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ANNUAL REPORT: SWITCH AFRICA GREEN

Promoting Biogas Technology in Ghana July, 2015 – June, 2016.

Submitted by

Ghana National Cleaner Production Centre

P. O. Box AS 11, Ashaiman, Tema

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1. Introduction, Summary and Context of the Action

The SWITCH Africa Green project builds on past and ongoing capacity building activities by UNEP, its partners and others in addressing Sustainable Consumption and Production (SCP) challenges and promoting sustainable business ventures as well as green economy policies. These include activities which increase access to sustainable energy sources and services, conserving ecosystems and the services they deliver and advancing green economy transition through macroeconomic analysis in the African region. The European Union through the United Nations Environment Programme (UNEP) awarded a grant to the Ghana National Cleaner Production Centre for the implementation of the Promoting Biogas Technologies Project which begun in July 2015. The Centre received a first tranche of one hundred thousand United States Dollars covering the initial phase of implementation. This report covers the implementation period from July 2015 to June 2016 (i.e. 11 months) in which a number of activities have been implemented. The second tranche of payment has been requested and paid to the GNCPC bank account to enable the Centre continue with the project implementation activities.

The Promoting Biogas Technologies Project is creating opportunity to develop capacity within the Assemblies of the Greater Accra Metropolitan Area (GAMA) for the adoption in planning and use of biogas technology to manage domestic faecal sludge while creating the opportunity for income generation, move towards clean and sufficient domestic energy. In addition, the project is providing the opportunity for the demonstration of biogas plant construction in schools as examples to eliminate physical handling of faecal sludge and consequently provide for environmentally sound faecal sludge management for other MMDAs.

The project has conducted desktop study and baseline assessment through consultants of which the outcome has resulted in the development of a biogas design calculator which is to help reduce the high cost of construction of the biogas plant and demystify the design and construction of the biogas plant. GNCPC also advertised the registration of biogas companies in collaboration with the Environmental Protection Agency and the Energy Commission. Before the registration commenced only two companies were known, namely Biogas Technologies Africa Ltd (BTAL) and Vulpec Ghana Ltd. Currently, the Centre has been able to register a total of 11 biogas companies as a result of the advert placed in the newspapers for registration. The registration is still ongoing as more companies are expected to be registered by the end of the project. This will pave way for the licensing of these companies.

The project after series of meetings with the Energy Commission and Council for Technical and Vocation Education Training (COTVET) agreed that there is the need to provide a nationally recognised certificate after the training hence a detailed curriculum be developed for artisans in the construction of the biogas plant. There is also the need to develop training materials for technician, operation and maintenance, and design level training which was identified during the development of the training materials by the team of experts from the three institutions. At the moment, a detailed curriculum has been developed and application for accreditation is ongoing for COTVET whiles National Vocational Training Institute (NVTI) is to provide certification. A total of 30 participants have been trained and currently performing a practical demonstration project at the GNCPC to test the biogas calculator which has been developed and give the trainees hands on experience as part of the training. Further training for artisans will be carried out in the subsequent months to meet the target of 100. The training materials for the training of Polytechnic students will be developed to train over fifty (50) Polytechnic students in the design and construction of biogas plants.





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Awareness creation activities will also be carried out. More stakeholders will be engaged in the promotion of biogas technologies.

The “Promoting Biogas Technologies” project in Ghana is working with the Metropolitan, Municipal and District Assemblies (MMDAs), individual experts and Small and Medium Scale Enterprises (SMEs) to build their capacity to enable them deal with organic waste (from agricultural, domestic and industrial sources) and sanitation. The project is further addressing the issue of job creation as skills development will make people become self-employed and earn a living for themselves.

Initial meetings held with the MMDAs has seen the MMDAs already willing to effect policy changes relating to the building codes and planning decisions, onsite domestic waste management installations, the national sanitation policy, the MMDA bye-laws on sanitation, national indoor air pollution standards as well as engineer policy on healthcare financing on pollution-related ailments by the National Health Insurance Authority (NHIA). There is also the issue of climate change improvement as the discharge of the methane into the atmosphere will be stopped.





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2. Activities carried –out during the reporting period.

This report covers the duration from July 2015 to April 2016. This covers a period of ten (10) months of activities implemented over the period. The key activities carried out during this period include the following;

- Desktop study and field visits.
- Baseline survey of existing biogas plants in the Greater Accra Metropolitan Area (GAMA) and the willingness of landlords, educational institutions, health facilities and hotels to adopt the use of Biogas as a source of energy.
- Development of a biogas plant design calculator.
- The organisation of a stakeholder workshops.
 - Registered 11 biogas construction companies.
- The construction of 10 pilot biogas plant in seven second cycle institutions.
- Training of artisans commenced.
 - First batch of 30 participants trained.
- Participation in stakeholder forum and exhibition at the ARSCP-9 Conference in Kampala, Uganda from May 27th to June 2, 2016.
- Reviewed baseline survey report and submitted to consultant for incorporation.
- Review work plan and prepare for implementation of activities.





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a. Present Operational progress vis-à-vis annual work-plan.

The following activities were carried out during the implementing period from July 2015 to April 2016 as follows;

Activities on workplan	What has been done so far	Where	When	How	Remarks/Comments
Desktop study and field visit	Gathering primary data on household and public schools census and waste management systems	In the GAMA	July 2015	Consultancy to cover summary of 2014 household census by Ghana Statistical Service and second cycle institutions via Ghana Education Service	Part of Consultant's draft report.
	Review of legal framework on renewable energy, waste to energy and reports on biogas projects	GNCPC, Tema	Aug. 2015	Review of past reports & academic journals on biogas promotion and potential in Ghana: Renewable Energy Act, Strategic Energy Plan and Ghana Shared Growth & Development Agenda II SEA4ALL project, Waste Management Policy Green Economy documents	Recommendations from review to be incorporated into <ul style="list-style-type: none"> The ongoing building codes for uptake and upscaling of technology in the country. The Draft National Biogas Strategy produced
	Development of a draft National Biogas Strategy (Policy initiative)	STEPRI	Jun-Aug 2015	Multi stakeholder national steering committee comprising Departments and Institutions under the Ministry of Environment, Science, Technology and Innovation (MESTI) to draft the Strategy.	GNCPC Project team represented in the committee & ensured the project objectives were reflected in the draft National Strategy produced.
	Site visit to a privately owned public toilet with a bio-digester	Ashaiman	Sept. 2015	Through recommendations by Municipal Assembly and transport conveying the team to site.	The facility is unable to generate biogas despite redesigning of the facility by two different contractors. There is the willingness by the owner to have a fully operational digester due to competition from other facilities.





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Activities on workplan	What has been done so far	Where	When	How	Remarks/Comments
Baseline assessment of existing biogas plants; Develop survey tools, Pre-testing of survey tools, Conduct survey & Compile reports (survey)	Consultant has submitted inception report and received comments	In the GAMA	July 2015	Carried through consultancy services also through interviews with biogas construction firms and individuals. Site visits	Draft report has been submitted and completed. One of the key findings was the high initial cost of the construction of the biogas plant.
Develop biogas construction calculator	Development of an excel template for bio-digester calculator (capacities, feed, LPG equivalence and bill of quantities).	GNCPC, Tema	Sept. 2015 Apr 2016	Using design equations for bio-digester and rescue chamber capacities, space, feed, amount CH ₄ generated and cost of construction	As identified in the baseline survey that the high cost of construction is not encouraging to the public the GNCPC decided to develop this calculator as an innovative approach to demystify the construction of biogas plant and help reduce the cost of construction of a biogas plant. In consultation with BTAL, Vulpec Company Ltd & Green EnergyTech Limited. Template is 80% complete.
	Completed the cost build up and LPG equivalence calculator	GNCPC office	Dec. 2015	Used software to develop the calculation. Liaise with experts to validate the software.	This was done by the Staff of GNCPC and consultants. It will also be used during the training programme
Organise stakeholder workshop	Formal discussions with MMDAs in the GAMA	GAR Regional Admin	Oct.,2015	Discussions with GAR Minister who invited all the District Chief Executives (DCEs) to a briefing meeting.	Invitation Letters sent out to DCEs and briefing notes on biogas Technology and application in the MMDAs
	Registration of biogas company's operating in Ghana	Collaborating with GNCPC, Energy	Jan.-Mar, 2016	An advert was placed in the newspapers for companies to register with the EC, GNCPC and EPA.	Before the advert were placed only 2 companies were known (BTAL and Vulpec Ghana Ltd) but currently a total of 11 has





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Activities on workplan	What has been done so far	Where	When	How	Remarks/Comments
		Commission (EC) and EPA			been registered and steps will be taken to help them obtain license from EC to operate.
Construction of Biogas plant in second cycle public schools	Completion of the construction of 10 demonstration plant in schools and procurement of generator sets	MESTI/EPA GNCPC	Jan. 2015	<ul style="list-style-type: none"> GNCPC counterpart funding in project and will use biogas to power generator sets for schools lighting 	<ul style="list-style-type: none"> Activity should have coincided with April 2016 artisans training but the Minister of Environment fast-tracked the civil works contracts in Oct 2015 to solve power crisis in some 2nd cycle schools in the project area
Training	Capacity building for one staff	Weitz Centre for Sustainable Dev't, Israel	Nov.-Dec. 2015	Course and project work on community bio-digester projects	Improved GNCPC bio-digester design skills and construction capacity.
	Stakeholder workshop for the development of certification of participants of the training programme	Series of meetings held at Energy Commission and GNCPC.	Feb, 2016	Consultative discussion held between Energy Commission, GNCPC and Council for Technical and Vocation Education Training (COTVET) on certification of participants in training programme	Series of meetings held and a technical committee setup working with the consultant to develop training materials. (Various levels were identified after series of discussions to develop proficiency based training for artisans, technicians, operation and maintenance and designers) for COTVET certify graduates whiles GNCPC runs the training programme).
	Stakeholder capacity building needs assessment and development of training materials (This was awarded on contracts)	GNCPC office	Nov. to Dec. 2015	<ul style="list-style-type: none"> ToR developed and Prepare tender document Shortlist of experts were written to with tender documents to complete (Limited tender consultancy) Select consultant, negotiate consultancy fees and award contract. 	<p>The contracts with the consultants (2 No.) have been signed and</p> <ul style="list-style-type: none"> Inception reports received for both. Draft report received for 1No.
	Recruit artisans for training	GNCPC office	Dec. 2015	<ul style="list-style-type: none"> Developed and advertised for individual & company artisans in the GAMA area 	<ul style="list-style-type: none"> Adverts were developed. The adverts published in the times and daily graphic newspapers in Jan 2016.





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Activities on workplan	What has been done so far	Where	When	How	Remarks/Comments
				<ul style="list-style-type: none"> • Paid two most circulated newspapers to put up adverts. • Register, profile and select candidates for capacity building workshop 	(Ghanaian Times and Daily graphic, copies attached) and received applications. A selection committee assessed the 35 applications and five (5) were disqualified as they did not meet the selection criteria.
	Training materials developed	EPA training school	Mar, 2016	<ul style="list-style-type: none"> • A committee comprising of experts from Energy Commission, GNCPC, Industry players and COTVET camped at the EPA training school for 4 weeks to develop training materials 	• Development of training materials took longer than expected. (Competency based proficiency II level for artisans was developed which is attached to the appendices). A total of 8 modules were developed
	Stakeholder validation workshop reports from consultants and training tools	Ange Hill Hotel	Mar, 2016	<ul style="list-style-type: none"> • Stakeholders invited (list attached) • Electronic copies of consultant's report sent out. • Consultants made presentations on work 	There was considerable turnout for the workshop especially the MMDAs and industry players. (Recommendations from the validation workshop)
	Skills training of artisans	GNCPC	11-15 Apr, 2016	<p>Training was organised with industry experts facilitating the training programme. Classroom theory and practical construction work</p> <ul style="list-style-type: none"> • Assessment was carried out and practicals was done at the GNCPC. 	<ul style="list-style-type: none"> • Training organised. A total of 30 participants were trained in the first batch. • Demonstration 3M³ bio-digester constructed at the GNCPC translating and testing the calculator <p>Draft training report report prepared and under review.</p>
	Accreditation for GNCPC and Training Program	NVTI, COTVET	April, 2016	<p>Completed Accreditation forms for centre & staff</p> <p>Inspection of GNCPC infrastructure</p> <p>Assessment of staff qualification and skills</p> <p>Approval of course curriculum content.</p>	The training materials has been validated Assessment and Accreditation for the GNCPC as a Centre to carry out skills training by NVTI accomplished and COTVET is ongoing





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Activities on workplan	What has been done so far	Where	When	How	Remarks/Comments
	Converted syllabus of training materials to National Vocational Training Institute (NVTI) requirement	NVTI Head Office	June 21-23, 2016	Technical team assembled by NVTI put together the syllabus based on the material developed.	Syllabus is attached in the appendix
Networking	Attend SWITCH Africa Green Networking Forum and ARSCP-9 Conference	Kampala, Uganda	May 27 to June 2, 2016	Through presentations that was made, and sharing experiences and interactions with various participants from different countries SAG Project with various participants.	Response was positive as some visitors to the exhibition stand would want to visit Ghana to identify potential business opportunities with some of the MSMEs.





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Desktop study and field visit

The desktop study and field visit was carried out to review reports and visit some toilet facilities to ascertain the viability of the construction of biogas plants and also make policy recommendations to MMDAs within the GAMA area.

The key activities performed has resulted in the following;

- Census on household and public schools on waste management in the GAMA area.
- Input has been made to the Draft national biogas strategy which has been produced.
- Input has also been made to the National Building Code of Ghana.
- Site visit to some private public toilets shows that it may not be possible to immediately convert the public toilet to a biogas plant. However, some work needs to be done for this to be achieved.

Baseline survey

A baseline survey was carried out to help develop an enduring Biogas Profile and other allied services that will promote Sustainable Consumption and Production (SCP) including green growth and sustainable development. The following are further details that the baseline was to address;

- Baseline of number of existing bio-digesters, their functionality (operational and dysfunctional) and the reason for the dysfunctionality as well as the number of public toilets in GAMA.
- Develop survey tools
- Conduct a survey to establish the willingness or otherwise of the GAMAs through the planning authorities to legislate the incorporation of bio-digesters in residential, public and commercial building applications for new building and redevelopment of pan latrines, septic tanks to incorporate bio digester technologies.
- Establish the willingness of landlords or estate developers, hotels, educational institutions, hospitals and public toilet operators to adopt and use biogas technologies.
- An assessment of the level of public awareness of biogas technology, its cost-benefits analysis.
- Examine other alternative types of bio-digesters that can be deployed in the project area at affordable cost.
- Needs assessment to determine the existing skills of artisans and the additional knowledge and skills that they would require to develop competence to design, construct operate and maintain a bio-digester.
- Prepare Profile on various types of biogas technologies, feedstock and recommendation on best available technologies.

In view of the level of work involved in performing these activities, the GNCPC engaged two consultants who provided consultancy services in the above areas and others. Annex 3 provides further details on the contract provided and the reports.

The recommendations obtained from the baseline survey includes the following;

- The need to intensify efforts to increase the uptake of Biogas technology by enacting the necessary legislation and promotional activities on adoption of the technology by individual landlords and institutions. The uptake has been slow due to initial cost of construction and equipment





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- Conduct further analysis in relation to functional design of the human excreta-fed digester to determine the suitability and ability of the toilets to provide sustained feed for the Biogas Digester and also ensure efficiency in retention time for the technology.
- Development of a viable public-private partnership business model as a way of encouraging use of the technology especially among private toilet operators, landlords, and other institutional stakeholders.
- A comprehensive capacity building programme for engineers, artisans, technicians, and all actors involved in the Biogas value chain to provide needed technical services.
- The technology should be promoted as a sanitation, energy and agricultural production system with all three receiving the needed political, financial and legislative support.
- The technology must be made available in terms of construction expertise, servicing and maintenance and relatively more affordable than the current type of fuels being used.
- There should be a Biogas technology adoption plan for the GAMA pursued on a well-focused information dissemination strategy using media sensitization especially radio and television.

Development of a biogas design calculator

Due to the outcome of the baseline survey, the Centre in order to reduce the cost of the construction of a biogas plant has developed a biogas design calculator to provide a detailed cost of biogas plant depending on the number of people living in a house. It also provides the quantity of biogas generated and also annual savings to be made. Some of the attributes related to the calculator include;

- Determination of the quantity of gas produced depending on the number of people resident in the house or facility.
- Quantity of waste required to be fed into the digester.
- Cost savings made on the gas produced.
- Quantity of the various types of materials required for construction and their related cost including labour cost.
- Volume of digester to be constructed.

The consultants were also engaged together with the Energy Commission after the initial development of the calculator. The challenge with the two consultants was the protection of each other's trades secret. Although it was difficult bringing both consultants to work together, the Centre managed to gather information required from both Consultants who dominate the biogas construction market in order to develop the biogas design calculator. See annex 6 for the calculator.

Stakeholder workshop

Adverts was placed in the newspaper (See annex 2) for companies operating in the biogas construction centre to register with the EPA, Energy Commission and GNCPC. The Centre has been able to register a total of 12 companies with details of their activities. The purpose is to identify the key stakeholders in the sector and also encourage them to acquire license from the Energy Commission for their operation.

MMDAs were also written to discuss the project and also promote the idea of the biogas technology as a means of waste management with them. In future a stakeholder workshop will be organised with the MMDAs to discuss the technology with them.





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Training

Series of meetings/work shops were organised in the development of training materials to discuss the way forward in training artisans. Eventually, the following recommendations were made;

- Acquire certification and accreditation for training of artisans with the COTVET for national recognition.
- Training levels were also agreed; artisans, technicians, operation and maintenance and design.

Training for artisans for Proficiency II for the construction of biogas digester was agreed to be the lowest level while design of biogas plants was to be highest level. The artisans after training will be given the construction of biogas digester proficiency II certificates. A team of experts were camped at the EPA training school to develop the training materials for the artisans to be trained.

A total of 35 applications but only 30 was selected after assessing all the applications by a selection committee.

Introduction of the calculator was a key activity during the practical demonstration in the construction of a biogas digester by the trainees. Reason is to demonstrate the functionality of the calculator with the pilot demonstration and to confirm the validity of the biogas calculator and pave way for transparency in the industry for customers to gain trust from the industry experts. See annex 4 for the draft training materials and annex 5 for the draft training report for the first batch.

b. List of all contracts (works, supplies, services)

Two consultants were engaged in carrying out activities related to the project by providing consultancy services. The amount paid to both consultants were more than \$2,500.00.

The Centre used a limited tender process and the national procurement standard contract template in procuring and contract award in this case. The local experts in this specialized technology field required are limited and the advert assisted us to locate them and those with proven record knowledge and practical experience were requested to submit both technical and financial proposals for the assignments.

Name of Consultant	Amount (\$)
Mr. Moses Pumpuni	29,343.00
Dr. John Afari Idan	11,839.47

Exchange rate = GH₵3.8

c. Visibility of SWITCH Africa Green in the Action

Visibility has been ensured in the project as it is part of the activities to be carried out. Awareness creation materials have been prepared to be used for awareness creation materials to promote the project. The following visibility materials have been developed;

- Banners for training of artisans have been printed.
- Writing notepads for the project has been printed.
- T-shirts have also be prepared to be printed.
- For each of these visibility materials, project and project sponsors, implementers and other partners' logos have been embossed on each of the materials.
- News video covering the validation workshop for the validation of the baseline survey and training materials was telecasted on the Ghana National Television station.





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- Participated in the exhibition at the European Commission displaying visibility materials developed for the project.
- Participated in exhibition at the SWITCH Africa Green Networking Forum and the ARSCP-9 Conference in Kampala Uganda. The exhibition displayed visible materials like project T-shirts, bags with a new cookstove which uses wood pellets/briquette. There was also a demonstration of the use of cookstove for cooking and lighting at the same time using wood pellets/briquette as source of firewood.

3. Difficulties encountered and measures taken to overcome problems

Difficulties/Challenges	Measures to overcome issues
Lack of support from relevant public institutions.	Adequate notification to relevant public institutions is critical. Ensure an officer from the relevant institution has been appointed to work with the GNCPC or appointed consultant(s) or agents.
Data and relevant information is not readily available in the form that can be used.	Ensure that the required data and relevant information are sorted for project use.
One of the major challenges was getting to meet the heads of the MMDAs for discussions on the project.	However we intend to overcome this by making a presentation at the Regional Coordinating Council meeting for the MMDAs.
Collecting data from the Ghana Statistical Service was extremely difficult and too bureaucratic just have to deal with it that way.	Work closely with the Ghana Statistical Service to ensure the relevant data is provided.
Demonstration plants financing envisaged 4 bio digesters but the Minister increased to 10No making financing all ten very difficult	The EPA had to be consulted to provide the additional funds for the 6No.
Development of training materials took longer than expected.	The technical team together with consultant had to stay longer than expected to complete the development of the training materials which affected the budget.
Industry experts protecting key trade secrets in the development and construction of the biogas plant. GNCPC has been able to device calculator to provide information on the design of the biogas plant.	The Centre managed to collect data from the key industry experts required for the development of the biogas digester design. It's a key result to demystifying the cost of construction of a biogas plant.

4. Changes introduced in the implementation

Standardization and certification of the artisans envisaged to be trained in this project was not part at the proposal stage until the method of distinguishing artisans trained from those not trained and the Energy Commission (EC) requirement for renewable energy practitioners to be certified was





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challenged at a stakeholder meeting developing the biogas national strategy. It became imperative that a certificate of participation was not enough and hence the need to go through COTVET the standardization and certification body. A team is put in place between the GNCPC, EC and COTVET and some private experts developed the standards, syllabus, and certification process.

The team identified and distinguished the following levels required for training;

- Artisans
- Technicians
- Operation and maintenance
- Designers

At these levels, there are varied requirements to qualify for each level of training.

5. Achievements/results by using the indicators included in this agreement

No.	Indicators (Logical framework)	Results
1	10 biodigesters and public toilets (constructed or converted) for generating biogas for schools and commercial use.	10 digesters constructed in 7 senior high schools. 1 digester to be connected to a generator. (Size, number of users, actual amount contributed, type of digester, performance,
2	Assessment/baseline survey successfully carried out; <ul style="list-style-type: none"> • To identify types of biogas in place • Feedstock types and availability • To identify training needs 	Draft reports submitted. Calculator developed to help in the design of biogas plant.
2	Training materials developed for the training of craftsmen.	Trained 30 artisans on competency based proficiency II training for artisans. Target is to train 100.
3	Two pilots' biogas plants from best design constructed and equipped with 1No mobile compressor.	1 has been constructed at the GNCPC. Size is about 3 m3 to demonstrate the use of calculator, help artisans to gain practical experience

6. Integration /Complementarity with other SWITCH actions

As part of Ghana's priority sectors for the SWITCH Africa Green Programme, three areas was selected as follows;

- Manufacturing
- Integrated waste management
- Tourism

This project was selected because of its multiple solutions it provides in waste management under the sector of integrated waste management. The promoting biogas technologies project solves the management of waste by treatment of the waste and wastewater, biogas and compost production and income generation for artisans/craftsmen.

This promotes the SAG programmes ideals in promoting SCP patterns and green economic activities in Ghana. The project also supports SMEs with the technical knowledge in this area.





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Industrial uptake with Accra Breweries Ltd using the technology for their wastewater treatment. Support to the Association of Ghana Industries (AGI) project where they are promoting biomass clean cookstoves and also the Industrial Symbiosis support for the industries with waste generated becoming a raw material for other industries.

Similarly, the Hanisa e-waste Model project being implemented by the Environmental Protection Agency also falls under the integrated waste management.

7. Cross cutting issues

There are a few cross cutting issues which have been identified in the project. Energy generation through the production of biogas is part of the integrated waste management is a crosscutting issue to the project.

The energy produced during the waste management process is to help government integrate renewable energy into the energy mix of the country. The beneficiary schools will have a reduction in the cost of energy consumed.

Innovation through the development of the biogas calculator which helps to develop standard in the construction of biogas plant.

8. Involvement/partnership with other key stakeholders

Various stakeholders have been identified to help in the implementation of the project.

Stakeholder	Role in the project
Energy Commission	<ul style="list-style-type: none"> ▪ To setup a procedure to ensure that all biogas projects in the country are streamlined to avoid any repetition. ▪ Working relationship has been established for possible collaboration in the offing. ▪ Provide technical advice on the development of training materials. ▪ Provide technical advice on training of artisans.
MMDAs through the Regional Coordinating Council	<ul style="list-style-type: none"> • To ensure their cooperation during the implementation of the project and also to ensure the sustainability of the project as they absorb the artisans that are going to be trained. • Liaise with GNCPC for the training of artisans.
Engineering Council of Ghana	<ul style="list-style-type: none"> ▪ To help with the awareness creation activities.
NVTI/COTVET	<ul style="list-style-type: none"> ▪ Provide accreditation for training programme and certification for trainees





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9. Work Plan for May 2016 – June 2017.

The project first year has not been completed yet. The workplan drawn for the year will be continued till the second year. Some of the key activities to be carried out include the following;

Year 2	Month													
Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Organise sensitization workshops and awareness creation														
Develop documentary on biogas construction														
Training of artisans														
Development of training materials														
Training of Polytechnic students														
Engage key stakeholders for discussion on promoting biogas technologies with policy and regulatory Agencies														
Final validation workshop														
Evaluation and final report preparation														





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10. Financial report: Annual Financial Expenditure





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European Union	PERIOD OF PROJECT		FROM: 1 ST JULY, 2015							TO: 30 TH JUNE 2017				
Budget for the Action/Cost	Over-all Budget	Budget (as per Work Plan) Year 1	Expenditure						Total Budget Balance (Year 1)	UNOPS contribution first tranche	GNCPC Contribution	Projected expenditure for next reporting period (1 July 2016 to 30 June 2017)	Remarks	
			As of last 6 months (1 July - 31 December, 2015)		As of this period (1 January - 30 June, 2016)		As of this period (1 January - 30 June, 2016)							
			Committed	Actual	Committed	Actual	Committed	Actual						
	(a)	(b)	(c)	(d)	(e)	(f)	g=(c+e)	h=(d+f)	i=(b-(d+f))	j	k	l	m	
1. Human Resources														
1.1 Salaries	38,400.00	14,400.00	0.00	1135.00	0.00	2432.43	0.00	3567.43	10,832.57	3,567.43		34832.57		
1.2 Staff assigned to the action (2No staff)	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		2800.00		
1.3 Seminar/Conference participants (100)	25,000.00	12,500.00	0.00	0.00	0.00	6648.65	0.00	6648.65	5,851.35	6,648.65		18351.35		
3. Equipment & Supplies														
3.1 Rent of Vehicles	12,400.00	7,400.00	0.00	0.00	0.00	3200.00	0.00	3200.00	4,200.00	3,200.00		9200.00		
4. Local Office														
4.1 Consumables, Office Supplies	9,600.00	3,600.00	0.00	0.00	0.00	2408.38	0.00	2408.38	1,191.62	2,408.38		7191.62		
4.1.1 Computer Equipment*	0.00	0.00	0.00	0.00	0.00	3480.00	0.00	3480.00	-3,480.00	0.00	3480.00	3480.00	GNCPC Contribution	
4.1.2 Office Rent*	0.00	0.00	0.00	0.00	0.00	6000.00	0.00	6000.00	-6,000.00	0.00	6000.00	6000.00	GNCPC Contribution	
4.1.3 Furniture*	0.00	0.00	0.00	0.00	0.00	3240.00	0.00	3240.00	-3,240.00	0.00	3240.00	3240.00	GNCPC Contribution	
10.1 Electricity and Water*	0.00	0.00	0.00	0.00	0.00	3351.34	0.00	3351.34	-3,351.34	0.00	3351.34	3600.00	GNCPC Contribution	
5. Other Costs, Services														
Publications	20,000.00	20,000.00	0.00	0.00	0.00	17241.96	0.00	17241.96	2,758.04	17,241.96		0.00		
5.2 Studies & Research	30,000.00	30,000.00	0.00	30216.00	0.00	0.00	0.00	30216.00	-216.00	30,216.00		0.00	Given out on Contract	
5.3 Costs of conferences/Seminars	74,400.00	64,400.00	0.00	0.00	0.00	12432.43	0.00	12432.43	51,967.57	12,432.43		61967.57		
Documentary & Air Time	12,000.00	2,000.00	0.00	0.00	0.00	2222.46	0.00	2222.46	-222.46	2,222.46		9777.54		
5.5 Training	60,000.00	0.00	0.00	0.00	0.00	14837.84	0.00	14837.84	-14,837.84	14,837.84		45162.16		
6. Other														
7. Subtotal Direct Eligible Costs of Action (1-6)	284,600.00	154,300.00	0.00	31351.00	0.00	77495.49	0.00	108846.49	45,453.51	92,775.15		205602.81		
8. Provision for contingency reserve (5% of 7, Subtotal of direct eligible costs of action)	14,230.00	7,715.00	0.00	1763.00	0.00	2000.00	0.00	3763.00	3,952.00	3,763.00		10467.00		
9. Total Direct Eligible Costs of Action (7+8)	298,830.00	162,015.00	0.00	33114.00	0.00	79495.49	0.00	112609.49	49,405.51	96,538.15		202291.85		
10. Administrative Costs (Maximum of 7% of 9, Total direct eligible costs of action)	20,918.10	11,341.05	0.00	2000.00	0.00	1067.57	0.00	3067.57	8,273.48	3,067.57		17850.53		
11. Total Eligible Costs (9+10)	319,748.10	173,356.05	0.00	35114.00	0.00	80563.06	0.00	115677.06	57,678.99	99,605.72	16071.34	220142.38		



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	Year 1	UNOPS	GNCPC
Total Amount for the Year	173,356.00		
Amount Spent to Date (July 2015 - April 2016)	115,677.06		
Amount Contributed (Received)		100000.00	73356.00
Actual Spending		99605.72	16071.34
Percentage of Amount spent to Amount Contributed (Received)		99.61%	21.9%
Percentage of Amount spent to total budget for the year	67%	57%	9%
Balance from Contributions		394.28	57,284.66
NOTE: J=Disbursement of UNOPS first tranche			
UNOPS contribution budget balance first tranche		394	





European Union

11. Annexes



The following annexes have been attached as follows;

- 11.1 Annex 1; Pictures of construction of biogas plants in schools.
- 11.2 Annex 2; Adverts placed in the newspapers.
- 11.3 Annex 3; Draft survey reports.
- 11.4 Annex 4; Draft training materials.
- 11.5 Annex 5; Draft first batch training report and attendance sheet
- 11.6 Annex 6; Excel calculator for the design of biodigester.
- 11.7 Annex 7; List of registered biogas companies in Ghana.
- 11.8 Annex 8; Draft validation workshop report and attendance sheet.
- 11.9 Annex; NVTI Syllabus for training in biogas construction





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11.1 Annex 1; Pictures of construction of biogas plants in schools.






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11.2 Annex 2; Adverts placed in the newspapers.

Daily Graphic, Wednesday, January 20, 2016. Visit www.graphic.com.gh **15**


Ghana National Cleaner Production Centre
GNCPC

CAPACITY BUILDING WORKSHOP IN BIODIGESTERS AND BIOGAS PLANTS

The Ghana National Cleaner Production Center (GNCPC), under the auspices of the Environmental Protection Agency (EPA) and the Ministry of Environment, Science, Technology and Innovation (MESTI) and the support from UNEP overseeing the Switch Africa Green (SAG) Project funded by the EU, wishes to inform companies and individuals in the bio-digester/biogas plant construction industry in the Greater Accra Region that it will be organising a 5-day training workshop for artisans in the industry from 14th to 19th March 2016 at the GNCPC, Com. 22, Tema near the Com. 22 Police Station. The course will cover:


1. The chemistry behind organic waste anaerobic decomposition and biogas generation and management
2. Technological updates of bio-digesters and efficiencies
3. Design of bio-digester plants and re-engineering existing septic tanks and public toilet to generate biogas
4. Bill of quantities and estimation of cost, LPG equivalence with different bio-digester capacities and feed stock and payback periods
5. The environmental, social, economic and health benefits of different organic waste management systems and the biogas alternative
6. Business and marketing plan development and
7. Practical demonstration of bio-digester construction

Individual and company artisans in the GAMA wishing to participate or upgrade their skills in this workshop should register at the following places with a registration fee of **Gh¢100.00 by the closing date of 24/02/2016:**


- a. GNCPC, Com. 22, Tema near the Com. 22 Police Station
- b. The EPA Head office Room M15
- c. EPA, Accra East Regional Office, near White House, Tema Com. 1.
- d. EPA, Accra West Regional Office in Amasaman

Individuals and artisans wishing to register and take part in the capacity building training programme, must have completed any engineering degree course, HND building with 1 year experience, advance block laying from a technical institute with 2 years practical experience in the bio-digester construction industry or qualified masons with at least 3 years working experience. For further enquiries, call 050-130-1505 and 050-130-1406 Accra, Amasaman 050-130-1400, Tema, 050-1301624- and GNCPC- 050-130-1465

Ag. Director, GNCPC


Ghana National Cleaner Production Centre
GNCPC

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GNCPC

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