

Appendices

Appendix 1: Challenges of biogas commercialization in Nigeria (Energy users perspective)

SECTION ONE: SOCIO-ECONOMIC INFORMATION

1 a) General information

Geopolitical Region: _____

State: _____

Gender	Male []	Female []	Prefer not to say []			
Age	18 -25 []	26-40 []	Over 40 []			
Education Level	Primay []	Secondary []	Undergraduate []	Graduate []	Postgraduate []	None []
Settlement type	Rural []	Urban []				
Means of livelihood	Farmer []	Casual Laborer []	Self Employed []	Employed []		
Monthly Income	Below N20,000 []	N20,000 – N50,000 []	N51,000 – N100,000 []	N101,000 and above []		
Household Size	2 []	3 – 5 []	6 – 9 []	10 and above []		
Possession/Access to Electronic media	Radio []	Print Media []	Television/Digital TV []	All []		

SECTION TWO: ENERGY DEMAND AND SOURCES

What sources of energy do you use?

SOURCE OF ENERGY	DAILY	WEEKLY	MONTHLY	NEVER
Wood fuel				
Charcoal				
Liquid petroleum Gas (LPG)				
Biogas				
Electricity				
Paraffin/ Kerosene				
Solar/Wind				
Biogas				
Any other specify				

Are you satisfied with the energy supply used in the household at present? Indicate the number in the space provided

Energy Source	Satisfaction	Reason for dissatisfaction	
	Yes No	1. Unreliable 2. Inefficient	3. Too expensive 4. Others (specify)
Wood			
Charcoal			
Liquid petroleum Gas (LPG)			
Biogas			
Electricity			
Paraffin/ Kerosene			
LPG			
Biogas			

Average Monthly Cost of Energy	Less than N2,000 []	N2,000 – N5,000 []	N5,000 - N10,000	Above N10,000 []
How many hours of Energy do you have access to per day	Less than 2 hours []	2hours to 6 hours []	7hours to 12 hours []	More than 12 hours []
Challenges of accessing energy	Costs []	Accessibility []	Availability []	(Others) Specify:

SECTION THREE: BIOGAS AWARENESS AND USAGE

Biogas technology is a technology that utilizes waste (often called Digestate) for the production of energy.

Which of these resources do you have access to	Firewood or Forest resources []	Farm Residue or Waste []	Municipal Solid Waste []	Animal Waste (Dung, Abattoir waste) []	Human Waste (Black and Greywater) []
How much of the resources above do you have access to weekly?	Less than 10Kg []	11kg to 50kg []	51kg to 100kg []	101kg to 200kg []	Above 200 kg []
Have you heard of Biogas Technology?	Yes []	No []	Maybe []		
Do you possess a biogas plant/digester?	Yes []	No []			
Would you be willing to use biogas technology if available?	Yes []	No [] Reason:		Maybe [] Reason:	

If you possess biogas technology, how often do you use the technology?	Regularly []	More often []	Less often []	Rarely []	
What would you say is the problem with its usage?	Inadequate installation []	Faulty digester/poor maintenance []	Unavailability of sources []	Others [] Specify:	

In your opinion, what do you consider to be the main challenges of adopting biogas energy?

Limitations	Very Important	Moderately Important	Less important	Not Important
Lack of adequate funds				
Inadequate information on biogas				
Poor infrastructure (lack of digestate)				
Inadequately skilled disseminators				
Poverty				
Community's negative attitude toward biogas energy				
High installation cost				
Lack of interest				

In your opinion what are some of the measures that would improve the commercialization of biogas technology?

Possible Measures	Very Important	Moderately Important	Less important	Not Important
Provision of Micro-finance or loan				
Increase awareness				
Increased government will and support				
Increased training programs for disseminators				
Community leadership program in renewable energy				
Establish demonstration centers				
Any other Specify.....				

Appendix 2: Challenges of biogas commercialization in Nigeria (Retailers/Marketers perspective)

1. Basic Information

1.1 Company's Name _____

1.2 Location: _____

1.3 Company size:

Under 10 employees () 10-20 employees () 20-50 employees () over 50 employees ()

1.4 Name of Respondent: _____

1.5 Position in Company: _____

1.6 Gender: Male () Female ()

1.7 Highest achieved level of education:

1.8 Have you ever attended any formal training on biogas production: Yes () No ()

1.9 How many years of experience do you have with energy production: _____

1.10 What energy type do you deal in your company: Liquid petroleum Gas {LPG} () Solar/wind () Petroleum () Electricity () Biogas () Others ()

Biogas Production

2.1 Are you interested in further innovations in energy production and sales?

Yes () No () Not Sure ()

2.2 Are you willing to adopt new technological approach in energy production?

Yes () No () Not Sure ()

2.3 Are you willing to invest in new energy sources for production?

Yes () No () Not Sure ()

2.4 How well will you rate your knowledge of biogas? On a scale of 1-5, with 1 being the least and 5 being the highest: _____

2.5 Have you ever thought of producing biogas for commercial purposes

Yes () No () Not Sure ()

2.6 If your answer to **2.5** is yes, what “primary” market(s) have you identified for biogas?

2.7 What are the respective sizes of these markets?

2.8 Who are the main competitors in the primary market(s) you are considering?

2.9 Are there any “secondary” markets which you are considering in which biogas may have some use? (a) Yes () (b) No ()

2.10 If yes, please identify

2.11 What are your estimates of the Production or sales volume per month

2.12 What are the projected costs of bringing biogas to market?

Materials	Cost (naira)

2.13 What is you estimated revenue per month from selling biogas?

Biogas Commercialization

3.1 Rate your level of agreement with the following barriers to biogas commercialization

Barriers	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Institutional/ policy hurdle *Lack of coordination among institutions *Excessive bureaucratic bottleneck					

<ul style="list-style-type: none"> * Lack of political support and specific programs to promote biogas technologies 					
<p>Economic hurdle</p> <ul style="list-style-type: none"> *A lack of research and development funding * Competition with other fuels easily available * Uncertainties related to injection of biogas into the market 					
<p>Technical/infrastructure hurdle</p> <ul style="list-style-type: none"> *Lack of technical and marketing infrastructure *Low to lack of cooperation/partnership with international bodies such as *Renewable Energy and Energy Efficient Partnership (REEEP) *Non-availability of feedstock 					
<p>Financial hurdle</p> <ul style="list-style-type: none"> *High initial cost of production *Lack of available credit facility with low interest rate *Perceived risks of biomass energy projects act as a major barrier to investments 					
<p>Information hurdle</p>					

*Lack of awareness and limited information on the national RE resource base *Poor telecommunications infrastructure (especially poor internet access and lack of adequate telephone access)					
Capacity/ manpower hurdle *Limited availability of correctly trained and skilled manpower					
Social-cultural hurdle * A lack of public participation and consumer interest. * Stigmatization due to religion/traditional beliefs * Low literacy level * Desire to maintain the status quo/Resistance to change					

Socio-demographic factors

3.2 What do you think are the main obstacle to biogas commercialization? Indicate as follows

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Income					
Age					
High cost of production					
Non availability of resources					
Health Consideration					
Environmental concerns					
Government policy					
Poor marketing					

Level of education					
Religion					
Household size					
Occupation					
Marital status					
Low level of awareness					
Others (Specify)					

3.3 Do you think the following will improve the commercialization of biogas?

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Security					
Improved household income					
Controlled livestock grazing					
Positive publicity					
Market availability					
Increased human population					
Environmental degradation					
Increased livestock numbers					
Water availability					
Land subdivision					
Others (specify)					

4 Please, feel free to share with us any other of your comments/information that could aid commercialization of biogas in Nigeria.
