



PECAM ENTERPRISES LTD

CONSULTANT'S ORGANIZATION AND EXPERIENCE

1. Executive Summary

PECAM Enterprise Ltd (Kenya) are pleased to present our Company Profile as follows;

Last Mile Connectivity Project-Lot 10



Consultancy Services for Engineering Design, Economic Analysis and Construction Supervision for
Lot 1: Gulu – Acholibur and Tee-off Paicho - Palaro 175km of 33kV line;
Lot 2: Opeta – Achokora and Tee – off Iceme – Otwal 45km of 33kV line for the electrification of these areas and their environs.



PECAM Enterprise Ltd (Kenya) is a leading Kenyan registered Energy Consultants, primarily looking into the Kenyan and East African markets in providing valuable experience as part of their service in Power Transmission and Distribution and Renewable energy business.

With a blend of rich experience in the energy field, **PECAM Enterprise Ltd (Kenya)** offers excellent consulting service as per the following areas :-

- Technical, Environmental and Economic feasibility studies
- Project conception, planning and design
- Project management
- Development of framework for Power Purchase Agreements
- Advisory services for Power Purchase Agreement.
- Advisory services for entry into power market in East Africa
- Power Tariff development
- Power system planning, detailed engineering studies and design
- Economic and Financial Analysis
- Strategic Planning
- Expert advice on Power Generation: Solar, Wind, Thermal, Geothermal and hydro
- Power Transmission and distribution design and supervision
- Supervisory Control and Data Acquisition (SCADA) and Energy Management Systems
- OPGW fiber communication
- Specifications of power system equipment
- Energy audits
- Tender preparation services

PECAM Enterprise Ltd (Kenya) employs experienced engineers and technicians in the relevant fields. All the employees are 100% Kenyans who have previously worked in all major energy utility entities in Kenya. These include Kenya Power Lighting Company (KPLC), Kenya Electricity Transmission Company (KETRACO), Rural Electrification and Renewable Energy Authority (REREC) and Energy Regulatory Board of Kenya (ERC).

"We have formed JV with a leading energy related consultant firm to bring the best design practice and worldly experience in successfully delivering the project"



"We believe that our innovative approach, collaboration and commitment to knowledge and skills development create value and bring visible positive changes as **return on investment** for KPLC"



Our Engineers are registered with the following professional bodies and possess critical licenses related to the energy sector:

- Institution of Engineers of Kenya (MIEK)
- Institution of Electrical and Electronic Engineers (MIEEE)
- Class A1 license in Electrical installations
- **Class A3 license in Solar installations**

PECAM Enterprises is commitment in delivering the best engineering practices in regards to power distributions and transmission. Our local experience is essential in successfully delivering project. We have undertaken Power generation, transmission and distribution networks based projects in Kenya and the greater East Africa.

PECAM Enterprises Limited is a vibrant Kenyan Power Consultancy company which operates from Kenya. We have undertaken projects in Kenya and internationally. **Our services cater for the** ever increasing demand of local and international market for the consultancy services within the power and energy industry particularly in Transmission Networks, Generation, Renewables and Distribution Networks. **PECAM is** also actively involving in civil and structure engineering design works for infrastructure projects, developments, buildings, bridges, water works and all kind of civil, structural and electrical works.

Today **PECAM** has emerged into a regional, multidisciplinary management, engineering and development consultancy, and recognisably one of the fast-emerging consultancy firms in the regional energy market.



2. PECAM'S Enterprises Ltd Overview

PECAM Enterprises Limited was established in 2004 as an Electrical and Civil Engineering Company dealing with design of Low, Medium and High voltage distribution and transmission networks.

Over the years, PECAM Enterprises Limited has widened its Scope of Operations and has grown to be a Key Player in the Distribution and Transmission Power Industry.

PECAM's highly experienced personnel offer a range of professional services in the following categories;

- Undertaking projects feasibility studies,
- Projects design and design review
- Tender documents preparation including contractor procurement through tender documents evaluation on behalf of our clients
- Project construction supervision and management including system performance monitoring during the Defect Liability Period.
- Capacity building through training and capability improvement for power utility organizations
- Research and field related assignments in individual specialized disciplines.

PECAM has undertaken projects in the energy sector covering voltages from 0.240kV to 400kV.

PECAM has successfully completed several projects in Kenya, Uganda, Malawi, Tanzania and Rwanda among other countries.

3. PECAM's Capability in Power Transmission and Distribution

PECAM's capability in power transmission and distribution has been refined through more than ten years of research and development in association with power utilities. Our services are tailored to meet the client's specific needs, including design review, construction management and supervision of transmission and distribution projects and associated switching stations and substations.



Services include:

- Review and Approval of Contractors' Designs
- Preparation of Bidding Documents
- Contract negotiations and award of contracts
- Project phasing
- Project Monitoring and Supervision
- Quality Control
- Inspection and Testing During Manufacture
- Supervision of Testing and Commissioning
- Project Completion Documents
- Training and Knowledge Transfer

PECAM renders consultancy services to government, parastatals and the private sectors in the field of power generation, transmission and distribution infrastructure development. These services range from feasibility studies, projects supervision and management, restructuring, planning, infrastructure improvement, capacity building and technical advisory services. We have good working relationships with our clients including governments, power utilities, private sector and international aid agencies such as USAID. Our technical, commercial and management expertise enables us to meet our client's expectations both locally and internationally.



4. Areas of Operation

Our services cover all the energy sectors of generation, Transmission and distribution. Within these fields of practice, PECAM's services extend through all stages of the project from project conception and cover pre-feasibility and feasibility studies, field investigations, laboratory testing, computer modelling, design, preparation of tender and contract documents, tender evaluation, contract management and construction supervision, quality assurance, commissioning, operation and maintenance, and training, as well as overall project management. Our Transmission and Distribution expertise covers voltages ranging from 0.240/0.415kV to 400kV. Our main activity areas include, but not limited to, the following;

- Power Generation, Transmission & Distribution
 - Green Power Infrastructures
 - Solar Power System
 - Wind Power System
 - Hybrid Power System
- ***Our Vision*** is to become the Leading Electrical and Civil Engineering Infrastructure Projects Design and Consulting Company in East and Central African Region Providing World Class Professional Service.
- ***Our Mission*** is to develop a Highly Technically Qualified, Motivated, Competent and Innovative Team to Enhance the Quality of Design and Construction of Electrical and Civil Infrastructure in the Rural and Urban Centers in East and Central Africa.

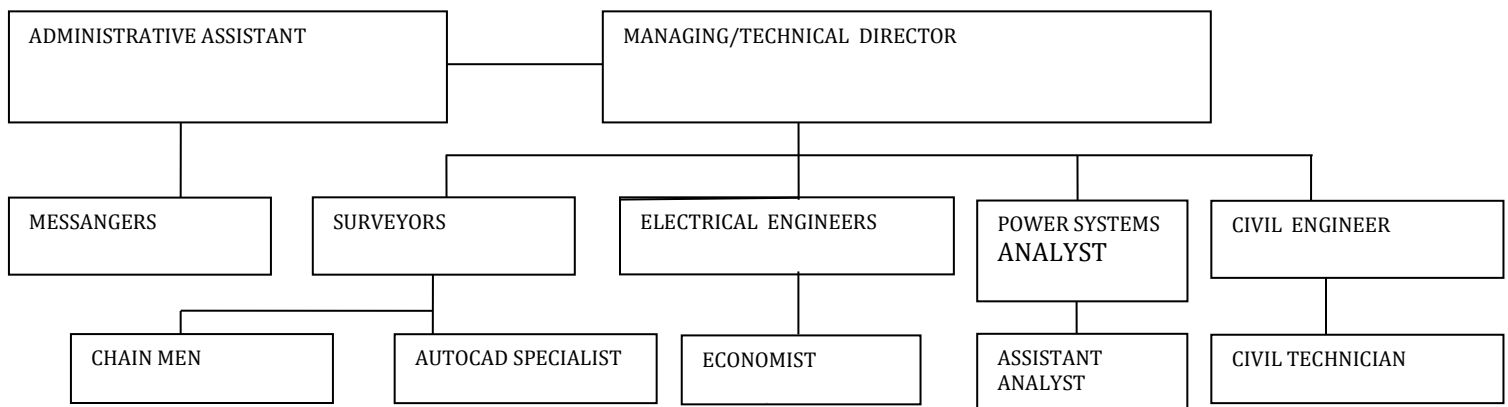
5. Organization Chart

The range and nature of services rendered to clients naturally dictate the company's organization structure and work allocation. The company has directors and technical personnel with multidisciplinary backgrounds making it possible for PECAM to offer multidisciplinary consulting services. This includes engineers in electrical, civil, construction, information technology, design and survey disciplines and technicians in the field of Wayleaves acquisition and Damage Assessment, Survey and Draughtsman-ship. This organization arrangement has resulted in specialization which has enabled us remain cost-effective and therefore competitive.



This is particularly important as clients are seeking value for money in relation to the Services rendered

TABLE 1-PECAM ENTERPRISES LIMITED ORGANIZATION



The company is well established and provides high quality, unique services. This is coupled with a highly qualified and motivated staff for maximum customer satisfaction. All our Technical Directors are of University level and above. We also take every opportunity to ensure that each of our staff is exposed to the latest technological advancement so as to keep trend with the ever-changing business environment and customer needs.



6. Technical Capacity

The company is well established and provides high quality, unique services. This is coupled with a highly qualified and motivated staff for maximum customer satisfaction. All our Technical Directors are of University level and above. We also take every opportunity to ensure that each of our staff is exposed to the latest technological advancement so as to keep trend with the ever-changing business environment and customer needs.

We have specialized in the design and construction supervision of low, medium and high voltage transmission and distribution networks and associated substations and equipment. Main activity areas include but not limited to;

- **Power Transmission & Distribution**
 - Design of Overhead lines and associated switchgears.
 - Design of Substations and associated switchgears.
 - Distribution and Transmission systems Load Flow, Stability, Voltage and Fault studies.
 - Distribution and Transmission Systems modelling, simulation and investigations.
 - Preparation of Technical Specifications and Technical Schedules.
 - Tender Documents preparation
 - Tender Documents Evaluation and EPC contractors procurement
 - Topographical and geological surveys, soil investigations.
 - Wayleaves acquisition.
 - Damage assessment and Property valuation

We also give consultancy services for installation of 33kV, 11kV and 415V Switched Reactive Power Compensators and Power Factor Correction Banks. Our clients have been Kenya Electricity Transmission Company, Rural Electrification Authority both in Kenya and Uganda, Portland Cement, Kenyatta Hospital, Ministry of Energy, BOC Gases, and AFD on Rural Electrification Projects. We are also involved in Survey, Design and Installation of Power generating Plants and associated distribution and transmission reticulation in the greater East African countries.



7. Projects Undertaken/Experience



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PECAM ENTERPRISES LTD EXPERIENCE					
	Duration	Assignment name/& brief description of main deliverables/outputs	Name of Client & Country of Assignment	Approx. Contract value (in US\$ or EURO)/ Amount paid to your firm	Role on the Assignment
1	Sept.2010 – Sept.2012	<p>Consultancy Services for Engineering Design, Economic Analysis and Construction Supervision for</p> <ul style="list-style-type: none"> Lot 1:Gulu – Acholibur and Tee-off Paicho - Palaro 175km of 33kV line; Lot 2: Opeta –Achokora and Tee – off Iceme – Otwal 45km of 33kV line for the electrification of these areas and their environs. <p>The project was done in 2 phases as follows;</p> <p>Phase I Pre-construction Phase</p> <ul style="list-style-type: none"> Data collection on potential investments within a planning horizon from relevant Govern Ministries and related organizations Carryout a load demand analysis for the next ten (10) years as well as determine the current and future demand Liaise with the Local government authorities with regard to use of the road 	Rural Electrification Agency (REA) of Uganda	US\$ 5.3 million	Sole Consultant



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		<p>reserves.</p> <ul style="list-style-type: none"> · Confirm from system operators the connectivity points from the existing grid network and obtain the connection requirements. · Carry out load flows to determine the impact of proposed loads on the existing network and produce optimum technical designs · Determine the optimal line routings and produce technical designs · Produce line profiles and pole schedules. · Prepare bills of Quantities (BoQ's) and cost estimates including and up to the energy meters · Carry out Economic and Financial analysis · Prepare Bidding Documents complete with engineering drawings, specifications and BOQs and thereafter assist in procurement of a contractor in accordance with the WB procurement guidelines utilizing WB Standard Bidding 			



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		<p>Documents and assist the Employer to respond to bidders' queries</p> <p>Phase II Project Implementation This included among other tasks:</p> <ul style="list-style-type: none"> · Site supervision · Progress monitoring and ensure that the Contractor follows the approved program. · Checking and verifying the Contractor's insurance documents · Budget control to ensure project is delivered within budget, · Checking of invoices and issuing of payment certificates, · Reviewing and approval of drawing in accordance with the specifications, · Review and verify as-built drawings · Prepare final payment certificates and project closure documents. 			
2	April 2008-	Infrastructure Services Project –	Electricity	US\$ 0.892	Partner in a JV



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	April 2010	<p>Electricity Component – Design and Construction Supervision)</p> <p>. Services included:</p> <ul style="list-style-type: none"> •data collection and stakeholder consultations •preliminary design and financial analysis •environmental screening including preliminary assessment of potential social and environmental impacts and mitigation measures •detailed design and preparation of design drawings, technical specifications, bills of quantities, cost estimates and tender documents •tendering, bid evaluation, and preparation of contract documents •contract management and supervision of construction •witnessing of testing and commissioning, and issue of acceptance certification and completion certification •training of client personnel •Monitoring and management of defect liability activities 	Supply Corporation of Malawi Limited UMOYO House, Victoria Street, Blantyre MALAWI	million	between Afrima Consulting Engineers and PECAM Enterprises Ltd
3	July 2011- July 2013	Engineering Consulting Services for Substations in Northern Region of	Rural Electrification	US\$ 1 million	Sole Consultant



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		Uganda Services included: <ul style="list-style-type: none"> . assistance in pre-qualification of contractors . assistance in the international bidding process, including bid evaluation and recommendation, contract negotiation and award . design review and approval . contract and project management, including review of budget estimates, timings and administration of project cash flows . review and monitoring of inspection, testing and delivery control during manufacture . supervision of construction and installation . supervision of testing and commissioning . assistance to local electricity authorities (LEA) in operation and maintenance requirements . monitoring through defects liability period and finalisation of contracts . formulation and 	Agency, Uganda		



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		implementation of transfer of technology to LCA personnel and provision of training through a counterpart exercise			
4	May 2014- April 2016	<p>Financial Inclusion for Rural Microenterprises: Grid Interconnection studies for proposed 2.4MW Northern Energy Limited Biomass Power Project in Garissa.</p> <p>Services included;</p> <ul style="list-style-type: none"> Undertaking the grid connection studies for the interconnection of the two systems to the nearest available transmission lines on site for the sale of power to the utility company. Designs of the main switchyard, Design of power evacuation distribution lines to the nearest transmission lines and the protection works required. Load Flow, Stability, Voltage and Fault Analysis, 	Northern Energy Limited / USAID Kenya	US\$ 692 000	Sole Consultant



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		<ul style="list-style-type: none"> Design Works for Substation, Design of Protection scheme and General Electrical Works, Single Line Diagram and Bills of Quantities. Detailed design and preparation of design drawings, technical specifications, bills of quantities, cost estimates. Tender documents, tendering, bid evaluation, and preparation of contract documents. Contract management and construction supervision. Witnessing of testing and commissioning. Issue of acceptance certification and completion certification and monitoring and management of defect liability activities. 			
5	May 2014-Apr.. 2016	Financial Inclusion for Rural Microenterprises: Grid Interconnection studies for proposed 1.44MW AM Ventures Small Hydro Project in Bungoma.	AM Ventures/ USAID Kenya	US\$ 492 000	Sole Consultant



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		<p>Services included;</p> <ul style="list-style-type: none"> · Undertaking the grid connection studies for the interconnection of the two systems to the nearest available transmission lines on site for the sale of power to the utility company. · Designs of the main switchyard, · Design of power evacuation distribution lines to the nearest transmission lines and the protection works required. · Load Flow, Stability, Voltage and Fault Analysis, · Design Works for Substation, · Design of Protection scheme and General Electrical Works, Single Line Diagram and Bills of Quantities. · Detailed design and preparation of design drawings, technical specifications, bills of 			



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		<p>quantities, cost estimates.</p> <ul style="list-style-type: none"> · Tender documents, tendering, bid evaluation, and preparation of contract documents. · Contract management and construction supervision. Witnessing of testing and commissioning · Issue of acceptance certification and completion certification and monitoring and management of defect liability activities. 			
6	June 2013- June 2015	<p>Supervision and Management for Kenya Power Transmission Improvement Project</p> <p>Services included;</p> <ul style="list-style-type: none"> · Review and preparation of Bid Documents for the 132kV Transmission lines and 132/33kV substations · Technical and financial evaluation of bids for the transmission and substation works, preparation of evaluation report and 	<p>Kenya Electricity Transmission Company Limited (KETRACO)</p> <p>Chyulu Road , PO Box 34942-00100, Nairobi Kenya</p>	US\$ 3 892 000	In association with SMEC International.



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		<p>procurement of the contractors</p> <ul style="list-style-type: none"> Preparation of a project implementation manual, covering project organization, payment procedures and time schedule, and quality assurance program; and establishment of a project monitoring program Review and approval of contractor's design, calculations, program and documentation for the transmission line and substation works Environmental and social impact assessment, preparation and implementation of an Environmental Monitoring Plan, updating of the existing Resettlement Plan and assistance in implementation of the plan Project monitoring and evaluation during project implementation Contract administration and construction supervision of 			



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		<p>contracts for the transmission line and substation works, including advice to client on variation orders, contractual or technical disputes and contractor claims, and review and approval of contractor's invoices</p> <ul style="list-style-type: none"> • Outage planning of existing facilities during implementation and coordination of safety measures within energised installations • Witness of factory and performance testing of various plant, and review and approval of contractor's commissioning test reports • Review and approval of contractor's as-built drawings and operation and maintenance (O&M) manuals • Preparation and issue of provisional acceptance certifications, and preparation of final take-over certification • Coordination with other 			



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		consultants and contractors <ul style="list-style-type: none"> Preparation of project completion report Provision of on-the-job training to client staff in all aspects of the project including procurement, contract management, and technical, environmental and social issues. Commissioning and Project monitoring during the Defect Liability Period. 			
7	Feb.2013-Jan.2014	Hides Generation, Transmission & Distribution Project Services included; Inception Phase <ul style="list-style-type: none"> definition of the project in terms of process design, cost, scope of work, schedule and resources establishment of the base line cost and schedule control mechanisms for monitoring and controlling the sub-projects assessment of site location including access, land availability, water availability, 	PNG Sustainable Energy Limited (PNGSEL) Level 2 Pacific Place, Musgrave Street, Port Moresby PAPUA NEW GUINEA	US\$ 300 million	Partner in a JV between Whittles Investment and PECAM Enterprises Ltd



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		<ul style="list-style-type: none"> gas quality and volume required for scope of works investigation of further options in terms of generation and transmission to promote PNGSEL's National Electrification Program selection of gas and steam turbine generation plant design of the 132kV transmission line and substations preparation of specifications and negotiation of procurement contracts preparation of single line diagrams and overall layout drawings initial environmental impact assessment assistance to PNGSEL with community consultation, land acquisition and associated compensation plan preparation of sub-project cost estimates and assistance with financial and economic analysis assistance to PNGSEL with development of gas agreements, PPA's and O&M agreements 			



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		<ul style="list-style-type: none"> detailed engineering planning <p>Implementation Phase</p> <ul style="list-style-type: none"> technical design and specification of power station and transmission assets electrical and control design and preparation of technical specification civil design including access roads, gas supply piping etc preparation of tender documents Contract negotiation and contract award. Implementing a web based Project Management Setting up Project Management Offices Implementing a monitoring and evaluation system Follow up of the Project execution progress Quality control of the contractors works Collection and review of as built drawings Completion certificates preparation 			



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8	Nov 2005- May 2007	<p>Rural Electrification Project-Coast and Eastern Provinces</p> <p>Services included;</p> <ul style="list-style-type: none"> • preliminary data collection and analysis of 33 kV, 11 kV and 415/240V system, • reviewing existing system performance including voltage levels • route selection and surveys including GIS mapping of proposed line routes • system planning studies including optimisation of 33 kV and 11 kV system before and after connection of proposed projects (using PSSE and SynerGEE), optimisation of network load flows, reduction of losses and stability • design and preparation of technical specifications and generic bidding documents for 33kV, 11kV and 240/415V distribution lines and 	<p>Ministry of Energy</p> <p>:P.O.Box 500-00606,Nairobi</p>	US\$700,000	Partner in a JV between Frandon Industries and PECAM Enterprises Ltd



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		associated substations. <ul style="list-style-type: none"> • Quality control of the contractors works • Collection and review of as built drawings • Completion certificates preparation 			
9	Feb. 2007- May 2008	Design, Supervision and Construction Management of a 2.4 MW Mini Hydro at Togarao and associated Transmission and Distribution Network. Services included; <ul style="list-style-type: none"> • supporting Papua New Guinea rural electrification policy; • involving local and regional stakeholders in energy planning; • planning to meet realistic expectations of future power demand; • ensuring sound and sustainable financial modeling for the project; • striking a balance between 	PNG Sustainable Development Program Ltd Port Moresby Papua New Guinea		Partner in a JV between Whittles Investment and PECAM Enterprises Ltd



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		<ul style="list-style-type: none"> the project costs and risks; striking a balance between operating requirements and environmental impacts and risks; supporting Bougainville reconstruction and poverty-reduction goals. 1.2 MW Francis turbine mini-hydro (3x400 kW) plus 400 kW diesel installation Design of approx. 100 km of 22 kV transmission line and 1 X 22/11kV substation. Design of approx. 67 km of 0.415 kV distribution network including 51 x 25 kVA, 11/0.415 kV transformers and 21 x 50 kVA, 11/0.415 kV transformers. Connection of 1,636 household, 44 government offices, police stations, medical facilities etc to a population of 9,626. Quality control of the contractors works Collection and review of as built drawings Completion certificates preparation 			



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10	July 2013 - May 2015	<p>Design, Supervision and Construction Management of 33kV, 11kV and 415/240V Kyotera-Kabira-Mitondo</p> <p>Services included;</p> <ul style="list-style-type: none"> · preliminary data collection and analysis of 33 kV and 11 kV system, reviewing existing system performance including voltage levels · route selection and surveys including GIS mapping of proposed line routes · system planning studies including optimisation of 33 kV and 11 kV system before and after connection of proposed projects (using PSSE and SynerGEE), including grid connection studies, optimisation of network load flows, reduction of losses and stability · Detailed design and preparation of technical specifications, technical schedules and bidding 	REA-Uganda P.O.Box 7317,Kampala		Sole Consultant



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		documents. <ul style="list-style-type: none"> Quality control of the contractors works Collection and review of as built drawings Completion certificates preparation 			
11	May 2016- to date	Last Mile Connectivity Project-Lot 10 Services included; <ul style="list-style-type: none"> Design of approx. 636 km of 0.240kV t and 0.415kV single phase and three phase low voltage lines emanating from 272 distribution transformers. The design involved line route survey, geo-referencing using GPS, integration with KPLC FDB and ICS software Development of construction drawings using AutoCAD Connection of approx. 15,000 household. Quality control of the contractors works Collection and review of as built drawings 	Etrade/KPLC, Kenya	US\$ 100,000	Sole Consultant



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12	May 2010-Mar 2011	<p>Upgrade of Bujagali substation from 11/132kV to 11/132/220kV</p> <ul style="list-style-type: none"> Design of the Layout and general arrangements, Primary Plant Design and related Specifications; Project Cost Estimates; Implementation Schedules. Tender documentation preparation. Construction supervision. Quality control of the contractors works Collection and review of as built drawings Completion certificates preparation 	Uganda Electricity Transmission Company, Uganda	US\$1.1 million	Partner in a JV between Whittles Investment and PECAM Enterprises Ltd
13	2015-2017	<p>Advisory services to Lake Turkana Wind Power 400kV line and Kenergy 132 kV line. Services included;</p> <ul style="list-style-type: none"> Liaison between KETRACO, MOE and LTWP Construction progress monitoring Wayleaves challenges monitoring Compensation of structures 	Lake Turkana Wind Power	US\$ 30,000	Partner in a JV between Nemel Kenya Limited and PECAM Enterprises Ltd



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		and line-route monitoring			
14	2018 to date	<p>Project supervision by providing expertize in the pre-construction, construction and post-construction phase of the project as follows;</p> <ul style="list-style-type: none"> • Provide technical support related to supervision of works and connections • Ensure quality and standard construction works and transparent project execution. • Mitigate/resolve probable technical problems/deadlocks associated with the project and hence accelerate project execution. • Ensure technically sound project implementation and contract administration. • Any other assignment within the Main contract which the Main consultant may assign. 	Last Mile Connectivity Project in Mt. Kenya, Coast, Kisumu and Nairobi	US\$ 400,000	Partner in a JV between AF Consult of Switzerland, Nemel Kenya Limited and PECAM Enterprises Ltd



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