ATTACHMENT 203
STUDY TOUR TO BIDCO’S COGEN PLANT, KENYA
Compiled by
AFREPREN/FWD
2017
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1.0. Introduction

1.1. Background of BIDCO Ltd

Bidco Africa, previously Bidco Oil Refineries Limited (BORL), is a multinational consumer goods company headquartered in Thika, Kenya with subsidiaries and distributorships across 16 countries in East Africa, Central Africa, and Southern Africa. Its products include edible oils, fats, margarine, laundry bars and detergents, personal care products, and animal feeds. Bidco Africa owns over 40 brands and is the largest producer, marketer, and retailer of consumer goods in the region. Bidco Africa has manufacturing factories in Kenya, Tanzania and Uganda. The Group's products are marketed to 13 African countries.

In April 2015, Bidco Africa announced plans to quadruple business volume before 2020, by building new manufacturing factories in Mozambique, Madagascar and Ethiopia in addition to existing operations in Kenya, Tanzania, Rwanda and Uganda.
1.2. Negawatt Limited

Negawatt Ltd is a leading Energy Services Company (ESCO) headquartered in Nairobi, with a branch in Uganda and operations across East Africa. The company has engineering solutions that make business and financial sense, based on the broad expertise, competencies and knowledge of the engineering team on board. The company aims to increase business’ efficiency by reducing its energy consumption, operating costs and reliance on expensive grid power and fossil fuel thermal energy.

Negawatt, conducts comprehensive and investment grade Energy Audits and implements turn-key Energy Saving Projects through Feasibility Studies as part of a dedicated energy management plan. The qualified team of professional engineers has the necessary experience to conduct such services for a broad range of building types and industrial facilities.
2.0. Profile of key personnel from Negawatt Limited

The study was carried out in accordance with internationally recognized standards. The team has vast experience in conducting comprehensive renewable energy feasibility studies coupled with the ability to design, supply, install and commission study recommendations in a diverse range of facilities and industries. The project team comprised of the following experts:

2.1. Mark Washer: Team Leader, CEM, CMVP, LEED AP,

Mark Washer has been working with co and tri generation systems for over 20 years. He worked for Caterpillar for 3 years and his job was to design and install co and tri Generation Plants. He has many projects under his belt, including an 800kW gas cogeneration Plant at 530 Collins St in Melbourne Australia. Mark was also involved in a waste to energy project for Melbourne Water which included the installation of a bio gas plant and 4 x 1.5MW Gas Engines.

Mark has also been involved with several steam and gas turbine cogeneration plants. Including a 7MW gas turbine and steam generator for Geelong Hospital. In Africa Mark has been involved with many leading edge renewable projects, such as 1MW Solar System at Garden City, 2MW Solar PV System at Two Rivers Mall. He has also completed many utility sized (10-40MW) Feasibility Studies and Designs.

2.2. Isaac Kiunga: Senior Energy Engineer, MSc. Renewable Energy Technology

Isaac is senior Energy Engineer with vast experience in energy management systems, and design, installation and commission of a wide range of alternative energy systems. He has conducted more than 20 renewable energy feasibility studies for a wide clientele base in the commercial and industrial sector.

His first degree is in Manufacturing and Mechanical Engineering and he has extensive knowledge in energy system design and installation. His Postgraduate research in solar thermal energy scooped the Energy Management Award 2015 awarded by Kenya Association of Manufacturers (KAM).
2.3. Jovia Nanziri: Energy Engineer, MSc. Renewable Energy Technology

Jovia is an Energy Engineer with a master’s degree in Renewable Energy Technology from Kenyatta University in Nairobi. She has a Chemical Engineering background with broad experience in energy and water conservation, energy management systems with a certificate in electricity generation from renewable energy sources.

She is also an established renewable energy researcher with extensive knowledge in Sustainable Energy analysis tools like MAED, MCDA and LEAP. Previously, she was a member of staff in the Engineering Faculty at Ndejje University and she has worked on various energy efficiency related projects under the University Energy and Water Research Centre and UNDP Climate Change Mitigation Program in Uganda. She brings along unequaled professional, organizational and analytical skills that enables her deliver quality results.

2.4. Brian Chebor: Energy Engineer, BSc. Power Engineering

Brian Chebor is a Mechanical Engineer with a background in power plant engineering and renewable energy technology. Brian has conducted comprehensive feasibility studies (wind, solar, biomass) for 18 base transmission station and hybridization program funded by EEP/KPMG and he is well conversant with renewable energy modelling software such as SUNNY 3 D, HOMER and PVsyst

Brian also worked on the standard operation and procedures of refrigeration, compressed air and boiler systems of a cheese factory as well. He is effective in project delivery having managed the installation and commissioning of solid state voltage stabilizers/optimizer in various facilities.
3.0. Mission/ Study tour to BIDCO Ltd

On 30th March, 2017, Team from Negawatt Ltd embarked on a study tour to BIDCO specifically for its biodiesel-fired thermal power plant. The team assessed the company’s facility in order to understand how it is performing as per specifications, what challenges the system is facing and what can be done to make it perform optimally or plans for expansion.

The boiler used a mixer of woodchips and sawdust/rice husks/coffee husks. The site has a 2.125 MWe cogeneration plant, a 20 ton/hour boiler discharging steam at 450 °C and 67 bar. The steam is delivered to a 2.1MW single stage back pressure turbine. The system was generating an average of 1980 kW (at the time of study) at full load and meeting 70% of the facility electrical energy demand and 80% of thermal energy demand.

The cogeneration plant uses approximately 130 tons per day with a mixture of woodchips and sawdust/rice/coffee husks in the ratio of 20:80. The energy cost savings obtained by installing this cogeneration system was so attractive that the system payback period was 2 years.

The facility is building a new factory and due to this benefit obtained from this existing plant, the facility is now planning to build another cogeneration system in the new factory.
4.0. Appendices

Copies of qualification

4.1.1. Mark Washer
Certificate of Successful Completion

This is to certify that

Mark Andrew Washer

has successfully completed the course assessment and examination for the

Energy Management Systems Auditor
Lead Auditor Training Course
(Based on ISO 50001:2011 Standard)

Course No. A17821, certified by the International Register of Certified Auditors (IRCA). This course satisfies the training requirements for the IRCA EnMS Auditor Certification Scheme.

Field: 26th - 30th Mar 2014

Signed: Training Manager

Date: 14th July 2014

Certificate Serial No.: ENMS14XE316
Course No.: A17821

The Certificate is valid for 3 years for the purpose of Auditors Certification by IRCA
4.1.2. Jovia Nanziri

Certificate

This is to certify that

Eng. Nanziri Jovia

has attended the training program

"Electricity Production from Renewable Sources
(Wind, Solar & Biomass)"


Executive Chairman

Dr. Eng. Mohamed Safah ElSobki (jr.)
May 30th, 2016

To whom it may concern,

I am writing this letter to recognize Mark Waseem, Mohamed Hassan and the rest of the team at Negawatt for a job well done in conducting an energy audit of the following properties:

- Jumbo camels Park
- Citrus House
- Digital Square
- Al Mawaleh Building
- Basement House
- Foyer Café
- Bank House
- Kitchen Center
- Mabrouk Mall
- Tower
- Juvenile Mall
- Concorde Mall
- Al Wasl Park
- Al Jazairia

Within the course of the energy audit, the team showed diligence and dedication to finishing within time and professional in writing the report.

The scope of the project included on-site measurement with specialized equipment, evaluating the operational efficiency of equipment, identification and evaluation of energy management opportunities, energy policy development and delivery of an LEED-compliant report.

I am very pleased with the quality of the workmanship of Mark & Mohamed displayed during the audit and would not hesitate to refer them to other organizations who are also in need of quality services from an energy auditor.

Yours sincerely,

[Signature]

[Name]
Head of Maintenance
27th October, 2015.

To whom it may concern;

I am writing this letter to recognize Mark Wacher, Mohamed Hassan, Herbert Kiptoo, and Brian Kiprop from NegaWatt Limited for their comprehensive and in-depth energy audit works at the following facilities:

- Standard Rolling Mills Limited – Mombasa
- Sotik Highlands Tea Estates – Bomet
- Accurate Steel Mills Limited – Nakuru
- Sossia James Finlay Limited – Kericho
- Harambee House Annex – Nairobi

Professionalism of the highest standards was demonstrated while interacting with the clients, during site works and in report writing.

The team’s audit works have identified a substantial amount of energy savings for our clients with examples such as energy management systems, process automation, equipment upgrades and integration of various renewable energy technologies.

We are very pleased with their work’s quality and the on-going support they are providing for EHC related matters and project implementations.

I am glad to recommend this team from NegaWatt Limited for energy related consultancy services.

Regards,

[Signature]

Nicholas Gachio
Executive Officer – Energy Services
Kenya Association of Manufacturers
12th October 2015.

TO WHOM IT MAY CONCERN,

Dear Sir/Madam,

RE: NegaWatt Limited

I am writing this letter to recognize Mark Washer and Brian Chebor from NegaWatt Limited for a job well done in conducting an energy audit for Canon Chemical Limited along Mombasa Road.

Within the course of the energy audit diligence and dedication was shown to finishing work on time in addition to professionalism in writing the report and assisting in completing the ERC compliance and approval process.

We have no reservations in recommending their business as we are very pleased with the quality of work and professionalism in delivering in time.

Further assistance and/or clarification over our business relationship with this organisation can be obtained from the undersigned.

Yours Faithfully,

Hitesh Gohil
Production Manager
REF: WILLAGEN.

RE: TO WHOM IT MAY CONCERN:

I am writing this letter to recognize Mark Winter, Brian Chebor and Daniel Bunyey from NegaWatt Limited for a job well done in conducting an energy audit at the following Williamson Tea Estates:

- Williamson Tea Kenya Limited — ChemiChem Estate
- Tondera Tea Estates (1989) Limited
- Kapchorwa Tea Company Limited
- Kaimosi Tea Estates Limited

Within the course of the energy audit diligence and dedication was shown to finishing work on time in addition to professionalism in writing the report and assisting in completing the ERC compliance and approval process.

We are very pleased with the quality of work and would recommend their services to all who are in need of high professionalism work delivered in time.

Regards,

Geoffrey Karimui
Technical manager
Williamson Power Limited

9th October, 2015