



Project Proposal for 2nd Phase Report

Project beneficiary:

Moi University – Kesses Campus

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Uasin Gishu, Eldoret, Kenya

FOR OFFICIAL **USE** ONLY

Final Financial & Implementation Report:

51.7 kW Solar PV Grid-Tie Solution System

Location: Moi University – Kesses Main Campus, Eldoret, Kenya

Project name:

MOI UNIVERSITY'S DYNAMIC RENEWABLE ENERGY INNOVATION PARK AND GREEN HYDROGEN, AMMONIA, AND FERTILIZER RESEARCH HUB



1. Moi University – Institutional Background

Moi University is one of Kenya's leading public universities, established in 1984 and located in Eldoret, Uasin Gishu County. The university serves more than **30,000 students** and hosts major administrative, academic, research, and medical facilities.

Due to increasing electricity demand, rising grid tariffs, frequent outages, and reliance on diesel generators, Moi University initiated a structured transition toward **renewable and sustainable energy solutions**. Solar energy was identified as the most suitable technology due to Kenya's high solar irradiation and the university's large landmass.

2. Overall Project Target

The overall objective of the Moi University Renewable Energy Initiative is the **progressive decarbonization of campus operations**, reduction of long-term energy costs, and improvement of energy reliability.

Key targets include:

- Reducing dependence on grid electricity and fossil fuels
- Lowering operational energy expenditure
- Ensuring stable electricity supply for academic and administrative functions
- Demonstrating renewable energy solutions for replication in Kenya

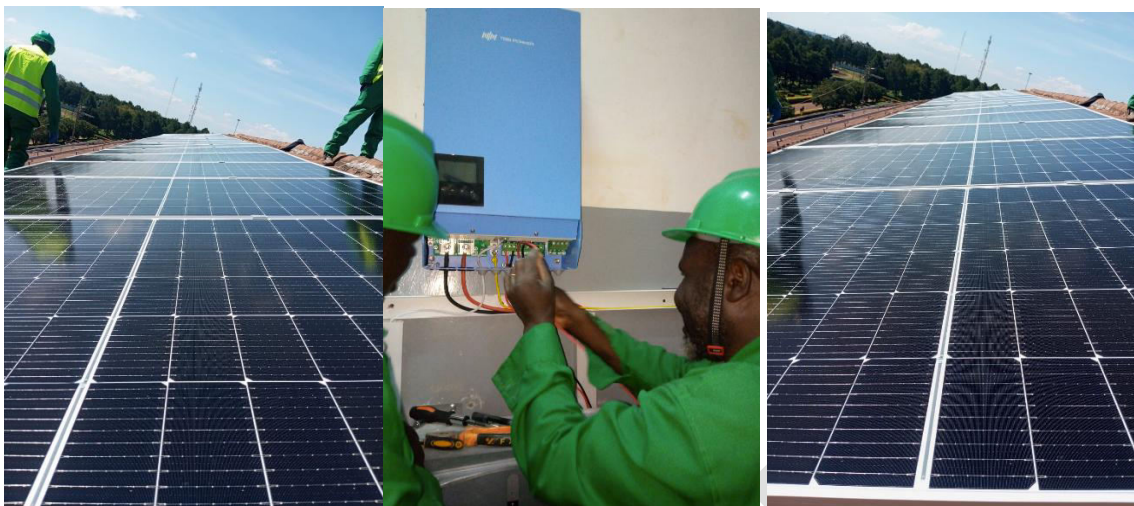
The initiative is implemented through **clearly defined phases**, ensuring transparency, cost control, and donor confidence.

Phase One – 30 kW Solar PV Grid-Tie System (Moi University)

Phase One of the renewable energy initiative at Moi University established the technical and operational foundation for subsequent scaling phases. The 30 kW Solar PV Grid-Tie System was successfully installed, commissioned, and integrated into campus operations.

Photo P1-1: Successfully implemented and commissioned, serving as the technical and institutional foundation for Phase Two scaling





2.1 Executive Summary

51.7 kW Solar PV Grid-Tie Project – Moi University, Kenya

(Donor & CSR / Impact Overview)

Project Title: Renewable Energy Development Initiative – Phase Two (Implemented) & Phase Three (Scale-Up)

Institution: Moi University, Eldoret, Kenya

Installed Capacity (Phase Two): 51.7 kWp (Grid-Tie)

Total Project Cost: EUR 40,145.63

System Status: Fully installed, operational and awaiting commissioning

Project Context & Rationale

Moi University, one of Kenya's leading public universities with over **30,000 students**, faces rising electricity costs, grid instability, and climate responsibility. To address these challenges, the university initiated a **phased renewable energy transition** centered on solar PV systems.

Phase Two installation of a **51.7 kW Solar PV Grid-Tie System**—was implemented as a **proof-of-concept and foundation** for long-term scaling. This report documents verified performance, transparent financing, and measurable impact, and forms the basis for **Phase Three expansion**.

Technical & Financial Overview

- **Annual energy generation:** ~96–98 MWh/year
- **Lifetime electricity production (25 years):** ~2.43 GWh
- **Lifetime electricity cost:** ~0.0165 EUR/kWh
- **Total CAPEX (incl. PM & travel):** EUR 40,145.63
- **Monitoring:** Real-time online system with verified kWh data

The system supplies the **library building** and is fully integrated into campus infrastructure.

Climate Impact (Verified Methodology)

Depending on the displaced electricity source (grid vs. diesel backup), the system avoids:

- ~19–69 tCO₂ per year
- ~486–1,701 tCO₂ over 25 years

Cost-effectiveness (25-year lifetime):

- 24–83 EUR per tCO₂ avoided

These values place the project within **highly competitive international mitigation benchmarks**.

Educational, Social & Community Impact

- **Students:** Hands-on learning using live monitoring data, enhanced employability and research opportunities
- **Children & Education Ecosystem:** Improved air quality, financial savings redirected to education and scholarships
- **Community:** Local job creation, skills transfer, reduced generator noise and emissions
- **Institution:** Lower energy costs, improved reliability, reputational leadership in sustainability

Risk Profile & Governance

The project is classified as **low-risk** due to:

- Proven technology and Tier-1 components
- Fixed and transparent cost structure
- Established monitoring, reporting, and maintenance procedures
- Clear institutional ownership and governance

All financial, technical, and environmental data are **audit-ready and verifiable**.

Strategic Case for Phase Two

Phase Two is **not a pilot project**. It is the **scaling of a proven, monitored, and audited system**, offering:

- Higher marginal impact per euro invested
- Lower relative risk than initial implementation
- Further reductions in **EUR/kWh** and **EUR/tCO₂**
- Expanded benefits across campus, education, and community

Formal Funding Call

Based on the documented success of Phase One and Two, Moi University respectfully invites funding partners to support **Phase Three scaling** of its renewable energy initiative.

Phase Three funding will:

- Expand solar capacity and CO₂ mitigation
- Strengthen education and research impact
- Deliver increased climate and social returns under an established governance framework

Final Donor Statement

The 51.7 kW Solar PV Grid-Tie Project at Moi University demonstrates how transparent, well-governed infrastructure investments can deliver measurable climate action, strong educational outcomes, and long-term institutional value. Phase Two offers a low-risk, high-impact opportunity to scale a proven solution.

3. Implemented Project – Phase Two Context

Phase Two represents the **second successfully implemented phase** of the renewable energy initiative and consisted of the installation of a **51.7 kW Solar PV Grid-Tie Solution System** at the Kesses Main Campus.

The system supplies the **library** and serves as:

- a functional energy solution, and
- a financial and technical reference for future scaling.



Moi University Main Library Building

The report documents **only the implemented system**.

4. Technical Description of the Installed System

The installed Solar PV Grid-Tie System consists of:

- **94 × 550 W Monocrystalline Solar Modules**
- **1 × 50 kW Huawei Grid-Tie Inverter**
- Communication and monitoring equipment
- High-voltage DC isolators
- Combiner board
- DC and AC cabling

- Smart meter
- Electrical integration components
- Ground-mounted prefabricated steel support structure

The system operates in **grid-parallel mode** and is monitored via an **online real-time monitoring platform**.

5. Detailed Financial Calculations and Cost Tables

Table 1: Solar PV Core Components Cost Summary

Item Description	Qty	Unit Cost (KES)	Total (KES)	Total (EUR)
550 W Monocrystalline Solar Panels	94	16,575.00	1,558,050.00	12,365.48
50 kW Huawei Grid-Tie Inverter	1	459,308.00	459,308.00	3,645.30
Subtotal – Solar PV Components			2,017,358.00	16,010.78

Table 2: Electrical Components Cost Summary

Item Description	Qty	Unit Cost (KES)	Total (KES)	Total (EUR)
Communication Equipment	1	73,955.00	73,955.00	586.94
High Voltage DC Isolator	6	7,500.00	45,000.00	357.14
Combiner Board	1	87,500.00	87,500.00	694.44
DC Cabling	400 m	300.00	120,000.00	952.38
AC Cabling	155 m	3,100.00	480,500.00	3,812.70
Smart Meter	1	93,657.00	93,657.00	743.39
Electrical Integration	1	195,650.00	195,650.00	1,552.78
Subtotal – Electrical Components			1,096,262.00	8,699.76

Table 3: Installation & Logistics Cost Summary

Item Description	Qty	Total (KES)	Total (EUR)
Roof-mounted Steel Solar Structure	1	722,856.00	5,738.54
Installation Accessories	1	61,827.00	490.69
Installation Labor	1	235,800.00	1,871.43
Transportation & Logistics	1	95,800.00	760.32
Subtotal – Installation & Logistics		1,116,283.00	8,860.98

Table 4: Total System Cost (Excluding Project Management)

Cost Category	Amount (KES)	Amount (EUR)
Solar PV Components	2,017,358.00	16,010.78
Electrical Components	1,096,262.00	8,699.76
Installation & Logistics	1,116,283.00	8,860.98
Total System Cost	4,229,903.00	33,571.52

Table 5: Project Management & Travel Costs

Cost Item	Amount (EUR)
International Travel Costs	5,400.00
Project Management & Coordination	1,174.97
Total PM & Travel Costs	6,574.97

Table 6: Overall Project Cost Summary

Description	Amount (EUR)
Total System Cost (51.7 kW PV)	33,571.52
Project Management & Travel	6,574.97
TOTAL PROJECT COST (100%)	40,145.63

5.1 Financing Structure and Donor Contribution Breakdown

This subsection presents the financing structure of the 51.7 kW Solar PV Grid-Tie Project, including the percentage contribution of each funding partner. The financing distribution is aligned with the approved project budget and is supported by the signed funding agreement provided in Annex D.

Table 7: Financing Structure and Donor Contribution

Funding Partner	Financing Share (%)	Amount (KES)	Amount (EUR)	Role
Boehringer Ingelheim. (Germany)	60%	3,035,009.63	24,087.38	Lead funding partner
State of Hessen (Germany) Through WERKHOF DARMSTADT e.V.	40%	2,023,339.75	16,058.25	Public co-financing
Total	100%	5,058,349.38	40,145.63	

Supporting documentation for the public co-financing component (State of Hessen) is provided in Annex D.3.

The above financing structure represents a co-financing model combining civil society and public funding. No additional undisclosed funding sources were used for the implementation of the reported system. In addition to the financial contributions outlined above, Moi University provided significant in-kind contributions, including the use of its own funds, personnel, and heavy machinery to clear, prepare, and make available the project site and park area prior to system installation. These in-kind contributions demonstrate strong institutional ownership and commitment but are not included in the monetary co-financing percentages stated above.

6. Implementation Status

The **51.7 kW Solar PV Grid-Tie Project at Moi University** has been **successfully completed, tested, and awaiting commissioning**. All system components comply with applicable **technical, electrical, and safety standards**. The system is fully operational, delivers renewable electricity reliably, and is continuously supervised through an **online real-time monitoring platform**.

The implementation process followed a **structured and transparent sequence**, beginning with an official project launch and stakeholder engagement, followed by physical implementation, installation, and commissioning.

6.1 Official Launch of Phase Two & Stakeholder Engagement

This subsection documents the **official launch and kick-off of Phase Two** of the Renewable Energy Development Initiative at Moi University. The launch formally marked the transition from the successfully implemented **Phase One system** to the **Phase Two scaling and expansion phase**, prior to physical implementation activities.

6.1.1 Purpose of the Official Launch

The official launch was conducted to:

- formally communicate the **completion and verified performance of Phase One**,
- present the **objectives, scope, and expected impacts of Phase Two**,
- confirm institutional ownership and leadership commitment,
- engage key stakeholders, partners, and beneficiaries, and
- strengthen transparency and donor confidence.

6.1.2 Stakeholder Participation

The launch involved participation from:

- Moi University senior management and academic leadership,
- Contractor, technical and implementation partners,
- Student and academic staff,
- invited institutional and community stakeholders.

Photo 6.1-1: Official launch and kick-off event of Phase Two of the Renewable Energy Development Initiative at Moi University, marking the formal transition to the scaling phase.





This engagement ensured a **shared understanding of project goals**, responsibilities, and expected outcomes.

6.1.3 Visibility, Transparency & Donor Recognition

The official launch enhanced:

- public visibility of the renewable energy initiative,
- accountability in the use of funds, and
- recognition of partners and supporters in accordance with donor and CSR communication guidelines including the media in Kenya.

6.1.4 Photographic Documentation

Photos to include:

- official opening or launch ceremony,
- keynote addresses by university leadership,
- stakeholder participation,
- site visit to the solar PV installation.

Photo 6.1-2: *The Renewable Energy Innovation Park is supported by founding members and advisory partners, including representatives from Kenya and Germany, who contribute technical expertise, strategic guidance, resource mobilization, and international cooperation.*



Photo 6.1-3: Address by Moi University leadership during the official launch of Phase Two, emphasizing institutional commitment to renewable energy and sustainability.











6.2 Project Implementation & Construction Documentation (Photo Evidence)

This subsection provides **visual documentation of the physical implementation process** of the **51.7 kW Solar PV Grid-Tie System** at Moi University. The photographic evidence complements the technical and financial documentation and serves as **verifiable proof of implementation**, in line with donor, audit, and CSR reporting standards.

6.2.1 Site Preparation & Ground Works

This phase documents the initial preparation of the project site, including earth works and logistical preparation using heavy machinery.

Photos to include:

- bulldozer activities during site preparation,
- ground leveling and access preparation,
- preparation of installation areas.

Photo 6.2-1: Site preparation and ground works carried out using heavy machinery prior to the installation of the solar PV system.

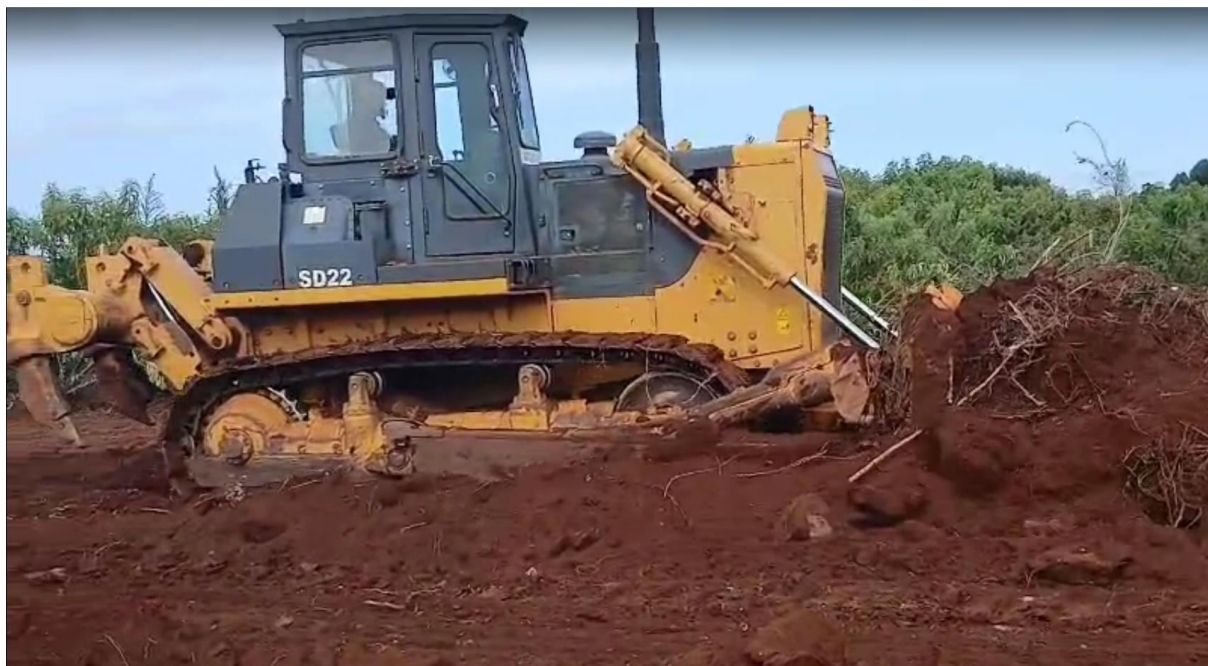


Photo 6.2-2: *Ground leveling and preparation of installation areas to ensure safe and stable system deployment.*



6.2.2 Material Delivery & Logistics

This subsection documents the delivery of key project materials to the Moi University campus.

Photos to include:

- delivery trucks on site,
- solar PV modules in packaging,
- inverters, electrical components, and mounting structures.

Photo 6.2-3: *Delivery of solar PV modules to the Moi University campus as part of the system logistics process.*









Photo 6.2-4: Arrival and on-site storage of inverters, electrical components, and mounting structures prior to installation.









6.2.3 Construction & Installation Phase

This phase captures the physical construction and installation activities of the solar PV system.

Photos to include:

- installation of mounting structures,
- mounting of solar panels,
- electrical wiring and system integration works,
- technicians performing installation activities.

Photo 6.2-3: *Installation of mounting structures and solar PV modules during the construction phase.*















































6.2.4 System Completion & Power Station

This subsection documents the completed system and key electrical infrastructure.

Photos to include:

- fully installed solar PV array,
- inverter and power station,
- electrical panels, meters, and protection equipment.

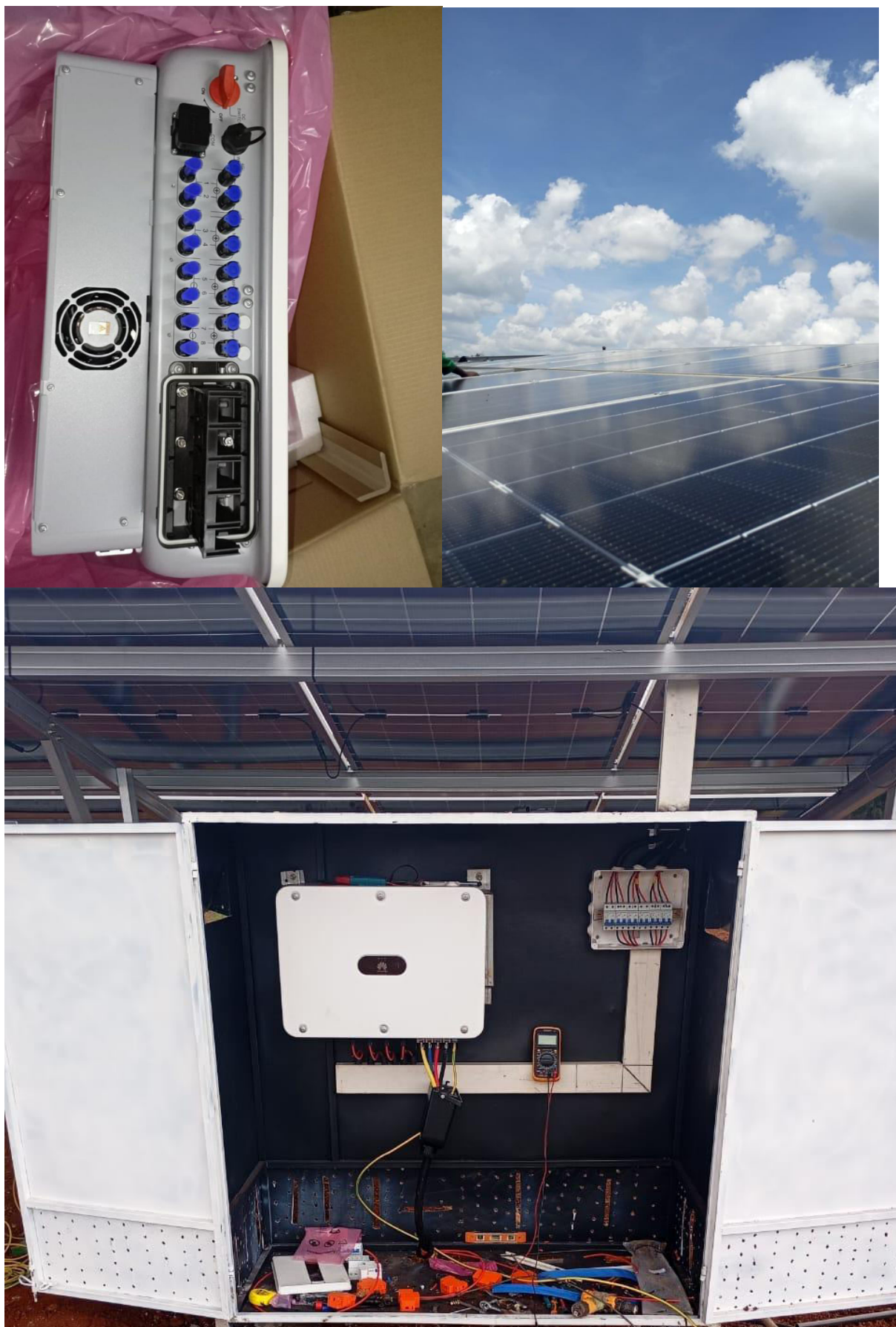
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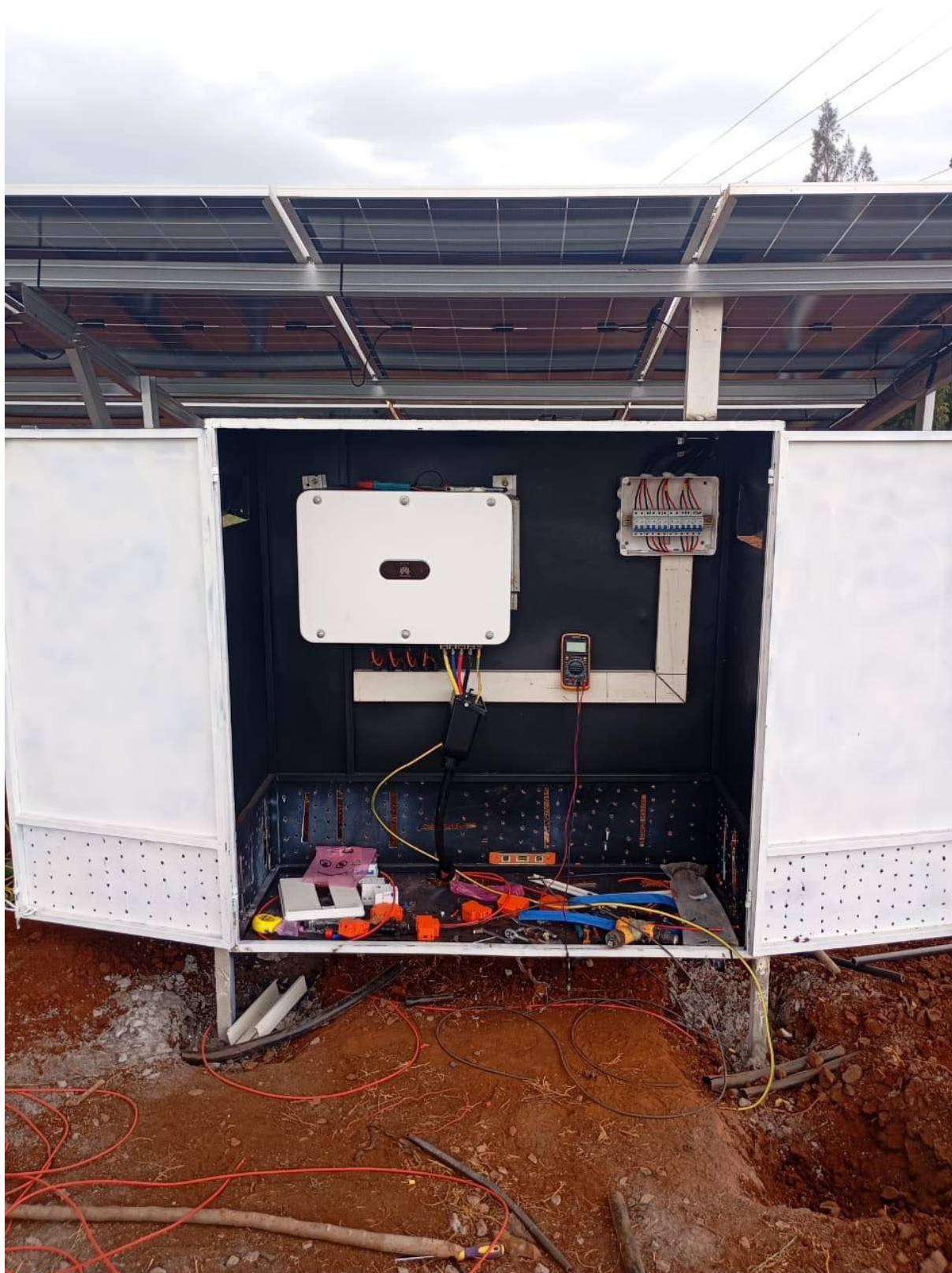
Photo 6.2-4: Completed 51.7 kW Solar PV Grid-Tie System and power station at Moi University.

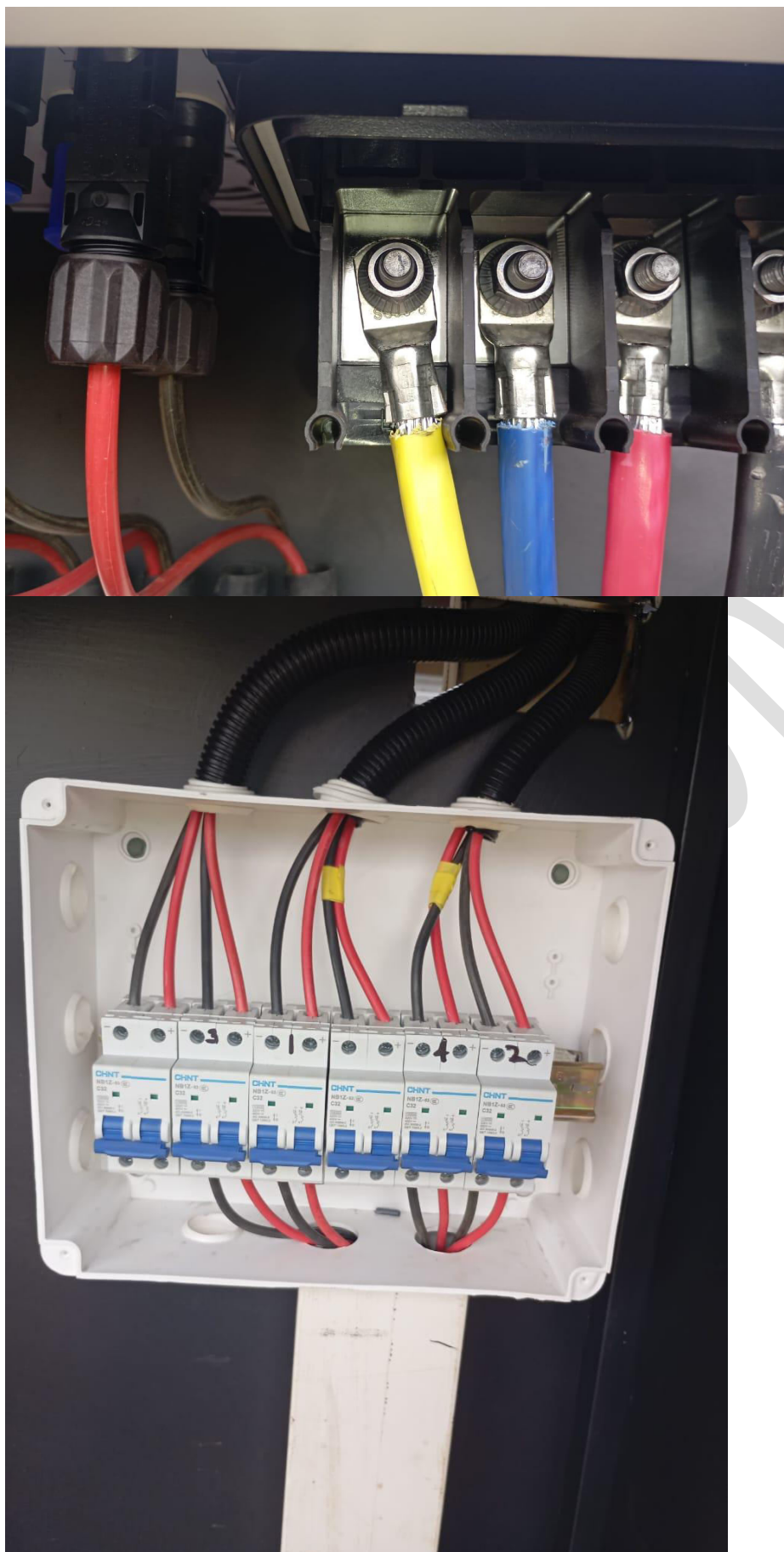


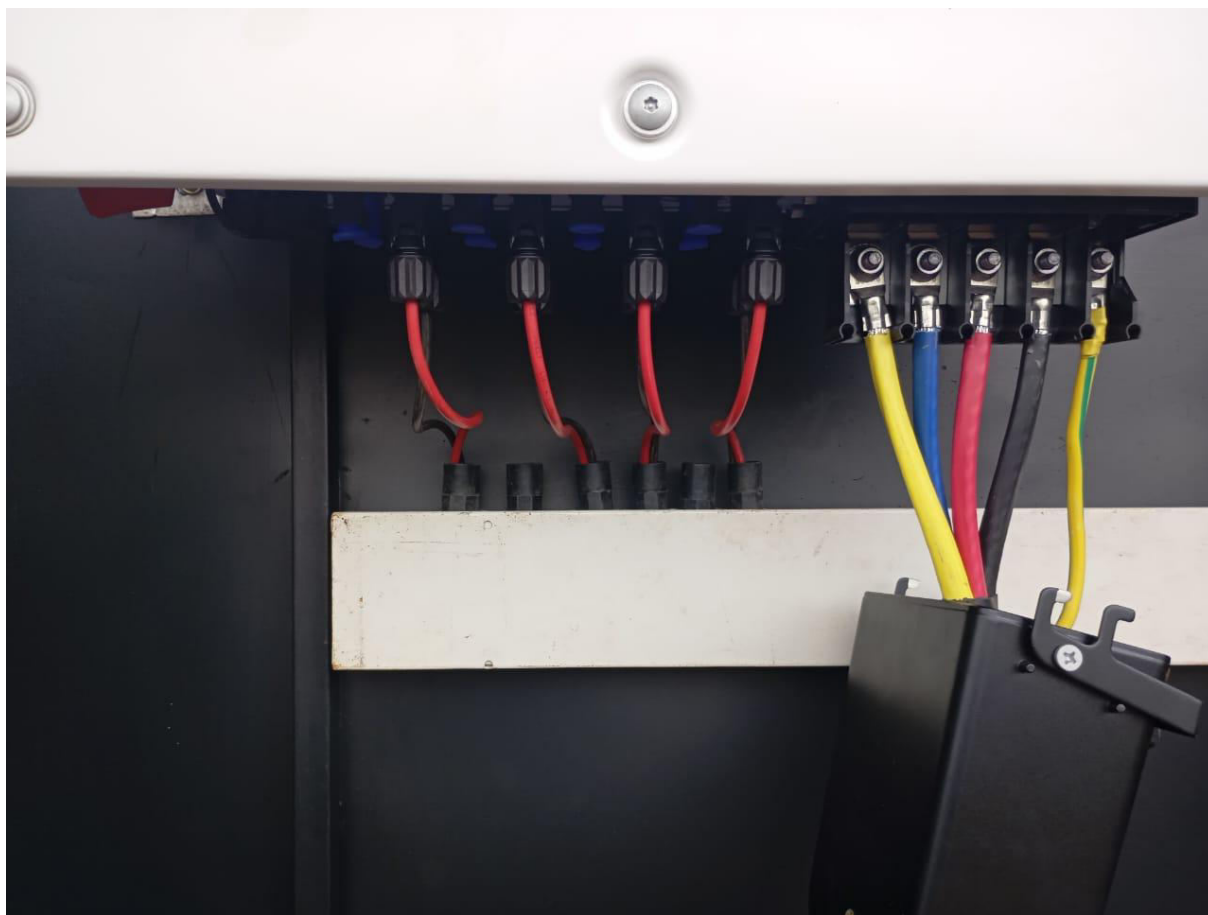












Photos 6.2-9 to 6.2-13:

Power station and electrical integration components of the 51.7 kW Solar PV Grid-Tie System at Moi University, including monitoring, protection, and distribution infrastructure.



6.2.5 Operational System & Monitoring

This phase demonstrates that the system is operational and producing electricity.

Photos to include:

- monitoring dashboard screenshots,
- real-time power output and energy generation displays,
- commissioning confirmation.

Photo 6.2-5: Operational monitoring system showing real-time energy generation.



7. Transparency and Accountability

All costs presented in this report are supported by:

- official contractor quotations,
- invoices and payment records,
- installation documentation,
- monitoring data.

This guarantees **full financial transparency and accountability** toward funding partners.

8. Conclusion for Funding Partners

The **51.7 kW Solar PV Grid-Tie Solution System** at Moi University has been implemented **successfully, transparently, and strictly according to the approved budget**.

The project confirms Moi University's capacity to responsibly manage donor-funded renewable energy investments.

9. Integrated Impact Assessment

Institutional, Educational, Social and Community Impact

This chapter provides a consolidated assessment of the **institutional, educational, social, and community-level impacts** of the 51.7 kW Solar PV Grid-Tie Project. It complements the technical and financial documentation by demonstrating **human, social, and development outcomes**, in line with donor and CSR/ESG reporting standards.

9.1 Institutional Impact on Moi University

The implementation of the 51.7 kW Solar PV Grid-Tie System delivers measurable institutional benefits:

- **Reduced electricity expenditure** through on-site renewable generation
- **Improved energy reliability** for critical administrative operations
- **Reduced dependence on diesel generators**, lowering fuel, maintenance, and operational risks
- **Long-term infrastructure asset** with a lifespan of 20–25 years
- **Enhanced institutional reputation** as a leader in sustainability and climate action

These outcomes strengthen the university's operational resilience and financial sustainability.

9.2 Impact on Students and Academic Development

The project serves as a **living laboratory** for academic training and research:

- Direct access to real-time PV monitoring data for coursework and research
- Support for undergraduate and postgraduate theses in energy-related disciplines
- Practical exposure to renewable energy systems, grid integration, and performance analysis
- Enhanced employability of graduates in the renewable energy and sustainability sectors

The system integrates sustainability into the **core academic mission** of the university.

9.3 Impact on Children and the Education Ecosystem

Although installed at university level, the project generates indirect benefits for children and youth:

- Financial savings enable increased investment in scholarships, teaching materials, and academic infrastructure
- Reduced diesel generator use improves local air quality, benefiting vulnerable groups
- The university acts as a **demonstration and learning site** for schools and youth programs

9.4 Community and Socio-Economic Impact

The project contributes positively to the surrounding community through:

- Engagement of local technicians, electricians, and service providers
- Skills transfer and capacity building in renewable energy technologies
- Reduced noise and air pollution from generator operation
- Demonstration effect encouraging replication by public institutions and SMEs

9.5 Summary of Impact Outcomes

Impact Area	Key Outcomes	
Institutional	Cost reduction, energy security, asset creation	
Educational	Practical training, research, employability	
Social	Healthier environment, education support	
Community	Jobs, skills transfer, replication	

10. Contribution to the United Nations Sustainable Development Goals (SDGs)

This chapter outlines how the 51.7 kW Solar PV Grid-Tie Project contributes directly and measurably to the **United Nations Sustainable Development Goals (SDGs)**, a core requirement for many international donors and CSR programs.

10.1 SDG 7 – Affordable and Clean Energy

- On-site generation of renewable electricity
- Reduced dependence on fossil-fuel-based electricity
- Improved access to reliable power for institutional operations

10.2 SDG 4 – Quality Education

- Enhanced learning environment through stable electricity supply
- Hands-on training opportunities using real infrastructure
- Improved allocation of financial resources to education

10.3 SDG 8 – Decent Work and Economic Growth

- Creation of short- and medium-term local employment
- Skills development for technicians and students
- Strengthening of the local green economy

10.4 SDG 9 – Industry, Innovation and Infrastructure

- Deployment of modern renewable energy infrastructure
- Strengthening institutional capacity for sustainable innovation
- Promotion of applied research and technology transfer

10.5 SDG 13 – Climate Action

- Quantifiable CO₂ emission reductions
- Contribution to national and global climate mitigation efforts
- Long-term reduction of carbon footprint of higher education infrastructure

10.6 SDG 3 – Good Health and Well-being

- Reduced air pollution from diesel generators
- Lower noise levels in the campus environment
- Improved occupational and environmental health conditions

10.7 SDG 11 – Sustainable Cities and Communities

- Demonstration of sustainable infrastructure solutions
- Replicable model for public institutions
- Contribution to resilient and low-carbon communities

10.8 SDG Alignment Summary Table

SDG	Description	Project Contribution
SDG 3	Good Health & Well-being	Reduced emissions and noise
SDG 4	Quality Education	Practical learning & funding relief
SDG 7	Affordable & Clean Energy	Solar PV electricity generation
SDG 8	Decent Work & Growth	Jobs & skills development
SDG 9	Industry & Innovation	Modern energy infrastructure
SDG 11	Sustainable Communities	Demonstration & replication
SDG 13	Climate Action	Verified CO ₂ reduction

11. Climate Impact Summary (Donor-Compliant) — FULL CALCULATIONS INCLUDED

11.1 Input Parameters (Assumptions stated for verification)

- **Installed PV Capacity (P):** 51.7 kWp
- **Average daily solar yield (Y):** 5.1 to 5.2 kWh/kWp/day (*Kenya typical range as used in our proposal*)
- **Days per year (D):** 365
- **Annual Energy (E_{γ}):**

$$E_{\gamma} = P \times Y \times D$$

Note: These are conservative planning assumptions. The **exact value will be verified** using system monitoring data (kWh/year).

11.2 Annual Energy Generation Calculation (kWh/year)

Case A (Lower yield): Y = 5.1 kWh/kWp/day

$$E_{\gamma} = 51.7 \times 5.1 \times 365$$

Step-by-step:

- $51.7 \times 5.1 = 263.67$ kWh/day
- $263.67 \times 365 = 96,239.55$ kWh/year
- ➡ Rounded: **96,240 kWh/year** (≈ 96.24 MWh/year)

Case B (Upper yield): Y = 5.2 kWh/kWp/day

$$E_{\gamma} = 51.7 \times 5.2 \times 365$$

Step-by-step:

- $51.7 \times 5.2 = 268.84$ kWh/day
- $268.84 \times 365 = 98,126.60$ kWh/year
- ➡ Rounded: **98,127 kWh/year** (≈ 98.13 MWh/year)

✓ **Verified planning range for annual generation:**

$$E_{\gamma} \approx 96,240 \text{ to } 98,127 \text{ kWh/year}$$

For scenario calculations below, we also use a midpoint reference:

$$E_{\gamma}(\text{mid}) = \frac{96,240 + 98,127}{2} = 97,183.5 \approx 97,184 \text{ kWh/year}$$

11.3 CO₂ Savings Method (tCO₂/year) — FULL FORMULA

$$CO_2 \text{ Savings}(kg/year) = E_{\gamma}(kWh/year) \times EF(kgCO_2/kWh)$$

$$CO_2 \text{ Savings}(t/year) = \frac{CO_2 \text{ Savings}(kg/year)}{1000}$$

Where EF is the **emission factor** depending on what electricity source is displaced:

- **Scenario 1 (Conservative grid):** EF = 0.20 kg CO₂/kWh
- **Scenario 2 (Average grid mix):** EF = 0.40 kg CO₂/kWh
- **Scenario 3 (Diesel generator displacement):** EF = 0.70 kg CO₂/kWh

11.4 CO₂ Savings Calculations — Range + Midpoint

Using Lower energy case ($E_{\gamma} = 96,240 \text{ kWh/year}$)

Scenario 1 (EF 0.20):

- $CO_2 = 96,240 \times 0.20 = 19,248 \text{ kg} = \mathbf{19.25 \text{ tCO}_2/\text{year}}$

Scenario 2 (EF 0.40):

- $CO_2 = 96,240 \times 0.40 = 38,496 \text{ kg} = \mathbf{38.50 \text{ tCO}_2/\text{year}}$

Scenario 3 (EF 0.70):

- $CO_2 = 96,240 \times 0.70 = 67,368 \text{ kg} = \mathbf{67.37 \text{ tCO}_2/\text{year}}$

Using Upper energy case ($E_{\gamma} = 98,127 \text{ kWh/year}$)

Scenario 1 (EF 0.20):

- $CO_2 = 98,127 \times 0.20 = 19,625.4 \text{ kg} = \mathbf{19.63 \text{ tCO}_2/\text{year}}$

Scenario 2 (EF 0.40):

- $\text{CO}_2 = 98,127 \times 0.40 = 39,250.8 \text{ kg} = \mathbf{39.25 \text{ tCO}_2/\text{year}}$

Scenario 3 (EF 0.70):

- $\text{CO}_2 = 98,127 \times 0.70 = 68,688.9 \text{ kg} = \mathbf{68.69 \text{ tCO}_2/\text{year}}$

Using Midpoint energy ($E_v \approx 97,184 \text{ kWh/year}$)

Scenario 1 (EF 0.20):

- $\text{CO}_2 = 97,184 \times 0.20 = 19,436.8 \text{ kg} = \mathbf{19.44 \text{ tCO}_2/\text{year}}$

Scenario 2 (EF 0.40):

- $\text{CO}_2 = 97,184 \times 0.40 = 38,873.6 \text{ kg} = \mathbf{38.87 \text{ tCO}_2/\text{year}}$

Scenario 3 (EF 0.70):

- $\text{CO}_2 = 97,184 \times 0.70 = 68,028.8 \text{ kg} = \mathbf{68.03 \text{ tCO}_2/\text{year}}$

11.5 Donor Summary Table — Annual CO_2 Savings (tCO_2/year)

Scenario (Displaced Source)	EF (kg CO_2/kWh)	CO_2 Savings @ 96,240 kWh	CO_2 Savings @ 97,184 kWh	CO_2 Savings @ 98,127 kWh
Conservative grid	0.20	19.25 t	19.44 t	19.63 t
Average grid mix	0.40	38.50 t	38.87 t	39.25 t
Diesel generator displacement	0.70	67.37 t	68.03 t	68.69 t

11.6 Multi-Year CO_2 Impact (10 / 20 / 25 years)

Using the **midpoint annual CO_2 savings**, multiplied by project lifetime:

Scenario 1 (EF 0.20): $19.44 \text{ tCO}_2/\text{year}$

- 10 years: $19.44 \times 10 = \mathbf{194.4 \text{ tCO}_2}$
- 20 years: $19.44 \times 20 = \mathbf{388.8 \text{ tCO}_2}$
- 25 years: $19.44 \times 25 = \mathbf{486.0 \text{ tCO}_2}$

Scenario 2 (EF 0.40): $38.87 \text{ tCO}_2/\text{year}$

- 10 years: $38.87 \times 10 = \mathbf{388.7 \text{ tCO}_2}$
- 20 years: $38.87 \times 20 = \mathbf{777.4 \text{ tCO}_2}$
- 25 years: $38.87 \times 25 = \mathbf{971.8 \text{ tCO}_2}$

Scenario 3 (EF 0.70): 68.03 tCO₂/year

- 10 years: $68.03 \times 10 = 680.3 \text{ tCO}_2$
- 20 years: $68.03 \times 20 = 1,360.6 \text{ tCO}_2$
- 25 years: $68.03 \times 25 = 1,700.8 \text{ tCO}_2$

11.7 Monitoring & Verification (Donor Requirement)

The CO₂ calculation will be finalized using:

- **Actual annual energy generation (kWh)** from the PV monitoring portal
- Agreed **emission factor** (grid factor or diesel substitution factor)
- Annual reporting schedule (e.g., semi-annual or annual)

This ensures that reported CO₂ savings are **measured, transparent, and verifiable**.

11.8 Cost Effectiveness – EUR per tCO₂ Avoided (FULL CALCULATION)

This subsection assesses the **cost efficiency of the 51.7 kW Solar PV Grid-Tie System** in terms of **investment cost per ton of CO₂ avoided**, a key indicator for **donor institutions, CSR programs and ESG reporting**.

11.8.1 Input Values (Verified Project Data)

- **Total Project Cost (CAPEX incl. PM & travel):**
EUR 40,145.63
- **Annual CO₂ savings (from Section 11.4 – midpoint values):**
 - Scenario 1 (Conservative grid): **19.44 tCO₂/year**
 - Scenario 2 (Average grid mix): **38.87 tCO₂/year**
 - Scenario 3 (Diesel generator displacement): **68.03 tCO₂/year**
- **System lifetime assumptions:**
10 years / 20 years / 25 years
(25 years is standard for solar PV modules)

11.8.2 Formula Used

$$\text{EUR per tCO}_2 = \frac{\text{Total Project Cost (EUR)}}{\text{Total CO}_2 \text{ avoided over lifetime (tCO}_2\text{)}}$$

Where:

$$\text{Total CO}_2 \text{ avoided} = \text{Annual CO}_2 \text{ savings} \times \text{Project lifetime (years)}$$

11.8.3 EUR per tCO₂ – 10-Year Perspective

Scenario 1 – Conservative Grid (19.44 tCO₂/year)

- Total CO₂ (10y) = 19.44 × 10 = **194.4 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 194.4 = **206.5 EUR/tCO₂**

Scenario 2 – Average Grid Mix (38.87 tCO₂/year)

- Total CO₂ (10y) = 38.87 × 10 = **388.7 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 388.7 = **103.3 EUR/tCO₂**

Scenario 3 – Diesel Generator Displacement (68.03 tCO₂/year)

- Total CO₂ (10y) = 68.03 × 10 = **680.3 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 680.3 = **59.0 EUR/tCO₂**

11.8.4 EUR per tCO₂ – 20-Year Perspective

Scenario 1 – Conservative Grid

- Total CO₂ (20y) = 19.44 × 20 = **388.8 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 388.8 = **103.3 EUR/tCO₂**

Scenario 2 – Average Grid Mix

- Total CO₂ (20y) = 38.87 × 20 = **777.4 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 777.4 = **51.6 EUR/tCO₂**

Scenario 3 – Diesel Generator Displacement

- Total CO₂ (20y) = 68.03 × 20 = **1,360.6 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 1,360.6 = **29.5 EUR/tCO₂**

11.8.5 EUR per tCO₂ – 25-Year Perspective (PV Standard Lifetime)

Scenario 1 – Conservative Grid

- Total CO₂ (25y) = 19.44 × 25 = **486.0 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 486.0 = **82.6 EUR/tCO₂**

Scenario 2 – Average Grid Mix

- Total CO₂ (25y) = 38.87 × 25 = **971.8 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 971.8 = **41.3 EUR/tCO₂**

Scenario 3 – Diesel Generator Displacement

- Total CO₂ (25y) = 68.03 × 25 = **1,700.8 tCO₂**
- EUR/tCO₂ = 40,145.63 ÷ 1,700.8 = **23.6 EUR/tCO₂**

11.8.6 Summary Table – Cost per tCO₂ Avoided

Scenario	10 years (EUR/tCO ₂)	20 years (EUR/tCO ₂)	25 years (EUR/tCO ₂)
Conservative grid	206.5	103.3	82.6
Average grid mix	103.3	51.6	41.3
Diesel displacement	59.0	29.5	23.6

11.8.7 Donor & CSR Interpretation

From a donor and CSR/ESG perspective:

- The project demonstrates **strong cost efficiency** compared to many international mitigation benchmarks.
- At standard PV lifetime (25 years), the project achieves **CO₂ avoidance costs as low as ~24 EUR/tCO₂** in diesel displacement scenarios.
- Even under conservative assumptions, the system remains within **acceptable and competitive mitigation cost ranges**.
- The indicator improves automatically over time, as CAPEX is incurred once while CO₂ savings continue annually.

Donor-compliant statement:

The 51.7 kW Solar PV Grid-Tie Project achieves long-term CO₂ mitigation costs between **~24 and ~83 EUR per ton of CO₂**, depending on the displaced electricity source, demonstrating high climate cost-effectiveness.

12. Cost Efficiency & Educational Reach

(Cost per kWh, Cost per Student, Cost per Beneficiary)

This section translates the total project investment into **unit-based efficiency indicators**. The indicators show how effectively each invested euro delivers **energy, education, and social benefit**.

12.1 Cost per kWh (Lifetime Electricity Cost)

Input Values

- **Total Project Cost (CAPEX): EUR 40,145.63**
- **Annual Energy Generation (midpoint): 97,184 kWh/year**
- **PV-System Lifetime: 25 years**

Lifetime Energy Generation

$$E_{lifetime} = 97,184 \times 25 = 2,429,600 \text{ kWh}$$

Cost per kWh

$$\begin{aligned} \text{EUR per kWh} &= \frac{40,145.63}{2,429,600} \\ &= \mathbf{0.0165 \text{ EUR/kWh}} \end{aligned}$$

≈ 1.65 euro cents per kWh (lifetime cost)

The system produces electricity at a very low lifetime cost, significantly below typical grid tariffs and diesel generation costs, demonstrating excellent long-term value for money.

12.2 Cost per Student (Direct Educational Reach)

Input Values

- **Total enrolled students: approx. 30,000**
- **Project lifetime: 25 years**

Students Benefiting Over Lifetime

$$30,000 \times 25 = 750,000 \text{ student-years}$$

Cost per Student-Year

$$\frac{40,145.63}{750,000} = \mathbf{0.0535 \text{ EUR}}$$

≈ 5.4 euro cents per student per year

For just a few euro cents per student per year, the project supports cleaner energy, improved infrastructure reliability, and hands-on sustainability education.

12.3 Cost per Staff & Student Beneficiary (Campus-Wide Reach)

Input Values

- **Students:** 30,000
- **Academic & administrative staff (estimated):** 5,000
- **Total direct beneficiaries per year:** 35,000 persons

Beneficiaries Over Lifetime

$$35,000 \times 25 = 875,000 \text{ person-years}$$

Cost per Beneficiary-Year

$$\frac{40,145.63}{875,000} = \mathbf{0.0459 \text{ EUR}}$$

≈ 4.6 euro cents per beneficiary per year

12.4 Cost per Ton of CO₂ Avoided (Link to Section 11.8)

Using the **25-year lifetime** results from Section 11.8:

Scenario	EUR per tCO ₂ (25 years)
Conservative grid	82.6 EUR/tCO ₂
Average grid mix	41.3 EUR/tCO ₂
Diesel displacement	23.6 EUR/tCO ₂

Integration note:

This confirms that the **low cost per kWh** directly translates into **high climate cost efficiency**.

12.5 Combined Efficiency Overview (Donor Snapshot)

Indicator	Result
Lifetime electricity cost	0.0165 EUR/kWh
Cost per student-year	0.054 EUR
Cost per beneficiary-year	0.046 EUR
Cost per tCO ₂ avoided (25y)	24–83 EUR/tCO ₂

12.6 Donor & CSR Interpretation

From a donor and CSR/ESG perspective, these indicators demonstrate that:

- A **single upfront investment** delivers **multi-decade benefits**
- Educational reach is achieved at **negligible per-capita cost**
- Climate mitigation is delivered at **highly competitive EUR/tCO₂ levels**
- The project combines **financial efficiency, educational impact, and environmental responsibility**

Donor-compliant statement:

The 51.7 kW Solar PV Grid-Tie Project achieves exceptional cost efficiency, delivering clean electricity at approximately **1.65 euro cents per kWh**, while supporting education and climate action at **less than 6 euro cents per student per year**.

13. Risk Assessment & Mitigation Measures

This section identifies potential risks associated with the **51.7 kW Solar PV Grid-Tie Project** and documents the **mitigation measures** implemented to ensure long-term technical, financial, and operational sustainability. The assessment follows standard donor and development-finance reporting practices.

13.1 Technical Risks and Mitigation

Identified Risks

- Equipment malfunction or premature component failure
- Reduced system performance due to dust, shading, or weather conditions
- Grid instability affecting inverter operation

Mitigation Measures

- Use of **Tier-1 monocrystalline PV modules** and a **Huawei grid-tie inverter** with proven performance records
- Proper system design, including string configuration and protection devices
- Scheduled cleaning and preventive maintenance
- Real-time **online monitoring system** to detect performance deviations early
- Compliance with national electrical and safety standards

Residual risk level: Low

13.2 Financial Risks and Mitigation

Identified Risks

- Cost overruns during implementation
- Exchange rate fluctuations
- Unexpected operational expenses

Mitigation Measures

- Fixed and approved supplier quotations and detailed cost breakdowns
- Clear separation between system costs and project management costs
- One-time capital expenditure (CAPEX) model with no fuel cost exposure
- Long system lifetime (20–25 years), minimizing long-term financial risk
- **Engagement of a single main contractor for the initial project phases**, ensuring:
 - continuity in pricing structures,
 - standardized maintenance procedures,
 - predictable servicing and spare-part costs, and
 - reduced transaction and coordination costs over time.

The use of one primary contractor during the first phases contributes to **price stability, operational consistency, and improved cost control**, particularly during the early operational years.

Residual risk level: Low

13.3 Operational & Maintenance Risks

Identified Risks

- Inadequate maintenance leading to performance degradation
- Lack of trained personnel for system operation

Mitigation Measures

- Training of Moi University technical staff and students during installation and commissioning
- Simple grid-tie system design with minimal moving parts, reducing mechanical failure risk
- Availability of qualified local technical service providers for routine and corrective maintenance
- Remote monitoring system enabling early detection of performance deviations and proactive maintenance
- **Engagement of the same primary contractor during the initial operational period**, ensuring:
 - standardized maintenance procedures,
 - continuity of technical knowledge,
 - predictable maintenance response times, and
 - reduced risk during the system's early operational phase.

This combined approach ensures operational reliability while progressively strengthening **in-house technical capacity** at the university.

Residual risk level: Low to Moderate

13.4 Environmental & Climate Risks

Identified Risks

- Extreme weather events (heavy rain, strong winds)
- Environmental exposure affecting mounting structures

Mitigation Measures

- Use of **roof-mounted prefabricated steel structures** designed for local conditions
- Secure mechanical anchoring and corrosion-resistant materials
- System insurance and routine inspection

Residual risk level: Low

13.5 Institutional & Governance Risks

Identified Risks

- Changes in institutional leadership or priorities
- Insufficient internal coordination

Mitigation Measures

- Strong institutional ownership by Moi University
- Integration of the PV system into core campus infrastructure
- Clear documentation, reporting, and accountability mechanisms
- Alignment with the university's long-term sustainability strategy

Residual risk level: Low

13.6 Social & Community Risks

Identified Risks

- Limited awareness or engagement from surrounding community
- Perceived inequitable access to project benefits

Mitigation Measures

- Demonstration role of the project for outreach and education
- Inclusion of students and local technicians in implementation
- Knowledge sharing through academic programs and community engagement

Residual risk level: Low

13.7 Summary Risk Matrix (Donor Overview)

Risk Category	Initial Risk	Mitigation Strength	Residual Risk
Technical	Medium	Strong	Low
Financial	Medium	Strong	Low
Operational	Medium	Adequate	Low–Moderate
Environmental	Medium	Strong	Low
Institutional	Low–Medium	Strong	Low
Social	Low	Adequate	Low

13.8 Donor Assurance Statement

Based on the above assessment, the **51.7 kW Solar PV Grid-Tie Project** is classified as a **low-risk, high-impact investment**. All major risk categories have been addressed through appropriate design, governance, and monitoring mechanisms.

Donor-compliant statement:

The project demonstrates robust risk management and institutional readiness, ensuring long-term operational reliability and accountability of donor funds.

14. Phase Two Scaling Logic & Increased Impact

(Continuation Based on Proven Performance)

This section outlines the **strategic logic, efficiency gains, and impact amplification** of **Phase Two**, building directly on the **successfully implemented 51.7 kW Solar PV Grid-Tie System** documented in Sections 1–13.

Phase Two is **not a pilot**. It represents the **scaling of a proven, monitored, and audited system**, thereby significantly reducing technical, financial, and governance risks for funding partners.

14.1 Rationale for Phase Two (Why Scaling Now)

The successful commissioning and operation of the 51.7 kW system demonstrates that Moi University has:

- the **technical capability** to design, install, and operate grid-tied PV systems,
- the **institutional capacity** to manage donor-funded infrastructure transparently,
- the **financial discipline** to control costs and deliver strong cost-efficiency indicators,
- an operational **monitoring and reporting framework** already in place.

Phase Two capitalizes on these established structures, ensuring that additional investments deliver **higher marginal impact at lower relative risk**.

14.2 Scaling Efficiency (Economies of Scale)

Phase Two benefits from multiple scale efficiencies:

Technical Efficiencies

- Reuse of existing grid connection points and monitoring systems
- Optimized system design based on Phase One performance data
- Reduced learning-curve effects for installation and commissioning

Financial Efficiencies

- Lower **EUR/kWp** installation costs due to bulk procurement
- Reduced project management costs per installed kW
- Improved **EUR per kWh** and **EUR per tCO₂ avoided** ratios

Institutional Efficiencies

- Trained in-house technical staff and students
- Established operational procedures
- Proven supplier and contractor relationships

14.3 Expected Impact Amplification (Quantitative Perspective)

Building on Phase One metrics, Phase Two will proportionally increase:

- **Annual solar electricity generation (kWh)**
- **CO₂ emission reductions (tCO₂/year)**
- **Number of beneficiaries (students, staff, community)**

Using Phase One as a reference benchmark:

Indicator	Phase One (51.7 kW)	Phase Two (Scaled)
Annual energy generation	~97 MWh	Significantly increased
CO₂ savings	19–69 tCO ₂ /year	Proportionally higher
EUR per kWh (lifetime)	~0.0165 EUR	Further reduced
EUR per tCO₂ (25 years)	24–83 EUR	Further reduced

This confirms that Phase Two delivers **greater impact per euro invested**.

14.4 Educational & Research Scaling Impact

Phase Two expands the educational and research benefits by:

- Extending hands-on access to renewable energy systems across additional faculties
- Increasing datasets for teaching, research, and innovation
- Supporting interdisciplinary research (energy systems, climate policy, economics, data analytics)
- Enabling long-term student projects and postgraduate research

The campus increasingly functions as a **living laboratory for sustainable energy systems**.

14.5 Community & Societal Scaling Impact

With expanded capacity, Phase Two will:

- Further reduce diesel generator use and local air pollution
- Increase local employment and technical skills transfer
- Strengthen Moi University's role as a **regional demonstration site**
- Encourage replication of solar solutions in public institutions, SMEs, and households

This amplifies **social return on investment (SROI)** beyond the campus boundaries.

14.6 Risk Profile of Phase Two

Because Phase Two builds on a functioning system:

- Technical risk is **lower than in Phase One**
- Financial risk is reduced due to known cost structures
- Operational risk is minimized through trained staff and students and monitoring
- Governance risk is mitigated by established reporting practices

Donor assessment: Phase Two qualifies as a **low-risk scale-up investment**.

14.7 Strategic Alignment with Donor & CSR Objectives

Phase Two aligns strongly with donor priorities by:

- Scaling **verified climate impact**
- Improving **cost-effectiveness indicators** (EUR/kWh, EUR/tCO₂)
- Deepening **education and skills development outcomes**
- Delivering measurable contributions to **SDGs 4, 7, 8, 9, and 13**

14.8 Donor & CSR Forward-Looking Statement

Donor-compliant statement:

Phase Two represents the responsible scaling of a proven renewable energy investment. By building on verified performance data, established governance, and demonstrated cost efficiency, Phase Two delivers increased environmental and social impact at reduced risk and improved value for money.

15. Monitoring, Reporting & Governance Framework

(Donor Assurance & Accountability)

This section describes the **monitoring, reporting, and governance mechanisms** established for the **51.7 kW Solar PV Grid-Tie Project** and its Phase Two scaling. The framework ensures **measurement accuracy, financial transparency, institutional accountability, and long-term sustainability**, in line with donor and CSR/ESG requirements.

15.1 Monitoring Framework (Technical & Environmental)

System Monitoring

The Solar PV Grid-Tie System is equipped with a **real-time online monitoring platform** that records and stores operational data, including:

- Instantaneous power output (kW)
- Daily, monthly, and annual energy generation (kWh)
- System availability and uptime
- Performance trends and fault notifications

Monitoring data is accessible to authorized university technical staff and forms the basis for performance verification.

Environmental Monitoring (CO₂ Accounting)

CO₂ emission reductions are calculated using:

- **Measured annual energy generation (kWh)** from the monitoring system
- **Agreed emission factors** (grid mix and/or diesel displacement)
- The calculation methodology documented in **Sections 11.1–11.8**

This ensures that reported climate impact is **measured, transparent, and verifiable**.

15.2 Reporting Framework (Donor & CSR Reporting)

Technical Reporting

- **Quarterly internal performance summaries** (generation, uptime, maintenance events)
- **Annual technical performance report** including verified kWh output and system efficiency

Financial Reporting

- One-time **CAPEX financial report** supported by:

- supplier quotations,
 - invoices,
 - payment confirmations
- Clear separation between:
 - system costs,
 - installation & logistics,
 - project management & travel

Environmental & Impact Reporting

- Annual reporting of:
 - verified energy generation (kWh),
 - CO₂ savings (tCO₂/year),
 - cost-efficiency indicators (EUR/kWh, EUR/tCO₂),
 - beneficiary reach (students, staff, community).

Reports can be aligned with **donor-specific templates** or **CSR/ESG frameworks** upon request.

15.3 Governance Structure

Institutional Ownership

- Moi University retains **full ownership** of the Solar PV system
- The system is integrated into the university's core infrastructure

Roles and Responsibilities

- **Project Oversight:** University management and designated sustainability/energy focal points
- **Technical Operation:** Trained university technical staff and students
- **Financial Oversight:** University finance and administration departments
- **Donor Liaison:** Designated project coordination unit

Clear role definition ensures **accountability and continuity**, independent of personnel changes.

Institutional approval for the establishment of the demonstration plant and allocation of space at the Moi University main campus has been formally granted by university management. The relevant internal authorization is provided in Annex C.

15.4 Maintenance & Sustainability Measures

- Routine preventive maintenance schedule
- Periodic cleaning of PV modules
- Visual inspection of mounting structures and cabling
- Remote diagnostics via monitoring platform
- Availability of local technical service providers

These measures protect system performance over its **20–25 year operational lifespan**.

15.5 Data Integrity & Audit Readiness

The project documentation includes:

- Cost calculation tables (KES & EUR)
- Supplier quotations and invoices
- Commissioning and acceptance documentation
- Monitoring data logs

All records are stored in a structured manner to ensure **audit readiness and donor verification** at any time.

15.6 Continuous Improvement & Learning

Monitoring and reporting data are used not only for accountability but also for:

- optimizing system performance,
- informing curriculum development,
- supporting student research and training,
- refining design and cost assumptions for Phase Two and future phases.

This establishes a **learning feedback loop** between operations, education, and future investments.

15.7 Donor & CSR Assurance Statement

Donor-compliant statement:

The monitoring, reporting, and governance framework ensures that all financial, technical, and environmental outcomes of the 51.7 kW Solar PV Grid-Tie Project are transparent, measurable, and verifiable. The established structures provide a robust foundation for responsible scaling under Phase Two.

16. Conclusion & Formal Funding Request

(Final Donor & CSR Statement)

This report documents the **successful implementation, transparent financing, and verified impact** of the **51.7 kW Solar PV Grid-Tie System at Moi University**, and establishes a solid, evidence-based foundation for **Phase Two scaling**.

16.1 Summary of Achievements

The project has demonstrably achieved the following outcomes:

- **Full technical implementation and commissioning** of a 51.7 kW grid-tied solar PV system
- **Transparent and verifiable use of funds**, supported by detailed cost tables, invoices, and monitoring data
- **Reliable renewable electricity generation** of approximately **96–98 MWh per year**
- **Quantified climate impact**, avoiding approximately **19–69 tCO₂ per year**, depending on displaced energy sources
- **Strong cost efficiency**, achieving:
 - **~0.0165 EUR/kWh** (lifetime electricity cost),
 - **24–83 EUR per tCO₂ avoided** over a 25-year lifetime,
 - **< 6 euro cents per student per year** in educational benefit delivery
- **Meaningful social and educational impact** for students, staff, children, and the surrounding community

These outcomes confirm that the project delivers **high value for money** while aligning strongly with donor accountability and CSR/ESG expectations.

16.2 Institutional Readiness for Phase Two

Moi University has demonstrated:

- technical competence in renewable energy system operation,
- institutional capacity for transparent financial management,
- established monitoring, reporting, and governance structures, and
- long-term commitment to sustainability and climate action.

Phase Two therefore represents the **responsible scaling of a proven and audited model**, not a pilot initiative.

16.3 Strategic Value of Additional Funding

Additional donor funding under Phase Three will:

- increase renewable energy generation and CO₂ mitigation impact,
- further reduce electricity costs and fossil fuel dependency,
- expand hands-on educational and research opportunities,
- strengthen community outreach and local capacity building, and
- improve overall cost-efficiency indicators (EUR/kWh, EUR/tCO₂).

Each additional installed kilowatt builds on **existing infrastructure and experience**, ensuring **higher marginal impact per euro invested**.

16.4 Formal Funding Request

Based on the verified performance and impact documented in this report, Moi University respectfully invites funding partners to support **Phase Three of the Renewable Energy Development Initiative**.

Requested support includes:

- capital investment for additional solar PV capacity,
- support for expanded monitoring, training, and reporting activities, and
- partnership in scaling a proven model for sustainable higher education infrastructure.

All funds will be managed under the **same transparent financial, monitoring, and governance framework** described in Sections 11–15.

16.5 Closing Statement to Funding Partners

Donor- and CSR-compliant statement:

The 51.7 kW Solar PV Grid-Tie Project at Moi University demonstrates how targeted infrastructure investments can deliver measurable climate impact, strong educational outcomes, and long-term institutional value. Phase Two offers funding partners a low-risk, high-impact opportunity to scale a proven solution with lasting benefits for students, communities, and the environment.

Prepared and compiled by:

Eng. Cromwell Kebenei

Approved by:

MUREPHA – Moi University Renewable Energy Project Hub (Phase Two Project Team)

ANNEXES (SUPPORTING DOCUMENTATION)

Annex A – Photographic Documentation

Annex B – Institutional Approvals & Internal Authorizations

Annex C.1 – Approval of Land Allocation by Moi University

Annex D – Funding Agreements & Legal Documents

Annex D.1 – Project Agreement (Moi University & Werkhof Darmstadt e.V. / State of Hessen)

Annex D.2 – Implementation Agreement (Moi University & Afriwatt Engineering Ltd.)

Annex D.3 – Public Funding Confirmation (HA Hessen Agentur GmbH / Innovationsförderung Hessen – Zuwendung bis EUR 16,058.00)

Annex D.4 – Certificate of Practical Completion (51.7 kW Solar PV Grid-Tie System)

Annex E – Delivery Notes & Proof of Material Receipt

Annex F – Supplier Invoices

Annex F.1 – Afriwatt Engineering Ltd. Invoice (General Project Costs)

Annex F.2 – Afriwatt Engineering Ltd. Invoice – Hessen-Funded Component

Annex F.3 – SoftSmartTech Solutions Invoice (Travel & Project Management Cost)

Annex G – Comparative Offers

Annex G.1 – Vergleichsangebote (Audry Technologies + Jusel Hydro Limited)

Annex H – Bank Account Details Werkhof

Annex H.1 – Afriwatt Bank Account Letter (40% Funds Payment Details)

16 JUL 2025

Sign:

RECEIVED
P.O. Box 5900 - 30100 ELDORET



**MOI UNIVERSITY
OFFICE OF THE VICE-CHANCELLOR**

INTERNAL MEMO

FROM: Vice-Chancellor

DATE: 14th July, 2025

TO: Deputy Vice-Chancellor (A,P&S)

REF: MU/ADM/1/20

SUBJECT: REQUEST FOR SPACE FOR ESTABLISHMENT OF A DEMONSTRATION PLANT FOR GREEN HYDROGEN FUEL AND AMMONIA FERTILIZER

The above-captioned subject matter refers.

The University Management Board at its 194th Regular Meeting held on Friday, 11th July, 2025 **approved** the request by the Director, RMEDIA, for allocation of a space of fifty (50) acres of land at the Main Campus for establishment of a demonstration Plant for green hydrogen fuel and ammonia fertilizer through the collaboration between Moi University and RheinMain University of Applied Sciences, Germany as per the proposal submitted following a call by UNIDO.

The approval for allocation of the space was based on the following justification:

- The initiative will promote the objectives of Moi University Renewable Energy and Innovations Park for Green Hydrogen and Ammonia (MUREPHA) of installing 30 MW clean energy projects.
- Availing 50 acres of land worth approximately 4.2 million USD amounts to University's contribution of 21% of the project's budget as its portion for co-funding the project.
- Hosting East Africa's first University-based green hydrogen and ammonia pilot Plant elevates Moi University's research profile, attracting competitive grants, postgraduate talent and high-impact publications.
- Through a "train the trainer" model with RheinMain University of Applied Sciences and GIZ, the University will establish new curricula and short courses in hydrogen technologies, benefiting students, lecturers and TVET institutions.
- The sale of green ammonia fertilizer and carbon credit opportunities can create a self-sustaining income stream.

Kindly implement the Management Board's decision and provide a brief report on the same for updating the Finance, Administration and Strategy Committee of Council and subsequently, the Council.


**Prof. Kiplagat Kotut, Ph.D.,
Ag. VICE-CHANCELLOR**

Cc:
Deputy Vice-Chancellor (ARE&SA)
College of Health Sciences
Registrar (ARESA) Principal,

Senior Legal Officer
Chief Finance Officer
Registrar, AP&S

/JKS



(ISO 9001:2015 Certified Institution)

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www.afriwatt.co.ke

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SUSTAINABLE ENERGY FOR GREENER AFRICA

Date: 22/07/2025

Dipl. Ing. Wolfgang Jakob,
Mitglied des geschäftsführenden Vorstands,
Vorsitzender,
WERKHOF DARMSTADT e.V.
Grenzallee 10,
64297 Darmstadt.
Tel. 06151-50048-16.

Dear Jakob,

Re:CONFIRMATION OF 60% FUNDS

We confirm that the Moi University renewable energy project phase two (51.7KW) received 60% funding from Boehringer Ingelheim Corporate on 9th May, 2025. The total amount received was 24,141.95 Euros. Of this totals, 20,141.95 Euros is for the solar project materials and installation while 4,000 Euros is for the German MUREPHAR team management cost.

The funds are still intact and have not been used in strict adherence to the proposal agreement, and is awaiting for the payment of the remaining 40% so that the project can start. The account was opened solely for this project and does not engage other transactions.

Attached is the Current Account Statement for the period from the payment month up to to-date, the cost breakdown of 60% of 51.7Kw, and the general quotation, Ref no. 001383.

Best regards,

Eng. Thomas Sigowa,
Executive Director,
Afriwatt Engineering Ltd.



Copied to: Boehringer, Moi University and Werkhof Darmstadt e.V.

Current Account Statement



Statement Date 22-Jul-25
Statement Period 2024-07-22 TO 2025-07-22
Branch code 1155

AFRIWATT ENGINEERING LIMITED
UTAWALA
NAIROBI GPO

00100
KENYA

Account No	22109453003005
Branch Name	UTAWALA BRANCH
Currency	EUR
Account	INSTANT ACCESS MIN BAL

Trans	Details	Channel	Value	Reference	Deposit	Withdraw	Book Balance
09-5-2025	03PR250508957468/DE05550700400078782000,1/Boehringer Ingelheim Corporate Ce,1/nt	CHANNEL	09-5-2025	S17814245	24,141.95	0.00	24,141.95 CR
TOTAL VALUE					24,141.95	0.00	
BOOK BALANCE AS AT 22-Jul-25					24,141.95 CR		
CLEARED BALANCE AS AT 22-Jul-25					24,141.95		
End of Statement							



60% of 51.7Kw Solar PV Gridtie Solution**Date: 22/7/2025**

#	Item & Description	Qty/Unit	Price	Net Amount
1	550W Monocrystalline Solar Panel	50 pc	131.55	6,577.50
2	50KW Huawei Grid-tie Inverter	1 pc	3,645.30	3,645.30
3	Communication Equipment	1	325.04	325.04
4	High Voltage DC Isolator	4	59.52	238.08
5	Combiner Board	1	365.08	365.08
6	DC Cabling	250	2.38	595.00
7	AC Cabling	100	24.6	2,460.00
8	Smart Meter	1	396.83	396.83
9	Electrical Intergration	1	759.13	759.13
10	Ground-Mount Steel Solar Structure	1	2,823.02	2,823.02
11	Installation Accessories	1	317.46	317.46
12	Installation Labor	1	1,196.65	1,196.65
13	Transportation Mobilization to and from the project site	1 pcs	422.86	422.86
14	Round-Trip Flight, Travel Expenses, and Management Costs for Two Persons – German Team (Eng. Cromwell Kebenei & Bernd Nussbickel)	1	4,000.00	4,000.00

Total EUR 24,141.95



QUOTATION

Quotation No: 001383

Afriwatt Engineering Limited

P.O BOX 14548-00100

Samnan House, Utawala

0711557510

afriwattengineering@gmail.com

www.afriwatt.co.ke

Pin No: P051782120X

Customer:

Moi University - Kesses Campus

0719241704,

ambkiprop@gmail.com

Uasin-Gishu

Eldoret, Kenya

Quotation Date :

19.12.24

Sales person :

Engr. Thomas

Subject :

51.7Kw Solar PV Gridtie Solution

#	Item & Description	Qty	Rate	Amount
1	550W Monocrystalline Solar Panel	94 pc	16,575.00	1,558,050.00
2	50KW Huawei Grid-tie Inverter	1 pc	459,308.00	459,308.00
3	Communication Equipment	1	73,955.00	73,955.00
4	High Voltage DC Isolator	6	7,500.00	45,000.00
5	Combiner Board	1	87,500.00	87,500.00
6	DC Cabling	400	300.00	120,000.00
7	AC Cabling	155	3,100.00	480,500.00
8	Smart Meter	1	93,657.00	93,657.00
9	Electrical Intergration	1	195,650.00	195,650.00



#	Item & Description	Qty	Rate	Amount
10	On-Roof Prefabricated Steel Solar Structure	1	722,856.00	722,856.00
11	Installation Accessories	1 pcs	61,827.00	61,827.00
12	Installation Labor	1 pc	235,800.00	235,800.00
13	Transportation Mobilization to and from the project site	1 pcs	95,800.00	95,800.00
			Sub Total	4,229,903.00
			Total	KES4,229,903.00

Notes

Bank: Co-operative Bank
 Acc/No.: 01192945300300
 Acc/Name.: Afriwatt Engineering Limited
 Branch: Utawala .

MPESA PAYBILL NO.: 4084339
 ACC/NO.: Your Name/Company Name



Terms & Conditions

1. 100% payment along with the purchase order.
2. Orders should be made in the name of AFRIWATT ENGINEERING LIMITED.
3. Goods once sold are not returnable. Quote valid for one month.
4. Service and maintenance contracts at 4% of the total project amount annually.
5. Warranty Conditions:
 - i) 1 Year - pumps, batteries, inverters, solar floodlights
 - ii) 2 Years - Solar water heaters
 - iii) 5 Years - Solar panels

Project agreement

Between

Werkhof Darmstadt e.V.
hereinafter referred to as the depot,

Grenzallee 10, 64297 Darmstadt, Germany

represented by
Dipl. Ing. Wolfgang Jakob

and

Moi University, Eldoret
Hereinafter referred to as Moi University,

P.O. Box 3900 - 30100
Eldoret - KENYA

represented by:

Sir Prof. Dr. Ambrose K. KIPROP (Ph.D.)

It is agreed:

1. Purpose of the project

Werkhof is working with Moi University as part of the project "Moi University's Dynamic Renewable Energy Innovation Park and Green Hydrogen, Ammonia, and Fertilizer Research Hub" in the funding period from 20.05.2025 to 30.11.2025.

Project goals, target groups, measures:

- Reduction of Moi University's CO₂-heavy energy supply through the use of solar energy. Support for research on green hydrogen and ammonia.
- Target group and beneficiaries: Moi University campus, as well as 3,200 local residents.
- Measures: Establishment of a 51.7 kW PV grid system as part of a long-term concept for the construction of a renewable energy innovation park at Moi University.
- Further details according to the project concept of Moi University, undated, author: Eng. Cromwell Kebenei.

2. Financing

Cost Allocation and Financing Statement – Moi University Phase II Project

Moi University will receive a total funding allocation of **€40,145.00** in accordance with the approved financing plan outlined in the project proposal titled "Project Proposal for 2nd Phase Funding, Moi University," dated **19th December 2024**.

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The total grant amount is itemized as follows:

- **Personnel Costs:** €1,871.00
- **Material Costs:** €31,700.00
- **of which Travel Expenses:** €5,400.00
- **Project Management Costs:** €1,174.97

The total eligible expenditure **only** for the project implementation in Kenya is **€33,571.00**.

This funding is co-financed as follows:

- **60% by Boehringer Ingelheim**
- **40% by the State of Hessen**

The disbursement and utilization of these funds shall be contingent upon the successful provision of the committed contributions by Boehringer Ingelheim and Werkhof Darmstadt e.V. This agreement is predicated on the project concept and the corresponding financing plan submitted and approved as part of the aforementioned proposal.

3. Request for funds

Advance Disbursement and Allocation of Project Funds – Phase II

Werkhof Darmstadt e.V. agrees to make the project subsidy available in advance for a period of up to four months to support the timely implementation of project activities.

An initial amount of **€24,087.00** has already been disbursed to **Afriwatt Engineering Ltd.**, inclusive of **€4,000.00** earmarked for project management and travel-related expenses.

Moi University shall, through its contractor as specified in **Appendix B**, submit a formal request for the remaining **€16,058.00** to **Hessen-Agentur**, which shall be processed through Werkhof Darmstadt e.V. in coordination with Moi University, Mr. Nussbickel and Mr. Kebenei.

Project components shall be sourced from existing inventory held by Afriwatt Engineering Ltd., and Moi University shall retain responsibility for the **quality control, technical supervision**, and formal **certification of completion** upon finalization of each deliverable.

In the interest of **efficiency and timely execution**, Moi University hereby grants its full consent for the **direct transfer of project funds** by Werkhof Darmstadt e.V. to the contractor, Afriwatt Engineering Ltd. This arrangement is intended to facilitate **expedited procurement, logistics, and installation** within the approved project schedule and scope.

It should be noted that the contractor sources system components from their own stock, as they also operate as a vendor of such equipment. Further details regarding available components and systems can be found on the contractor's website: <https://afriwatt.co.ke/shop/>.

4. Information obligations

Moi University will inform Werkhof immediately if

- the purpose of the project or other circumstances relevant to the granting of the financial grant change or cease to exist,

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- it intends to make significant changes to the project concept,
- the project goal cannot be achieved or there are obstacles to the implementation of the project,
- it receives additional funding from a third party for the same project during the course of the funding,
- the planned total expenditure is reduced or increased,
- the funds made available for the planned needs of 5 months cannot be spent,
- items to be inventoried are no longer used or no longer needed in accordance with the purpose of the project within the commitment period.

5. Management of funds and awarding of contracts

Continuation of Project Implementation and Procurement Justification – Moi University Phase II

In continuation of the project, Moi University has retained the services of Afriwatt Engineering Ltd. for the implementation of the second phase of the Renewable Energy Innovation Park. Details of this engagement are provided in Appendix B. Afriwatt Engineering was originally selected through a competitive tendering process and has successfully fulfilled all contractual obligations in Phase I to the full satisfaction of Moi University.

Given the proven quality of delivery, technical capacity, and the high level of trust established during the first phase, Moi University has resolved to proceed with Afriwatt Engineering Ltd. for the second phase without initiating a new public tender. This strategic decision is supported by multiple benefits associated with a Single Company Approach in the context of the long-term development of Moi University's Renewable Energy Innovation Park (see Appendix A for further justification).

This approach also considers the procedural challenges of public procurement within Kenyan public universities. These processes are frequently highly bureaucratic, often extending over several months, thereby delaying project implementation and risking non-compliance with agreed milestones and funding timelines.

It is therefore proposed that 40% of the project funding from Werkhof Darmstadt e.V. be transferred directly to Afriwatt Engineering Ltd., with Moi University assuming full responsibility for ensuring value for money and quality assurance. The pricing proposed by Afriwatt Engineering Ltd. has been reviewed and deemed reasonable and non-excessive. For the purposes of transparency and accountability, price comparisons and related documentation will be provided to Werkhof as part of the procurement records.

As a general principle, the award of contracts for goods and services (including construction works) shall continue to observe competitive procurement standards, including the following:

A minimum of three written offers must be obtained for any contract exceeding a net value of €7,500,

Selection must be based on the most economically advantageous offer, and

The procurement process, including price comparisons, must be properly documented.

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Where quotations from suppliers in Kenya or other developing countries are equivalent in quality and price to those from industrialized countries, preference shall be given to suppliers from developing countries.

Afriwatt Engineering Ltd. was awarded the Phase I contract in accordance with these standards, having submitted the most economical offer among three bidders evaluated during the initial procurement phase.

6. Inventory

All objects financed from the subsidy of the Werkhof become the property of Moi University to whom they are to be transferred according to the intended purpose of the project. Moi University keeps an inventory of items that have been funded by the grant and undertakes to use the items exclusively for the work in the project. The items may only be used for another purpose with the consent of the depot, otherwise Moi University will compensate for the value of the market value.

The value equalization no longer has to be made if:

- five years have passed since the acquisition of items with a useful life of more than one year and since the acquisition with an acquisition value of more than €5,000,
- two years have passed since the acquisition of items with a useful life of more than one year and a purchase value of €410 to €5,000.

Any compensation granted in the event of involuntary misappropriation must be forwarded to Werkhof.

7. Billing and reporting

Moi University shall ensure that **Afriwatt Engineering Ltd.**, as the implementing contractor, maintains separate accounts for all income and expenditure related to the project. All financial transactions and documentation shall be conducted in accordance with the principles of proper accounting.

The contractor as well as Moi University is required to retain all books, receipts, and related financial documentation for a period of **five (5) years** after the submission of the final financial report.

All expenditure must be fully documented, with receipts clearly indicating:

- The **recipient** of the funds,
- The **reason for payment**,
- **Proof of payment**,
- **Date of transaction**, and
- A unique attribution to the project (e.g., project abbreviation or reference code).

Original receipts and supporting financial documents shall be submitted by Moi University to **Werkhof Darmstadt e.V.**, and copies retained by Moi University in coordination with its contractor.

Final Financial and Narrative Reporting

Moi University shall submit a comprehensive **financial and narrative report** to Werkhof **no later than three (3) months after the completion of the project**. The financial report shall:

- Present all income generated and expenditure structured according to the approved financing plan,
- Be accompanied by **chronologically arranged expenditure receipts**, grouped according to budget line items,
- Be accompanied by an updated inventory list of all assets procured under the project.

Progress Reporting

Moi University shall provide an initial **progress report** to Werkhof **within three (3) months of the project start date**, documenting:

- Project implementation status in relation to objectives,
- Achievements versus planned activities,
- Challenges encountered, and
- Measures taken to address them.

A final **comprehensive project report** shall also be submitted **within three (3) months after project completion**, providing:

- A detailed account of activities implemented,
- Outcomes and impact on target groups,
- An evaluation of successes, shortcomings, and lessons learned,
- Sustainability and handover strategies,
- An explanation of relevant numerical results and
- The original receipts must be attached to the financial report.

Information obligations

Moi University will inform Werkhof immediately if:

- The project goal or purpose changes
- Significant adjustments are made
- Obstacles to implementation arise
- Additional third-party funding is received
- Expenditure changes
- Funds cannot be used as planned
- Items are no longer in use as per project goals

8. Examination law

Werkhof and citizens of the State of Hessen may inspect project documents and visit the site at any time upon consultation with Moi University.

9. Blocking or reclaiming funds

The depot can block the disbursement of funds and demand the return of amounts paid if:

- the conditions for concluding the agreement subsequently cease to apply,
- overpayments have occurred,
- the information on which the funding was based was incomplete or incorrect,
- the funds are not used in accordance with this agreement,
- the transferred funds are not used for payments due within the foreseen period,



- The accounting, financial reporting, and notification obligations have not been fulfilled in a timely and proper manner, which may constitute a breach of contractual compliance requirements and could impact the continued eligibility for funding.

In addition, Werkhof may demand interest of 8% for the year from the date on which the claim for repayment arises.

10. Reservation of withdrawal

Werkhof reserves the right to withdraw from this contract with effect for the future if it concludes that the purpose of the project cannot be achieved.

11. Entry into force, Amendments

This agreement shall enter into force upon signature by the authorized signatories of the two contracting parties.

Changes to this agreement must be made in writing.

<i>Darmstadt</i>	<i>16.08.2025</i>	Eldoret	25/07/2025
.....			
Place	Date	Place	Date
<i>G. Jahn</i>		<i>M. Z. / 5</i>	
.....			
Legally binding signature		Legally binding signature	
Werkhof Darmstadt e.V.		Director, Resource Mobilization, Enterprise Development and Institutional Advancement (RMEDIA)	
		Moi University	

IMPLEMENTATION AND EXECUTION AGREEMENT

Between

Moi University, Eldoret

hereinafter referred to as 'the Client',

P.O. Box 3900 - 30100, Eldoret - KENYA

and

Afriwatt Engineering Limited

hereinafter referred to as 'the Contractor',

P.O. BOX 14548-00100, Samnan House, Utawala – Kenya

It is agreed as follows:

1. Purpose and Scope of Work

The Contractor shall carry out the installation of a 51.7 kW photovoltaic (PV) grid system as one of the micro-subphases under Phase 1 of the broader 5 MW Renewable Energy Innovation Park Program at Moi University. Phase 1 is subdivided into multiple micro subphases contributing to the cumulative capacity target of 5 MW by 2030.

The scope of this specific subphase includes procurement, transport, installation, commissioning, and system integration of all solar energy components. The system shall be installed according to standards defined by Kenyan and international engineering codes

2. Source and Specification of Materials

Afriwatt Engineering shall utilize system components from its own stock as a certified supplier. All components used shall comply with relevant safety, environmental, and performance standards. Component details are available at <https://afriwatt.co.ke/shop/>.

3. Payment and Financial Terms

Boehringer Ingelheim has disbursed €24,087.00 directly to Afriwatt Engineering, which includes a proportional share of project management and travel costs related to Kenya-



11. Liability and Risk Management

The Contractor assumes responsibility for site safety, proper handling of materials, and personnel conduct. Insurance coverage shall be maintained as per statutory requirements throughout the project duration.

12. Dispute Resolution

Disputes shall be resolved amicably. Failing resolution, the matter shall be referred to arbitration in Nairobi, Kenya, under the Kenyan Arbitration Act.

13. Correlation and Appendices

This contract forms part of the greater funding relationship under the Werkhof-Moi University Project Agreement. See Appendix B for cross-reference.

14. Entry into Force and Amendments

This agreement shall become effective upon signature by the authorized representatives of both parties. Any modifications must be made in writing and agreed by both parties.

- I. Moi University
- II. Afriwatt Engineering Ltd.

15. Long-Term Implementation Framework

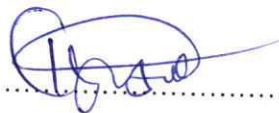
The Contractor, Afriwatt Engineering Ltd., is additionally engaged to implement Phase I of the overall Renewable Energy Innovation Park Program at Moi University. Phase I comprises multiple sub-phases with a cumulative installed capacity of up to 5 MW, to be progressively implemented by the year 2030. These sub-phases include successive photovoltaic system expansions and grid integrations, executed under the supervision of Moi University and its designated Energy Taskforce.

The entire Renewable Energy Park project targets a long-term installed generation capacity of 30 MW, to be achieved in phases, with final completion targeted by the year 2050.

Signed on 24 July 2025 at Eldoret.



Sir Prof. Dr. Ambrose K. Kiprop (Ph.D.)
Moi University



Eng. Thomas Cheruiyot
Afriwatt Engineering Ltd

Werkhof Darmstadt e.V.
Grenzallee 10
64297 Darmstadt

HA Hessen Agentur GmbH
Innovationsförderung Hessen
Herrn Louis Bernd
Mainzer Str. 118
65189 Wiesbaden

Förderung im Rahmen der Maßnahme „Entwicklungszusammenarbeit“

mit einer Zuwendung in Höhe von bis zu 16.058,00 Euro

für das Vorhaben: „Moi University's Dynamic Renewable Energy Innovation Park and Green Hydrogen, Ammonia, and Fertilizer Research Hub“

Bescheid vom 14.05.2025
Referenz-Nr.: 2695303025HA1915
HA-Projekt-Nr.: 1915/25-24

hier: Eingangsbestätigung und Erklärung zum Rechtsbehelf

Erklärungen:

(Bitte ergänzen und nichtzutreffendes streichen.)

1. Der Bescheid ist eingegangen am 19.05.2025
2. Auf die Einlegung eines Rechtsbehelfs wird verzichtet.

Die Vorschriften zur Verwendung der Mittel, insbesondere die ANBest-P, werden beachtet und angewendet.

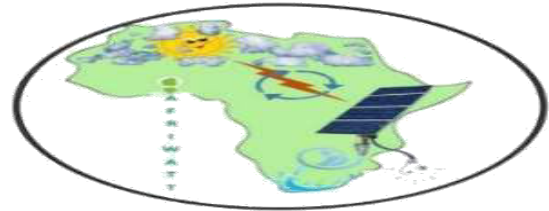
WERKHOF DARMSTADT e.V.
Grenzallee 10
64297 Darmstadt
T. 06151-50048-0
www.werkhof-darmstadt.de

Darmstadt, den 19.05.2025 Wolfgang Jähle

Ort, Datum

Rechtsverbindliche Unterschrift/en, Stempel

AFRIWATT ENGINEERING
LTD P. O. BOX 14548-00100
sales@afriwatt.co.ke
www.afriwatt.co.ke
+254711557510



SUSTAINABLE ENERGY FOR GREENER AFRICA

Date: 23/09/2025

Dipl. Ing. Wolfgang Jakob,
Mitglied des geschäftsführenden Vorstands,
Vorsitzender,
WERKHOF DARMSTADT e.V.
Grenzallee 10,
64297 Darmstadt.
Tel. 06151-50048-16.

Dear Jakob,

Re: AFRIWATT BANK ACCOUNT INFORMATION

Here are the bank details for the payment of the remaining 40% (16,003.23 Euros) of the second phase of Moi University's 51.7KW renewable energy project currently under implementation.

CO-OPERATIVE BANK KENYA (EURO ACCOUNT)
ACC/NAME: Afriwatt Engineering Limited
ACC/NO: 22109453003005
BANK CODE: 11000
SWIFT CODE: KCOOKENA
BRANCH CODE: 11155
BRANH NAME: Utawala

Best regards,

Eng. Thomas Sigowa,
Executive Director,
Afriwatt Engineering Ltd.



MOI UNIVERSITY
HEAD OF DEPARTMENT
DEVELOPMENT UNIT

29 NOV 2025

P. O. Box 3900 - 30180,
ELDORET

MOI UNIVERSITY

CERTIFICATE OF PRACTICAL COMPLETION

FROM: PROJECT MANAGER Ref: MU/BD/ SOLAR/6/3/1 Date: 28 th November, 2025		TO: MS. Afriwatt Engineering Limited P.O. BOX 14548- 00100 NAIROBI	
Details of Work		Description of Work	
Project Name Installation of a 51.7Kw Photovoltaic (PV) Grid system macro-subphase Phase II		Installation of 94 Panels grid tied 51.7 Kw complete ground mounted structure and termination to Power House at Margaret Thatcher Library, Moi University, Main Campus	
As per contract signed between Moi University of P.O Box 3900 – 30100, ELDORET and MS. Afriwatt Engineering Limited P.O. BOX 14548- 00100 NAIROBI		Name/Address of Contractor MS. Afriwatt Engineering Limited P.O. BOX 14548- 00100 NAIROBI	

COMPLETION OF INSTALLATION OF A 51.7KW PHOTOVOLTAIC (PV) GRID SYSTEM MACRO-SUBPHASE PHASE II

The Contract Works are now complete to my satisfaction and are ready to be handed over to the Client Department of Moi University.

SIGN:

NAME: Antony Murage

Date: 29/11/2025

Clerk of works

CONFIRMATION BY THE CONTRACTOR

The above works have been completed to my satisfaction

SIGN:

NAME: BENJAMIN KIPROTICH

Date: 29/11/2025

MS. Afriwatt Engineering Limited

CERTIFICATION BY PROJECT MANAGER

This is to certify that the Contract Works are now complete to my satisfaction, without defects, tested, commissioned and are ready to be handed over to Moi University.

SIGN:

MOSES KIPKULEI

Date: 29 NOV, 2025

AG. HEAD, DEVELOPMENT UNIT AND PROJECT MANAGER

Copies:

Vice-Chancellor

Vice-Chancellor, Administration, Planning and Development

Director, RMEDIA

Registrar, Administration, Planning and Development

Contractor, MS. Afriwatt Engineering Limited

Clerk of Works





DELIVERY NOTE

INV-000207

Afriwatt Engineering Limited

P.O BOX 14548-00100
Samnan House, Utawala
0711557510
afriwattengineering@gmail.com
www.afriwatt.co.ke
Pin No: P051782120X



Bill To

Moi University – Kesses Campus
071924170
ambkiprop@gmail.com
Uasin-Gishu
Eldoret, Kenya

Date: 24.09.25

Reference#: 51.7KW Solar PV Grid tie solution
Salesperson: Engr. Thomas

Subject: 51.7KW Solar PV Grid tie Solution

Item & Description	Quantity
1 550W Solar Panels	94pcs
2 50KW Grid Inverter Huawei	1pc
3 Communication Equipment	1pc
4 Smart Meter	1pc
5 High Voltage DC Isolators	6pcs
6 Combiner board	3pcs
7 DC Cabling	400m
8 AC Cabling	300m
9 Electric Integrations Components	1lot
10 Ground Mount Steel Structure	1lot
11 Conduits 25mm	15pcs
12 Conduits 32mm	5pcs
13 Couplers 25mm	15pcs
14 Couplers 32mm	5pcs
15 Bend 25mm	15pcs
16 Bend 32mm	5pcs
17 Installation Accessories	1lot
18 Ballast	17tons
19 Quarry Sand	17tons
20 Cement	20bags

RECEIVING DETAILS

Name: PAUL BEFF
ID. NO: 7999 459
Date: 24/9/2025
Receiving Conditions:
Good condition
Authorized Signature



Receiver Signature





QUOTATION

Quotation No: 001383

Afriwatt Engineering Limited

P.O BOX 14548-00100

Samnan House, Utawala

0711557510

afriwattengineering@gmail.com

www.afriwatt.co.ke

Pin No: P051782120X

Customer:

Moi University - Kesses Campus

0719241704,

ambkiprop@gmail.com

Uasin-Gishu

Eldoret, Kenya

Quotation Date :

19.12.24

Sales person :

Engr. Thomas

Subject :

51.7Kw Solar PV Gridtie Solution

#	Item & Description	Qty	Rate	Amount
1	550W Monocrystalline Solar Panel	94 pc	16,575.00	1,558,050.00
2	50KW Huawei Grid-tie Inverter	1 pc	459,308.0 0	459,308.00
3	Communication Equipment	1	73,955.00	73,955.00
4	High Voltage DC Isolator	6	7,500.00	45,000.00
5	Combiner Board	1	87,500.00	87,500.00
6	DC Cabling	400	300.00	120,000.00
7	AC Cabling	155	3,100.00	480,500.00
8	Smart Meter	1	93,657.00	93,657.00
9	Electrical Intergration	1	195,650.0 0	195,650.00



#	Item & Description	Qty	Rate	Amount
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11	Installation Accessories	1 pcs	61,827.00	61,827.00
12	Installation Labor	1 pc	235,800.00	235,800.00
13	Transportation Mobilization to and from the project site	1 pcs	95,800.00	95,800.00
Sub Total				4,229,903.00

Total KES4,229,903.00



Notes

Bank: Co-operative Bank
 Acc/No.: 01192945300300
 Acc/Name.: Afriwatt Engineering Limited
 Branch: Utawala .

MPESA PAYBILL NO.: 4084339
 ACC/NO.: Your Name/Company Name

Terms & Conditions

1. 100% payment along with the purchase order.
2. Orders should be made in the name of AFRIWATT ENGINEERING LIMITED.
3. Goods once sold are not returnable. Quote valid for one month.
4. Service and maintenance contracts at 4% of the total project amount annually.
5. Warranty Conditions:
 - i) 1 Year - pumps, batteries, inverters, solar floodlights
 - ii) 2 Years - Solar water heaters
 - iii) 5 Years - Solar panels

**Afriwatt Engineering Limited**

P.O BOX 14548-00100

Samnan House, Utawala

0711557510

afriwattengineering@gmail.com

www.afriwatt.co.ke

Pin No: P051782120X

INVOICE**Invoice No: INV-00020**

Invoice to:

Werkhof Darmstadt e.V.

Grenzallee 10,

64297 Darmstadt,

Germany.

06151-50048-16



Invoice Date : 29.07.25

Due Date : 29.07.25

L.P.O NO:

Sales person : Engr. Thomas

Subject:

40% of 51.7Kw Solar PV Gridtie Solution

#	Item & Description	Unit	Qty	Price	Net Amount
SECTION A: MATERIALS					
1	550W Monocrystalline Solar Panel	pc	44	131.55	5,788.20
2	50KW Huawei Grid-tie Inverter	pc	1	1,358.1	1,358.12
3	Communication Equipment	lot	1	234.78	234.78
4	High Voltage DC Isolator	pc	2	59.52	119.04
5	Combiner Board	pc	1	208.76	208.76
6	DC Cabling	m	150	2.38	357.00
7	AC Cabling	m	55	24.60	1,353.00
8	Smart Meter	pc	1	207.32	207.32
9	Electrical Integration	lot	1	621.11	621.11
10	On-Roof Prefabricated Steel Solar Structure	lot	1	1,953.5	1,953.53
11	Installation Accessories	lot	1	196.27	196.27
TOTAL					12,397.13
SECTION B: LABOUR FOR PROJECT INSTALLATION					
1	Installation Labor	lot	1	727.00	727.00
TOTAL					727.00
SECTION C: TRANSPORT OF MATERIALS & PROJECT LOGISTICS					
1	Transportation - Mobilization to and from the project site	lot	1	304.13	304.13
TOTAL					304.13
SECTION D: GERMAN TERM TRAVEL AND OVERSIGHT COST					
1	Round-trip Flight, Travel Expenses and Management Cost for Two Persons (Eng. Cromwel Kebenei and Bernd Nussbickel)	lot	1	2,574.97	2,574.97
TOTAL					2,574.97
AMOUNT		A+B+C+D			16,003.23

Payment Details

CO-OPERATIVE BANK KENYA (EURO ACCOUNT)
ACC/NAME: Afriwatt Engineering Limited
ACC/NO: 22109453003005
BANK CODE: 11000
SWIFT CODE: KCOOKENA
BRANCH CODE: 11155
BRANH NAME: Utawala



Our Services

Borehole Drilling & Servicing	Power Backup
Solar Water Pumping	Solar PV Off-Grid
Solar Water Heating	Solar PV Grid Tie

Authorized Signature

Receiver Signature

INVOICE

SoftSmartTech Solutions – Where Technology Meets Ingenuity.

Empowering tomorrow's innovations, today.

Seller: Eng. Cromwell Kebenei SoftSmartTech Solutions Mainzer Str. 79 55411 Bingen am Rhein Germany Phone: +49 67211873941 Mobile: +49 1621030562 Email: c.kebenei@kebenei-softsmarttech.de Website: https://www.kebenei-softsmarttech.de/	Bill to: Afriwatt Engineering Ltd P.O. Box 14548-00100 Nairobi, Kenya Email: sales@afriwatt.co.ke Website: www.afriwatt.co.ke Phone: +254 711 557 510
Tax details: Business Identification Number (W-IdNr.): DE443459124 Tax number (economic activity): 2708008152663	

Invoice No.: SST-2025-1029

Date: 29 Oct 2025

Project: Moi University – Renewable Energy Innovation Park (2nd Subphase)

Payment terms: 14 days net

Currency: EUR

No.	Description	Qty	Unit price (EUR)	Amount (EUR)
1	Travel & Project Management (as per cost plan)	1	6,574.97	6,574.97

Subtotal (net)	6,574.97 EUR
VAT (0%)	0.00 EUR
Total due	6,574.97 EUR

VAT / Tax Note:

Gemäß § 19 UStG wird keine Umsatzsteuer berechnet (Kleinunternehmerregelung).

(In accordance with § 19 UStG, no VAT is charged / small business regulation applies.)

Please transfer the amount to:

Account holder: Eng. Cromwell Kebenei

IBAN: DE74 3002 0900 3220 9042 10

BIC: CMCIDEDDXX

Bank: Targo Bank

Thank you for your business!



AUDRY TECHNOLOGIES LIMITED

DEALERS IN; Electrical Suppliers and Installation Services

P.O. Box 18003-00200, River Road, Nairobi Town.

CELL: 0780 514 450, E-MAIL: audrypower20@gmail.com

Customer: Moi University - Kesses Campus

PROFORMA no: PF7031C

Contacts: 0719241704,

Date: 20/05/2024

ambkiprop@gmail.com

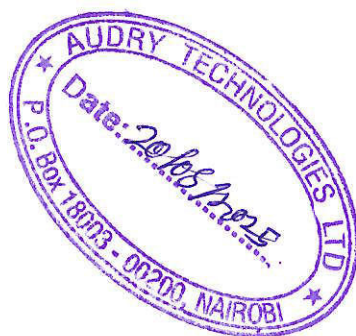
Eldoret, Kenya

BILL OF QUANTITIES FOR 22KW GRIDTIE SYSTEM AND BACKUP

Item No.	Description	Qty	Unit Price (KES)	Total (KES)
SECTION A				
1	Monocrystalline Solar Panel 485W	47	15,700.00	737,900.00
2	SUN3 Grid-tie Inverter 45KW	1	590,607.00	590,607.00
3	Backup Inverter 10KVA	1	328,400.00	328,400.00
4	Platinum Lithium Battery 4.8KWH, 51.2V	1	160,802.00	160,802.00
5	Remote Communication Accessories	1	55,133.00	55,133.00
6	Solar DC Isolator	2	6,500.00	13,000.00
5	Power Combiner Board	1	29,830.00	29,830.00
6	Solar PV Cable 6MM	100	450.00	45,000.00
7	Power Cable 6MM, 4Core	150	835.00	125,250.00
8	Smart Meter	1	60,657.00	60,657.00
9	Electrical Integration	1	106,009.00	106,009.00
10	Solar Structure - Steel Mounting	1	255,000.00	255,000.00
11	Accessories	1	10,500.00	10,500.00
			TOTAL	2,518,088.00
SECTION B				
1	Mobilization	1	27,250.00	27,250.00
2	Installatio, Testing and Commissioning	1	105,500.00	105,500.00
			TOTAL	132,750.00
			GRAND TOTAL	2,650,838.00

Terms and Conditions

- 1 The BQ is valid for 60 days only.
- 2 The scope of work includes supply, installation, testing and commissioning.
- 3 The prices are in Kenyan Shillings currency.
- 4 The prices includes all taxes and levies where applicable.
- 5 Solar Items warranty of one year, workmanship warranty three months.





JUSEL HYDRO LIMITED

EXCELS IN WATER & ELECTRICAL TECHNOLOGIES

TELEPHONE: 0727 035 489

P. O. Box 79200 - 00200, NAIROBI

CLIENT: MOI UNIVERSITY - ELDORET

CONT: supplies@mu.ac.ke

ELDORET, KENYA

PROF NO: 00441

DATE: 17/04/2024

QUOTATION FOR GRID-TIE POWER AND BACKUP (22KW)

Item No.	Description	Qty	Unit Price (KES)	Total (KES)
SECTION A				
1	565W, 49.8Voc Monocell Solar	38	21,165.00	804,270.00
2	55KW Grid-tie Inverter Fronius	1	531,000.00	531,000.00
3	8.5Kw Hybrid Dual Inverter	1	266,706.00	266,706.00
4	5.12KWh, 48Vdc CESS Lithium Battery	1	198,000.00	198,000.00
5	Online Communication Accessories	1	55,400.00	55,400.00
6	Solar PV Disconnect	2	9,000.00	18,000.00
5	Power Combiner Board	1	42,300.00	42,300.00
6	PV Cables	110	290.00	31,900.00
7	Power Cables	155	650.00	100,750.00
8	Multi Directional Smart Meter	1	80,657.00	80,657.00
9	Power Integration	1	111,009.00	111,009.00
10	Alluminium Structure - Onroof	1	350,910.00	350,910.00
11	Installation Materials	1	17,860.00	17,860.00
			TOTAL	2,608,762.00
SECTION B				
1	Labour	1	250,000.00	250,000.00
2	Mobilization	1	45,500.00	45,500.00
			TOTAL	295,500.00
			GRAND TOTAL	2,904,262.00

JUSEL HYDRO LIMITED
P.O. Box 79200 - 00200
NAIROBI
DATE: 17th APRIL 2024

Term:

- > 100% payment before delivery
- > Prices in Kenyan Shillings
- > Goods once sold are not returnable

Warranty:

- > 1 year battery and inverter

Account Details:

Equity Bank

Account Number: 080171846078

Account Name: Justy Hydro Electricals

Branch - OTC



**Afriwatt Engineering Limited**

P.O BOX 14548-00100

Samnan House, Utawala

0711557510

afriwattengineering@gmail.com

www.afriwatt.co.ke

Pin No: P051782120X



QUOTATION

Quotation No: 000975

Customer:

Moi University - Kesses Campus

0719241704,

ambkiprop@gmail.com

Uasin-Gishu

Eldoret, Kenya

Quotation Date :

28.05.24

Sales person :

Engr. Thomas

Subject :

22Kw Solar PV Gridtie Solution with Back-up

#	Item & Description	Qty	Rate	Amount
1	550W Monocrystalline Solar Panel	40 pc	16,975.00	679,000.00
2	12KVA 3PH Deye Hybrid/Grid Tie Inverter	2 pc	454,800.0 0	909,600.00
3	5Kwh, 48Vdc Megatank Lithium Battery	1 pc	200,432.0 0	200,432.00
4	Communication Equipment	1	61,980.00	61,980.00
5	High Voltage DC Isolator	2	7,500.00	15,000.00
6	Combiner Board	1	35,000.00	35,000.00
7	DC Cabling	100	300.00	30,000.00
8	AC Cabling	150	680.00	102,000.00
9	Smart Meter	1	60,657.00	60,657.00

#	Item & Description	Qty	Rate	Amount
10	Electrical Intergration	1	130,650.00	130,650.00
11	Ground-Mount Steel Solar Structure	1	142,500.00	142,500.00
12	Installation Accessories	1 pcs	17,860.00	17,860.00
13	Installation Labor	1 pc	157,250.00	157,250.00
14	Transportation Mobilization to and from the project site	1 pcs	35,500.00	35,500.00
			Sub Total	2,577,429.00
			Total	KES2,577,429.00

Notes

Bank: Co-operative Bank
 Acc/No.: 01192945300300
 Acc/Name.: Afriwatt Engineering Limited
 Branch: Utawala .

MPESA PAYBILL NO.: 4084339
 ACC/NO.: Your Name/Company Name

Terms & Conditions

1. 100% payment along with the purchase order.
2. Orders should be made in the name of AFRIWATT ENGINEERING LIMITED.
3. Goods once sold are not returnable. Quote valid for one month.
4. Service and maintenance contracts at 4% of the total project amount annually.
5. Warranty Conditions:
 - i) 1 Year - pumps, batteries, inverters, solar floodlights
 - ii) 2 Years - Solar water heaters
 - iii) 5 Years - Solar panels

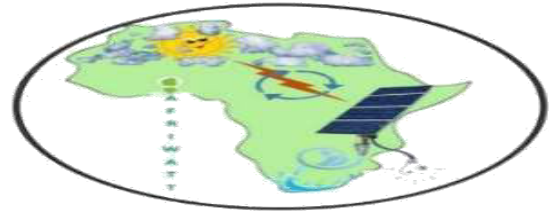


BIC	MVBMDE55XXX	Datum	25.09.2025
IBAN	DE54551900000221270010	Uhrzeit	16:45:17
Kontoinhaber	Werkhof Darmstadt, Verein zur	Abgefragt von	Wolfgang Jakob

Umsatzdetails

Zahlungsbeteiligter	Afriwatt Engeneering Limited
Buchungstag	25.09.2025
Betrag	-16.058,00 EUR
Vorgang	Auslandsüberweisung
Verwendungszweck	Ref. Bank: YC0580-ZAI066325EUR *****16.058,00 EUR *****16.058,00-Verwendungszweck: renewable energie park moi university phase II Begünstigter: 22109453003005 Afriwatt Engeneering Limited KCOOKENAXXX

AFRIWATT ENGINEERING
LTD P. O. BOX 14548-00100
sales@afriwatt.co.ke
www.afriwatt.co.ke
+254711557510



SUSTAINABLE ENERGY FOR GREENER AFRICA

Date: 23/09/2025

Dipl. Ing. Wolfgang Jakob,
Mitglied des geschäftsführenden Vorstands,
Vorsitzender,
WERKHOF DARMSTADT e.V.
Grenzallee 10,
64297 Darmstadt.
Tel. 06151-50048-16.

Dear Jakob,

Re: AFRIWATT BANK ACCOUNT INFORMATION

Here are the bank details for the payment of the remaining 40% (16,003.23 Euros) of the second phase of Moi University's 51.7KW renewable energy project currently under implementation.

CO-OPERATIVE BANK KENYA (EURO ACCOUNT)
ACC/NAME: Afriwatt Engineering Limited
ACC/NO: 22109453003005
BANK CODE: 11000
SWIFT CODE: KCOOKENA
BRANCH CODE: 11155
BRANH NAME: Utawala

Best regards,

Eng. Thomas Sigowa,
Executive Director,
Afriwatt Engineering Ltd.