Acceptability of Awango Solar Energy as Rural Development Enabler in Benue State, Nigeria

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Abstract: Total Exploration and Production Nigeria Limited (TEPNG), one of the leading Oil and Gas Production Company in Nigeria has a mandate of exploring hydrocarbons. Her operations in Niger Delta region is faced with human challenges of kidnappings, vandalization, armed robbery due to acclaimed high level of poverty amongst host communities. Many developmental interventions had been implemented in most of these host communities under Memoranda of Understand and Corporate Social Responsibilities. Instead of lowering expectations of the youths, community demands had been at the increase. Developmental budget had been on the increase without commensurate value for money. It became imperative to try acceptability and sustainability of intervention in a non oil and gas producing environment. To this effect, TEPNG decided to re-create her CSR to test acceptability, affordability and marketability of Awango Solar energy for sustainable rural economic development in Benue State. Most rural communities in Benue state are into peasantry agriculture. Unfortunately these activities were not supported by micro finance institutions hence credit availability imposed constraint to economic prosperity. This phenomenon had increased incidence of poverty which is predicated on nature and system of rural economic activities. The communities were expectant of assistance, especially from the private sector. Objectives of the research were to; Unravel acceptability and commitment to pay for Awango Solar energy by non oil and gas producing communities in Nigeria, Identify characteristics of rural economy at the Bottom of Pyramids (BoP) to ensure sustainability of Awango project and ascertain available market potentials for Awango solar products to justify impactful CSR to rural communities

Methodology adopted was Participatory Exploratory Research (PER) where proponents of rural development model were based on context of social dynamics prevalent in the study area. Purposively, non oil and gas producing region was chosen. Ten (10) rural communities close to State capital (Makrudi) without electricity for years were randomly selected namely; Uchen, Adaka, Lower Basin Makurdi farm project, Kpeifi, Tse Kwenyi, Tse Akpum, Tse Upaha, Tse Mbatem Tyomu Yande Ne Km 12 and Tyomu Yande La Km 14. Communities were accessed without traditional structure of permission from traditional rulers. Introduction of Awango product strategically mobilized interested persons from where respondents were selected. Data were collected using Semi structured interview (SSI), transect walk and quick Focused Group Discussion (qFGD). Quick in the sense those communities had frequently been attacked by Fulani Herdsmen. Houses roofed with grasses burnt several times. Therefore, presence of enumerators could trigger reprisal attacks.

A total of 600 respondents were involved in the study. Data analysis was carried out using descriptive statistics (averages, percentages and frequencies) including Likert type scale to produce results that were presented in tables, pie charts and histograms. Results showed basic night economic activities to be processing (43%), petty trading (26%), food vendor (21%) and security (10%). The need for safe solar energy to extend business time without additional cost was unprecedented. This phenomenon heightened acceptability, willingness to pay and ready market for Awango to sustain rural socio-economic businesses.

Typical of Nigerian rural communities, Benue state rural communities were very poor. Food was abundant in poor living conditions. Enterprise knowledge and economic support were lacking hence, middlemen took advantage of the situation to perpetuate incidence of poverty in the area. At the BoP, farming (31%), processing (36%) and Artisans (13%) fuelled the circle of poverty. This created additional source of likelihood to boost income generation potentials of the respondents. A local based Non Governmental Organisation, Gender and Environmental Risk Reduction Initiative was identified and built into an Enterprise model to enhance sustainability through availability, capacity development, access to credit and market linkages.
It was recommended that each community should form and register cooperative group to attract access to credit. Functional members of the groups should be trained and mentored by the NGO. Awareness should be created through road-shows. TEPNG should deploy this CSR model to her host communities in the Oil and Gas rich Niger Delta region of Nigeria.

Considering revealed impact of Awango solar energy to socio-economic development of rural communities, its enterprise development potential and job creation, it was concluded that deployment should not be delayed before marketers would import sub-standard products. TEPNG was advised to lunch Awango solar energy as CSR model in the Niger Delta, especially in rural schools.

Keywords: Awango solar energy, Corporate social responsibility, Oil and gas rich Niger Delta, Participatory Exploratory Research, Rural development model

Introduction

Nigeria as a country had been reaping the benefits of hydrocarbons to boost its economy. However, at an increasing magnitude, the host communities of these multinationals that explore and produce oil and gas in Nigeria had being accused of exploitations and neglect. This scenario had triggered innovative strategies in engagements, signing of Memoranda of Understanding (MoU) and giving back to the society (corporate social responsibilities – CSR). Unfortunately, these renewed strategies had not contributed much towards image laundry of these multinational oil and gas companies. It does appear that more efforts of these oil and gas companies expose them the more even in the midst of product theft that had affected profitability of the oil and gas business in Nigeria. This product theft by way of operating illegal refineries that have caused environmental concerns in Nigeria had let to allegations and defenses of who the real culprits are. Litigations in this regard have also been at the increase which affects the volatility of Multinational Oil and Gas operating environment in Nigeria.

Sustainability of development projects / programmes has been doubtful as a result of absence of identified indices of sustainability as identified in Ogueri, 2010. Agitations and conflicts have been at the increase in the Niger Delta as a result of these major factors. The multinationals have been working hard to improve on perceptions on their images that appear to be battered. Sometimes these allegations cannot be substantiated as few data had started to emerge (Emeseh 2009, Obi 2010 and Agwu 2013. Madubuko, 2014 had joined the band wagon to accuse the Multinationals of devastating the environment and people without adequate compensations. It had been advocated that addressing the environmental ills of oil and gas production activities is multifaceted (Baretta, 2011). In the United States of America, environment justice had been conceived in the context of the struggle for racial equality. It was against this background that sustainability of development projects was imperative. However, it was observed that there is no sustainability without justice, Liu et al (2014).

The Multinationals quickly incorporated the use of Corporate Social Responsibility (CSR) as strategy to enhance stakeholder's welfare. The goal of corporate sustainability is to improve the processes of exploration and production of hydrocarbons by creating lasting values for all stakeholders as opined by Afinotan and Ojakorotu, 2009. However, Total Exploration and Production had tried the advocated strategy in the Nigerian Niger Delta with little or no appreciation. Instead, facilities were vandalized, blocked and sabotaged.

Thus, when the case of Awango solar energy was made in Nigeria, the choice of none oil and gas producing state was preferred to address rural economic development and by implication gradually proceeding to the oil and gas producing states and communities. Boosting rural economy had been a major challenge in Nigeria in other to tap into non-oil and gas economy for survival. Acceptability through willingness to pay and environmental sustainability were some variables in the study that triggered Awango solar energy as an enabler of rural economic development in Nigeria.

Objectives of the Study

The objectives of the research were to;

- Unravel acceptability and commitment to pay for Awango Solar energy by non oil and gas producing communities in Nigeria
- Identify characteristics of rural economy at the Bottom of Pyramids (BoP) to ensure sustainability of Awango project and
- Ascertain available market potentials for Awango solar products to justify impactful CSR to rural communities

Scope and Limitations of the Study

The scope of the study was Benue State, Nigeria; a non oil and gas producing state and a typical representation of characteristics of rural communities in Nigeria. The people of Benue were mostly farmers hence the state regarded as the food basket of Nigeria. They were also involved in all activities along the value chain of agriculture.

They cultivate mostly Nigerian staple foods like cassava, yam, and plantain. It was difficult to identify farmers with a mono crop of cassava; instead they practice intercrops to cushion the effects of losses as a result of climate change effects – coping mechanism.

The scope was also limited to Solar Energy in the form of different types of lamps. Though this was the product of the upstream, the downstream having identified the strength in the use of Awango solar energy, capitalized on it to improve on her stakeholder's relationship. The study was finally limited to rural dwellers that were relatively poor but were involved in some economic activities to improve their standard of living.

The study was faced with several challenges that should be mentioned but did not in any way influence the results of the study. These included;

(a) Security issues
The Boko Haram saga in Nigeria including several attacks by herdsmen was a big challenge to safety in the study area

(b) Poverty
The heightened poverty level occasioned by flooding of the communities. The people lived in shanties and could not afford three square meals daily.

(c) Rural Poverty and Unemployment
There was visible poverty among the farming communities and thousands of idle youths were milling around. No doubt, these youths usually fall prey to waiting hands of politicians and security job recruiters.

(d) They demands that TATAS could also help them charge their mobile phones and viewing of televisions

(e) Absence of sample of the product nearly meant un-seriousness for the study team

(f) Attitudes of previous development practitioners that obtained data even at a cost of N500 and never brought feedback to the communities caused the people to be weary in providing needed data

(g) Politicians among the communities were visibly unhappy as they had claimed photographs taken in such gathering had been used by political opponents to destroy their political careers, hence limited photographs could only be taken.

(h) Poor access to identified rural communities was an issue as commuters keep on increasing their tariffs and sometimes threatened to abort journeys.

Methodology

Study Area

Randomly, Benue and Kogi states were selected for the study. However, certain limitations enhanced the choice of Benue state given also that Uchen and Adaka communities are structurally contiguous to Kogi communities and shared common characteristics. Therefore, the study took place majorly in Benue state with Makurdi (State capital) as pivotal co-ordinate, hence the study area includes the following communities in Benue state that had been without electricity regardless nearness to state capital namely;

1. Uchen community
2. Adaka community
3. Lower Basin Makurdi farm project community
4. Kpeifi community
5. Tse Kwenyi community
6. Tse Akpum community
7. Tse Upaha community

8. Tse Mbatem community
9. Tyomu Yande Ne Km 12 community
10. Tyomu Yande La Km 14 community

The chosen communities for the study had no trace of electricity connection to the national grid. It is surprising to note that Makurdi, the State capital runs on stand-alone generator to lighten the streets while nearly 80% of residences and businesses in Makurdi are dependent on electricity generating sets.

Population and Sampling

Target population
The target population was all rural communities in the middle belt region (Benue, Kogi, Plateau and Kwara states) of Nigeria that are involved in organized socio-economic activities in the late hours of the day as alternative means of livelihood. Basic characteristics in this regard are non-connection to the national grid for power generation. It specifically included all Community Based Organizations (CBOs), Non Governmental Organisations (NGOs), Small and Medium Enterprises (SMEs), Relevant Traders Associations, Micro Finance Institutions (MFIs) and Total Service Stations in the region.

Sampling Strategy, Procedure and Unit
The sampling strategy was a combination of purposive and probability. Benue State and Makurdi were purposively selected based on certain limitations as enumerated in 1.4 above. Additionally, Makurdi was identified as the commercial nerve centre of Benue state that has 3# operational Total service centres in which the sales executive oversees other stations in the middle belt.
Randomly, 10No communities were selected in Makurdi LGA upon which 3No community based organizations (Chiefs/Elders, Women and Youth groups) were purposively selected to represent a homogenous Focused Group for A total of 30 questionnaires (3No selected CBOs x 10No selected communities) were interviewed to collect data from the groups during qFGD. Average participants per group were 20. Therefore, total respondents for the study could be put at 20 x 3 x 10 = 600.

Data Collection
Data used for this study comprised mainly of semi structured interview administered through face-to-face techniques by experienced field assistants that understood the culture and language of the respondents at every point in time. This method was obvious in view of perceived high level of illiteracy among the respondents and visible high level of insecurity. However, the interaction was participatory which afforded the respondents rooms to make useful contributions and suggestions that guided recommendations in this study. This aspect was also used to determine the key indices of sustainability. Quick Focused Group Discussion (qFGD) provided information that was used to confirm the authenticity of data from individual respondents.

Analytical Techniques
Data generated from the Semi Structured Interviews and quick Focused Group Discussions were analysized using quantitative and qualitative (where necessary) techniques. Descriptive statistics (averages, percentages and frequencies) was widely used including Likert type scale to produce results that were presented in tables, pie charts and histograms as are shown below.

Analysis and Results
The personal characteristics of the respondents were consciously ignored to avoid heightening already charged environment and since group approach (qFGD) was adopted, individual characteristics would make little or no sense in the study. Therefore, the socio-economic characteristics of respondents (age, educational qualification, marital status and highest level of education attained) would visibly be missing but be assured that imports of these were considered in the overall analysis in the study.

Fig 1; Quick Focused Group Discussion with a trained local facilitator introducing Awango solar project

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Fig 2; Quick Focused Group Discussion with some unemployed Youths as a strategy to boost local income

Fig 3; Train the Trainers session for the locals to enhance data collections in the midst of insecurity

Priority Driven Locations for Awango Solar Energy

To confirm the degree of rurality of selected communities, the study aimed at communities though rural but were not too far off from state capital and had never had any form of national grid being steeped down. It was also important to study what students among the respondents used to study at night for exams as to underscore the criticality of

need for Awango solar energy which will perhaps stimulate interests and willingness to pay as a measure of its acceptability amongst the selected communities.

Table 1. Current source of energy for rural economic activities and studies by students

Students medium of study at night in Benue State rural communities	**Frequency**	**Cumulative frequency**	**Percentage**
Local lantern	23	230	52
Torchlight	10	100	23
Handset	3	30	7
Candle	8	80	18
Total	44	440	100

Source: Field data 2015

As shown in table 1 above, a total of 52% of the respondents opined that students in Benue state rural communities used local lanterns to study, 23% use torchlight and 18% use candle. This analogy revealed that environmental unfriendliness of local lanterns, health implication, expensiveness of kerosene and associated risks are some tips that would beef-up advertorial and acceptability of Awango solar energy in Benue state communities.

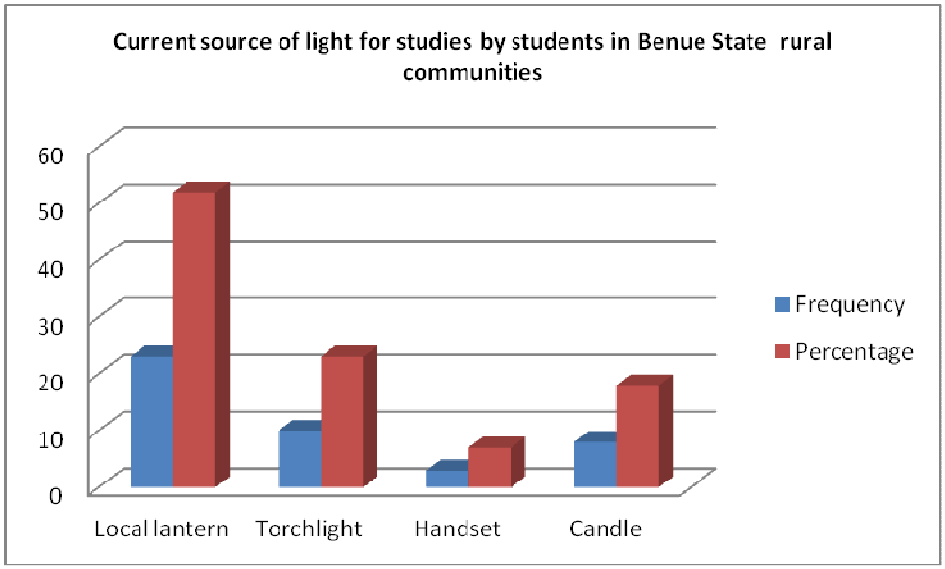

Fig 4: Response on source of energy for reading/ rural economic activities in rural communities of Benue State

Demand for Better, Cost Effective and Environmentally Friendly source of Light in Benue State Rural communities

As shown in Table 2 below, there was a general clamour for alternative source of light in the study area. A total of 100% of the respondents needed a change as the local lanterns produce smokes – dangerous gas (Nitrogen monoxide) and kerosene not readily available and expensive. Based on these facts, it was therefore concluded that oil and gas producing communities with similar characteristics would also need same; the multinationals operating in the Nigerian Niger Delta would explore possible replication as corporate social responsibility (CSR).

Table 2. Respondent's preference to better source of energy at night

Preference to cost effective and environmentally friendly source of light at night in rural communities of Benue	**Frequency**	**Cumulative frequency**	**Percentage**
Yes	30	450	100
No	0	0	0
Total	30	450	100

Source: Field data 2015

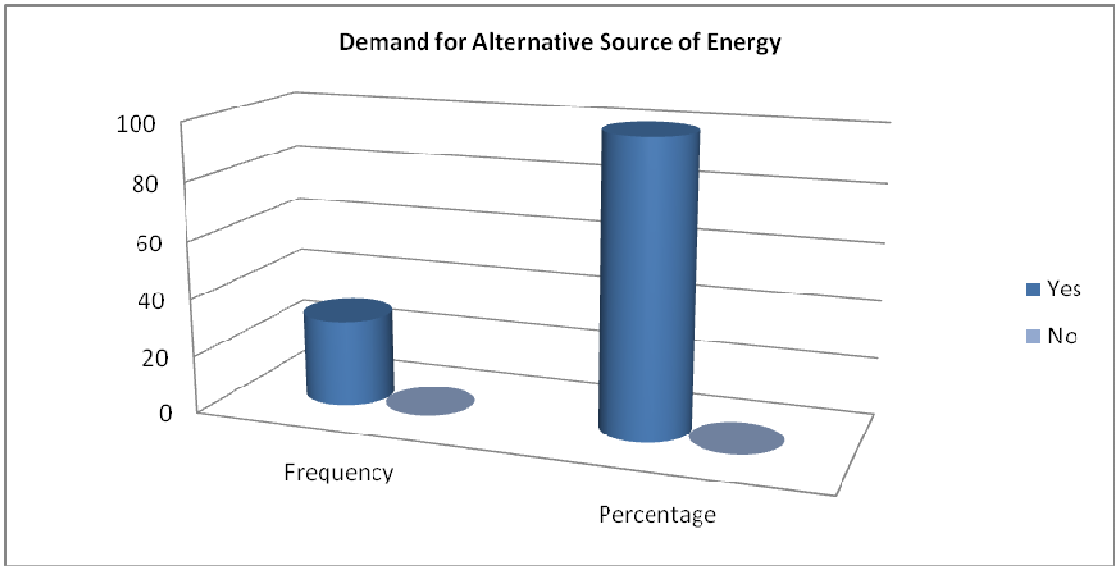

Fig 5: Demand for Cost effective and environmentally friendly source of light

Accessibility, Acceptability and Commitment (Willingness to pay)
Accessibility

All rural communities chosen could be accessed by land transport except Lower Basin Makurdi Farm project and Kpe-ifi Agboghal communities that could also be accessed by boat. It was concluded that accessibility to respondent communities will have direct relationship with access to Awango solar energy and by implication utility and volume of sales.

Acceptability

Reference Table 2 and Fig 5 above, the respondents cannot wait longer to embrace a better alternative source of energy for the rural communities at night provided it is cost effective, environmentally friend and less risky. This therefore could be translated as 100% acceptability of Awango solar energy since the product meets the desired request of the respondents.

Additionally, volunteered organizations, Fresh Impact Rural Development Initiative and Gender and Environmental Risk Reduction Initiative (GERI) in Benue State worked with Makurdi Electrical and Technicians Marketers Association availability confirmed acceptability of Awango solar energy as they maintained that there had never been an energy lamp that is solar rechargeable in any market in Benue state, hence the willingness to advertise / market the products even more in the state capital, Makurdi.

Commitment (Willingness to Pay for the product)

Table 3. Current expenditure per night on local lanterns

Average Expenditure on local lantern/night	Frequency	Cumulative Frequency	Percentage
< N100	9	90	29
N100 – N200	2	20	6
N201 – N300	1	10	3
N301 – N400	3	30	10
Above N500	16	160	52
Total	31	310	100

Source: Field data 2015

In the table 3 above, 52% of the respondents from 16 Focused Groups opined that they spent above N500 / night to fuel their local lanterns. However, we did not get to know how many lanterns based on household size and rural economy involved in by the respondents. On the other hand, 29% respondents from 9 FGD groups claimed that they spent less than N100 per night on local lanterns. The disparity as stated above could not have been unconnected with family and household size and type of rural economy (processing of farm produce, petty trading, etc) engaged in by the various respondents. On this note, the respondents declared their commitment to pay between N300 – N900 ($2 - $6) per Awango solar energy provided it is adjudged to be efficient and durable.

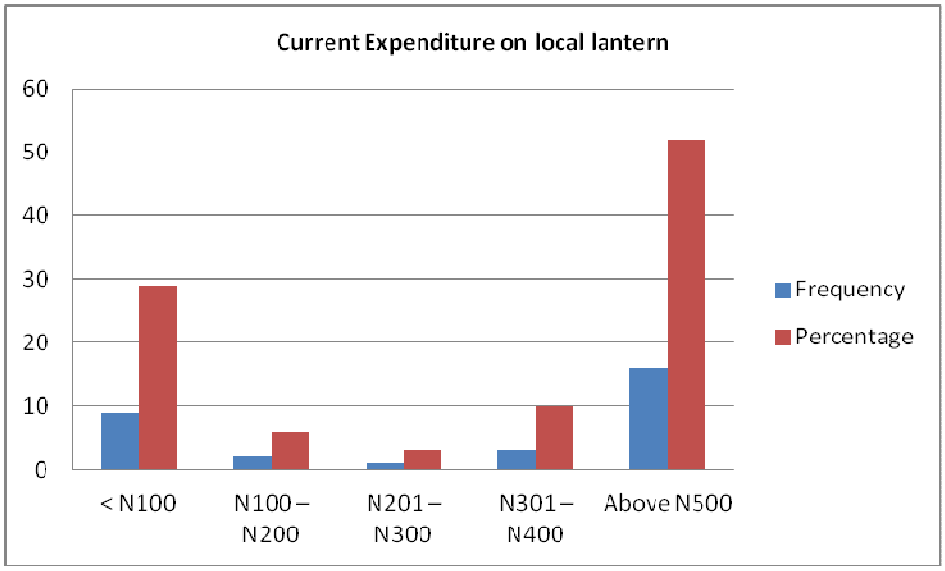

Fig. 6: Willingness to pay benchmark

Determinants of Bottom of Pyramid (BOP) and Rural Economy in Benue State

Like most rural communities in Nigeria, Benue state rural communities are very poor in all sense of the word. No good living conditions, food in abundance as people are predominantly farmers but absence of other economic support parameters hence the middlemen take advantage of the situation. Economy is predominantly traditional agriculture with able bodied youths available for cheap labour. Education could not be regarded as priority because most graduates were still dependent on their parents due to unemployment. They mostly get involved in ticketing at motor parks and commute to the city of Makurdi from their various rural communities. Significantly, the people could be said to be living in abject poverty in an agrarian society. Simply put incidence of poverty in Benue state rural communities is very high. This is predicated on the nature and system of rural economic activities. Most rural

communities in Benue state are agrarian in a peasantry form. Unfortunately these activities were not supported by micro finance institutions hence credit availability imposed serious constraint to economic prosperity. In the table 4 below, farming (31%) and processing (36%) are the most important economic activities of rural communities in Benue state. Artisans / Brick laying, petty trading and food vendor were 13%, 6% and 4% respectively.
Most importantly to this study, processing (43%), petty trading (26%), food vendor (21%) and security are the only activities that take place at night and therefore would be in dare need of Awango Solar Energy for rural economies growth and sustainability.
It became imperative therefore to articulate Awango solar energy marketing campaigns along these rural economic activities that dominate night activities as shown in fig 7 so as to reduce incidence of poverty in Benue state

Table 4: Night rural economic activities - Basics of BOP

Rural Economy Indices	Frequency	Percentage	Credit Support from micro finance institution
Farming	22	31	Nil
Processing	26 (20)	36 (43)	Nil
Food Vendor	3 (10)	4 (21)	Nil
Artisans / Brick laying	9	13	Nil
Moto cycling (Okada)	3	4	Nil
Fishing	1	1	Nil
Selling firewood	1	1	Nil
Poultry	1	1	Nil
Petty trading	4 (12)	6 (26)	Nil
Security	2 (5)	3 (10)	Nil
Total	72 (47)	100	

Source: Field data 2015

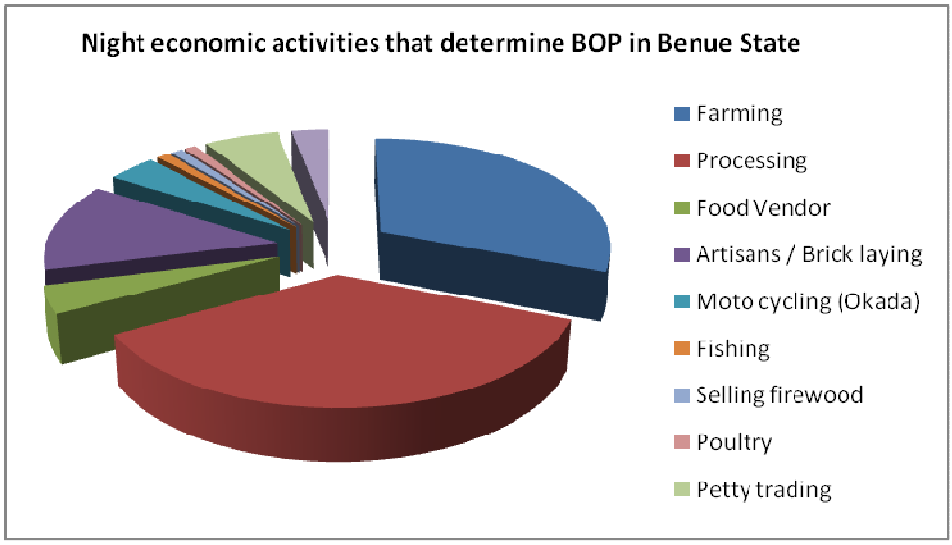

Fig 7: Determinants of BOP in Benue rural communities

Socio-Economic Determinants of BOP in Benue State
Measurement of Rural poverty is dependent on certain socio-economic parameters which include but not limited to the following;

- No of Households
- Average family size
- Types / No of houses in the communities
- Average size of households
- Infrastructural availability (Schools, etc)

- No of children / wards in schools
- Livelihood activities (as seen in Table 4 & Fig 7 above) and
- Access to credit for rural economies expansion.

Tables below therefore show the status of these indices for selected rural communities in Benue state as pointers to Bottom of pyramid (BOP), an index of poverty.

Table 5: Response on number of Households (HH) in selected rural communities

No of Households (HH) per rural community	**Frequency**	**Percentage**
< 100	5	18
100- 200	7	25
201 – 300	1	4
301– 400	2	7
401– 500	10	36
>500	3	10
Total	28	100

Source: Field data 2015

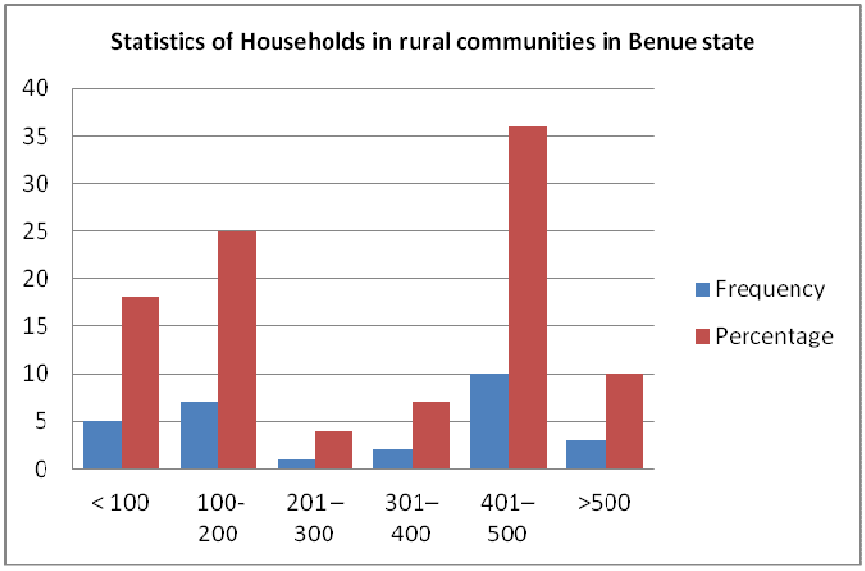

Fig 8 Response on number of Households

There are about 401 – 500 households in most Benue rural communities with more of youths that usually engage in farm works. Farming being the main occupation remains peasantry.

Table 6: Response on Average size of family per selected rural community

Av size of family	Frequency	Percentage
< 5	0	0
6 – 10	11	39
11 – 15	12	43
16 – 20	5	18
Total	28	100

Source: Field data 2015

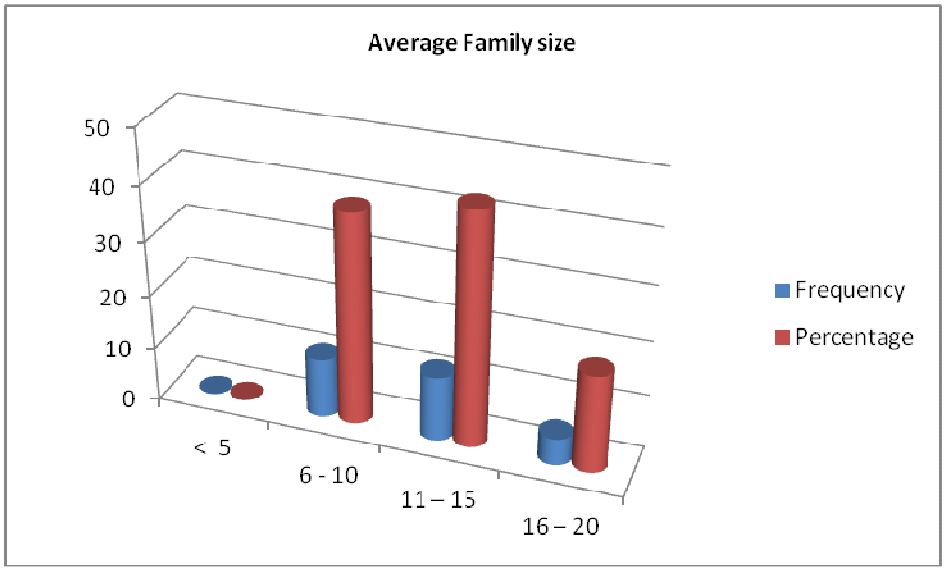

Fig 9: Estimated Average Family size

An average family size of 6 – 10 (39%) and 11 – 15 (43%) and even between 16 and 20 members (18%) as shown in fig 9 above seems very outrageous for a family. No family has less than 5 persons. Since the communities are agrarian, there are abundant foods but less money to buy other needed items for balanced diet, thus incidence of poverty continue to be at an increasing rate of magnitude.

Table 7: Response on Average number of locally made Houses

No of locally made Houses per rural community	**Frequency**	**Percentage**
< 100	5	18
100- 200	8	29
201 – 300	3	11
301– 400	2	7
401– 500	5	18
>500	5	18
Total	28	

Source: Field data 2015

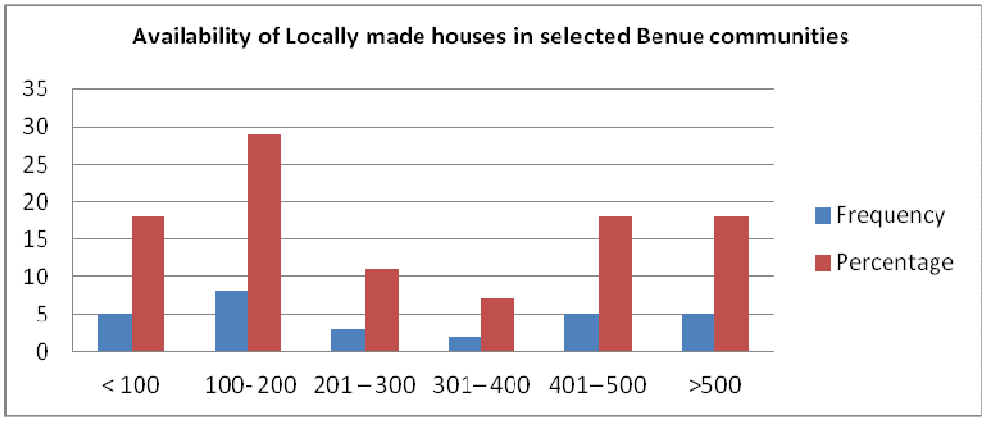

Fig 10: Number of local houses (Grass house) in Benue communities

The locally made houses skewed to the extreme, 401 – 500 (18%) and > 500 (18%) which is very dangerous for continuous use of local lanterns with inflammable flames. However, it also skewed to 100 – 200 (29%). This may have been responsible for continuous fire outbreaks in the area, a phenomenon that increases poverty as properties and lives were mostly lost to fire.

Table 8: Response on Average Size of HH in Benue rural communities

Av size of	Frequency	Percentage
< 5	0	0
6 - 10	7	27
11 – 15	15	58
16 – 20	2	8
21 - 25	2	8
Total	26	

Source: Field data 2015

As shown in table 8 above, a Household size of 11- 15 members (58%) was in tandem with the average family size and seems very outrageous for dependence on peasantry rural economy that is supported by farming, processing, petty trading, security and artisan. This puts serious pressure on heads of households who normally should be men but women – headed households were significant in the study area.

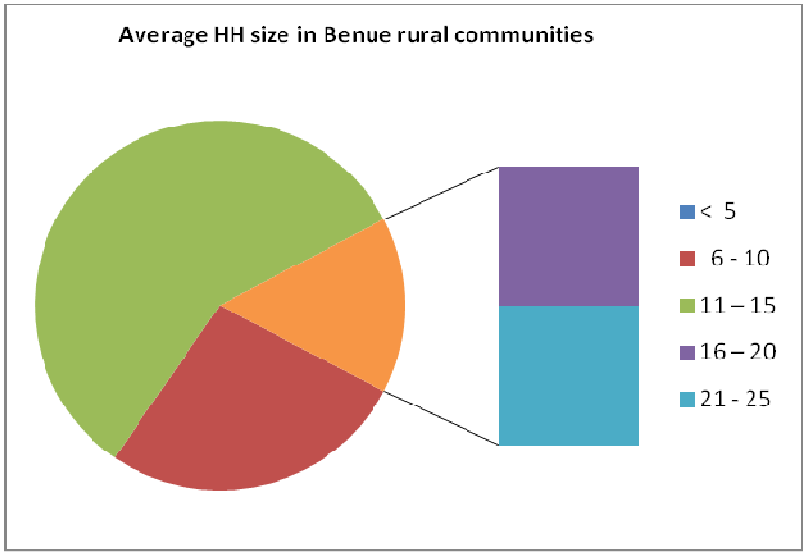

Fig 11: Average Household size

Table 9: Response on Type and Availability of schools in Benue rural communities

Category of Schools	**Frequency**	**Percentage**
Primary school	27	71
Secondary school	11	29
Post secondary	Nil	Nil
Total	38	100

Source: Field data 2015

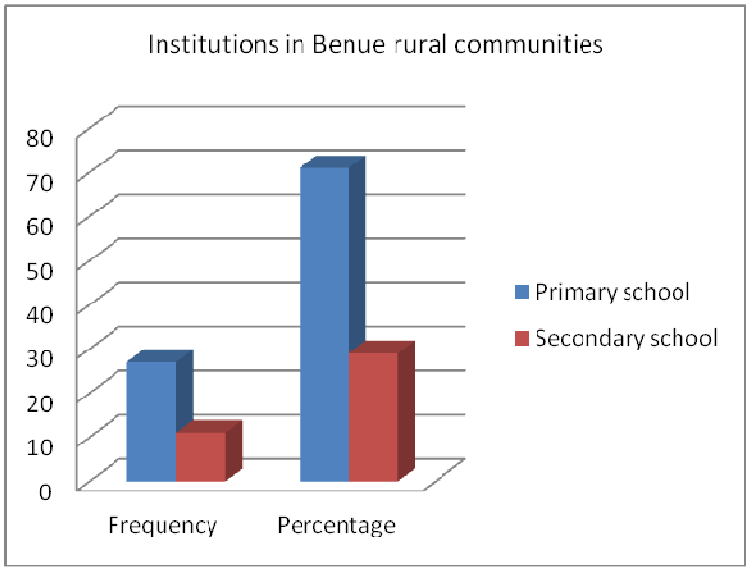

Fig 12: Available type of schools

Unfortunately, Table 9 and Fig 12 above clearly demonstrated that education was not taken serious in the rural communities of Benue state. Few of the respondent communities boasted of secondary schools which were mostly private owned while primary schools recorded 71%. Pupils rather were engaged more as farm hands, a situation that is very dangerous for Benue state.

Summarily, the indices and indicators above clearly demonstrated the choice of the selected 10 communities as they fell within the confines of BOP as a basis for demonstration of Awango solar energy. It therefore means that Awango solar energy can serve as CSR initiative for multinational oil and gas industries like TEPNG; a poverty alleviation and improved standard of living initiative aimed at enhanced socio-economic activities like processing and petty trading among others that could provide employment for teeming unemployed youths in their operating communities.

Market Potentials for Awango Solar Energy to Justify Impactful CSR
Co-operative Association / SMEs

Strategically, Co-operative and Enterprise development approaches are ideal for the marketing of Awango Solar energy in the middle belt. Therefore, the study has to review existence and viability of co-operative societies or SMEs in the study area.
There were some existing co-operative societies identified namely;

(a) Doo shima bam
(b) Mba Iten bam
(c) St Peters bam
(d) Mu co-operative society
(e) Burn brick Association
(f) Lower Basin Vegetable producers and sellers Association
(g) Kpeifi Youths Multi Purpose Co-operative Society
(h) Kpeifi Men Devt Association
(i) Tyomu Fadama iii community Association
(j) Kaseu-Anyum
(k) Achika Youths Forum and
(l) Kpirim Youth Progressive

There were no SMEs found in the course of the study. Most of the co-operative associations were not registered. It would be ideal to form new co-operative group in each community that will target youths (males / females). Specifically, these focal groups 10 (one per community) would be trained on Enterprise development, business

plan development, business linkage/networking, marketing strategies, business communication and record keeping to enhance the marketing of Awango Solar Energy.

Existing Markets

There were existing personal stores that sale related products but were managed by mostly non-indigenes of the area. These include;

- Emmy Torch
- Aleshi Kolayeshop
- Tiger Torch
- Igbo Marketers
- Sunday Eze Stores

It is hereby suggested that co-operative groups formed should be treated as market outlet channels and each could actually establish mini-distribution centre in their own area

Sources of Products

Presently, the sources for local lanterns and other associated energy supply items were identified as;

- ❖ Makurdi Modern Market
- ❖ Fiidi Market
- ❖ Airport market
- ❖ North Bank Market
- ❖ Onitsha market
- ❖ Aba Market and
- ❖ Lagos Market

Therefore, there would be a need to establish a mega station for distribution to retailers at central located places.

Awango Solar Energy Reliability

A total of 100% of the respondents need reliable and effective rural energy for domestic and economic activities at night. Some requested that design of Awango should assist them to;

- ✓ Charge mobile phones
- ✓ Play radio

It was concluded that Awango Solar Energy has high patronage potential provided it is reliable and durable. It could be multi-functional to address additional requests from respondents.

Market and Marketing Channels

Awango Solar Energy markets should actually be targeted to communities that are rural, semi urban and urban without sustainable energy source. This phenomenon was predominant in most African developing countries like Nigeria. Using a 5-point Likert type scale, Table 5 below, shows distance between selected communities and communities with electric energy. Thus, considering a distance of 2km (33%) and 4km (40%), there is no better alternative than to target these typical rural communities in Benue and by extension, Niger Delta region where the Multinational oil and gas industries predominantly carry out operations. It therefore makes case for a sustainable, safe, economic and durable source of energy at night, a gap which Awango Solar Energy was designed to fill.

Secondly, there was urgent need for solar chargeable energy source to checkmate intruders like the Fulani herdsmen and other security issues.

Thirdly, sustenance of local economy will depend largely on sustainable energy alternative at night as processing; food vendor and petty trading were discovered to be booming business at night in all the selected communities.

Presently, food vendors use local (kerosene) lanterns that have high risk even as most houses were roofed with grasses.

Table 10: A case of alternative source of light at night

Distance b/w communities & Electricity point	**1km**	**2km**	**4km**	**5km**	**>5km**	**Total**
Frequency	2	10	12	2	4	30
Percentage	7	33	40	7	13	100

Source: Field data 2015

Awango Solar energy marketing channel should be a combination of key actors namely,

1. Electrical and Technical Marketers association, Makurdi – 10%
2. Local NGO - Gender and Environmental Risk Reduction Initiative. – 20%
3. Community co-operative groups - 70%
4. Total Service Station as the Mega distribution base and
5. MFI (Zion Community Bank) for Micro credit guarantee support and
6. Capacity building component for Trainings and Promotions

During the qFGD, respondents provided reasons why the teeming youths in various communities should be formed into co-operatives towards marketing Awango Solar Energy in Benue state and by implication, Oil and Gas producing communities as CSR programmes. These included

- To address unemployment problems in the state
- Reduction of vices from idle but educated and energetic youths in the communities
- Benue youths are hard working and have a lot of energy to dissipate
- If trained (as they hoped should be done) they can work even for NGOs
- To earn a living and be responsible while contributing to community development
- Assist to finance their education and reduce burden on parents
- Improve their standard of living, mix up in the society and become responsible citizens

Awango Solar Energy- A Replicable CSR Strategy For Oil And Gas Multinationals

Fig 13 below emphasizes the deployment model for Awango Solar energy in Nigeria. After study of the pilot project in the middle belt Nigeria, Awango Solar Energy could be deployed to other Nigerian rural communities as CSR for the oil and gas multinationals. The product would need to be popularized through mass enlightenment through consulting NGOs in view of its domestic, socio-economic and gender sensitivity advantages. It is a quick win project that could serve as gift items to most Nigerian secondary schools (especially boarders) in the rural areas, including those in the cities as electric power was never constant and generators were switched off mostly late nights.

Summary, Conclusion and Recommendations

Summary

Awango solar energy is a new concept of renewable energy that is environmentally friendly, economical, gender sensitive and a major enabler for socio-economic development of rural communities in developing countries. It provides constant illumination, when fully charged by Solar. Based on above characteristics, a study was commissioned to justify its usefulness as CSR strategy of enabler of rural economic development. The objectives among others were to;

- Unravel acceptability and commitment to pay for Awango Solar energy by non oil and gas producing communities in Nigeria
- Identify characteristics of rural economy at the Bottom of Pyramids (BoP) to ensure sustainability of Awango project and
- Ascertain available market potentials for Awango solar products to justify impactful CSR to rural communities

The choice of none oil and gas producing communities of Benue State, Nigeria was to ascertain acceptability and usefulness as enabler of rural development before attempting replication in Oil and Gas producing communities of Nigeria that demand from Multinational companies as of right. In most cases, such demands end in vandalization of facilities and conflicts.

Methodology adopted was participatory through group actions where focused group discussions, personal observations of enumerators (local NGO group), photography and semi structured interviews were used to obtain data for the study. Descriptive statistical tools were used while results were presented in tables, charts and histograms. Results of the study could be summarized as follows;

- General agriculture was the main stay of the people and processing, food vendor and petty trading operate well into the night which further justify the need for Awango solar energy

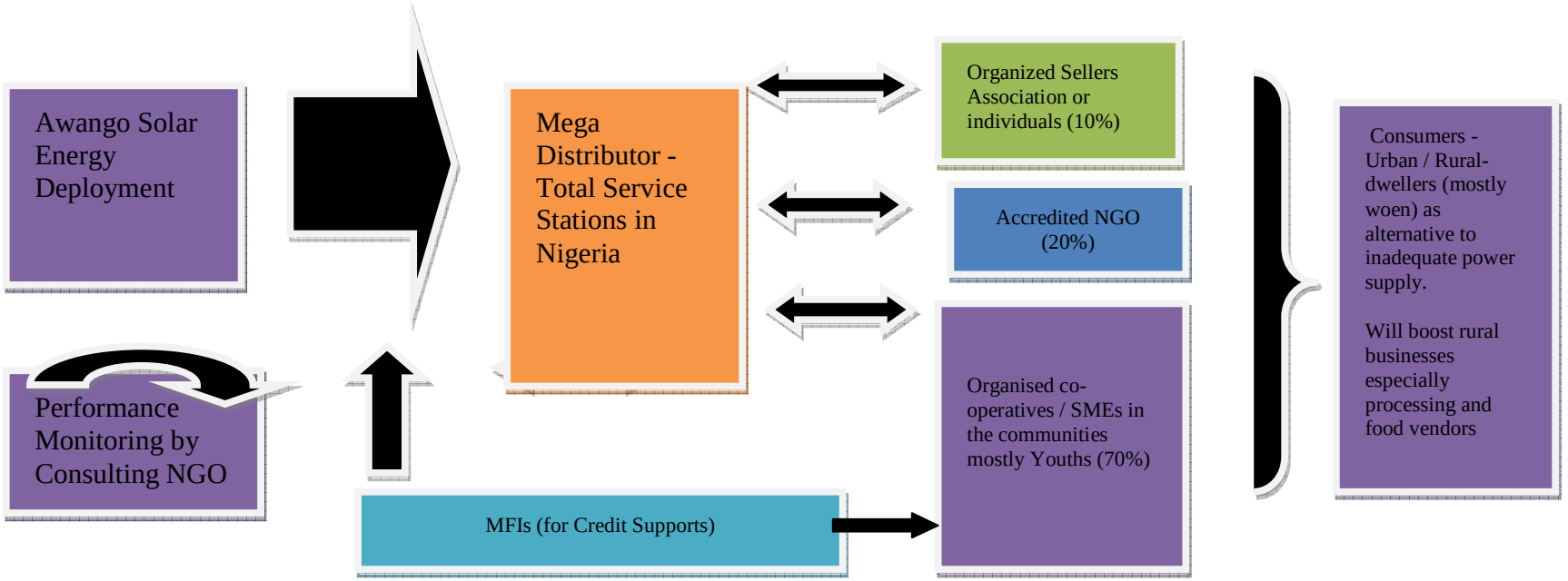

Fig.13; Awango Solar Energy Deployment as CSR Model

- Based on the Bottom of Pyramid (BoP) analysis, Poverty rate was at peak especially after the devastating flood that besieged the study area hence the communities clamoured for assistance. This scenario may have increased the desired need for Awango solar energy to extend business time which invariably means more patronage and consequently increased profit, ceteris paribus.
- Study area was constantly under attack by Fulani herdsmen in the dark; hence the Awango solar energy was timely and important for safety and security reasons. Given the environmental friendliness, Awango Solar Energy can suffice as Health, Safety and Environment (HSE) gift items among the multinational oil and gas companies operating in Nigeria during "Safety Week" instead of the usual jingles.
- Youth unemployment was very high and each of the selected 10 communities had teeming population of youths that participated, hoping to be formed into co-operative to commence marketing of Awango solar energy
- Key actors in the marketing equation were identified as Communities youths (to be formed into co-operatives), local NGO (Gender and Environmental Risk Reduction Initiative) and Electrical and Technicians marketers association, Makurdi.
- Enterprise development model for Awango solar energy was developed
- Awango solar energy could serve as critical CSR purpose for the Oil and Gas Multinationals in Nigeria.

Conclusion

In conclusion, Awango solar energy would make serious impact in the socio-economic development of Nigerian rural communities. Unemployment would be addressed among others. Considering results of the study, Awango Solar Energy should be adopted as Corporate Social Responsibility (CSR) strategy for Oil and Gas Multinationals operating in Nigeria especially, TEPNG to address youth unemployment that has soared high since the global fall in the price of oil provided SUSTAINABILITY of product is ensured**.**

Recommendations

In order to enhance the objectives of this study, it is hereby recommended as follows;

- ✓ Awango Solar Energy should be adopted as one of the models to tackle unemployment in Nigeria
- ✓ Enterprise model as developed in this study should be encouraged as business development model where groups are formed as co-operatives and registered with relevant authorities
- ✓ Capacity Development Training and Mentoring should be included as deployment strategy for Awango Solar Energy
- ✓ Networking amongst identified key players namely, local NGOs, banks (for credit assistance) and marketing associations of similar products is inevitable
- ✓ Awango solar energy should be made household name in all rural communities because of numerous advantages of the product which include environmental friendliness, cost effectiveness, brightness, and economy booster, among others.
- ✓ Replicate initiative especially in the oil-rich Niger Delta States of Nigeria as a "Green Economy Initiative" of carbon emission reduction.
- ✓ Given the environmental friendliness, Awango Solar Energy can suffice as Health, Safety and Environment (HSE) gift items among the multinational oil and gas companies operating in Nigeria during "Safety Week" instead of the usual jingles.
- ✓ Highly recommended that TEPNG should customize initiative as its CSR strategy to enhance socio-economic development of Nigerian rural communities.

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Acronyms

TEPNG	Total Exploration and Production Nigeria Limited
CSR	Corporate Social Responsibility
NGO	Non Governmental Organisation
qFGD	Quick Focused Group Discussion
HH	Households
BoP	Bottom of Pyramids
SME	Small and Medium Enterprises
MFIs	Micro Finance Institutions
HSE	Health, Safety and Environment