

BKRI INVESTMENT

Enhancing Urban Spaces through Sustainable Lighting Solutions

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I. Introduction

- **Overview of Bakri Investment**

Bakri Investment is a leading subcontractor specializing in sustainable urban development and innovative solutions that enhance urban quality of life. In collaboration with GAB, we support manufacturing, import, export, and development companies, offering expertise in machinery engineering competencies to drive progress and deliver impactful results.

- **Mission Statement**

Our mission is to develop environmentally conscious infrastructure that fosters community engagement, enhances safety, and celebrates cultural identity.

- **Purpose of Proposal**

This proposal describes our vision for an illumination project in Luanda, designed to transform public spaces with innovative lighting solutions that prioritize safety, sustainability, and community pride.

- **Importance of the Project**

Thoughtful illumination is essential for enhancing social interaction, stimulating economic activity, and improving urban safety. By addressing Luanda's current lighting challenges, this project aims to create a vibrant and welcoming environment for both residents and visitors.

II. Project Background

- **Current Situation in Luanda**

Public spaces in Luanda often face inadequate lighting, which raises safety concerns and limits nighttime activities.

Inefficient lighting systems contribute to high energy costs and negatively impact the environment.

- **Challenges Identified**

Poor visibility in critical areas has led to higher crime rates.

Urban development projects lack adequate community involvement, limiting their impact and effectiveness.

- **Importance of Urban Illumination**

Improved lighting enhances the usability of public spaces, encouraging social interaction and driving economic growth during evening hours.

III. Objectives of the Proposal

- **Enhance Safety and Security**
Increase visibility in public spaces to deter crime and create safer environments for all.
- **Promote Sustainability**
Adopt energy-efficient lighting solutions to minimize energy consumption and reduce environmental impact.
- **Engage the Community**
Collaborate with local stakeholders to ensure the project aligns with the community's specific needs and ambitions.
- **Celebrate Cultural Identity**
Design lighting that highlights and preserves Luanda's unique cultural heritage, fostering a sense of local pride.

IV. Our Partnership

- **Collaboration with GAB Comércio e Indústria Lda**

Established in 1997, **GAB Comércio e Indústria Lda** is a highly regarded company based in Luanda, known for its expertise in industrial gases and construction materials. Their extensive experience in providing essential supplies, such as tubes, hoses, and PVC accessories, aligns seamlessly with our goals to deliver comprehensive and innovative lighting solutions.

- **Expanding Our Network**

Bakri Investment collaborates with more than four specialized companies across the United States and Angola, all of which bring unique skills and advanced technologies to the table. These partnerships include:

- ✓ **Lighting Technology Experts**

Dedicated to designing and implementing innovative, energy-efficient lighting solutions that meet modern standards.

- ✓ **Electrical Engineering Firms**

Providing expertise in the design, integration, and implementation of safe and effective electrical systems tailored to project requirements.

- ✓ **Environmental Consultants**

Focused on ensuring that all solutions meet strict sustainability guidelines, minimizing ecological impact while maximizing efficiency.

- ✓ **Local Contractors**

Actively engaging local labor, materials, and resources to foster economic growth, strengthen community ties, and ensure the project reflects local needs and values.

- **Quality and Cost-Effectiveness**

Our strategic partnerships and selection of advanced technologies ensure the delivery of high-quality, reliable, and efficient lighting solutions. By leveraging local resources and expertise, we can manage project costs effectively while maintaining the highest standards of quality and performance.

- **Benefits of Collaboration**

This multi-faceted partnership significantly enhances our capacity to provide tailored, innovative solutions that address the specific needs of Luanda's community. By combining diverse expertise with cutting-edge technology, we are able to implement lighting systems that are not only environmentally sustainable and culturally sensitive but also impactful and transformative for public spaces.

V. LED Lighting System Overview

- **What is LED Lighting?**

LED stands for Light Emitting Diode, a semiconductor device that emits light when an electric current passes through it. When electrons move through the semiconductor material, they release energy in the form of photons, producing light.

- **Key Features of LED Technology**

- ✓ **Energy Efficiency**

LEDs consume significantly less energy than traditional incandescent or fluorescent bulbs. They convert 80-90% of electrical energy into light, with minimal heat loss.

- ✓ **Long Lifespan**

LEDs last 25,000 to 50,000 hours, far exceeding traditional bulbs, which normally last around 1,000 hours.

- ✓ **Durability**

As solid-state lights, LEDs are more resistant to shocks, vibrations, and external impacts compared to fragile glass bulbs.

- ✓ **Instant Lighting**

LEDs illuminate instantly at full brightness, unlike some fluorescent lamps that require a warm-up time.

- ✓ **Directional Lighting**

LEDs emit light in a specific direction, reducing the need for reflectors and diffusers that can trap light.

- **Benefits of Using LED Technology**

- ✓ **Cost Savings**

Lower Energy Bills: Reduced power consumption leads to significant long-term savings.

Reduced Maintenance Costs: Longer lifespan means fewer replacements and maintenance.

- ✓ **Environmental Impact**

Lower Carbon Footprint: Reduced energy use translates to fewer greenhouse gas emissions.

No Hazardous Materials: Unlike some traditional lighting, LEDs contain no mercury or toxic substances.

✓ **Improved Quality of Light**

Color Temperature Options: LEDs come in various color temperatures (warm white, cool white) for flexible lighting designs.

High CRI (Color Rendering Index): LEDs offer better color accuracy than many traditional light sources.

✓ **Smart Technology Compatibility**

Many LED systems integrate with smart technology, enabling dimming, color changes, and automated schedules.

✓ **Enhanced Safety**

Lower Heat Output: LEDs generate less heat, reducing the risk of burns and fire hazards.

Better Visibility: Improved brightness and clarity enhance safety in public areas.

VI. High-Quality Equipment and Materials

- **U.S.-Sourced Equipment**

All equipment and materials for this project will be sourced from the United States, ensuring the highest standards of quality, innovation, and reliability. The imported components will include:

- ✓ **Types of LEDs**

Advanced models such as SMD and COB for superior performance.

- ✓ **LED Drivers and Power Supplies**

Designed for efficiency and long-lasting operation.

- ✓ **Lighting Fixtures**

Streetlight poles, floodlights, and decorative lights tailored to diverse needs.

- ✓ **Control Systems**

Smart lighting solutions for modern, adaptive functionality.

- **Leveraging Angolan Expertise**

- ✓ **Local Workforce Engagement**

We are committed to employing Angolan engineers and skilled workers, equipping them with hands-on experience in cutting-edge lighting technology. This collaboration will enhance local expertise and ensure the project aligns with the specific needs of Luanda's communities.

- **Economic and Social Impact**

- ✓ **Job Creation**

The project will generate significant employment opportunities in engineering, installation, and maintenance, fostering sustainable economic growth.

- ✓ **Knowledge Transfer**

Through partnerships with specialized U.S. companies, Angolan professionals will gain advanced skills and techniques in lighting design and implementation, empowering local teams to deliver high-quality, innovative solutions.

VII. Technical Specifications

- **LED Specifications**

- ✓ **Luminous Efficacy**

Typical values range from 80 to 150 lumens per watt (lm/W), significantly outperforming traditional lighting options.

- ✓ **Color Temperature**

Available in various color temperatures, including:

Warm White (2700K - 3000K): Ideal for residential and hospitality settings.

Neutral White (3500K - 4100K): Suitable for commercial spaces.

Cool White (5000K - 6500K): Recommended for street and security lighting.

- ✓ **Color Rendering Index (CRI)**

Typically, above 80, ensuring accurate color representation—crucial for safety and aesthetics in public areas.

- ✓ **Lifespan**

Ranges from 25,000 to 50,000 hours, reducing the need for frequent replacements.

- **LED Fixtures**

- ✓ **Types of Fixtures**

Streetlights: Designed for optimal roadway illumination with high-performance optics to minimize light pollution.

Floodlights: High-intensity lighting for outdoor spaces, parks, and sports facilities.

Decorative Lights: Aesthetic lighting solutions for public spaces and urban design.

- ✓ **IP Rating**

Fixtures have an IP65 or higher rating, ensuring resistance to dust and water ingress for outdoor durability.

- **Lighting Controls**

- ✓ **Smart Lighting Solutions**

Integrated with smart controls for enhanced functionality, including:

Dimming Capabilities: Adjusting brightness based on ambient light conditions.

Motion Sensors: Activating lights based on movement to improve energy efficiency.

Centralized Control Systems: Enabling remote management and monitoring.

- **Installation and Safety Standards**

- ✓ **Installation Standards**

- Compliance with international standards such as IEC (International Electro Technical Commission) and local regulations to ensure safety and reliability.

- ✓ **Safety Features**

- Includes over-voltage protection, surge protection, and thermal management systems to prevent overheating and extend lifespan.

- **Energy Consumption**

- ✓ **Power Consumption**

- Detailed wattage specifications per fixture, ensuring efficient energy use while meeting illumination requirements.

- ✓ **Energy Savings**

- Projected energy savings of 50-70% compared to traditional lighting systems, reducing operational costs.

VIII. Lumens Comparison

When selecting the best lighting solution, factors like energy efficiency, lifespan, and cost savings are essential. Among all the lighting technologies available, LED lighting is the most advanced and sustainable option. LEDs provide greater energy efficiency, delivering more lumens per watt than traditional incandescent, halogen, and CFL bulbs. This higher efficiency translates into significant energy savings and helps reduce the environmental impact by consuming less electricity.

One of the key advantages of LEDs is their exceptionally long lifespan, lasting anywhere from 15 to 25 years, which is significantly longer than incandescent, halogen, and CFL bulbs. For instance, while incandescent bulbs last only about a year, LEDs can endure for over 15 years, reducing both the frequency and cost of replacements. This durability, combined with minimal maintenance requirements, makes LEDs a smart choice for both residential and commercial spaces providing substantial savings over time, making LEDs a more economical choice in the long run.

The table below compares standard incandescent, halogen, CFL, and LED bulbs, highlighting how LEDs outperform the competition in terms of energy consumption, lifetime, and overall cost savings.

Efficiency	Least Most			
Lumens	Standard	Halogen	CFL	LED
450	40 W	29 W	9 W	8 W
800	60W	43 W	14 W	13 W
1100	75 W	53 W	19 W	17 W
1600	100 W	72 W	23 W	20 W
Rated Life	1 year	1-3 years	6-10 years	15-25 years
Savings	X	up to 30%	up to 75%	up to 80%

Figure 1: Comparison of lighting technologies: Efficiency, energy consumption, and lifespan of incandescent, halogen, CFL, and LED bulbs.

High-Pressure Sodium (HPS) lights have been a common choice for outdoor and street lighting for many years, but LED technology is quickly becoming the superior option. While HPS lights emit a yellowish, dim light that often distorts color and reduces visibility, LEDs offer brighter, clearer illumination with better color accuracy, allowing for safer and more vibrant environments. LEDs consume significantly less power than HPS bulbs, reducing energy costs while providing superior lighting quality. The longer lifespan of LEDs further enhances their appeal, as they require fewer replacements, reducing both waste and maintenance costs. In the images below, you can easily compare the stark contrast between the dim, yellowish glow of HPS and the bright, clear light of LED technology.



Figure 2: High-Pressure Sodium (HPS) lighting showing a dimmer, yellowish hue.



Figure 3: LED lighting providing brighter, clearer, and more accurate illumination.