Model N0.1

(cost given may be little older, may compare with the present one)

Large Scale/ Community level Biogas Enterprises for

1. Cooking & Lighting needs- Pipeline supply
2. Rural sanitation

I. Size of Biogas Plant- 85 m3/day
No. of families Beneficiaries—50
No. of Animals—200
Cow dung required—2 Tons/day- 250/Ton
Gas utilization—Cooking or Electricity
If for Cooking – 2 hrs. morning & 2 hrs. evening(1.5 m3/family per day)
Pipeline length—up to 1km. distance
Pipe quality—HDPE, pressurize system—0.3 kg./cm2(Rs. 2.5 lacs cost)
Gas charge—150/month-family
II. Raw material—Cow dung+ Toilet (community-20 toilets costs 1.5lacs)
III. Slurry Management—Biogas digested slurry
Four options-

1. Liquid slurry
2. Recycle water
3. Dry slurry
4. Semi dry

750 kg. semi dry slurry @ Rs. 2/- kg. costs 1500/day

Cost

1. Plant cost—4,50,000/-
2. Pipeline cost—1,50,00/-
3. Appliances 50*400—20,000/-
4. Pressurizing system—2,00,000/-
5. Manpower (mechanic-5,000, helper-3000)—90,000

Income—

1. Gas—150*50= Rs.7500/month= Rs.90,000/yr.
2. Slurry—Rs.1500/day= Rs.5,00,000/yr.
3. CDM benefits – Rs.71,000/yr.

Non- recurring cost—Rs. 8,20,000
Recurring/ Variable cost—Rs. 2,12,000
Manpower-- Rs.96,000
Depreciation—Rs.80,000
Sum of recurring cost- 3,88,000
Revenue generation—5,90,000-3,88,000= Rs.2,02,000

Note- In addition to this Carbon credit benefit to the tune of Rs.71,000/yr. will also be available.

Model N0.1 alternative scenario

Large Scale/ Community level Biogas Enterprises for
1.Electricity Generation and supply for domestic consumption, water supply and community consumption.
2.Rural sanitation

I. Size of Biogas Plant- 85 m^3/day
No. of families Beneficiaries—50
No. of Animals—200
Cow dung required—2 Tons/day- 250/Ton
Gas utilization— Electricity
Domestic connection—2CFL, 1 Fan= 100 Wt.*50=5000Wt.
Water supply connection—4000 Wt.
Community Hall—2 CFL, 2 Fan & 1 TV.= 500 Wt.
Total consumption= 9500 Wt/day say 10 KWt.

Cost

A. Non recurring
Plant cost—4,50,000/-
Electricity distribution cost—2,00,000/-
Genset cost-15 kw.—1,00,000
Genset room cost—1,00,000
Sum =8,50,000
B. Recurring
Manpower (mechanic-5,000, helper-3000)—90,000
Raw material—1,62,000
Miscelineous—50,000
Depreciation—85,000
Sum=3,87,000

Income—
Electricity supply 130 unit @ Rs.6 per unit *365 = Rs.2,84,700/yr.
Slurry—Rs.1500/day= Rs.5,00,000/yr.
CDM benefits – Rs.71,000/yr.
Sum= Rs.7,84,000
Surplus—
7,84,000-3,87,000= 3,97,000

Note- In addition to this Carbon credit benefit to the tune of Rs.71,000/yr. will also be available.

Model 2
for biogas enterprise
Cylindering of methane available from biogas plant for tractors and rural vehicles and production of biomanure

Feasibility analysis for a community biogas plant of 300 M^3 per day capacity with biogas enrichment and bottling plant has been shown below.

Dung requirement -
For 300 q.m. Biogas Plant = 6000 Kgs.
Assuming cost of Dung = 0.20 Rs/kg.
Cost of Dung for Biogas plant = 1200 Rs. per day.

CAPITAL COST –

1. Bio Gas Plant (Digester) Provided by Buyer (@Rs. 3000/- per cubic meter capacity, for 300 cubic meter capacity Rs. 900000/-)
2. Cost of Scrubbing unit Rs. 4,50,000.00
3. Cost of Compressor Rs. 7,50,000.00
4. C.N.G. cylinders Rs. 2,00,000.00
5. Storage tank Rs. 1,00,000.00
6. Installation Exp. Rs. 2,00,000.00

Total Rs. **17,00,000.00**

OPERATION COST -

A. Fixed operational cost-

1. Interest on capital @ 10% per annum= 0.1x 14,00,000 = Rs. 1,40,000 per annum
2. Depreciation @ 5% per annum = 0.05x 42,50,000= Rs.70,000 per annum.

Total cost = 2,10,000 per annum

B. Annual Running (Operational) Cost: -

1. Dung cost 1200x350 = Rs. 4,20,000 P.A.
2. Labors Cost (1 skilled and 2 unskilled labors) 300x 350 = Rs. 1,05,000 P.A.
3. Electricity cost (10 Kwhx12 Hrs) 360x350 @3/- unit = Rs. 1,26,000 P.A.
4. Repair and Maintenance@ 2% capital cost on 14,00000 = Rs. 28,000 P.A.

Total cost = 6,79,000 per annum

Sum of Fixed Operation cost and annual running cost:

=6,79,000+2,10,000 = 8,89,000.00

Total cost of Operation = Rs. 8,89,000.00 /-

Income:-

Total production of Bio Gas per day is 300x80%(capacity utilized)= 240 m^3.
In Bio Gas there is 60% pure methane gas so we can say 240x60%= 144 m^3 methane.
In terms of CNG Cylinder we get total 144 m^3x 76% = 109 Kg.
Each Cylinder has 12 kgs. = 9 Cylinder.
Cost of CBG Rs. 25/- per Kg. 109x25 = 2725.00 Rs.

Therefore income generate by selling CBG in year 2725x350 = 9,53,750.00
= **9.54 Lacs.(a)**

Total production of digested slurry @33% of daily feed = 2000 Kgs.
Yearly production of digested slurry 2000x350 = 700 Tons
Cost of slurry @1/- kgs. X 2000 kgs. Per day = 2000 Rs.

Therefore income generate by selling slurry in year 2000x350 = 7,00,000.00
= **7.0 Lacs.(b)**

Total income from Biogas Bottling plant and Slurry = (a+b)
Rs. 16,54,000.00 (Yearly)

Reasons for switching over to this alternate fuel are mainly:

1. **Economic benefits**: The cost of Compressed Bio Gas (CBG) is almost a third of the cost of petrol in terms of calorific value resulting in substantial saving in fuel cost, and investment on the CBG kit is paid back in a short period
2. **Environment friendly**: the use of CBG as a fuel reduces vehicular exhaust emissions significantly. Carbon monoxide emissions are compared to vehicles that use the conventional fuel- petrol. Carbon dioxide emissions, a cause for Global warming, are also reduced significantly by 10%.

Employment generation in rural areas:

In rural areas the main problem is unemployment. Due to unemployment problems of fulfillment of basic needs like food, shelter, energy and education lead to rampant poverty. Due to the poverty the people belonging to scheduled caste, scheduled tribe and backward caste are unable to give education to children. By this project there is a great possibility of employment generation in villages. For a $500M^3$ bio gas (methane cylindering plant) approximately 60 people can be directly benefited. Some people will be involved in collection of dung, some of them will be required to mix the dung with water and feeding it to biogas digesters, two or three technical persons will be required for operating this plant and some will be required for processing and marketing of bio gas slurry (manure). Farmers are generally reluctant to use manure in their field due to high cost of manure handling and salinity problems associated with manure application. Now the farmers get a trouble free substitute in the form of biogas slurry. Hence, this project

seems to be technologically and financially feasible as a rural enterprise project in the area of energy self reliance for villages.