

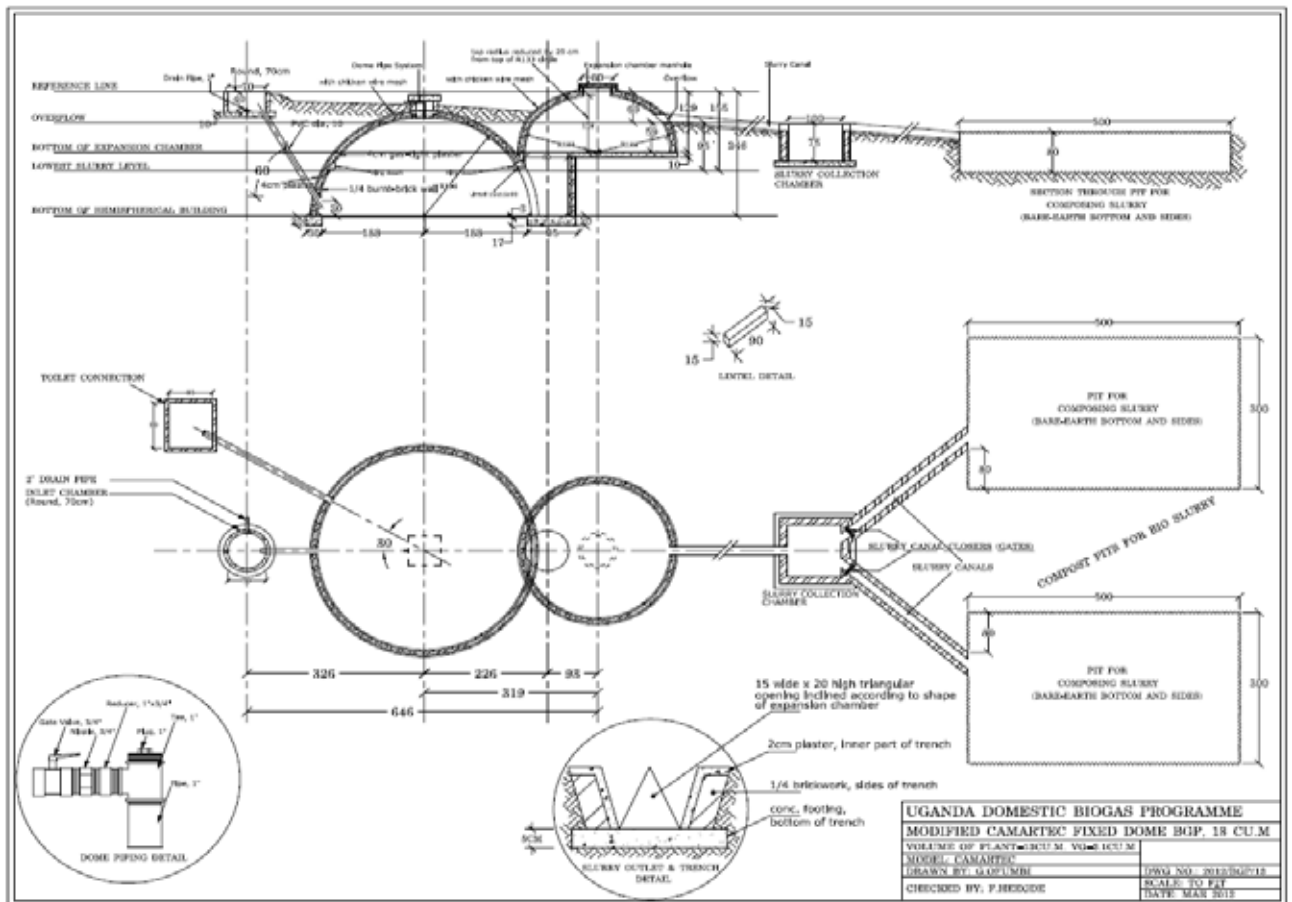
ANNEX 5



Bill of Quantities Biogas Installation

ANNEX 5: BIOGAS INSTALLATION

For more information see files Biogas as mentioned in Annex 3 ref biogas installation with a capacity of 4-, 6-, 9-, and 13-m³.



Example of Biogas installation with a capacity of 13 m³

Energy calculation example diesel to biogas

Power	35 kW		
Runtime	6 hrs/day		
Energy	210 kWh/day		
Conversion factor kWh to MJ	3.6		
Net electric energy production	756 MJ/day		
Efficiency diesel generator	30%		
Gross energy consumption	2520 MJ/day		
Calorific value diesel	46 MJ/kg	Calorific value biogas	20 MJ/m ³
Density diesel	0.9 kg/ltrm ³		
Calorific value diesel	41.4 MJ/ltr		
Diesel consumption generator	18 ltrs/day	Biogas consumption generator	37.8 m ³ /day
		Specific biogas production cow dung	0.04 m ³ /kg
		Feeding requirement	945 kg dung
		Biogas storage factor	82%
		Biogas storage volume	31.1 m ³

Biogas - Bill of Quantities and pricelist (indicative)

Modified Camartec domestic biogas installation						13m ³
Bill of Quantities and pricing(KES)						
	qty	unit	rate	household	Company	Total
1 General bulk materials						
1.1	Sand	5.00 [m ³]	900	4,500		4,500
1.2	Gravel	4.00 [m ³]	54	216		216
1.3	Stones	3.00 [m ³]	900	2,700		2,700
1.4	Cement	28 [bags 50 kg]	390		10,920	10,920
1.5	Bricks	1,550 [piece]	9	13,950		13,950
1.6	Lime	5 [bags 50 kg]	420		2,100	2,100
1.7	Acrylic emulsion paint	2 [ltr]	210		420	420
1.8	Chicken wire (1 mtr wide)	75 [mtr]	90		6,750	6,750
1.9	Welded / square mesh	1 [pcs]	-			-
1.10	Round bar	2 [length]	390		780	780
1.11	PVC pipe 4"	1 [length]	420		420	420
1.12	HDPE 3.4" class 6	100 [mtr]	240		24,000	24,000
					45,390	66,756
2 Biogas materials						
2.1	Dome pipe	1 [pcs]	600		600	600
2.2	Single biogas stove	1 [pcs]	900		900	900
2.3	Double biogas stove	[pcs]	-			-
2.4	Biogas lamp	1 [pcs]	-		-	-
2.5	Main gas valve	1 [pcs]	360		360	360
2.6	Stove tap	[pcs]	270		-	-
2.7	Lamp tap	1 [pcs]	-		-	-
2.8	Water trap	1 [pcs]	60		60	60
2.9	Pressure meter	1 [pcs]	60		60	60
2.10	Fitting material & sundry	1 [set price]	300		300	300
2.11	Repair & maintenace set	1 [set price]	180		180	180
					2,460	2,460
3 Labour						
3.1	Unskilled labour	24 [persondays]	4			-
3.2	Skilled labour	12 [persondays]	8			-
3.3	Artisan	2 [persondays]	10			-
Total costs per category						
				of comp share in bldg materials		
	Buidling material			21,366	45,390	66,756
	Biogas materials			-	2,460	2,460
	Company fees	40%			19,140	19,140
	Grand total				66,990	88,356



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