



**Global Scientific** JOURNALS

GSJ: Volume 9, Issue 3, March 2021, Online: ISSN 2320-9186

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# MEKDELA AMBA UNIVERSITY

COLLEGE OF SOCIAL SCIENCES AND HUMANITIES:

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES:

Project proposal: Borena woreda biogas, renewable energy supply:

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Mekdela Amba, Ethiopia

January, 2021

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### ABOUT THE PROJECT

Name of the project: Borena woreda biogas, renewable energy supply:

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Total cost of the project: **11185\$ or 336,200 birr**

Project duration: 1 year

## 1. Executive Summary

The name of the project is Borena woreda biogas renewable energy supply. will be run by any volunteers/donors. Budget needs **10873 \$ or 326,200 birr** to start the project. our project will be aimed at reduce the green gas emission, dependence of fuel on biomass consumption, land degradation, deforestation and, to be able to establish alternative biomass renewable energy and reducing inefficiency traditional cooking fuel consumption. Biogas is a flammable gas mixture produced during the anaerobic digestion of organic matter in an anaerobic biogas reactor during anaerobic digestion, wastes are treated and degraded and biogas is produced. Anaerobic treatment also has the advantage over aerobic treatment of a smaller emission of greenhouse gases. Biogas is a renewable green energy source Since it often produced from materials that form manure and waste products. It can be used to produce electricity and for the purpose of heating as well. So, our project can be fulfilling this gap and proving renewable biogas energy consumption as well as use of energy efficiency in the study area.

## 1. Back ground of the project

The proposed project is named as Borena woreda renewable energy supply. It will be run by any donors/volunteers. In our own experience and interest in the subject realized that there is no biogas production in the study area. due to this reason people in the area was depend on biomass consumption for a long period of time and this resulted in frost destruction and animal dung consumption for a fuel this lead an area for environmental pollution as well as for environmental pollution health related problems. In the area in addition to this female are consume their time in

collecting the fuel for their family and they face to many challenges. They absence from school, and facing for rape.

Generally, this project is very important and has play a great role in protecting environment and sound able developmental projects so, our project satisfy social needs and generate environmentally friendly renewable energy sources.

## 2. Project location

Borena woreda is found in, Amhara regional state, Southwest wollo. It is far 190 km from Dessie town to the south west. The relative location of Borena woreda is bordered on the south by wegidin on the North by lega ambo woreda, on the northwest by saint woreda and on the east were ilu. According to 2007 census, the total population in this woreda is estimated at 2712 from which 1304 (48%) are females and the remaining 1408(52%) are male population in the Woreda. our project is targeting all this population.

## 3. Statements of a problem

Biogas is a clean cooking and lighting fuel that can be produced at varying scales; and also can be used for electricity generation, heating, cooking, process steam and powering farm equipment it also contributing to the reduction of greenhouse gas emissions (Alemayehu, 2011)

Africa currently has the highest level of energy intensity in the world. African's are using energy but are doing so in such a way that is not aiding economic development. in Sub-Saharan Africa 90% of the rural population and 74% of the overall population do not have access to electricity and renewable energy (Nair, 2009)

The majority of households in sub-Saharan Africa some 700 million people rely on traditional biomass for cooking. almost 900 million people in sub-Saharan Africa are expected to cook with traditional biomass in 2020 (Lambe *et al.*, 2015)

Access to modern energy is a key element in rural development however, despite all attention given to energy issues in Ethiopia in the past, rural communities continue to be deprived of basic energy services. Modern forms of energy are simply not available in rural areas while traditional sources are rapidly being depleted, thereby deepening the rural energy crisis (Esthete, 2007)

Every day, millions of women and children risk being raped and beaten as they search for collect the firewood, they need to cook their food. In poorly ventilated dwellings, smoke from solid

fuels exposes occupants to heightened risks of respiratory diseases. Women and children are susceptible because they spend the most time near the cooking area (Cesare Giulio, 2012)

According to conducted preliminary development research imply that seemed to be there no modern energy consumption in the project area. people in the area are mainly depend up on the traditional energy consumption which is lead them to environmental degradation, pollution, and deforestation.

Generally, biogas has long term benefits for society it replaces biomass consumption and keeps environmental degradation. This project will reduce soil erosion and environmental degradation, by working towards longer-term renewable energy use objectives.

#### **4. Problem justification**

Biogas is generated when bacteria degrade biological material in the absence of oxygen, in a process known as anaerobic digestion and it is a mixture of methane (also known as marsh gas or natural gas, (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) it is a renewable fuel produced from waste treatment (Harris, 2008)

Methane is a very powerful greenhouse gas: its global warming potential it 23 times higher than that of CO<sub>2</sub>. In this way, recovering of biogas is very interesting to limit the greenhouse effect Furthermore, by using biogas as an energy source, we can reduce our dependency on fossil resources as coal, oil and natural gas (Demazel, 2008)

biogas is used to replace the use of traditional consumption of biomass energy greenhouse gas emissions will be greatly condensed and reducing greenhouse gas emissions (Esthete, 2007)

According to our preliminary study the use of modern sources of cooking fuel such as butane gas, and electricity is uncommon in the project areas. A current domestic energy requirement in a woreda is mostly met from wood, animal dung, and agricultural residues. This situation presents a number of disadvantages like green gas emission, and environmental pollution as well as forest degradation. So, our project replaces biomass energy consumption by biogas energy supply.

## 5. Project goal and objective.

The overall Goal and objective of the project is to provide a solution to the current environmental pollution, and, to be able to establish alternative renewable biogas energy.

**With Specific objectives are presented as follows**

- To reduce greenhouse gas emissions and environmental pollution.
- To reduce health related problem with satisfying the community needs.
- To provide opportunity for women to spend more time in productive activities rather than collecting wood for fuel
- Promote environmental benefit awareness and link it with economic advantages

## 6. Project outputs

The main product or output that will be provided by our project when, its operate of full capacity after accomplished immediately

- Renewable energy generated in the project area.
- The emission of greenhouse gas like methane is reduced
- Improved health and living conditions of, women and children
- The use of firewood and charcoal for cooking is reduced,
- Improved soil fertility, agricultural production is increased.
- Natural resources like soil and forest are protected.

## 7. Project Outcomes.

After the implementation of a project the project has benefits for the

- Clean and free from greenhouse gas environment will be created.
- consumption of traditional fuel wood, will replace by modern one,
- protecting scarce forest resources will be insured
- The benefits of women and children will be insured
- expenditure on health care money will saved
- The traditional firewood cooking stoves will be replaced by modern efficiency one.

## 8. Project Activities

- First of all, preliminary studies about area of project implementation the land and place of biogas planted area will be identified and the place of sun light area should provide.

- Then we identifying Need of society by giving training and inform them about benefits of biogas in terms of environment, social and economic benefit, because it helps our project to be successive in implementation time and aware them to participate in our project since it helps them then we identify the users or our targeting people those benefits from our project.
- After that we identify materials for building and digest Animal manure, human waste, and agricultural residue and other intensive.
- These may well be the most important before setting up biogas gas plant then we will have started our projects with what we have.

## 9. Project inputs

Our project inputs are 1, **human resource** the skilled professional human resource, unskilled human resource for physical work and 2, **land** in which biogas is planted on and 3, **material** resource, material like digester tank, gasholder, pipe to be used for feeding waste material, pipe fixed inside gas holder tank as guide pipe, slurry output pipe, gas output pipe incite pipe and cement is all materials and human resources is required in 2 years 4, **financial** resources

### 9.1 Human resource

The proposed project needs skilled manpower to make the project successful. Of course, the project needs qualified skilled human power spatially technician we will employee skilled man power and make the project more efficiency and satisfactory. The type of vacancy for some number of individual's required and monthly salary will be announced through medium and the format is stated as follow.

**Table1: cost of man power requirement (labor cost)**

NO;	Job title	quantity	Academic	Field	Year of	Monthly	Total amount of

			rank		experience	salary	salary
1	Manager	1	BA	Mgt	1	4000 birr	48,000 birr
2	Finance head	1	BA	accountant	2	35000 birr	42,000 birr
3	Secretary	1	diploma	ICT	1	1200 birr	14,400 birr
4	Architect	1	BA	architecture	2	4 000 birr	8,000 birr
5	Engineer	1	BA	civil	2	4000 birr	8,000 birr
6	Chemist	1	diploma	chemical	1	3000 birr	9,000 birr
7	Electrician	2	10+3	Technic	2	2000 birr	14,000 birr
8	Daily Worker	10			0	2000 birr	20,000 birr
9	Store keeper	1	-	-	-	2000 birr	10000 birr
total	-	-	-	-	-	-	144,400 birr

\* From the above table we can understand that some workers will not involve throughout the year, they are seasonal except manager, Finance head and secretary.

### 9.2 Material Requirement

The main important materials are animal dung, human manure, and agricultural waste product is freed available from project provider and other technical material can be gate from markets digester tank. Pipe gas holder and other are coasted as follows. Except for Animal dung, Human manure and Agriculture waste product, land for a project area can contribute by project beneficiary.

**Table: 2 material requirements &its cost**

no	Item	quantity	Unit of cost	Amount
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1	Digester tank	for 20 households	2000	40,000
2	Gas holder tank	20	200	4,000
3	Pipe used to feed waste material	20	150	3,000
4	Pipe fixed inside gas holder	20	100	2,000
5	Slurry outlet pipe	20	70	1,400
6	Gas outlet pipe	40	90	3,600
7	Inlet pipe	20	120	2,400
8	Cement	200kg for each	240	9600
9	Sand	2 lorry	6,000	12,000
10	Transport	-	2000	4,000
total	-	-	-	<b>81,800</b>

### 9.3 Physical resources (land)

The project will have its known building with built up area of 3m<sup>3</sup> square meter area of land in each house hold. The total land requirement for the project is estimated to be 3 square meters, for the construction of biogas building the land estimated to cost of X birr which is gifted from each house hold.

**Table 3: Cost of physical resources**

no	Item	quantity	Unit cost	Total amount
1	Building of bio digester	20	10,810	216200
2	Land occupied by one digester	3m <sup>3</sup>	2000	40,000
	Total	-	-	256200

\*40,000 cost of land is provided by project beneficiary.

### 9.3.1 Financial feasibility analysis

#### Basic Assumptions

How to arrive at most possibly exact value of project costs, benefits, and the resulting gross profit or loss induced as a result of project implementation in an important area in viability context of a project associated with this, the following fundamental assumptions are accounted in to consideration with respect to financial and economic viability analysis of Borena woreda rural area renewable biogas supply planting project

Full operation of the project will be launched after Sep 15/09/2021

Fulfill of necessary equipment, material and human resource will be completed before Nov/30/11/2020-January 15/01/2021

### 9.4 Financial operating cost

In this regaled operating cost of the Borena woreda rural area renewable energy supply project can be defined as regular expenditure mostly paid on monthly basic and include as a result of project implementation.

Table 4: Financial operating cost

No	Cost item	Total amount
1	Labor cost	144,400
2	Raw materials cost	81,800
3	Other utility cost	20,000
4	Other supplying cost	10,000
5	Repair and maintenance cost	20,000
6	Monitoring and evaluation of the project allowance to 2 staff members for 12 months	20,000
7	Land occupied by 20 digester cost	40,000
	<b>Total</b>	<b>336,200 birr</b>

## 10. Source of Finance

Out of the total project cost of birr 90% (**336,200 birr**) or 302,580 birr is from any donors and volunteers and the remaining (10%) 33,620 is expected to be financed by project beneficiary The project organizational structures will be organized in to two main departments, in human power, that is administrative &

financial head and technical staff and general manager. The administrative staff will undertake the day to day administration and finance related activities like security, supply of raw materials, handling legal matters and other and also the technical staff divides in to biogas observance of working process. The general manager will have the necessary qualification and experience which enables him to manage the whole work of biogas planting project

## **12. Project monitoring and evaluation**

The project will be regularly managed, implemented, monitored and evaluated by the two main departments of project implementers mean that the administrative & financial head and technical staff and general manager, they will collect regular information on the functioning of biogas equipment and on the work implemented by those responsible for observation and maintenance among other a more comprehensive evaluation of the overall impact of the project level will be elaborate after a careful analysis of all information provided throughout the year and will be attached to Borena woreda rural area renewably energy supply annual project report the project will be jointly monitored and evaluated during implementation and operating phase of stage.

## **13. Project phase out and strategy and sustainability**

The project is continuing after the one year. Because there is scarce of fuel consumption in the project area even when electricity will be distributed in the area in the fixture because of biogas is cheaper than electricity and cheap to producing its cost is less than electricity consumption. due to this there is a large gap between biogas and electricity energy consumption in cost efficiency. so, our project is sustainable due to its inputs are easily gained from agricultural waste products and animal manure.

## **Conclusion**

The proposed project is interesting and possibly because the input of the project is less cost and easy to use and available there and biogas renewable energy production has many advantages economically, environmentally and it is efficient energy sources. Some of our project advantages are mentioned as follows; first it is renewable Source of Energy to begin with, biogas is considered to be a renewable source of energy since it often produced from materials that form manure and waste products, the only time it will be depleted is when we stop producing any waste. Second it is non-Polluting: It is also considered to be non-polluting in nature. The production of biogas does not require oxygen, which means that resources are conserved by not using any further fuel. Third Reduces Landfills: It also uses up waste material found in landfills,

dump sites and even farms across the country, allowing for decreased soil and water pollution. Cheaper Technology also Applications for biogas are increasing as the technology to utilize it gets better. It can be used to produce electricity and for the purpose of heating as well. Production can be carried out through many small plants or one large plant.

Fourth little Capital Investment; Biogas is easy to set up and require little capital investment on a small-scale basis.

**Table 5: Time Schedule**

No	Activities	Time
1	Pre-feasibility study	sep15/09/2021-october30/10/2021
2	Purchasing the necessary materials and employment job vacancy	Nov/30/11/2021-January 15/01/2022
3	Start the project implementation	January 15/01/2022-june15/10/2022
4	Project completion	Sep 15/01/2022

### 14. Logical framework of the project

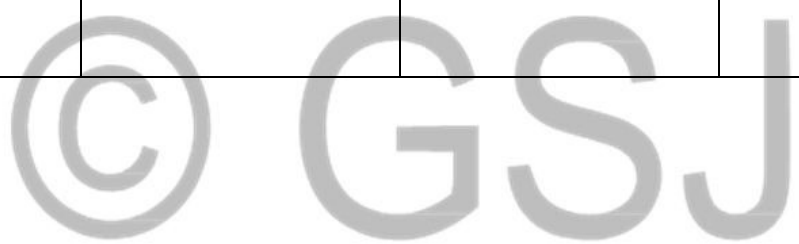
**Project title: Borena woreda rural area renewable energy supply Total Fund: 336,200-birr**

**Life of project: 1 year**

**Date Prepared sep15/1/2020-october 30//2021**

Narrative Summary	Objective verifiable indicators	Means of verifiable	Important Assumption
<b>Goal: is to establish renewable energy and protect environmental pollution with improving of social life.</b>	Generating renewable energy with no pollution of environment and solve social problem.	Project observation and situational analysis report.	Renewable energy produced for each farmer
<b>Project purpose: is reducing biomass</b>	The environmental quality is insuring and	Biogas generating observation and	People who live in the project area may be asking for

<b>consumption and replacing with renewable biogas energy with improving quality life of the people</b>	be sustainable of environment quality	periodic report and social change analysis	additional biogas plant.
<b>Activities: organizing human resources with material and monitoring and implementing the process</b>	Reduced biomass consumption and change the people life Provide high quality of fuel cooking stove.	Expansion of biogas energy consumption.	Government give tax exemption and support the project
<b>Output:</b> -generating renewable biogas energy and reduced biomass fuel consumption	Improve people's health in the project area. Insure women's benefits.	Surveying and demand need analysis	The peoples and the environment have positively relation no environment pollution.



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