

ELECTRICITY ACCESS IN AFRICA:

Why a Green Energy Innovation Competition?

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About the Milken Institute

The Milken Institute is a nonprofit, nonpartisan think tank focused on accelerating measurable progress on the path to a meaningful life. With a focus on financial, physical, mental, and environmental health, we bring together the best ideas and innovative resourcing to develop blueprints for tackling some of our most critical global issues through the lens of what's pressing now and what's coming next.

About the Milken Institute Innovation Competitions

Milken Institute Innovation Competitions offer exciting and effective tools for partners interested in sourcing or scaling innovative solutions. As a think tank and research institute, the Milken Institute sees each competition as an important opportunity to landscape a given field, incentivize new ideas and innovators, create and analyze data, and prime new markets and entrepreneurs for success. Ranging from seed money and achievement awards to large-scale global competitions, we tailor competitions and awards to maximize the impact and goals of our partners. The Milken Institute Innovation Competitions team is part of MI Philanthropy, which advises philanthropists and foundations seeking to develop and implement transformative giving strategies.

Milken-Motsepe Innovation Prize Program

The Milken-Motsepe Innovation Prize Program is a series of multiyear, multimillion-dollar innovation competitions and programs to advance technological solutions that accelerate progress towards the UN Sustainable Development Goals (SDGs), with a spotlight on Africa.

CONTENTS

1	Introduction: Progress Toward Accessible Energy In Africa
1	Why the Milken-Motsepe Prize in Green Energy?
2	Key Takeaways
3	Challenges and Opportunities for Expanding Access to Electricity in Africa
3	Challenge #1: Insufficient Infrastructure and High Costs
4	Opportunity #1: Green Energy and Off-Grid Solutions
4	Challenge #2: Inadequate Access to Capital
5	Opportunity #2: Targeted Green Energy Investment in Africa
6	Challenge #3: Lack of Community Buy-In
6	Opportunity #3: Community Solutions for Sustainable Energy Systems
7	Key Elements of the Milken-Motsepe Prize in Green Energy
7	Challenge Statement
9	Competition Structure
11	Additional Design Elements
14	Finalists' Green Energy Innovations
15	Summary
16	Appendix 1: Experts Consulted during the Design Phase
18	Appendix 2: Semifinalists in the Milken-Motsepe Prize in Green Energy
20	References
23	Acknowledgments
24	About the Authors

INTRODUCTION: PROGRESS TOWARD ACCESSIBLE ENERGY IN AFRICA

Sustained access to reliable energy, particularly electricity, is crucial for economic and social development. Beyond individual and household needs, electricity enhances a community's ability to adopt modern technologies and live safely and affordably. Electricity access is therefore central to achieving almost all the United Nations Sustainable Development Goals (SDGs), a set of 17 targets that form a blueprint for sustainable prosperity through global partnership and action (Independent Group of Scientists appointed by the Secretary-General 2023; United Nations Conference on Trade Development 2023).

Across much of Africa, however, current energy systems are failing to meet these needs. This is especially true in sub-Saharan Africa, where at least 600 million people, or about 50 percent of the region's population, lack access to electricity (Nduhuura, Garschagen, and Zerga 2021; International Energy Agency 2022a; United Nations Conference on Trade Development 2023). Globally, as of 2021, one in five people without energy access lived in sub-Saharan Africa. According to current projections, that figure will remain about the same by 2030 because electrification rates will not keep pace with population increases (The World Bank et al. 2023). Two-thirds of sub-Saharan countries currently experience regular outages, forcing businesses and households to rely on backup generators that run on diesel or gasoline at costs that are four times the price of the power grid (Copinschi 2022).

African countries are responsible for less than 3 percent of global energy-related carbon dioxide (CO₂) emissions and have the lowest emissions per capita of any region. However, due to the global, interconnected nature of climate systems, African countries are already heavily affected by climate change through increased water stress, food insecurity, and extreme weather events (International Energy Agency 2022a).

In this report and throughout the Green Energy competition, green energy refers to generating power from natural resources in ways that do not harm the environment by releasing greenhouse gases into the atmosphere. Examples of green energy sources include solar power, wind power, geothermal energy, and hydropower. Energy sources that will not qualify for this prize competition include nuclear power, biomass and biofuel sources, and "clean coal."

Why the Milken-Motsepe Prize in Green Energy?

The energy field in Africa is ripe for disruption. While traditional energy sources must be part of the mix as African economies emerge, investment in green energy sources will be critical for meeting infrastructure and job market needs as Africa's population grows. For these reasons, the Milken Institute and the Motsepe Foundation partnered to launch the Milken-Motsepe Prize in Green Energy in 2022. This is the second competition in the Milken-Motsepe Innovation Prize Program, a series of multi-year, multimillion-dollar global innovation competitions and initiatives to advance technological solutions that accelerate progress

toward the UN SDGs, with a spotlight on Africa. The Milken-Motsepe Prize in Green Energy was designed to advance progress toward **SDG 7—Ensure access to affordable, reliable, sustainable, and modern energy for all**—by catalyzing innovation and new investment in green energy, particularly for access to electricity in Africa.

This report outlines key challenges and opportunities that arose throughout the landscape and design process, describes the competition structure and its unique elements, and summarizes the innovations and their potential impact.

Key Takeaways

- Investing in green energy systems will accelerate progress toward UN SDG 7, providing crucial resources for economic and social development.
- By focusing on off-grid electricity, the competition encourages infrastructure that can increase access to electricity, particularly in rural areas.
- Intentional design elements of the competition allow for new, creative ideas from anywhere in the world to succeed and scale.
- Using technology to verify entries generates meaningful data from all teams consistently and equitably.

CHALLENGES AND OPPORTUNITIES FOR EXPANDING ACCESS TO ELECTRICITY IN AFRICA

Competitions incentivize entrepreneurs to apply innovative solutions to difficult problems. Designing an effective innovation competition requires a thorough understanding of underlying issues, key challenges, and the opportunities those challenges present. To understand the current electricity landscape in Africa, the Milken Institute's innovation competition design team created a rigorous process to see where and how this tool might be most effectively applied. The design team interviewed a diverse pool of experts across sectors (see Appendix 1) and conducted in-depth research to shape the competition's design. Our research process uncovered several challenges and opportunities.

Challenge #1: Insufficient Infrastructure and High Costs

Africa's poorly maintained energy infrastructure results in ongoing, disruptive outages. More than 75 percent of African businesses experience recurrent electrical outages (Nduhuura, Garschagen, and Zerga 2021). As a result, some businesses rely on costly backup generators if they can afford them, while others have no choice but to reduce their hours or production output (Kirubi et al. 2009; Abotsi 2016; Nduhuura, Garschagen, and Zerga 2021). Coupled with the reliance on expensive fossil fuel generation, the cost of electricity in Africa is two to three times higher than the global average (Golubski and Holtz 2021; PwC 2021; Copinschi 2022; Leke, Gaius-Obaseki, and Onyekweli 2022).

Access to electricity is especially lagging in sub-Saharan Africa. This region includes the three countries that have had the most significant electricity deficits globally since 2019: Nigeria, Democratic Republic of Congo, and Ethiopia. Together, these countries account for 42.6 percent of the global population lacking access to electricity (The World Bank et al. 2021, 2023). Even the combined countries of sub-Saharan Africa only generate about the same amount of electricity as Spain (European Investment Bank 2018).

Villages in rural parts of sub-Saharan Africa face the most significant energy scarcity in this region. They are rarely connected to national power grids, and electrification rates are not keeping pace with population growth in these areas (PwC 2021; International Energy Agency 2022a; The World Bank et al. 2023). This is largely because cost structures can make electricity unaffordable for much of the population.

Even without considering the severity of costs relative to level of income, grid connection charges in sub-Saharan Africa are among the world's highest (Golumbeanu and Barnes 2013; Byaro and Mmbaga 2022). For example, in Kenya, a lower-middle income country, the cost for a grid connection can be US\$400 to \$1,200 (Herscowitz 2017; The World Bank et al. 2023). Many rural African communities, therefore, rely on standalone off-grid energy systems, which

can be more economical than connecting a system to an electricity grid located miles away (The World Bank et al., 2023). However, construction, maintenance, and materials are still costly for larger off-grid generators that run on fossil fuels (Kirubi et al. 2009; Copinschi 2022).

Opportunity #1: Green Energy and Off-Grid Solutions

The flip side of the challenge is that there is a significant opportunity for innovation. African countries have immense potential to meet their energy needs through green, or renewable, energy—that is, energy from sources that can generate energy at a faster rate than they are consumed. In most cases, green energy sources are naturally restored, abundantly available, environmentally friendly, and release few or no greenhouse gas emissions (United Nations Conference on Trade Development 2023). As a region, **Africa has more than half the world's renewable energy potential, and much of this potential remains untapped** (Copinschi 2022). For example, the continent has 60 percent of the world's best solar sites by land area, but its installed solar capacity comprises only 1 percent of global capacity thus far (International Energy Agency 2022a). Hydropower already accounts for half the electricity generation in sub-Saharan Africa, representing only 7 percent of its hydropower generation potential (Copinschi 2022). The International Finance Corporation found that Africa's annual onshore wind potential is enough to meet the electricity demand of the entire continent by more than 250 times (United Nations Conference on Trade Development 2023). Geothermal resources offer another opportunity for long-term, sustainable energy that is essentially unlimited (International Renewable Energy Agency and International Geothermal Association 2023).

Off-grid solutions present a key opportunity to deploy this wealth of green energy resources, especially in rural areas. Standalone, off-grid generators can use local green energy sources such as solar and wind power. Furthermore, a network of modular power generators, known as a distributed energy resource (DER) system, can draw and store enough electricity for an entire community or even contribute to a power grid (International Energy Agency 2022b).

Building off-grid systems that harness green energy is increasingly more economical than extending existing grids to rural areas. Solar-powered mini-grids have already become the least expensive, most reliable energy source for most off-grid communities (International Energy Agency 2022a; The World Bank et al. 2023). The cost to implement an off-grid solar device has declined by over 30 percent from US\$0.55 per kWh in 2018 to \$0.38 per kWh in 2023 (United Nations Conference on Trade Development 2023).

Challenge #2: Inadequate Access to Capital

Several economic factors are impeding universal energy access, making SDG 7 in Africa unreachable. These include high levels of inflation, currency fluctuations, debt distress in a growing number of countries, lack of financing, supply chain bottlenecks, tighter fiscal circumstances, and soaring prices for materials (The World Bank et al. 2023). Investing in green energy development in Africa could address many of these issues, but financing Africa's shift to green energy will take billions of dollars annually (International Energy Agency 2022a). Renewable energy investments in Africa (excluding industrial-scale hydropower)

totaled almost US\$60 billion between 2000 and 2020, but that was only about 2 percent of global investments in renewables during this period (United Nations Conference on Trade Development 2023). Developing and scaling green energy systems in Africa requires more capital.

Financing for green energy development in rural Africa is especially needed. It is costly and logistically difficult to scale into rural communities that are not already well connected to infrastructure systems like electrical grids and paved roads. Therefore, infrastructure development in rural Africa requires working with narrow profit margins and high risk, which compounds the challenge of insufficient investment in green energy (Golumbeanu and Barnes 2013; European Investment Bank 2018; Chinzara, Dessus, and Dreyhaupt 2023).

Opportunity #2: Targeted Green Energy Investment in Africa

Africa's energy markets present a fruitful opportunity for international investors because of the continent's rapidly growing energy demands and ample green energy resources. Green hydrogen is expected to become a major power source and export for Africa, and financial institutions that invest in this sector as early as possible could see major returns in under a decade (Augier et al. 2023). Expanding electric grids is another focus, and China has already become the largest source of foreign investment in this sector in Africa. It is estimated that Chinese companies are responsible for about one-third of newly installed power capacity in sub-Saharan Africa since 2010 (Copinschi 2022).

There is also growing momentum toward public-private investment in African green energy systems. For example, the US Agency for International Development's Power Africa program has partnered with more than 170 companies, investing over US\$40 billion in Africa's energy markets. In 2022 alone, it mobilized US\$234 million in investment and advisory support to help off-grid solar companies gain access to finance and secure capital for growth (Power Africa 2022). Another initiative, Sustainable Energy for All, works in partnership with the United Nations and leaders in government, the private sector, financial institutions, civil society, and philanthropies to drive faster action toward achieving SDG7 in Africa (Sustainable Energy for All 2023).

Earlier investments in Africa's green energy transition will not only help African economies emerge with lower emissions but also bolster them against the eventual global shift away from hydrocarbon markets. **Analysts predict that investing in green energy could be more profitable than replacing existing oil production infrastructure in Africa by 2040** (Leke, Gaius-Obaseki, and Onyekweli 2022). Rural areas in Africa that lack oil and gas infrastructure can offer ideal testing grounds for building and scaling green energy systems. Considerable investments made now could support access to affordable, sustainable energy in Africa for generations.

While infrastructure funding in Africa has relied heavily on external sources thus far, private funding in Africa's energy infrastructure must focus on cultivating local markets, workforces, and management to make it self-sustaining (African Development Bank 2018). **Job creation is a critical benefit to the development of a local green energy economy in Africa, especially**

for the 12 million young people joining its workforce each year and competing for only 3 million jobs currently added annually (World Economic Forum 2017; African Development Bank 2018; International Energy Agency 2022a; Akileswaran, Mazumdar, and Perez Albertos 2023). Expanding the African job market in green energy will also include entrepreneurial opportunities for women (International Energy Agency 2022a). Globally, the green energy sector creates more jobs per US dollar invested; in Africa, renewable energy technology is projected to create over 5 million jobs by 2030, including in rural communities (PwC 2021).

Challenge #3: Lack of Community Buy-In

While existing innovations could increase energy access, adoption often fails when there is little or no community buy-in. Solutions introduced by external parties without community input do not engender trust or ensure sustainability. For example, farmers may be aware of new agricultural technology, but they are unlikely to adopt it when they are left out of conversations about implementation (Kazembe 2021). This also applies to energy technology adoption. Communities may not always have the knowledge and tools to successfully adopt new technologies to improve their lives. Solar panels, for instance, require appropriate infrastructure systems, technical expertise, and supportive policy frameworks to be successfully implemented.

Communities need opportunities to learn the required skills and understand the benefits and risks of new technologies. Similarly, innovations must be tested in the intended sites of use. Designing and operating a system in a different landscape can yield false results about usability and success. Innovators and communities need a shared language about the technologies that empower both parties to drive adoption and ensure scalability.

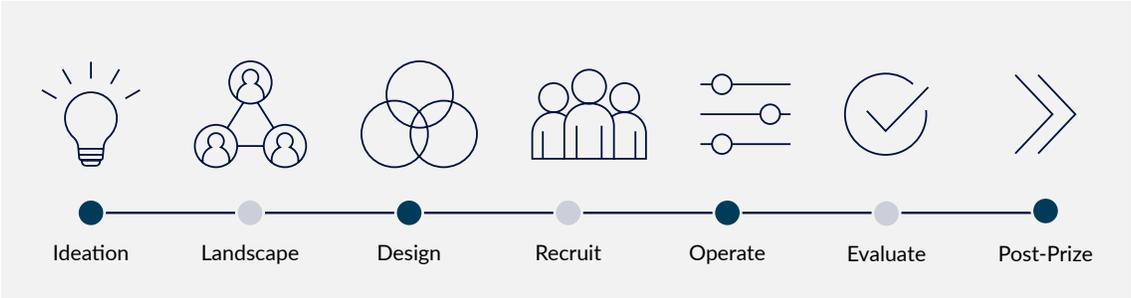
Opportunity #3: Community Solutions for Sustainable Energy Systems

End users in rural communities in Africa understand their everyday energy needs best and have the most experience dealing with the obstacles to meeting those needs. **Community involvement in green energy solutions will be critical to long-term implementation and scalability for innovations.** Especially in remote areas, local communities are best positioned to support the production, distribution, and maintenance of decentralized green energy systems. By supporting small-business entrepreneurs in green energy and requiring them to demonstrate a capacity for deployment and scalability in rural parts of Africa, the Milken-Motsepe Prize in Green Energy can complement ongoing community-level initiatives. Additionally, participating entrepreneurs can gain the skills to promote their innovations through professional development and capacity-building opportunities.

KEY ELEMENTS OF THE MILKEN-MOTSEPE PRIZE IN GREEN ENERGY

Innovation competitions have a long history of inspiring new or unconventional entrepreneurs, revolutionizing industries, and creating new markets. Each Milken Institute innovation competition goes through a standardized, intensive process of ideation, landscaping, implementation, and evaluation (Figure 1). In partnership with the Motsepe Foundation—and given the challenges and opportunities described above—the competition design team determined that the highest possible impact focus for this competition would be providing electricity to rural communities in Africa through affordable and sustainable off-grid sources of green energy. This focus also lends itself to field testing and data collection, both essential components of a rigorous innovation competition.

Figure 1. The Milken Institute’s Innovation Competition Process



Source: Milken Institute (2023)

Challenge Statement

After extensive expert interviews and in-depth research, the design team developed the following challenge statement to serve as the guidepost of the competition:

Winning teams will demonstrate the ability to deploy distributed green energy solutions at scale in Africa, with the goal of dramatically expanding access to reliable electricity. Teams should make use of new technologies or should adapt existing technologies in innovative ways to generate at least 60 kWh of off-grid electricity daily (24 hours) using green energy sources.

The goal of the competition was to encourage widespread participation while also motivating teams to achieve their greatest potential energy generation. The design team determined that 60 kWh/day would be an ambitious but feasible target. This amount would more than satisfy the energy needs of a typical rural African village and afford surplus energy to support additional small and microenterprises (SMEs). The following box and Table 1 provide an example of what 60 kWh/day could look like for a business in a rural community.

BOX 1

Example of Energy Use in a Rural African Village

An example of how this energy budget might be used can be found in longitudinal data from the Mpeketoni Electricity Project, which tracked small-grid electricity usage in a rural village in Kenya over 13 years (1994–2007 [Kirubi et al. 2009]). Based on these data, a typical rural African village with one small or microenterprise (SME) from each of six types would need 49.7 kWh/day to meet its energy needs (Table 1). A budget of 60 kWh/day would exceed that amount by 10.3 kWh/day, providing enough energy to power additional SMEs: for example, seven more retail or repair shops, one new petrol station or welding garage, or 20 more cafes.

Table 1. Example of Electricity Use by Business Type in a Rural African Village

SME Type	Total monthly consumption by existing SMEs in village (kWh/month)	Total daily consumption by existing SMEs in village (monthly consumption/ 30 days; kWh)	No. of SMEs in village	Daily consumption per SME (kWh)
Retail and repair shop	2,525	84.2	64	1.3
Grain mill	2,200	73.3	3	24.4
Petrol station and welding garage	1,325	44.2	7	6.3
Bar, lodging, and hotel	1,200	40.0	5	8.0
Carpentry	550	18.3	2	9.2
Cafe	300	10.0	20	0.5
Total consumption of a village with one of each type of SME (kWh/day)				49.7

Source: Milken Institute (2024), using data from Kirubi et al. (2009) based on the 13-year Mpeketoni Electricity Project, which collected electricity usage data in Mpeketoni Village from 1994 to 2007

The target of 60 kWh/day is an ambitious goal to advance SDG 7 strategically in rural African communities. Providing surplus electric power to SMEs while considering feasibility and cost would increase overall community productivity and economic value creation (Kirubi et al. 2009).

Competition Structure

Design Round: November 2022–March 2023

In November 2022, the [Milken-Motsepe Prize in Green Energy](#) issued an open call for entrepreneurs from all over the world to join the competition. During the Design Round, teams submitted their design proposals online. To be considered for the competition, team leaders had to submit a package of materials that outlined their idea, business model, and how their system would be deployed in the real world. The competition received over 150 completed submissions by the end of March 2023.

An independent panel of five [judges](#) decided which applying teams would continue in the competition. The judging panel included tech investors, green energy experts, innovators, and venture capitalists. The judges were selected based on their diverse professional backgrounds and the holistic perspectives they would use to judge the submissions. They used the criteria below to select 20 semifinalists from the Design Round submissions.

Criteria	Weight (%)
Alignment of proposed innovation with the competition purpose and Challenge Statement	40
Potential scalability of the team’s approach across the continent of Africa	25
Potential to provide affordable, reliable electricity to communities lacking sufficient energy, including in rural areas	25
Use of innovative technology to expand green energy access	10
Total	100

Out of the completed submissions, competition judges selected 20 teams to continue to a Semifinalist Round (see Appendix 2).

Semifinalist Round: May 2023–September 2023

The judges selected 20 semifinalist teams representing three continents and 13 countries, including nine African countries. Innovations in the Semifinalist Round included solar, wind, hydro, geothermal, and hydrogen-fueled systems that produced electricity as well as useful byproducts such as clean drinking water and bioplastics. Many innovations featured multipurpose systems that powered community service centers while providing enough power

for businesses and households, sometimes even with surplus power generation for increased community revenue.

The semifinalists received US\$20,000 each in seed funding. They then had four months to implement a real-world demonstration (use case), with no geographical requirement, and write a case study on their innovation’s performance. The purpose of the use case is to demonstrate with pilot data that the proposed innovations can be practically and effectively implemented in the real world. To advance to the next round, teams based outside Africa had to document their use case and draw on results to explain how they would deploy and scale their innovation in Africa. Based on the use case design and execution, as well as the case study document, judges selected five teams to advance to the Finalist Round using these criteria:

Criteria	Weight (%)
Quality of use case demonstration design and alignment with competition purpose	25
Use case demonstration execution and data collection	25
Potential scalability of the team’s approach, as informed by use case—with an emphasis on scalability in Africa, particularly in rural areas	25
Potential to provide affordable and reliable electricity to energy-poor communities, as informed by the use case	25
Total	100

Finalist Round: September 2023–February 2024

The five finalists received an additional US\$70,000 each. Finalists had five additional months to execute a second real-world demonstration and prepare their final submission package for the judges. For this round, teams were required to conduct a real-world demonstration in Africa.

In February 2024, the finalist teams were deployed to South Africa to test their solutions against the challenge statement and showcase their innovations live to judges, partners, and other key stakeholders. The winning team will receive the grand prize of US\$1 million, and the runner-up team will receive US\$250,000. The final stage of the competition was designed this way for the following reasons:

1. The Milken-Motsepe Innovation Prize Program does not award money to ideas alone but to solutions with working prototypes.
2. Solutions must be proven to work in Africa; thus, finalists are required to test their prototypes in Africa.
3. Deployment to a new location in Africa challenges teams to show they can scale and adapt their innovations to conditions in Africa.

To track the longer-term impact and sustainability of the innovations, the Milken Institute team developed impact metrics that will inform post-competition data collection across the Milken-Motsepe Innovation Prize Program. Each competition has unique metrics aimed at creating markets, unlocking entrepreneurial potential, and incentivizing breakthroughs. At the conclusion of each competition, the Milken Institute will assess outcomes and share impact data through a report.

Additional Design Elements

Through the Milken-Motsepe Innovation Prize Program, the Milken Institute sought to explore ways to make innovation competitions more accessible and equitable. It also designed the Green Energy Prize to attract innovative solutions conducive to rigorous testing. With these goals in mind, the competition adhered to several strategic principles to elevate the experience of participants.

Design Element #1: Streamlined Accessibility and Networking through the Milken-Motsepe Prize Portal

A critical component of the competition was the Milken-Motsepe Prize Portal, a custom online platform built to allow entrepreneurs to register for the competition, meet and team up with other entrepreneurs from around the world, and access helpful resources to get started. Semifinalists and finalists had access to free curated webinars with topical experts, community forums, and opportunities for networking throughout the competition using the portal. Following the launch of the Milken-Motsepe Prize in Green Energy in 2022, over 900 new users joined the portal, adding to the 3,000+ entrepreneurs already using the platform since the program's inception.

Design Element #2: Tech for Verification

The use of fourth industrial revolution (4IR) technology, such as artificial intelligence (AI), advanced robotics, and the Internet of Things (IoT), is a key element of the Milken-Motsepe Innovation Prize Program. Each competition is designed to encourage 4IR technology use among the competing teams and build awareness around the power of 4IR tech for solutions to deeply entrenched problems.

In this competition, the design team addressed the challenge of authentic data collection from global entities using a data verification platform, Truepic, to allow teams to document their real-world demonstrations and capture images and videos of their process. Truepic is a mobile-based tool for verifying the authenticity of images and video, and can complement or replace on-site inspection and due diligence. Teams had to capture pictures and videos of their teams in the field while building and testing their innovations. With this verification, the competing teams and the program team could be confident that the data submitted were protected and verified across all competitors.

Design Element #3: Flexibility to Test Anywhere in the World during the Design Round

Global competitors had the flexibility to test their solutions at their headquarters or another location of their choosing. This design choice made the first round of the competition more accessible for participants worldwide. Teams were responsible for identifying an appropriate site and receiving all proper permissions to execute their demonstration. In their case study documentation, teams had to provide all operating requirements for their demonstrations, including personnel, electricity, water, other consumable or reusable inputs, and waste processing and disposal. Teams were also required to record and report the actual operating costs of their use demonstrations and provide this information to judges.

Design Element #4: Increased Seed Funding throughout the Competition

The seed funding awarded in the Semifinalist and Finalist Rounds was unrestricted to give teams immediate and equitable financial assistance for deploying their innovations. Experts interviewed during the competition's design process were clear: Give money upfront to level the playing field between teams starting with an idea and teams adapting an existing system.

Providing seed funding for an innovation competition is not an industry norm. Typically, participants compete only for the grand prize money with no financial support available during the competition. Awarding seed funding throughout the competition is a way to ensure that new entrepreneurs can compete with companies that have existing innovations or entrepreneurs with additional resources. It also encourages competitors to seek additional funding to support their efforts.

Design Element #5: Professional Development and Capacity Building

The Milken-Motsepe Innovation Prize Program ensures that any competitor participating in the competitions can access resources and tools supporting entrepreneurship. During the Semifinalist Round, the 20 teams had the opportunity to participate tuition-free in an experiential learning course offered by Global Innovation Catalyst in collaboration with Stanford Online. This opportunity included 14 mentors, 12 industry experts, and 11 guest lecturers, with the majority based in African countries or working on projects focused on African markets.

Through this program, teams took Stanford Online's Idea-to-Market course, participated in weekly workshops, received pitch feedback, and matched with mentors for the duration of the program. The 13-week course took place during the Semifinalist Round so that teams were able to improve their pitch decks and lean on their mentors for support as they prepared their materials for submission. Among the semifinalists, 38 individuals participated in the course, including individuals from all five finalist teams.

To amplify impact, competitors were encouraged to submit an entry to be displayed in the Milken Institute's [Stories from the Field](#) platform to showcase their team and innovation. Teams also had the opportunity to receive one-on-one pitch support through a communications firm to prepare them to meet with potential investors and partners.

Design Element #6: Global Stage for Visibility and Growth

Winners of the competition will be announced at the flagship Milken Institute Global Conference in May 2024. Among the participants of the Global Conference are investors representing over US\$32 billion in assets under management, CEOs from Fortune 100 companies, Nobel laureates, high-level executives in international capital markets, and experts in energy, education, health, telecommunications, technology, and philanthropy.

One team will be named the Grand Prize Winner, and a second will win the Runner-Up title. Finalist teams will have exposure to potential investors, mentors, and potential partners. Additionally, they will leverage the Milken Institute and Milken-Motsepe Prize media channels to promote their technologies.

FINALISTS' GREEN ENERGY INNOVATIONS

In late February, the Innovation Competition hosted the finalists in South Africa to conduct field tests of their solutions, which featured the following innovations:

- **Afrak (United Kingdom and Malawi):** Afrak is a system of solar-powered microgrids that power SMEs as well as small solar-electric tractors. The tractors are designed for deep-bed farming, which tills deeply enough to sustainably irrigate soil even in dry conditions. This method triples smallholder crop yields, increasing revenue 12-fold. The Afrak tractor can also store enough energy to run multiple electrical home appliances.
- **GEG-Geosleeve (Iceland):** This startup produces thermoelectric power from low-temperature geothermal energy using equipment that can be shipped and deployed in remote areas. The team has already established 15 geothermal power plants in Africa, with more in progress.
- **Newdigit (Nigeria):** This start-up created a solar-powered device called “Just Add Water” that converts dirty water into hydrogen gas and oxygen gas. The hydrogen produces electricity through a reversible fuel cell, and the oxygen is distributed to hospitals.
- **OMNIVAT (South Africa and Tanzania):** This start-up created a solar-powered “Green Market” system that uses an electrolyzer to generate green hydrogen, which charges a fuel cell that can power 30 off-grid homes. This process generates clean drinking water as a byproduct. The system is hosted in a communal market, where it facilitates commercial activity by providing electricity, refrigeration, and Wi-Fi for digital transactions.
- **Smart Agri-Centres (United Kingdom and Uganda):** A joint venture between Smart Villages (UK) and Keema Foods (Uganda), this team created Smart Agri-Centres, which are small solar-power plants with lithium-ion battery storage. The facilities also include space for agricultural services such as cold storage and flour mills, as well as community services such as workshop spaces, Internet access, and charging centers. Pilot tests showed that the value added by these services can increase community income fourfold, which also helps recover the capital costs of deploying the equipment.

SUMMARY

Novel approaches to incentivize innovation and stimulate entrepreneurial activities can significantly increase access to reliable, affordable, and sustainable energy in sub-Saharan Africa. Redirecting investments from fossil fuels to green energy sources and increasing investment in off-grid solutions will be necessary to create scaled access to electricity in rural and urban communities alike. Accessible energy initiatives in Africa should focus on de-risking investments in innovations, fostering transparency and accountability, and supporting symbiotic relationships between start-ups and local communities.

Innovation competitions, such as the Milken-Motsepe Prize in Green Energy, can offer an infusion of human capital and financial resources to help advance solutions from ideas to impact. The innovations borne out of this competition can improve every aspect of a community's health and well-being. Using green energy rather than fossil fuels improves environmental quality. Access to electricity can improve the standards, accessibility, and reliability of health-care facilities and the services they deliver. Schools can attract and retain teachers and increase the number of teaching resources and classroom materials. Businesses can meet existing electricity needs while increasing revenue, which can drive growth and create new jobs. Individuals can use the time they would otherwise spend on fuel collection to explore opportunities that enhance their livelihoods.

The Milken-Motsepe Prize in Green Energy was designed to streamline the path for more communities to realize these benefits. By incentivizing entrepreneurs to develop new technology, generate accessible data, and deploy and document their solutions, the competition is helping discover new approaches for increasing green energy access in Africa. The hope is that these innovations can benefit millions across the continent and beyond.

APPENDIX 1: EXPERTS CONSULTED DURING THE DESIGN PHASE

Name	Position	Organization	Region
Iyinoluwa Aboyeji	CEO & General Partner	Future Africa	Africa
Shouvik Banerjee	CEO	AverPoint	North America
Ezgi Barcenas	Chief Sustainability Officer	AB InBev	North America
Daniel Berkove	Senior Advisor, Strategic Energy Initiatives	IHS Markit	Middle East
Aron Betru	COO	Trident Capital	North America/Africa
Brian Dames	CEO	African Rainbow Energy & Power	Africa
David Danielson	Managing Director	Breakthrough Energy Ventures	North America
Marcus Extavour	Chief Climate Solutions Officer	TIME CO2	North America
Greg Fischer	Partner & Director, Sustainable Investing	BCG	North America
André Fourie	Global Vice President of Sustainability	AB InBev	North America
Linda Greer	Senior Scientist & Impact Advisor	Formerly with National Resources Defense Council	North America
Ashley Grosh	Vice President	Breakthrough Energy Ventures	North America
Mona Hamdy	Chief Strategy Officer	Sino Global Capital	North America/ Africa/ Middle East
Eunice Heath	SVP and Chief Sustainability Officer	CRH	North America /Europe
Angela Homsí	Founder and President	Ignite Power	Middle East
Samir Ibrahim	CEO	SunCulture	Africa

Name	Position	Organization	Region
Paula Ingabire	Minister of ICT and Innovation	Republic of Rwanda	Africa
Marlene Jennings	General Counsel	African Rainbow Capital	Africa
Carolyn Kissane	Academic Director, Center for Global Affairs	New York University	North America
Rachel Kropa	Managing Director	Footprint Coalition	North America
Susan Lyons	Director of International Advancement	Harvard University	North America
Wanli Min	Founder and CEO	North Summit Capital and QuadTalent Technology	Asia
W. Gyude Moore	Senior Policy Fellow	Center for Global Development	North America/Africa
Todd Moss	Executive Director	Energy for Growth Hub, Center for Global Development	North America/Africa
Paul Muthaura	Former Chief Executive	Capital Markets Authority of Kenya	Africa
James Mwangi	Executive Director	Dalberg	Africa
Landry Signé	Senior Fellow, Global Economy and Development Program	Brookings Institution	North America/Africa
Esther Pan Sloane	Managing Director	Avenue Capital Group	North America
Matthew Stremmlau	Vice President of Research & Development / Director, West Africa	Implicyte / Blacklvy Group	North America/Africa
Simon Sylvester-Chaudhuri	Founder and Executive Director	CIV:LAB	Europe
Eric Toone	Executive Managing Director & Technical Lead, Investment Committee	Breakthrough Energy Ventures	North America/Africa

APPENDIX 2: SEMIFINALISTS IN THE MILKEN-MOTSEPE PRIZE IN GREEN ENERGY

Team Name	Description of Innovation	Home Country
AfTrak	Sustainable solar microgrids and tailored tractors	United Kingdom
Airborne Power Technologies	Airborne wind turbines	Tanzania
GEG-Geosleeve	Solar- and geothermal-powered hybrid renewable energy system	Iceland
GenH	Rapidly deployable modular hydropower system	United States of America
GreenBox	Mobile, scalable solar containers	Republic of the Congo
Inensus GmbH	Digitalizing green minigrids for rural industrialization	Germany
Jamii Energy International	Hybrid system of solar photovoltaic, wind turbine generators, and battery storage	Kenya
Kawi Technologies	Solar energy generation, storage, and distribution utilizing the Swarm Grid Technology	Kenya
New Horizons Technologies	Solar thermal power generation	United States of America
Newdigit	Compact, portable device to generate energy from water	Nigeria
OMNIVAT	Containerized electricity generation and storage system	South Africa
PAM Africa Green Power Generation Company Ltd.	Combined refrigeration and energy distribution system	Nigeria
Powerbox Energy Systems	Smart and customizable technology-enabled wind and solar energy system	Nigeria
Prospera Generation Inc.	Optical, nonsolid, airborne solar concentrator	Ethiopia
Reeddi	Affordable, reliable portable electricity solutions	Nigeria

Team Name	Description of Innovation	Home Country
Skicc Tech	Smart, containerized, portable solar energy-generating unit	Zimbabwe
Smart Agri-Centres	Community solar power and productive use hubs	United Kingdom
Solar Freeze	PAYGO cold storage units powered by solar energy	Kenya
VGreEN	Fully localized vanadium redox flow battery through ion-exchange membrane	South Africa
WasteWatt Technologies	Conversion of food waste into bioplastic photovoltaic windows	Tanzania

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