SUSTAINABLE ENERGY SOURCING COST CHALLENGES FOR A FAIRE CIRCULAR MACROECONOMY IN TOGO

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ABSTRACT: Sustainable projects in Africa are particularly vulnerable to corruption due to the complexity of sourcing processes, contract agreement and also relationships between society managers or directors and supplyer chain entities. Corrupt agreements can affect any phase of sustainble project, and the consequances are very high about **3.2 €/Gj**; reduced also competition, poor-quality of the sustainable energy project, destuire circular macroeconomy...

The main causes of this phenomena is the leak of commucation between parteners or key stackhoders, this give advantage to unconscience personnes to be come more riche and the lower class, the hard workers our labors are more and more poor and facing the scarcity of the food.

Design and establishment of scalable socio-ecologically integrated multistory biomass, industry waste, municipal waste, alternative fuels cultivation and sourcing systems to locally produce renewable energy for pyro-processing, to reduce carbon footprints, create income opportunities and new regional value chains in the normal situation.

The usage of this mobile application is one of the powerful solutions to deal with this corruption phenomena, and helping also the companies to make a high cost saving arrow **1.89 €/Gj,**

Developing a mobile App for the controlling or managing supply and demand of biomass-based fuels, agriculture residue, industry waste... The advancement of Information Communication Technology (ICT) has created opportunities to improve exchange and logistics efficiency in commodity markets up to **88%**.

Keywords: ***CIRCULAR ECONOMIE, BIOENERGY, MOBILE APPLICATION, USSD, SUPPLIER CHAIN, CORREUPTION***

INTRODUCTION

The development of infrastructure and economic growth in Africa especially in Togo is demanding significant amounts of building materials such as concrete, cimentious materials with most of the energy required to produce it coming from fossil fuels. Underutilized and degraded land resources offer opportunities for the establishment of biomass-based renewable energy production systems and industrial waste collection.

That have the potential for creating new value chains for rural and peri-urban communities and give Togolese companies the opportunity to reduce the carbon footprint of their products thus moving closer to goals in sustainability and carbon-neutrality. Most of time the project end badly without social good impact, as part of our aims to search the solution to deal with corruption and to establish scalable adapted systems to source and mapping biomass, agricultural waste, municipal waste, industrial waste… as alternative fuel in Togo.

The first objective of this article is to fit with the corruption in procurement organization and in other to Have supplier chain data base for better sustainable energy masterplan.

Secondly is to have Potential pathways along value chains are to be established in cooperation with NGOs and partners from farmers cooperatives each AF-Fuel for better cost management

And thirdly is to developpe circular macroeconomy and make Bioenergy or Waste marketing.

SUSTAINABLE ENERGY SOURCING APPLICATION DESIGN.

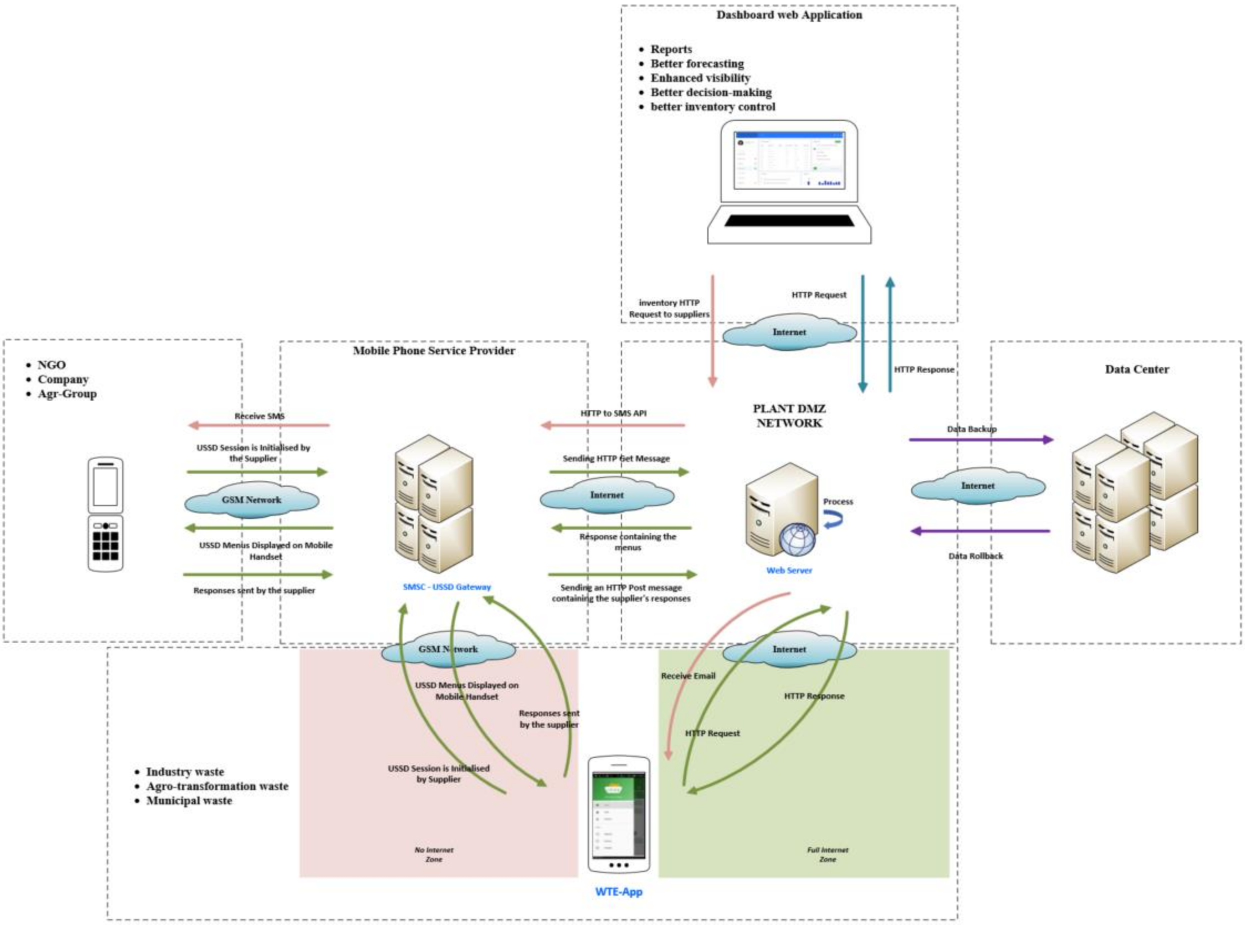
In Togo, some regions are facing challenges in the handling of waste products from the milling process of coffee, Rice, cashew, Palm shell Kernel and cocoa. As no system has been established that makes use of these considerable quantities and prices of biomass, the coffee husks, cocoa pod husk are either discarded into the countryside, or burnt in the open the others biomass are subject of underpricing.

developing a mobile phone-based App for the managing supply and demand of biomass-based fuels, agriculture residue, industry waste... The advancement of Information Communication Technology has created opportunities to improve exchange and logistics efficiency in commodity markets. Moreover, increased penetration of mobile phone technology in rural has created an opportunity for addressing the information asymmetry in the agricultural value chains. Information asymmetry problem tends to compromise the bargaining power of rural-based small-scale farmers and traders with informed urban-based buyers. Likewise, improved market transparency on multiple spheres (e.g., inputs, commodity supplies, demand, prices, etc.) are important for informed business decisions for traders, logistics operators, manufacturers, and even policy makers and regulators). For improving the transparency in the sustainable energy value chains, a tailored mobile phone-based biomass market access system was designed with key stakeholders.

Across Africa there have been several initiatives to use Information Communication Technology for improving market information access with both success and failures in relation to intended outcomes. Some limitations that sustainable energy application face during the implementation process that among others include limited literacy of rural users regarding text-based messaging, costly tariffs, handset technology (smart versus non-smart), lack or costly internet connectivity for APP-based systems,

this Integrated stakeholder demand driven user incentive and motivation structures within the S.E-App. It has been demonstrated that the system can control the corruption organization and le companies makes more profit.

PICTURE 1. COMMUNICATION MAPP.



1.1 USSD AND NETWORK DESIGN

Notwithstanding the high rate of smartphone use, mobile internet coverage remains low in sub-Saharan Africa countries especially in Togo. In this context, the USSD is positioned as a channel for deploying corporate mobile services for this customer segment as showing the picture1.

Integrating messaging (USSD) and Android APP (S.E-App) to leverage services to both users with smart and no smart mobile phones. This involved also the design of web application technology to communicate between android App and messaging portal in the S.E-App server as showing in the picture.1.

Development of a flexible SMS based or USSD functionality for Android App that can work in case of no internet zone is one of the key solutions of communication circular macroeconomy.

this Android App can interactively be user friendly and demonstrated his efficiency and utility of the system in circular macroeconomy.

1.2 SUSTANABLE ENERGY SOURCING COSTS

The data was collected from the same two company the **COMPANY A** is before the use of S.E-App, the **COMPANY B** is with web application technology and the **LOCAL COMMUNITY PRICE** was collected from the villages during the exploratory visit. The energy costs were calculated with biofuel moisture

The shift assistance needs to be increased to 13 labors per shift. Given the working environment, at all the points a relief personnel were needed to be addressed. During relief, the personnel could be addressing non-intensive activity like guiding the load at the storage area when lifting to the 2nd floor, hoisting the material to the 2nd floor and hoisting the material to the 3rd floor. The arrangement was as follows:

- 2 Labors for PKS load & 2 Labors for CNS load; 1labor relief for non-intense activities
- 2 labors for feeding at smoke chamber; 1 labor relief on operating hoists
- 2 labors for feeding at precalciner and 2 labors for moving the material from elevator to feed point; 1 relief on miscellaneous jobs and eventually hoist operator

The daily substitution rate was 50tpd of PKS and 30tpd of CNS; the labor expenses per day per personnel was 6.1€.

Table 1. BIOFUAL COST.

ITEMS	**Fuel**	**PURCHASING COST**		**Lab data**		**Energy Cost as landed (€/Gj)**
		Energy Cost (€/t)	Energy Cost(€/Gj)	Fuel Moisture Avarege%	Fuel LHV (Gj/t) Avarege	
COMPANY A	Petcoke	67,18	2,28	8,50	32,22	2,47
	Cashew Shell	44,08	2,40	8,34	20,04	2,60
	Pastics waste	50,38	1,97	5,40	27,00	2,08
	Moza-Coal	79,39	3,35	7,56	25,6	3,61
	PKS	32,82	2,06	10,20	17,76	2,27
	Rice Husk	32,06	2,87	8,56	12,23	3,11
	Waste oil	290,08	7,09	2,00	41,73	7,23
	Coffee Husk	32,06	2,04	5,70	16,70	2,15
	Coconut Husk	32,06	1,62	5,50	21,00	1,70
	Coco Put Husk	32,06	2,08	13,2	17,75	2,36
	Maise waste	32,06	2,33	10,70	15,40	2,58
COMPANY B	Cashew Shell	12,21	0,66	8,34	20,04	0,72
	Pastics waste	22,90	0,90	5,40	27,00	0,95
	PKS	18,32	1,15	10,20	17,76	1,27
	Rice Husk	16,79	1,50	8,56	12,23	1,63
	Waste oil	22,90	0,56	2,00	41,73	0,57
	Coffee Husk	12,21	0,78	5,70	16,70	0,82
	Coconut Husk	10,69	0,54	5,50	21,00	0,57

	Coco Put Husk	12,21	0,79	13,20	17,75	0,90
	Maise waste	13,74	1,00	10,70	15,40	1,11
LOCAL COMMUNITIES PRICE	Cashew Shell	7,63	0,42	8,34	20,04	0,45
	Pastics waste	9,16	0,36	5,40	27,00	0,38
	PKS	6,87	0,43	10,20	17,76	0,47
	Rice Husk	5,34	0,48	8,56	12,23	0,52
	Waste oil	10,69	0,26	2,00	41,73	0,27
	Coffee Husk	4,58	0,29	5,70	16,70	0,31
	Coconut Husk	6,11	0,31	5,50	21,00	0,32
	Coco Put Husk	10,69	0,69	13,20	17,75	0,79
	Maise waste	6,11	0,44	10,70	15,40	0,49

1.2 CAPEX NEEDS

The table2 is showing the equipment used and there prise.

Table 2. CAPEX.

		ESSD BUDGET			
Category	**Activities**	**Unit**	**Number**	**Daily Cost Excluding Tax**	**Total Cost**
Euro	Code	Number	2	763	1527
	Maintenance	Month	12	69	824
		S.E-App Design Budget			
Category	**Activities**	**Unit**	**Number**	**Daily Cost Excluding Tax**	**Total Cost**
Conception and creation	Mission Farming	Day / Man	10	158	1527
	Preliminary study, collection, analysis and procssing of data	Day / Man	15	229	3435
Platform development (web and mobile application)	conception, programming	Day / Man	60	458	27481
	preparation of the procedure manual	Day / Man	10	299	2290
	Commissioning and operationalization	Day / Man	10	305	3053
	Control and quality assurance tests	Day / Man	20	229	4580
Training and support for users	Skills transfer	Day / Man	15	229	3435
System monitoring and user support	Periodic update and maintenance (fixed price)	Month	12	763	9160
		Total investment			**54961,83**

2. RESULTS AND DISCUSSION

2.1 DATA

Collecting data allows us to store and analyze important information about our existing and potential supplier's... It costs less and is faster than in-person data, and it removes any potential bias or human error from the data collected.

The information's can also directly insert the data with no use of paper; more accuracy: being completely automated, there's no room for mistakes or unclear compiling; complete control on interviews progress.

we can check in real-time waste types, regional waste, completed, incomplete, and dropped information's.

2.2 SAVING

Saving calculations show the net positive difference over 65% of procurement perchaising service and this represent 1,89 €/Gj for CNS and 1,56 €/Gj for PKS as show the table2**.**

By considering the fossil fuel cost of 3,61€/Gj as landed cost, the saving is arrow 2,89 €/Gj all most 80% of fossil fuel cost saving.

The operation was not fulling automatized the feeding was man settee and the manpower charge was only 0.14 €/Gj. The management bonus for the project execution was about 4,3€/Gj for the procurement managers and 6,8 €/Gj for directors for their supervision and project execution.

The sustainable goal is to deal with food scarcity of labors, the data above show the difference output of sustainable project on our communities. The saving is impacted by the purchasing prices of biofuel, and this have impact on labors this can explained there low revenue.

Table 2. SAVING & PAYBACK

TIME	**Y1**	**Y2**	**Y3**	**Y4**
EXPENSES €	63044,27	9984,7	9984,7	9984,7
SUSTANABLE ENERGY BUDGET Kt/Y	7,2	25,5	30,5	50,87
SAVING €	118800	420750	503250	839355
PAYBACK €	**55755,73**	**410765,3**	**493265,3**	**829370,3**

3.CONCLUSIONS

The application has effectively developed a virtuous circular macro-economy. As co-shareholders, the farmers receive request from the plant and by supplying their waste as feedstock; this help to reduce their costs as well.

Getting local communities involved, literally giving them some buy-in to help them benefit from S.E- App, is an important aim.

Supply chain optimization for biomass-based, industry, municipal waste… are an important research area due to greater emphasis on green energy sources. This article aims is to develop and apply two optimization models to analyze the impacts of waste competition on cost structures and gross margins for competing wastes.

This model scenarios were run to study the impacts of changes in parameters relevant to waste type and processing technology, and prices of inputs and outputs on procurement costs.

Cost minimization model shows that per unit procurement costs are directly proportional to the size plants in all scenarios.

Profit maximization model, on the other hand, shows that closer the waste is, making higher gross margins. However, the margins significantly will increase but in this situation our biofuel is more expensive than imported fosil fuel.

The variations in costs and gross margin structures under various model scenarios are explained corruption in the procurement cost processing.

These results help us, we decision makers to make improved decisions related to waste supply chains applications for bioenergy consumption and production for sustainable goals.

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