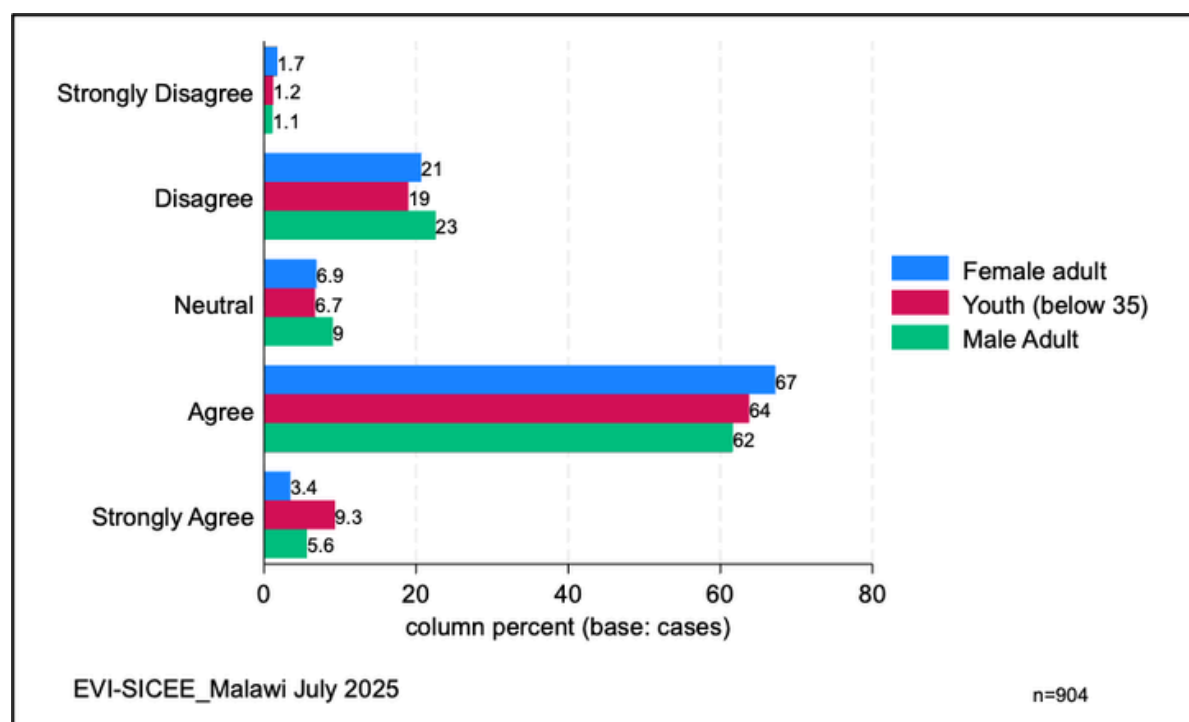


Figure 6. Respondent's perception on awareness of market opportunities among CEEs

The respondent's perception on how informed women or youth are about market opportunities in clean energy businesses is shown in Figure 7, where 69% adult women, 74% youth and 62% adult men agree on this aspect more generally.

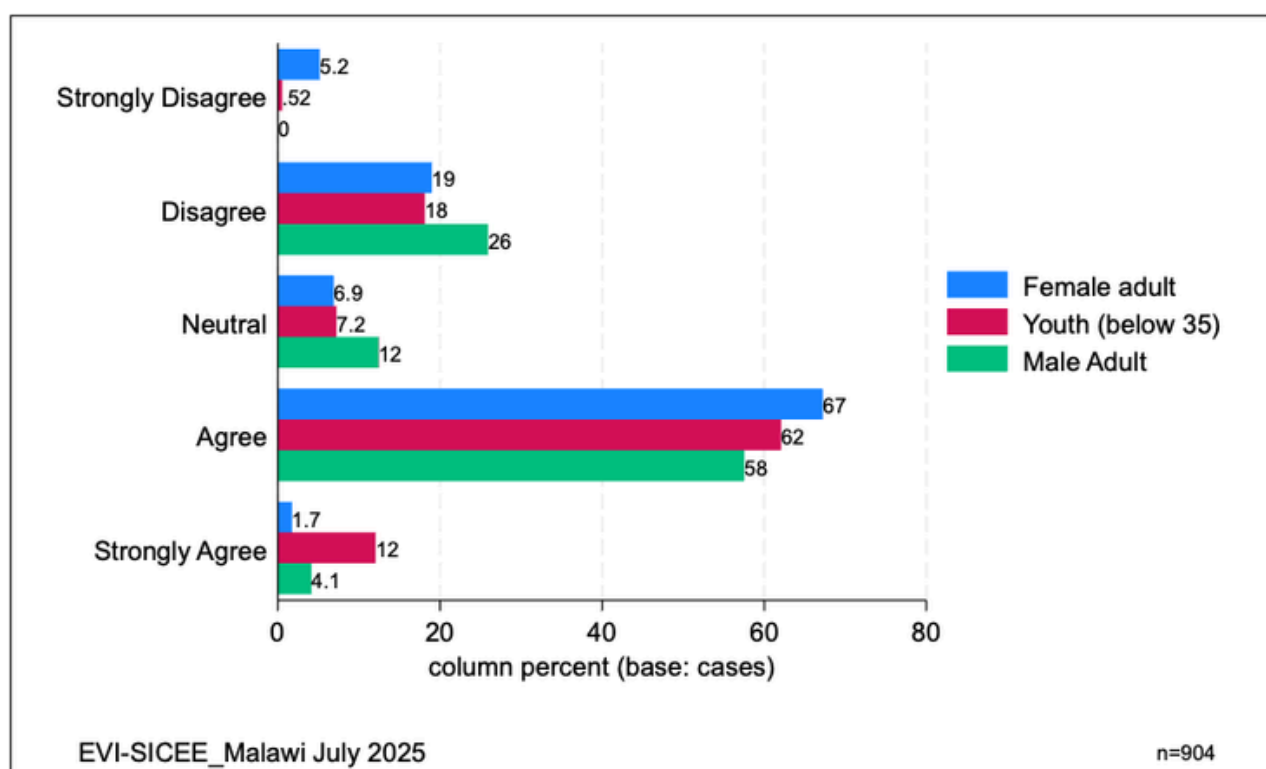


Figure 7. Respondent's perception on how informed women/youth are about market opportunities in clean energy businesses

The results are positive and show a rising profile for opportunities in solar energy, clean cooking, however, further qualitative evidence indicates that awareness is not enough to grow the enterprises. Many entrepreneurs require a combination of system level knowledge including market information, mentoring, access to finance and business support services to convert identification of opportunities to sustainable commercial activities (SEforALL, 2024; GET.invest, 2023). Strengthening of market intelligence systems, networking platforms and mentoring programmes will be essential in enabling women and youth to translate awareness related knowledge and information into enterprise development outcomes.

COMMUNITY ENGAGEMENT PLATFORMS AND DEMAND ARTICULATION

Technology adoption is not only impacted by affordability and availability but it also call for social acceptance, trust, cultural norms and consumer understanding. Community engagement and awareness creation is essential for successfully transitioning (Wold bank, 2024; IRENA 2023). According to research, various components including awareness campaigns, demonstrations and community participation reduce uncertainty and build consumer confidence, significantly increasing the adoption rates of renewable energy technologies (UNDP, 2023; SEforALL, 2024). The Malawi study shows that besides the incubation hubs platforms alluded to elsewhere, the demonstration sites are also useful community-oriented learning sites.

A government stakeholder noted the following:

“The demonstration projects assist the people to physically see the technologies working” (Ministry 2, KII). Another one added: “We use demonstrations so that communities can see technologies physically working”(Ministry 3, KII).

According to a study from clean cooking and off-grid solar programmes in Africa, demonstrations enable potential users to experience how the technology works and can help to overcome their scepticism and create a behaviour change (IEA et al. 2024).

Entrepreneurs further reported using schools, churches, traditional leaders, NGOs, radio programmes, television advertisements, and community outreach campaigns to increase awareness and acceptance.

“We do demonstrations, sometimes door-to-door or in communities. We also advertise on TV. We target schools, churches, chiefs and NGOs” (Producer 2, KII).

Such approaches are consistent with evidence showing that trusted local institutions and community leaders can significantly affect household energy choices and support the uptake of clean energy technologies (UNDP 2023; SEforALL, 2024). Thus, enhancing the mechanisms of community engagement can lead to accelerated demand creation, improved confidence from consumers and more sustainable markets for women and youth led clean energy enterprises.

BOX 3: CASE STUDY 1: MZUZU E-HUB - STRENGTHENING DIGITAL AND ENTREPRENEURIAL SKILLS FOR INCLUSIVE CLEAN ENERGY INNOVATION

Digital Skills Expansion Program Mzuzu E-Hub (2024), reveals the increasingly significant role of innovation hubs in addressing Malawi's perennial digital and entrepreneurship skills gaps, which severely restrict the engagement of women and youth in the clean energy economy. With targeted training in digital literacy, ICT competence, entrepreneurship and innovation readiness, the hub offers a vital entry point for youth and women to tap into emerging opportunities in the green economy with a special focus on digital energy platforms, clean energy marketing, and technology-enabled service delivery. Considering 65% of youth and 62% of women feel they do not possess the technical skills for clean energy enterprise development, this intervention is relevant. This indicates a structural exclusion from these pathways. Nonetheless, the programme of activity helps to reduce basic divides in digital access but is not likely to significantly help with scaling up ICT and clean energy innovations. This is because of limited resources and poorly integrated clean energy sector which results in weak direct linkages. There is therefore need for a much stronger alignment between digital innovation hubs and clean energy skills ecosystems to deliver digital competencies that participate in solar, e-mobility and productive-use energy ventures.

Source: Mzuzu E-Hub (2024).

BOX 4: CASE STUDY 2: TEVETA MALAWI – RENEWABLE ENERGY WORKFORCE DEVELOPMENT AND SYSTEMIC SKILLS ALIGNMENT

The Renewable Energy Workforce Development Project for Malawi (TEVETA, 2026) represents a more systemic approach to addressing systemic skills mismatches in the growing renewable energy sector in Malawi through the alignment of TEVET systems with labour-market needs in the areas of solar installation, mini-grids, energy efficiency, and clean cooking technologies. The activity is a response to the identified shortage of technicians and engineers. Survey and key informant data revealed that they face an urgent demand for installation, maintenance, and system design capacity. The goal of the project is to strengthen and create workforce readiness opportunities driven by demand, create apprenticeship pathways and enhance industry collaboration. Higher-value segments of clean energy value chain, with a focus on women and youth participation. Nevertheless, findings from EVI-SICEE study in Malawi indicate that TEVET interventions, while designed with strong structural foundations, tend to be patchy and poorly implemented and are seldom aimed at rural women and youth or embedded in wider innovation and incubation systems.

Arguably, Malawi needs a gender-responsive skills ecosystem that is coordinated and effective. In concrete terms, the TEVET institutions, innovation hubs, private sector actors, and financing should be connected in a systemic and synergistic manner. This is highly likely to catalyse skills development towards enterprise growth, decent employment and leadership opportunities for women and youth in the clean energy transition.

Source: TEVETA (2026)

CONCLUSION AND RECOMMENDATIONS

To empower women and youth to advance beyond last-mile distribution and engage meaningfully in higher-value segments of Malawi's clean energy value chains, government policies must tackle systemic and structural barriers including financing, skills, technology, markets, social norms and enterprise development. Inline with evidence informing this research brief, the following recommendations are proposed:

- A national clean energy skills framework should be established by TEVET, universities, and clean energy enterprises (CEEs), with standardised competencies for solar, biogas and clean cooking.
- Encourage technical apprenticeships in rural areas, ensuring women and youth are guaranteed quotas for installation, maintenance and system design.
- Holistic training for clean energy sector graduates that incorporates entrepreneurship aspects.
- Decentralized incubation and innovation hubs through satellite district level hubs that could be connected to Mzuzu E-Hub and national accelerators.
- Combine grants, concessional loans, and guarantees to set up a Clean Energy Innovation Fund targeting women- and youth-led enterprises.
- Develop a national clean energy market intelligence system to provide demand, pricing, and investment opportunity feedback.
- Embed gender-responsive apprenticeship quotas into all government and donor-funded energy projects.
- Enhance certification systems for renewable energy technicians for better quality assurance and professional recognition.
- The connection of Village Savings and Loan Associations (VSLAs) and financial institutions should be formalized through a guarantee-backed loan product for clean energy SMEs.
- Develop a national gender and youth participation monitoring system for clean energy with sex- and age-disaggregated reporting requirements.

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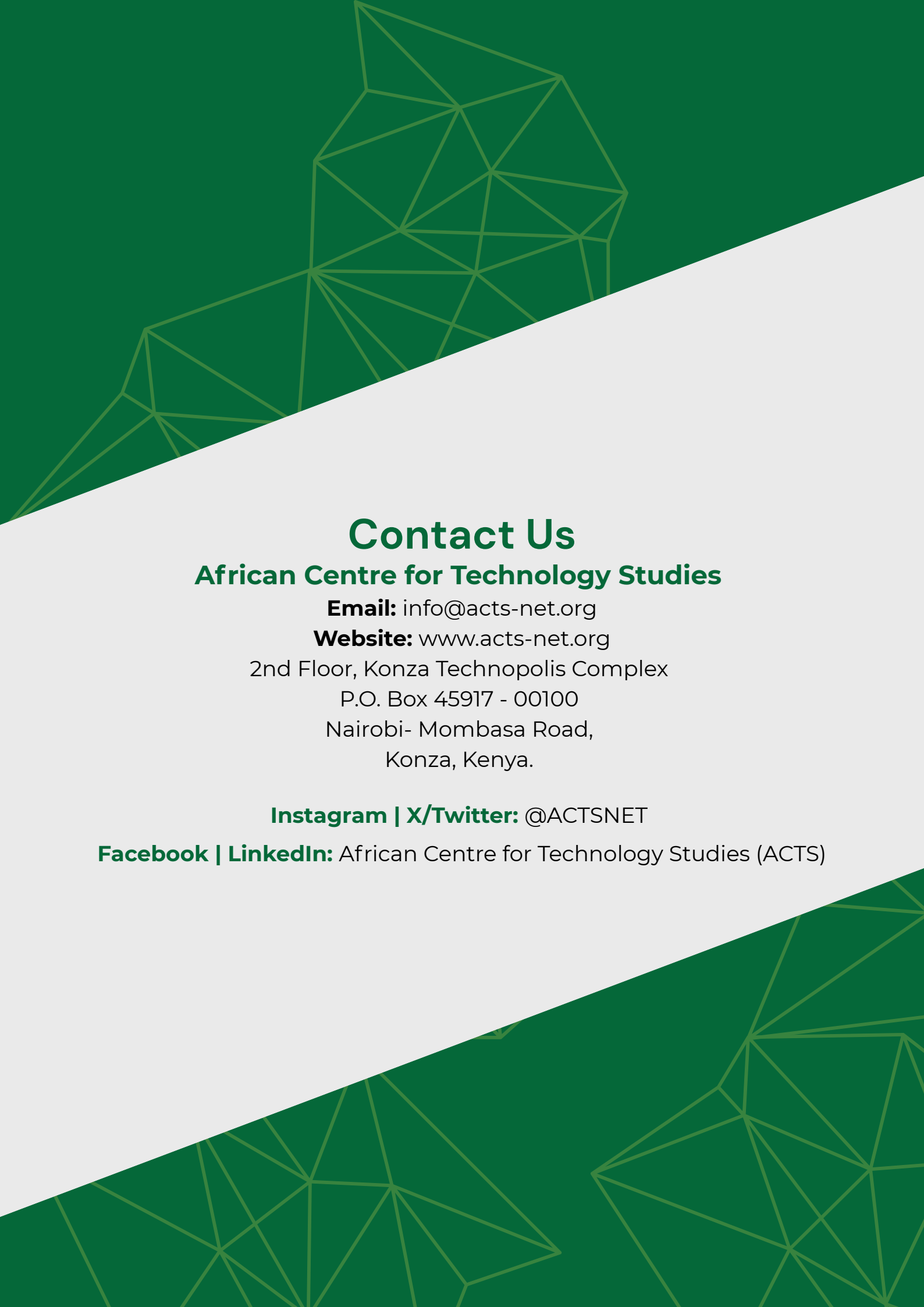
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Contact Us

African Centre for Technology Studies

Email: info@acts-net.org

Website: www.acts-net.org

2nd Floor, Konza Technopolis Complex

P.O. Box 45917 - 00100

Nairobi- Mombasa Road,

Konza, Kenya.

Instagram | X/Twitter: @ACTSNET

Facebook | LinkedIn: African Centre for Technology Studies (ACTS)