

**GVE PROJECTS LTD. NIGERIA**



Electrification of Two (2) Villages; Angwan  
Rina & Demshin, Plateau State with PV  
Solar-Hybrid Mini-Grids

# Company Introduction: GVE PROJECTS LIMITED

- Founded in 2009 by three (3) Undergraduate Nigerian Students
- Pioneered PV Solar CEMG in West Africa and have successfully completed six Pilot Projects
- US\$2.14million raised and committed to CEMG Projects till date
- Rated by USAID and GIZ as the ideal model for advancing energy access in Nigeria
- Listed among Sankalp Forum's top-60 promising Sub Saharan Africa SMEs 2015
- Beneficiary of Nigeria Government's Pioneer Status Tax Holiday for Innovating CEMG

## Awards:

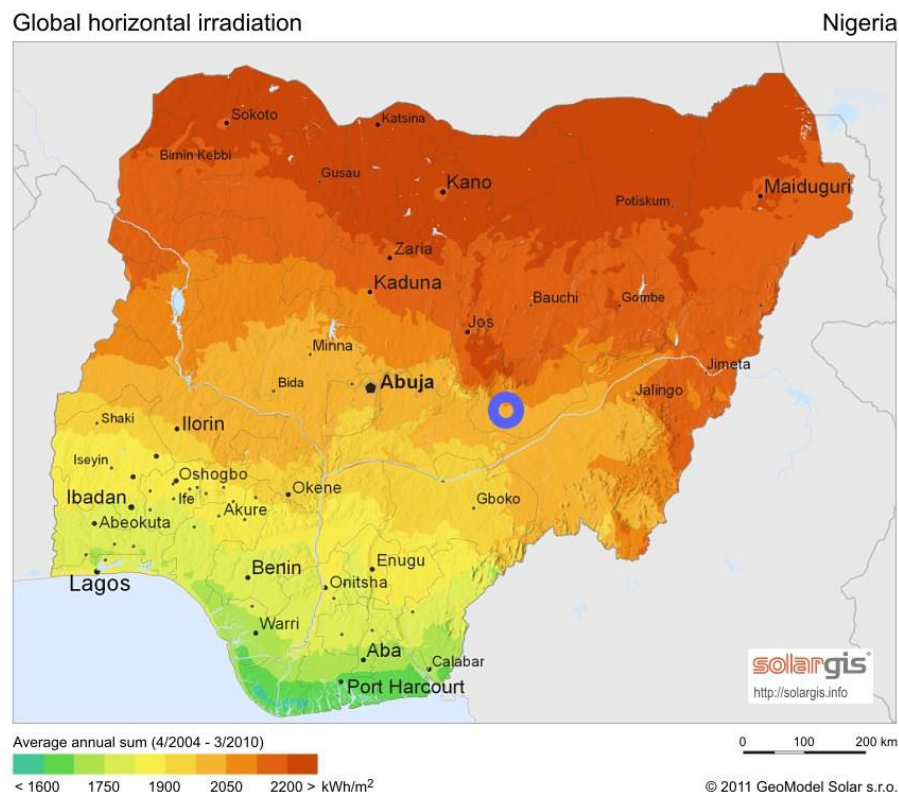
- *Finalist; Premier Project of the Year 2016, 9<sup>th</sup> Africa Energy Awards, J'burg South Africa March - 2016*
- *Finalist; West African Forum for Clean Energy Financing Business Plan Competition, Sept. - 2015*
- *Finalist; City Mart/ City of Lagos Off-Grid Power Solution Challenge, June 2014.*
- *Winner; GE Africa/ USADF, Power Africa Off-Grid Energy Access Challenge, Nov. 2013.*
- *Winner; UNDP/ Bank of Industry –Nigeria, Access to Renewable Project Nigeria, Dec. 2012.*
- *Winner; IEEE Presidents' Change the World Project Challenge 2009 .*

## Corporate Partnerships:



# Project Locations

The Project will be implemented in the northern part of the Plateau State. The villages of Angwan Rina & Demshin in the LGA of Shendam ( $8^{\circ}40'59.63''N$   $9^{\circ}28'25.50''E$  and  $8^{\circ}41'18.18''N$   $9^{\circ}26'48.24''E$ ) have a total population of approximately 4,800 inhabitants (~536 Households), a big market servicing many villages in the vicinity and comprehensive productive power usage potential.



Number of Customers	Angwan Rina & Demshin
No. of indirect beneficiaries	4800
No. of direct beneficiaries	3216
No. HH customers	536
No. Commercial customers	122
No. Community customers	14
No. Productive users	21
- Mills & Agricultural Workshops	11
- Metal Welders	3
- Filling Station / Beer Parlour	6
- Telecom towers	1
- Drinking water pumps	1

# Project Development

## (Electricity Demand & Capital Requirement)

For Angwan Rina, productive users will consume 91.1 kWh/day, commercial users 61 kWh/day, community users 7 kWh/day and households users 214.4 kWh/day. Based on these energy demands, the total energy demand can be calculated as 373.5 kWh/day.

Whereas for Demshin, productive users will consume 105.5 kWh/day, commercial users 61 kWh/day, community users 7 kWh/day and households users 214.4 kWh/day. Based on these energy demands, the total energy demand can be calculated as 387.9 kWh/day.

### Required Financing (Project implementation phase):

- 64.9 mNGN of Equity (162.4 k€)
- 50 mNGN of long-tenor debt (125 k€)
- 78.6 mNGN of NESP grant (200 k€)
- 144.8 mNGN of other grant (362 k€)

Electricity Demand		Angwan Rina & Demshin	
<b>Total average electricity demand [kWh/year]</b>		<b>278,101</b>	
Electricity Production for Customers		Angwan Rina & Demshin	
<b>Total average electricity production [kWh/year] (incl. distribution losses and electricity for mini-grid operation)</b>		<b>302,103</b>	
Total of Electricity Production		Angwan Rina & Demshin	
<b>Total yearly electricity production including excess electricity from solar [kWh/year]</b>		<b>356,649</b>	
Renewable Fraction [%]		71.7%	
Excess electricity %		6.10%	
ACTIVITY	START DATE	DURATION (Days)	END DATE
Feasibility	30-Jun-15	395	15-Jul-16
Permitting	22-Jul-16	30	20-Aug-16
Financial close	25-Aug-16	120	25-Dec-16
Procurement	1-Jan-16	45	13-Feb-17
Installation	20-Feb-17	45	5-Mar-17
Commissioning	6-Mar-17	14	20-Mar-17

# System Design (Power Station & Distribution Network GIS Design)

Power Station Design	Angwan Rina & Demshin
Solar Panel [kWp]	180
Solar Inverter [kWp]	180
Solar module mounting structure + Solar cables, connectors and string Cluster boxes [kWp]	180
Deep cycle battery bank with racking system [kWh]	912
Battery inverter [kW]	140
Diesel Genset incl. tank 23 KVA [NGN]	2



# System Design - Business Model

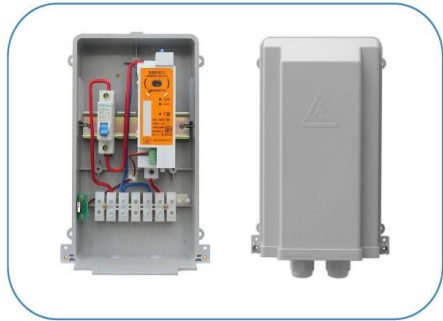
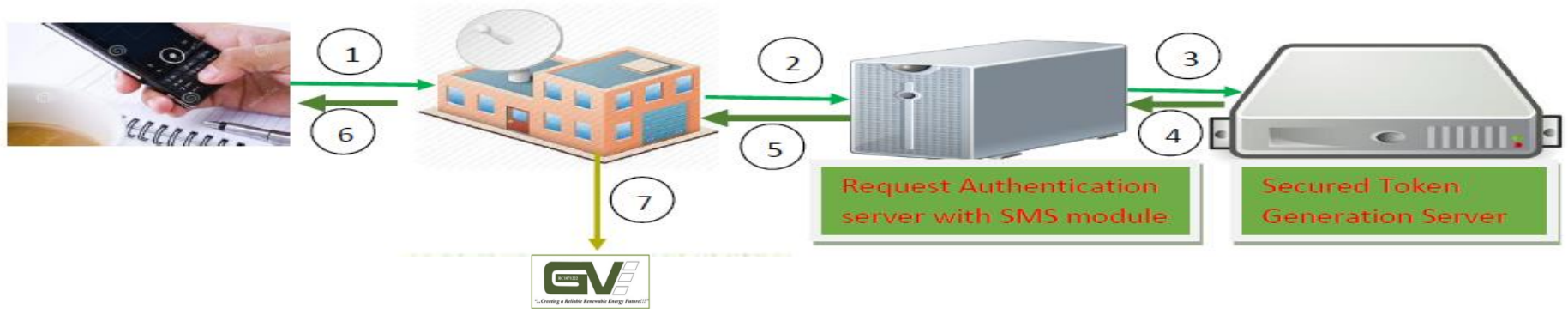
## Load Management & Accounting

### Prepaid Meter Technology

The type of meter that will be used is specially designed for mini-grids in rural areas. Therefore, it offers a good combination between a low unit cost, a high degree of convenience in regards of its installation and its utilisation and a sufficient security level to prevent tampering. The sealing provided allows to protect the meter from both bad weather conditions and from theft.

In order to charge credit, the customer uses a keypad that can be either connected and that communicate remotely with the meter.

The meters are also able to collect consumption data and transfer them to a collector. The information are then aggregated in a management centre.



1-Way Meter Box



4-Way Meter Box



# Financial Analysis

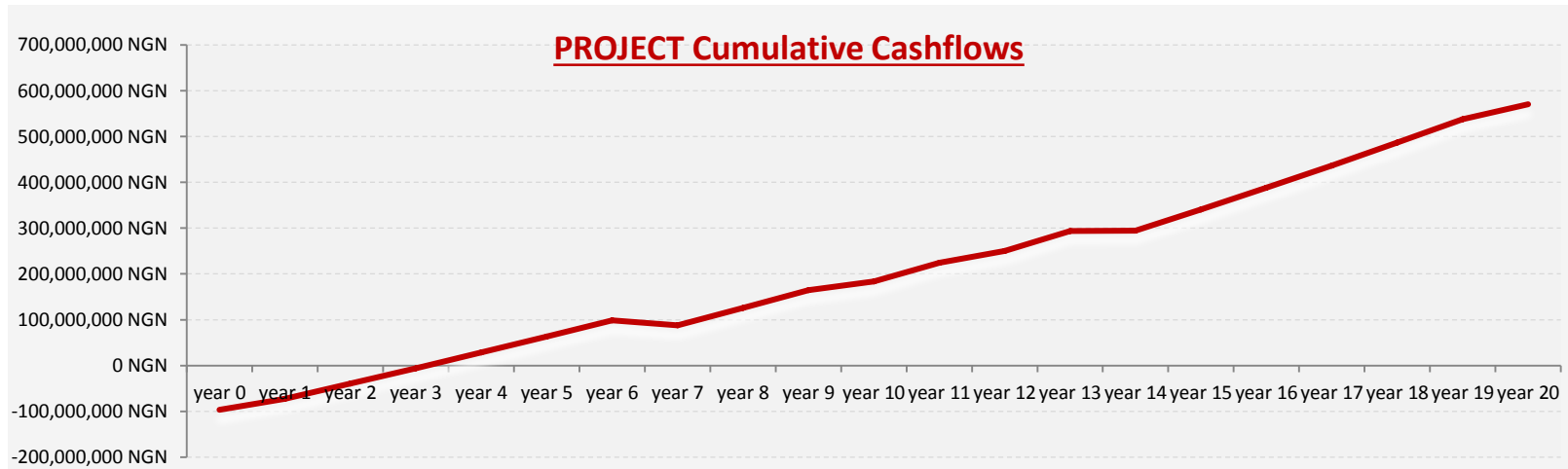
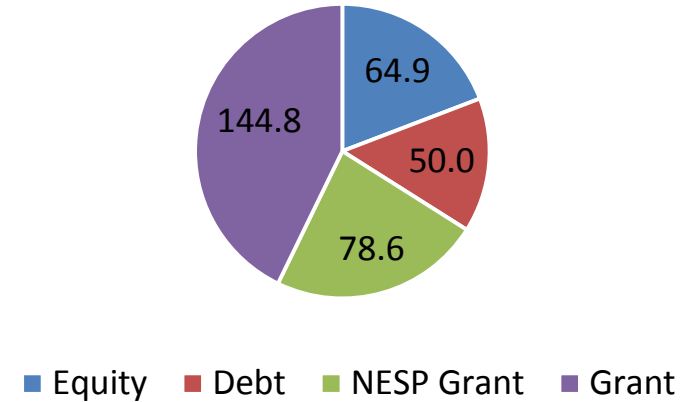
## Model Assumptions & KPIs

### Financial Model

NESP covers the assets that need to be procured abroad using hard currency, while GVE covers for the costs of the assets that are available locally and can be purchased in Naira. This model helps to bypass the FOREX issues that Nigeria is currently experiencing.

Essential Economic Info	
Project IRR 15 years	30.8%
Equity IRR 15 years	30.3%
Lowest DSCR	201.3%
Avg. Operating Profit Margin	22.7%
Lowest Operating Profit Margin	-33.9%

### Project CAPEX Split [million NGN]





# Thank you!

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