

Policy Brief on Productive Use of Energy (PUE)



Background

The PUE plays a crucial role in driving economic activities and improving livelihoods in low-resource settings like Malawi. As the country prepares to review its national energy policy, it is essential to recognize the significance of integrating PUE into the energy landscape to unlock its full potential for sustainable development.

In Malawi, where access to reliable electricity remains a challenge, standalone off-grid energy systems have emerged as a viable solution to meet the energy needs of rural communities. These systems not only provide essential electricity services but also enable productive activities such as agricultural processing, small-scale manufacturing, and entrepreneurship.

To fully harness the benefits of PUE, it is imperative for different sectors to collaborate and synergize their efforts. The convergence of agriculture and energy sectors presents a unique opportunity to leverage PUE technologies for enhancing agricultural productivity, value addition, and market access. By integrating energy solutions into agricultural practices, Malawi can improve irrigation systems, post-harvest processing, and agro-industrial activities, leading to increased agricultural output and income generation for rural communities.

In addition to small-scale standalone PUE initiatives, large-scale PUE projects such as Distributed Renewable Energy Solutions for Agriculture in Malawi play a vital role in supporting rural farmers and organized farmer groups/institutions with a range of solar facilities and products. These initiatives aim to address the challenges of access to reliable electricity in rural areas while simultaneously boosting agricultural productivity and income generation. By integrating solar-powered irrigation systems, post-harvest processing facilities (e.g. cooling), and other agro-industrial activities, large-scale PUE projects contribute to enhancing food

security, increasing agricultural output, and fostering economic development in rural communities.

The relevance of PUE technologies in Malawi cannot be overstated. These technologies have the potential to address energy poverty, stimulate economic growth, and enhance food security in the country. By promoting the adoption of energy-efficient appliances, renewable energy sources, and innovative business models, Malawi can create a conducive environment for sustainable energy development and economic empowerment at the grassroots level.



Malawi can draw valuable lessons from neighboring countries like Uganda, where successful initiatives have propelled the PUE market from pre-commercial to pioneering and expansion phases. Uganda's strategic approach has led to the extension of PUE applications beyond the agricultural sector

to include commercial, health, transport, and hospitality sectors, demonstrating the diverse opportunities PUE offers for economic growth and development. Although Uganda does not have a specific policy dedicated solely to PUE, it has developed a PUE strategy and integrated aspects of PUE into various policies, including the National Energy Policy, Electrification Policy, Irrigation Policy, Agricultural Sector Strategic Plan, and the Uganda Micro, Small, and Medium Enterprise (MSME) Policy, showcasing a comprehensive and integrated approach towards promoting PUE across different sectors.

As the Energising Development (EnDev) Programme in Malawi collaborates with the Malawi Ministry of Energy to develop a policy brief on PUE, it is essential to emphasize the transformative impact of PUE on rural livelihoods, the need for cross-sectoral collaboration, and the strategic integration of energy and agriculture for holistic development. By prioritizing PUE in the national energy policy agenda, Malawi can pave the way for inclusive growth, poverty reduction, and resilience building in the energy sector and beyond.



Technology

Technology plays a pivotal role in unlocking the potential of PUE in Malawi, where access to reliable and affordable energy services is essential for driving economic activities and improving livelihoods. To harness the full potential of PUE initiatives, it is essential to focus on technology standards, research and development, innovation, and adaptation tailored to the Malawian context.

Standards for PUE Technologies: Developing and enforcing standards and certification processes for PUE technologies is crucial to ensure quality, safety, and reliability, particularly in the context of standalone PUE off-grid systems. However, the reputation of PUE products, especially solar-powered water pumps, has been tarnished by cheap, low-quality products flooding the market. While standards for solar panels exist, they only partially apply to standalone PUE systems. Additionally, international performance ratings like those found in the Verasol database offer valuable product performance data on certified solar energy kits and off-grid appliances. Robust standards and certification mechanisms can prevent such reputational damage and rebuild trust in PUE technology. Therefore, it is recommended to develop, domesticate, and gazette standards and guidelines specifically tailored for PUE equipment. Furthermore,

promoting a consumer protection code of practice can further enhance consumer confidence and ensure the reliability of PUE technologies across various sectors.

Technology Research and Development Support: To drive innovation and enhance the efficiency, affordability, and applicability of PUE technologies in Malawi, comprehensive support for research and development (R&D) initiatives is imperative. This support should be structured to align with the specific needs of the PUE sub-sector, necessitating a review of existing innovation systems and the creation of instruments and incentives to promote collaboration between universities, industry, and government entities—a concept known as the triple helix collaboration. By aligning science, technology, and innovation infrastructure with the requirements of the PUE sub-sector, Malawi can effectively leverage the expertise and resources of various stakeholders to drive innovation and address the unique challenges faced in this domain.

Furthermore, facilitating networking among research institutions, academia, and industry is essential for sharing best practices and fostering partnerships for collaborative R&D, technology, and innovation initiatives. This can be achieved through the establishment of platforms such as innovation challenges, academies, and incubation hubs dedicated to promoting technology transfer and innovation within the PUE sub-sector. By providing a conducive environment for collaboration and knowledge exchange, Malawi can accelerate the development and adoption of innovative PUE solutions tailored to local needs.

Moreover, establishing innovative mechanisms for profiling and financing indigenous R&D efforts can catalyze innovation and support collaborative Science, Technology, and Innovation (STI) initiatives in the PUE sub-sector. This may involve the creation of dedicated funding mechanisms and investment platforms to support local R&D initiatives and incentivize collaboration between researchers, industry players, and government agencies.

Lastly, organizing regional and national technology conferences, webinars, and exhibitions can serve as platforms for showcasing and demonstrating the latest trends in science and technology for industrial development. These events provide opportunities for knowledge sharing, networking, and collaboration among stakeholders in the PUE sub-sector, ultimately contributing to the advancement of innovative solutions and the promotion of sustainable industrial development in Malawi.

Encouraging innovation and adaptation of existing technologies is essential for meeting the unique needs and challenges faced by Malawian communities and industries. By fostering a culture of innovation, Malawi can explore creative solutions that leverage renewable energy sources suitable for local conditions. This approach not only enhances energy access but also drives economic growth and environmental sustainability. Additionally, considering aspects of local manufacturing can further boost the adoption of PUE technologies by creating employment opportunities and promoting self-reliance.

Local Manufacturing Considerations: In light of the prevailing situation where Malawi lacks a significant local manufacturing or assembly presence for PUE technologies, there is an urgent need to address this dependency on foreign imports. This dependency presents multiple challenges, including

currency shortages that hinder the smooth flow of products into the country. Consequently, there is a compelling case for developing local manufacturing capabilities to stimulate the growth of the PUE market within Malawi. Importantly, products sourced from overseas often do not align with the specific needs and conditions of the local environment, leading to perceived low quality due to frequent product failures and malfunctions. By promoting domestic manufacturing capabilities, Malawi can create employment opportunities, stimulate economic growth, and reduce dependency on imported technologies. Moreover, local manufacturing enables the customization of energy solutions to suit the specific needs of Malawian communities, fostering a sense of ownership and sustainability in the energy sector.

Leveraging technology for PUE in Malawi requires a multi-faceted approach that encompasses standards development, research and development support, innovation, adaptation, and local manufacturing considerations. By embracing technological advancements and fostering a conducive environment for innovation, Malawi can harness the transformative power of PUE technologies to drive sustainable development, economic growth, and energy access for all its citizens.

Enabling Environment

Establishing an enabling environment is crucial for promoting the adoption and successful implementation of PUE technologies in low-resource settings. This chapter explores the importance of financial incentives, capacity building initiatives, and additional factors that contribute to creating a supportive ecosystem for driving the uptake of PUE technologies, with a focus on MSMEs and rural communities.

Financial Incentives for PUE Technologies: An essential pillar of creating an enabling environment for the adoption of PUE technologies involves the implementation of financial incentives to encourage investment in these solutions. Governments can play a crucial role in stimulating investment by offering tax breaks, subsidies, and grants to businesses, MSMEs, and rural communities. These financial incentives serve to reduce the financial barriers associated with adopting PUE technologies, making them more accessible and attractive for a wider range of stakeholders.

Moreover, harmonizing and domesticating the tax regime on entire PUE packages with other countries in the region, such as those in the East African Community (EAC), Southern African Development Community (SADC), and Common Market for Eastern and Southern Africa (COMESA), can further incentivize investment in PUE technologies. By aligning tax incentives with regional standards and regulations, Malawi can create a conducive environment for investment and promote regional integration in the energy sector.

Additionally, addressing inconsistencies in the tax regime criteria for PUE packages is essential to ensure clarity and transparency in financial incentives. Harmonizing and clarifying the criteria for tax incentives related to PUE technologies can remove ambiguity and provide certainty for investors, thereby boosting confidence in the market. This alignment will facilitate smoother transactions and encourage more businesses and communities to invest in energy-efficient

solutions, driving market competitiveness and accelerating the transition towards sustainable energy practices.

Capacity Building Initiatives: In order to address the diverse capacity training needs required for the effective deployment of PUE technologies in Malawi, it is imperative to invest in comprehensive training programs tailored to various stakeholders. Technicians play a crucial role in the installation, operation, and maintenance of renewable energy systems, including solar PV systems, solar dryers, solar water pumps, solar coolers, and energy storage systems. Therefore, providing training on the design, installation, and maintenance of these systems is essential to ensure their proper functioning and longevity. Additionally, equipping technicians with business skills such as marketing, financial management, and project management can enhance their ability to manage operations efficiently and expand their services. Furthermore, building the technical capacity of communities and end users in the operation and maintenance of PUE equipment is crucial to ensure the sustainability of these systems. By empowering communities with the knowledge and skills to operate and repair PUE equipment, they can effectively manage and maintain the systems, reducing downtime and ensuring uninterrupted access to energy services.



Awareness and level of knowledge: To maximize awareness and knowledge dissemination regarding the opportunities in PUE, targeted actions are necessary. Key stakeholder groups, including innovators, fishers, ICT enterprises, workshops, MSME owners, aggregators (SACCO managers), and community opinion leaders, are pivotal in spreading awareness messages to a wider audience to stimulate demand.

A Knowledge Attitude and Practices survey, coupled with value chain mapping among key stakeholders within the PUE ecosystem, will provide crucial insights. Developing a PUE Stakeholder Engagement Plan will activate communication pathways, ensuring effective information dissemination.

Education and awareness campaigns will be conducted through public lectures, workshops, seminars, and social media platforms. Additionally, energy barazas (discussion platforms) will engage citizens, communities, and businesses, promoting the benefits and financing opportunities for renewable energy initiatives.

Localized Information Education and Communication materials in native languages will enhance understanding, while demonstration sites at the district level will facilitate experiential learning for specific end-user categories.

Establishing a Community of Champions will further drive awareness and support for PUE initiatives.

Stakeholders and partnerships

Stakeholders involved in PUE sector:

- **PUE Suppliers:** PUE suppliers are crucial stakeholders in the sector, providing renewable energy technologies and solutions to end-users. Inclusion strategies for PUE suppliers involve fostering partnerships with them to ensure the availability of quality products, after-sales services, and technical support for sustainable energy access.
- **Renewable Energy Industries Association of Malawi (REIAMA):** REIAMA represents the collective voice of renewable energy industry players in Malawi. Inclusion of REIAMA in stakeholder engagements, policy dialogues, and capacity-building initiatives can strengthen industry advocacy, promote best practices, and drive sectoral growth.
- **Financial Institutions:** Financial institutions play a critical role in providing funding, loans, and financial support for PUE projects and initiatives. Inclusion of financial institutions in the stakeholder ecosystem involves developing innovative financing mechanisms, risk-sharing arrangements, and capacity-building programs to unlock investment in renewable energy solutions 17.
- **MSMEs as PUE Users:** MSMEs are important stakeholders as end-users of PUE technologies. Inclusion strategies for MSMEs involve providing tailored energy solutions, capacity-building programs, and market linkages to enhance their productivity, competitiveness, and sustainability through energy access.
- **Local Communities:** Local communities are key stakeholders in the PUE sector, representing the end-users and beneficiaries of energy access initiatives. Inclusion strategies for local communities include participatory decision-making processes, community-led projects, and awareness campaigns to empower them with clean and sustainable energy solutions.
- **Ministry of Energy:** The Ministry of Energy plays a central role in setting energy policies, regulations, and strategies in Malawi. Inclusion of the Ministry of Energy in stakeholder consultations, policy dialogues, and project implementation is essential for aligning national energy goals with sectoral priorities and driving coordinated action.
- **MERA (Malawi Energy Regulatory Authority):** MERA is responsible for regulating the energy sector in Malawi. Inclusion of MERA in stakeholder

engagements, regulatory discussions, and capacity-building initiatives is crucial for ensuring transparent, fair, and efficient energy governance that supports the growth of PUE technologies.

- **Academia/Research:** Academic institutions and research organizations play a vital role in generating knowledge, conducting studies, and driving **innovation in the PUE sector. Inclusion of academia/research stakeholders involves collaboration on research projects, technology development, and capacity-building programs to advance the evidence base and promote sustainable energy solutions.**
- **International Organisations and Programmes:** International organizations and programs provide funding, technical assistance, and global best practices to support energy access initiatives in Malawi. Inclusion of international stakeholders involves partnership building, knowledge exchange, and alignment with global energy goals to leverage resources and drive impactful interventions in the PUE sector

Partnerships and Collaboration: Fostering partnerships and collaboration among government agencies, private sector entities, international organizations, research institutions, civil society organizations, and other stakeholders is essential for leveraging resources, sharing knowledge, and coordinating efforts to promote PUE technologies in Malawi. Key strategies for enhancing partnerships and stakeholder engagement include:



Public-Private Partnerships (PPPs): Collaborating with the private sector to co-create innovative business models, financing mechanisms, and technology solutions that address energy access challenges and drive market growth. By mobilizing private sector expertise and resources, PPPs can accelerate the deployment of PUE technologies and expand their reach to underserved communities.

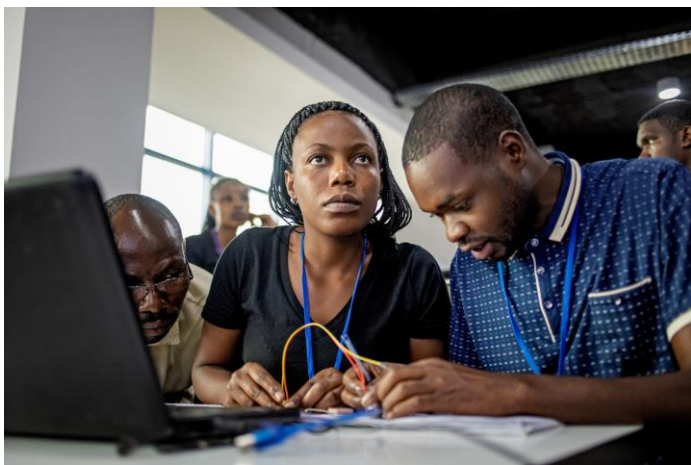
International Cooperation: Engaging with international organizations and development partners to access funding, technical expertise, and best practices in the PUE sector. International partnerships can facilitate technology transfer,

capacity building, and policy alignment with global energy goals. By coordinating with international stakeholders, Malawi can leverage external support to strengthen its PUE initiatives and achieve sustainable energy outcomes.

Research and Innovation: Partnering with research institutions and academic organizations to conduct studies, pilot projects, and technology demonstrations that advance the knowledge base and promote the uptake of PUE technologies in Malawi. Collaborative research initiatives can drive innovation, inform evidence-based policymaking, and address specific challenges related to energy access and productivity enhancement.

Civil Society Engagement: Mobilizing and engaging civil society organizations to address issues in the PUE sub-sector, raise awareness, advocate for policy reforms, and mobilize community support for energy access initiatives. Civil society partnerships can amplify the voices of marginalized groups, promote social inclusion, and drive grassroots change. Mainstreaming gender, equity, and inclusivity in PUE initiatives is essential for ensuring that the benefits of energy access reach all segments of society.

Strengthening the Role of the PUE Sector Working Group: Enhancing the role and engagements of the PUE sector working group hosted by the Renewable Energy Industries Association of Malawi (REIAMA) can facilitate coordination, knowledge sharing, and collaborative action among stakeholders. The working group can serve as a platform for addressing sectoral challenges, identifying opportunities, and driving collective efforts to promote PUE technologies.



Finance

Access to finance is pivotal for the successful implementation of PUE projects, particularly in low-resource settings like Malawi. This chapter emphasizes the significance of addressing barriers to financing and developing innovative financial mechanisms tailored to the needs of PUE projects, including microfinance, pay-as-you-go (PAYG) models, and public-private partnerships (PPPs).

Finance plays a crucial role in unlocking the potential of PUE projects by providing capital for development, implementation, and sustainability. It enables stakeholders to invest in renewable energy technologies, improve energy access, and enhance productivity, thereby contributing to economic growth and sustainable development in Malawi.

Strategies to Overcome Financing Barriers:

Addressing financing barriers requires collaborative efforts with financial institutions and the implementation of innovative financing models. Key strategies include:

- **Microfinance and PAYG Models:** Developing tailored financial mechanisms such as microfinance and PAYG models to make financing more accessible and affordable for end-users.
- **Public-Private Partnerships (PPPs):** Establishing partnerships to mobilize resources, share risks, and leverage expertise for sustainable financing solutions in the energy sector.
- **Capacity Building:** Building the capacity of financial institutions to understand PUE project requirements and design appropriate financial products.
- **Regulatory Support:** Advocating for supportive regulatory frameworks that incentivize investment in renewable energy and mitigate risks for financial institutions.

Proposed Actions for Affordable PUE Services:

To address financing issues at both service provider and end-user levels, proposed actions include:

- **Government Financial Incentives:** Providing tax waivers and subsidies to make renewable energy more affordable and competitive.
- **Grant Components:** Designing projects with grant components from international organizations and philanthropic foundations to support renewable energy development in rural communities.
- **Additional Loans:** Offering additional loans to equipment suppliers and end-users at affordable terms through banks, financial institutions, or other lenders.
- **Equity Financing:** Engaging investors interested in offering equity financing to start-ups or early-stage companies.
- **Carbon Credits:** Supporting PUE projects to register for carbon credits as an additional source of funding.
- **Financing for Startups:** Providing financing for startups and extending the supply chain to rural communities, potentially using a result-based financing model.
- **Public-Private Partnerships (PPPs):** Promoting PPPs to combine resources and expertise for financing and implementing PUE projects.
- **PAYGo Financing:** Promoting PAYGo financing for renewable energy products on a pay-as-you-go basis to enhance affordability and accessibility.



Recommendations

1. Prioritize PUE in National Energy Policy:
Embedding PUE in national energy policy is key for inclusive growth and resilience.
2. Focus on Tailored Technology Standards:
Invest in tailored tech standards and R&D to maximize PUE potential.
3. Implement Financial Incentives:
Use tax breaks, subsidies, and grants to make PUE tech accessible and attractive.
4. Engage Diverse Stakeholders:
Collaborate with civil society, innovators, and community leaders to boost PUE awareness and demand.
5. Establish Innovative Financing Mechanisms:
Create innovative financing for local R&D to drive sustainable energy innovation.

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