Cover page

Jonhson Street Electrification Upgrade Project

Solar Streetlight Upgrade

Distance: Approx. 1.5 Km Stretch Road

Location: Tim to Johnson (Java L.G.A) Road

Title Page

Proposed

Johnson Street Electrification Upgrade Project

Client:

Hon. Dauda
The L.G. Chairman
Java L.G.A, Anambra State

Project Execution:

Suchnetcom Solar
(Div. of Parity Systems Technology Ltd)
Ikeja-Lagos

Project Director:

Steve U. Udechukwu **(BEng-Hons D.E.C.C, Solar Expert)**
Suchnetcom Solar

Disclaimer

I hereby certify that the attached presentation titled '***Proposed Johnson Street Electrification Upgrade' Project*** is original work of Suchnetcom Solar | A division of Parity Systems Ltd except where otherwise indicated.

Signed

Mr. Stephen U. Udechukwu
Project Director

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Part 1 Introduction

1. Introduction

Suchnetcom Solar (A division of Parity Systems Tech. Ltd) is an engineering company that provides solution for data transmission between machines by means of wireless data-link modems powered with uninterrupted solar energy. We direct and manage installation projects of related technology products, including photovoltaic solar electrification of domestic home, streetlight in urban and rural locations. We also provide online sales services through a fully-integrated business model.

1.2 Mission and Vision

1.2.1 Mission

Our mission is to provide high quality uninterruptible solar-powered data-link communication, remote sensing and control products and services in professional, ethical and profitable manner; to produce creative turnkey/customized engineering design meeting the client needs; to bring our practical skills and experience to bear on every project with speed and accuracy; to engage in research and development of our related technology focus; to propagate eCommerce activities to all corners of Nigeria, such as online retail sales and caring for the environment and people.
We, meaning the entire staff of Suchnetcom, succeed because our customers succeed. We are part of a much larger community to which we are compelled to act responsibly.

1.2.2 Our Vision

To have *uninterrupted solar powered wireless data-link communication as* a seamless technology for transmitting data between machines in a network compare to its wired technology, and *to propagate online shopping experience to all corners of Nigeria*.

1.2 Our Expertise in Solar Streetlights

Suchnetcom Solar offer unique option to power-up superb new range of solar streetlights that are environmentally friendly, easy to install and offer tremendous light output. PV Solar powered streetlights are ideal for all sorts of uses and their modern design have found favour with everyone. These lights can be easily installed and moved and deliver free renewable energy which is stored in a battery ready to be used when darkness falls. In certain situation like in cloudy days micro wind turbine is attached to supplement for battery charging. We partner with Europe giant solar company such as Kirchner solar group – www.kirchner-solar-group.de; Simba Solar Nigeria – www.solar.com.ng

1.2.1 Options:

The Photovoltaic (PV) Lighting System comes in two options namely,
(1). The stand-alone solar streetlight structure; and
(*2). Rows of solar streetlights powered with customized solar on K.S.G unique range of generators*.

We are able to offer a range of turn-key solutions. Available in various sizes from 6 Watt streetlight to 45W streetlight lamps and solar PV panels with advanced energy management options to generate the maximum energy from a PV cell.

In some preferred applications a rugged power house serving as a distribution station is installed in a safe location to distribute electric energy that is used for delivering power to rows of streetlights. Such power house can also be used to supply power to hospitals, traffic lights, electronic sign posts, etc. By this means an efficient, constant and cost effective power output is achieved. A system that is 95% maintenance free and entirely environmentally friendly.

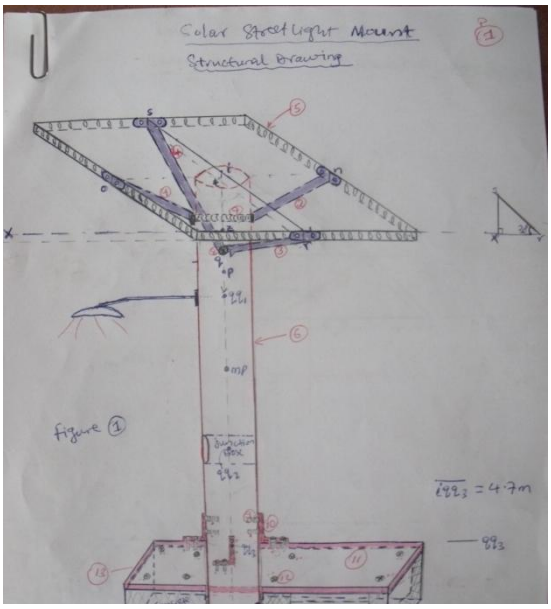


Figure 1 PV Suchnetcom Solar Custom pole-mount structural outlays for solar light

2.0 Benefits

On stand-alone PV solar streetlights there is no need to dig trench, lay underground cables or resort to other expensive methods to install street lighting. You just require using solar power. There are no on-going costs once installed, no standing charges and best of all they are helping to reduce energy consumption. Generating their power from the sun means that solar streetlights are cost effective.
Besides that they are very environmental friendly - they do not use any greenhouse gases as sunlight is converted into energy and stored in a battery, and in some cases a micro windmill generator will be attached to support charging the storage battery system.
Solar powered LED lighting can be used wherever there is a need for lighting, like:

- Discreet lighting
- Footpaths in parks & car parks

- Industrial buildings & Airfields
- Countryside roads
- Bus shelters
- Remote homes
- Play areas
- Harbour side lighting
- Developing countries

Benefits of LED Lighting

Long life - The long life of LED lighting means that lamp changing and lamp failures are a thing of the past. LED lighting life is up to 100,000 hours (approximately 12 years). In a typical Nigerian night time burning situation, this equates to ***approximately 25 years***.

Reliability - LEDs as electronic luminous devices, offer superb reliability over conventional lamps like incandescent, tungsten halogen, fluorescent, etc.

Maintenance free operation - No major routine maintenance is required to ensure continued performance, so reducing costs and avoiding the possibility of missed maintenance. To maintain high efficiency of light output, the solar panels much be cleaned if dusty.

Energy efficient - With advanced LEDs, Luminaire design, energy efficient operation is ensured.

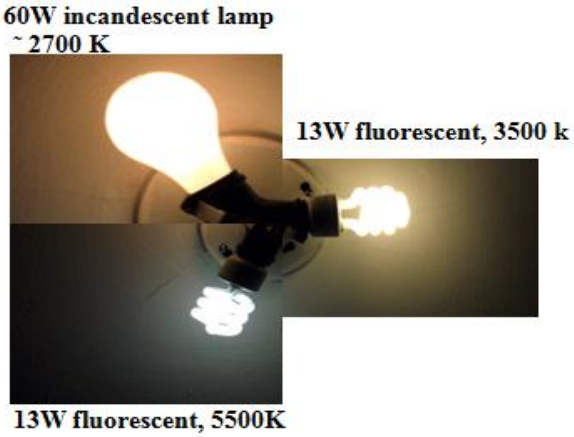
Environmental benefits - Lamp disposal problems are eliminated due to the long life of LED lights, and no resources are used in routine maintenance.

New lighting possibilities - New Luminaire designs are made possible by the small size of LEDs and eliminating the need to allow for maintenance required for conventional lamps. Example is the specially made Simba solar streetlight lamps which are proposed for use in the Johnson project.

3.0 Questionnaire - Design Requirements

Table 1 Questionnaire

	PV Solar Streetlight Project Profile	
№	**My Questions**	**Your Answers**
1	What is the material of the road/street surface? Natural soil, gravels, cements slab, brick floor, and bitumen? Specify surface colour	
2	What is the Luminaire mounting height? (vertical distance between the lighting Luminaire and the surface of the road.)	

3	What is the lighting column (i.e. pole spacing - the distance between two lighting poles/posts)?	
4	Where are lighting poles located? On the walkways?	
5	What is the width of the carriageway? Is it single-direction carriageway? Or double-direction way? How many lanes are there for a single-direction way? 2/3/4 lanes each direction? What is the width of each lane?	
6	What is the requirement for colour temperature? 2700~3500K or 5500-6500K?	
7	Luminaire Properties（if for replacement project）	
	-Existing Luminaire type & Description:	
	-Luminaire per Pole	
8	Others you may list here:	
	 Figure 2.1 The block of buildings above appears a bright yellow colour during midday, but seems a milky white here in the snowy light before full sunrise. Note the different colour temperature of the sunrise in the background.	 Figure 2.2 For lighting building interiors, it is often important to take into account the colour temperature of illumination. For example, a warmer (i.e., lower colour temperature) light is often used in public areas to promote relaxation, while a cooler (higher colour temperature) light is used to enhance concentration in offices.

3.1 Sample Specification

Figure 3.1 Typical project site

You can take a picture like above, or give us a drawing as below

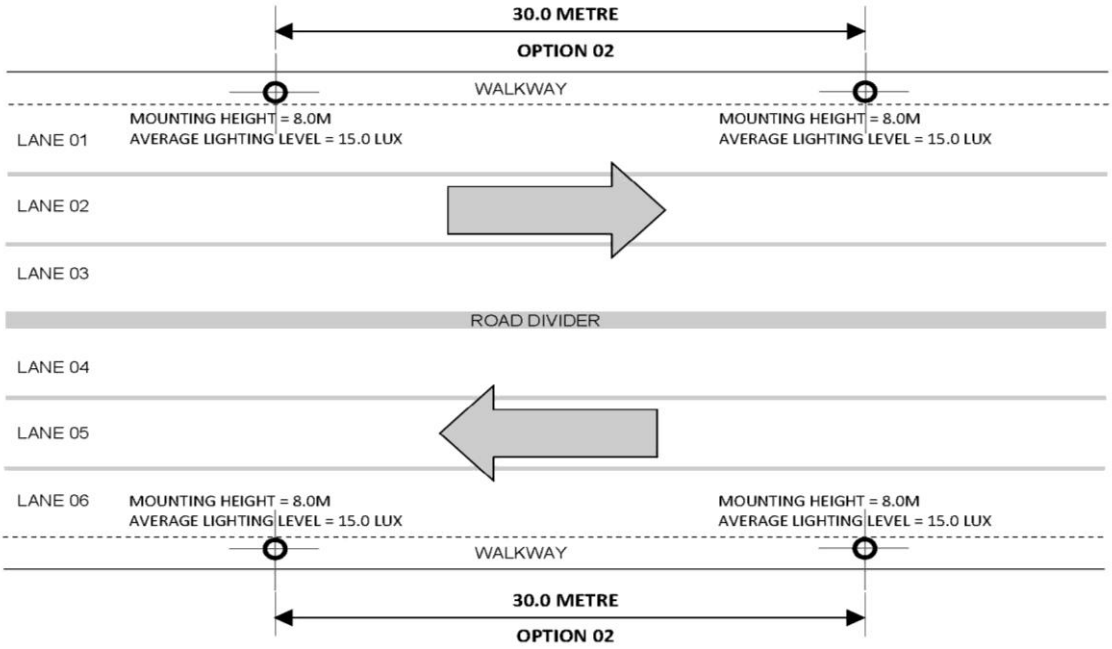


Figure 3.2 PV Solar Streetlights – Drawing of example project

Project: xx Recreation City

Subject: Computation of Lighting Isolux based on mounting Height of 8m and 2 lamp posts placed at 30 metres apart.

Luminaire: Rated IPr8 above ground high power LED modules achieving 95% power factor and minimum 66% illumination uniformity.
Colour rendering index: 75 and higher.
Power Source: Option 2 Solar power output 220Vac + 25Vac / 1 phase / 50˜ 60Hz with Power inverter & stabilizer.
High and under voltage cut-off and auto-reset capability.

Part 2

Johnson Streetlight Upgrade Project

1. Aim

To carryout tests and measurements on all components of the existing solar streetlight installations stretched out along ***Tim to Johnson*** (approx 1.5Km distance) Road in Java Local Government Area of x State; install and commission the two project phases.

2. Objectives

Table 2.1 Objectives of Johnson solar streetlight project

Item №	Description
	Phase one
1	Site visit and costing
2	Perform tests and measurements of existing components (Solar panel, charge controller, battery, light sensor, pole structure)
3	Determine cost of upgrading the facilities
4	Present Phase 1 report
	Phase Two
5	Perform redesign of streetlight and generate wiring diagram
6	Procurement of materials
7	Build and test prototype
8	Installation
9	Commissioning
10	Present project report

3. Timeline / Charge Analysis

Table 2.2 Timeline and cost on labour analysis

Item №	№ of Engineers/Technicians	№ of Days	Men-hour	Charges (NGN)
	Phase One			
1	2 men	1 day	3 H	Free (done)!
2	5 men	10 days	400 H	Charged for
3	2 men	2 days	32 H	Charged for
4	2 men	2 days	32 H	Charged for
	Phase Two			
5	2 men	3 days		
6	2 men	2 days		
7	2 men	5 days		
8	5 men	21 days		
9	2 men	2 days		
10	2 men	2 days		

4. Visual Assessment on Existing Streetlight

Figures in table 2.4 below are established from our findings of visual assessments conducted on the existing solar streetlight facility located along Tim – Johnson Road. Number of solar streetlight pole structures sited was 50, which include all the damaged and the recoverable items. The ***recoverables*** costs were calculated based on equipment second hand market value. However, no actual percentage depreciation was taken into consideration.

Table 2.4 Results of the visual Assessment on Existing Streetlight

Name of Component	Technical Status	Quantity	Cost (NGN)	Recoverable
Solar Panel	Faulty	3	N 33,000	
	May be Good	47	N 517,000	**NGN 517,000**
Charge Controller	Faulty	34	N 204,000	
	May be Good	16	N 96,000	**NGN 96,000**
Battery	Faulty	46	N 184,000	
	May be Good	4	N 16,000	**NGN 16,000**
Day/night Sensor	Faulty	46	N 92,000	
	May be Good	4	N 8,000	**NGN 8,000**
Lamp	Faulty	46	N 230,000	
	May be Good	4	N 20,000	**NGN 20,000**
Pole Structure	Damaged	7	N 35,000	
	May be Good	43	N 215,000	**NGN 215,000**
			Total	**NGN 872,000**

5. Option 1 System – Stand Alone Solar Streetlight

5.1 Cost Analysis for the proposed upgrade of solar streetlights

Table 2.5 Cost Analysis table for proposed upgrade

Item No.	Name	Work Description	Qty	Unit Cost	Amount
1	Pole structure - Galvanized Pipe ft x mm x 4"	Rebuild of battery casing, solar panel angle metal structure, concrete base; and double coating with paint of color aluminum and oil white.	43		
2	Pole structure - Galvanized Pipe ft x mm x 4"	Replace damaged poles with new ones	7		
3	Solar Panel	Servicing the existing parts	47		
4	Solar Panel	Doubling existing solar panels by 2	47		
5	Solar Panel	Replace faulty panels with new one	6		
6	Charge Controller (C.C)	Servicing the existing charge controller unit	16		
7	Charge Controller (C.C)	Replace faulty charge controller with new one	34		
8	Battery	Replace faulty batteries with new ones	46		
9	Day/night sensor	Servicing the existing sensor units	4		
10	Day/night sensor	Replace faulty sensors with new ones	46		
11	Lamp set	Servicing the existing lamp units	4		
12	Lamp set	Replace faulty lamps with new LED lamp sets	46		
13					
14			VAT	5%	
15			**Total**		
16	Technical Labor	Work load 1004 hours (21 days)			

6. Cost Per Pole of Solar Streetlight for a Complete New Installation

The total cost for a complete new installation of a customized 50 poles of standalone solar streetlight from Suchnetcom Solar is **NGN xxxx.**

Item 2 in table 6.2 below highlighted in yellow is considered suitable for the client's sited location at Johnson – Java LGA

Table 6.1 Galvanized Pipe Size: length ft x Thickness mm x Dia 6 Inch | Light-on 6pm to 6am

No	LED Lamp Size	Pipe Size	Concrete Base	Panel	Battery	Charge Controller	Price
1	72 Watts	19ft x 3mm x 6 inch	2ft x 2 ft x 3 ft	3	1	1	
2	36 Watts	19ft x 3mm x 6 inch	2ft x 2 ft x 3 ft	2	1	1	
3	30 Watts	19ft x 3mm x 6 inch	2ft x 2 ft x 3 ft	2	1	1	
4	28 Watts	19ft x 3mm x 6 inch	2ft x 2 ft x 3 ft	2	1	1	

Table 6.2 Galvanized Pipe Size: length ft x Thick mm x Diam 4inch | Light-on 6pm to 6am

No.	LED Lamp Size	Pipe Size	Concrete Base	Panels	No of Batteries	Charge Controller	Price
1	72 Watts	16ft x 2mm x 4 Inch	1ft x 1 ft x 4 ft	3	1	1	
2	**36 Watts**	**16ft x 2mm x 4 Inch**	**1ft x 1 ft x 4 ft**	**2**	**1**	**1**	
3	30 Watts	16ft x 2mm x 4 Inch	1ft x 1 ft x 4 ft	2	1	1	
4	28 Watts	16ft x 2mm x 4 Inch	1ft x 1 ft x 4 ft	2	1	1	

7. Option 2 System – Rows of Solar Streetlights Powered with a Solar Power House

7.1 Solar Power Generation House – Cost of a fresh installation

Table 7.1 Cost table for fresh installation of solar power generation house

Item №	Category/Name	Size and Description	Qty	Unit (N)	Total (N)
Cat A	**Pole structure**				
1	Pole + metal base + angle	"/ ft / mm thick Pipe	50		
2	Concrete Base	ft x ft x ft: (l x w x d)	50		
Cat B	**Electrical Components**				
3	Armored Cable	mm/ core	200m		
4	Distribution Cable	mm/ core	600m		
5	Wiring Cable	mm core	100m		
6	Connector block	mm, mm, mm	50		
7	Lamp and fixing	Watts LED Lamp (Simba TM)	50		
	Protection System				
8	Earthing System	E. rod, copper tape, Arrestor, charcoal			
9	Circuit Breaker	Amp			
10	Fuses	5A, 10A			
	Solar Power Generator + Power House + Trench Digging				
11	Solar power system	KVA / KWh / 230Vac, 50Hz	1		
12	Special Battery Casing		4		
13	Solar Mounting & Fixings		bulk		
14	Power House + Trenching				
15	VAT		**5%**		
16	Labor				
		Grand total			

7.2 Solar Power Distribution House - Cost of Upgrade from Existing Stand-alone Solar Streetlights

Table 7.2 Cost table of solar power generation house upgrade from existing streetlights

Item №	Category/Name	Size and Description	Qty	Unit (N)	Total (N)
Cat A	**Pole structure**				
1	Pole + metal base + angle	4"/ 16ft / 2mm thick Pipe	50		
2	Concrete Base	2ft x 2ft x 4ft: (l x w x d)	50		
Cat B	**Electrical Components**				
3	Armored Cable	mm/ core	200m		
4	Distribution Cable	mm/ core	600m		
5	Wiring Cable	mm core	100m		
6	Connector block	mm, mm, mm	50		
7	Lamp and fixing	36 Watts LED Lamp (Simba TM)	50		
	Protection System				
8	Earthing System	E. rod, copper tape, Arrestor, charcoal			
9	Circuit Breaker	Amp			
10	Fuses	5A, 10A			
	Solar Power Generator + Power House + Trench Digging				
11	Solar power system	KVA / KWh / 230Vac, 50Hz	1		
12	Special Battery Casing		4		
13	Solar Mounting & Fixings		bulk		
14	Power House + Trenching				
15	VAT		**5%**		
16	Labor				
17		**Grand total**			

8. Conclusion

The recoverables from the existing solar streetlights located along Tim – Johnson Road are evaluated to be ***NGN xxx***. Two possible options to achieve the solar streetlight upgrade project are "*Option 1 – Stand alone solar streetlight*" and "*Option 2 - Rows of solar streetlights powered with a solar power house*", of which cost are ***NGN yyy and NGN zzz*** respectively. For upgrade of the 50 streetlights using components from existing solar streetlights are computed to cost ***NNG ttt*** for stand-alone system and ***NGN wyz*** for the Option 2 category (i.e. the power house generation).

9. Recommendation

It can be justified from our above conclusion that the choice of upgrading the existing 50 poles of standalone streetlights located along Tim – Johnson Road is more cost effective at the value of ***NGN xxx .*** However, the advantage of *solar power house generator* is that system equipment can best be managed and secured with less maintenance cost, as all system components are installed in one location. Hence, the Option is more like the traditional streetlights in our major cities, which are powered from the Grid supply (i.e. Power Holding Company of Nigeria).

10. Contacts

Project Title	Johnson Solar Streetlight Upgrade
Client	Hon. Dauda The Chairman Johnson Local Government Area Anambra State, Nigeria
Mobile	080-------
Email	----@yahoo.com
Site Location	Tim – Johnson Road
Distance (Approx)	1.5 Kilometres
№ Of Poles	50 solar streetlights
Approx Height	16 ft

Project Proposed by	Suchnetcom Solar (Div. of Parity Systems Ltd), Ikeja, Lagos State, Nigeria.
Contact Person	Engr. Steve Udechukwu | Tel: 0812343365, 08171968872
Email	sudechukwu@suchnetcomsolar.com, OR suchnetcomsolar@gmail.com|
Website	www.suchnetcomsolar.com

Figure 4.1 Sample image of street lighting post

Figure 4.2 Example of PV solar street lights

Figure 4.3 Community – School Electrification project in Tanzania - executed by Kirchner Solar Germany – Partners of Suchnetcom Solar