

**Appendix A**  
**Need assessment survey**

**Survey Questionnaire for acceptance and adoption of TEG cook stove**

**Questionnaire No:**

**Time:**

**Date:**

**A. Basic information**

a. Respondent name:	f. Block
b. District:	g. Village:
c. Panchayat:	f. Pin:
d. Post Office:	g. Pin:
e. Mobile	h. email:

**B. Respondent information\**

a. Age of Respondent :

20-30	31-40	41-50	50 and above
1	2	3	4

b. Occupation of Respondent:

c. Number of family members in household:

d. If the household is under BPL?  Yes  No

e. Annual income :

50,000-1,00,000	1,00,000-1,50,000	1,50,000-2,00,000	2,00,000 and above
1	2	3	4

f. Education of respondent :

Illiterate	1
Literate but no formal schooling	2
HSLC/HS	3
Graduate/Post Graduate	4

g. Level of education of other members

Education	M1(mention M/F/Age)	M2(mention M/F/Age)	M3(mention M/F/Age)
HSLC			
HS			
Graduation			
Post-Graduation			
Any further (details)			

**C. Cooking mode information**

a. Mode of cooking used by the family:

LPG	1
Kerosene stove	2
Biomass cook stove (Traditional or improved)	3
Anything else (details)	4

- b. Number of LPG/month: Cost of a single LPG cylinder (INR/cylinder):
- c. Litres of Kerosene/month:  
 Litres of Kerosene available from subsidy:  
 Price of subsidized kerosene (INR/litre):  
 Price of unsubsidized kerosene (INR/litre):
- d. Amount of firewood/month (kg/month):
- e. Amount of firewood collected (kg/month):
- f. Amount of firewood purchased (kg/month):
- g. Price of firewood (INR/kg)  
 Mode of collection: \_\_\_\_\_ Time devoted for firewood collection:  
 Who collects firewood? \_\_\_\_\_
- h. Time devoted in cooking

Type	Hours
Breakfast	
Lunch	
Dinner	
Any other (details)	

- i. Have you faced any problem related to Indoor air pollution (IAP)? (For biomass cookstove users.)
- j. Who is the household has respiratory problem as a result of IAP?

The cook (usually the wife)	1
Children	2
Any other	3

- k. Have you ever heard of Improved Cook stoves? If Yes, where and how?
- l. Any knowledge on Energy conservation and environment protection?

#### D. Electricity access information

- a. Access to electricity:

Electrified through Grid (APDCL)	1
Not electrified	2
Decentralized electricity (using SPV)	3
Decentralized electricity (using only battery charging)	4

- b. Electricity availability throughout the day:

1-6 hours	1
7-12 hours	2
13-18 hours	3
19—23 hours	4
24 hours	5

- c. Mode of Lighting:

Kerosene lamp	1
Incandescent light bulb	2
Tube light	3
CFL	4
LED	5

d. Other electrical appliances

Type of appliance	Power rating	Operational hours

e. If Mobile phone is available?

Type: \_\_\_\_\_ Battery specification: \_\_\_\_\_  
Charging time: \_\_\_\_\_

f. For decentralized (using battery) electrified household

- i. Cost of battery and other auxiliaries?
- ii. Where is the battery charged?
- iii. Charging cost? (INR/full charge):

g. For decentralized (using SPV) household

- i. Cost of SPV system?
- ii. Operation and maintenance cost?
- iii. Any difficulties? Details.

**E. TEG cook stove acceptance and adoption**

a. Willingness to take TEG cook stove

Yes	1
No	2

b. How much are you willing to pay for the TEG cook stove?

INR 1000-1500	1
INR 1501-2000	2
INR 2001-2500	3
INR 2501-3000	4
INR 3001-3500	5

## Appendix B

Sukhad stove is fabricated using materials viz., clay with additives of cow dung (20%) and rice husk (5%) on weight basis. Based on the dimension as shown in Fig. AB, Sukhad stove is fabricated in the laboratory and field.

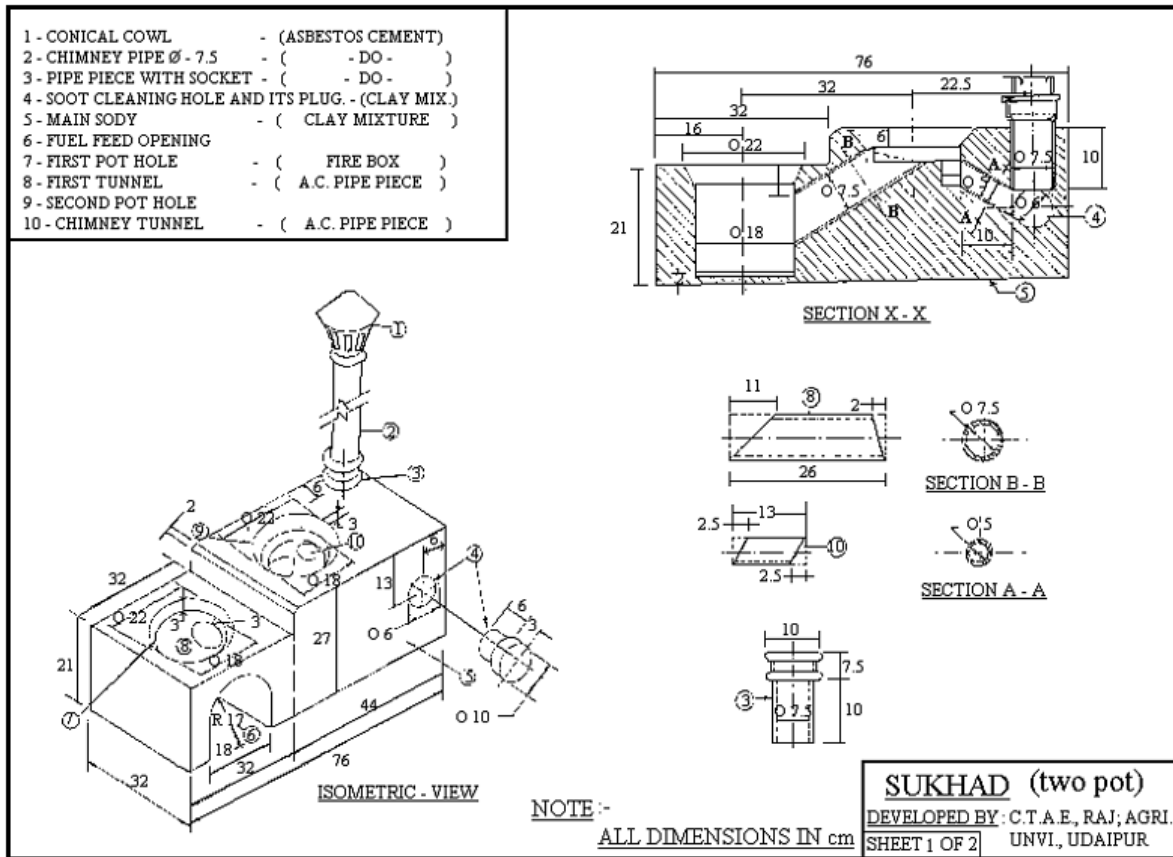


Fig. AB. Technical drawing of *Sukhad* stove

## Appendix C

The actual cost required for fabricating, assembling are considered to estimate the total cost of installation of TIFICS as per the prevailing market price at the time of purchase during 2017. TEG module is the driving component of electricity generation. The market price of TEG available at users' side was considered. Heat collector plate, fixtures and cooling tank includes material and fabrication costs which is estimated as per the local market cost in Tezpur, Assam, India during 2017. The cost of charging circuit includes battery cost, circuit components cost, circuit housing box and fabrication costs. The stove cost includes material and labour costs for fabrication of the stove.

Table C1 Cost of the TIFICS

Component (for a single stove)	Cost (US \$)		
	Single unit	Small scale bulk manufacturing of 1000 units	Large scale bulk manufacturing of 10000 units
TEG module (unit purchase)	50	13	11
Heat collector plate, fixtures and cooling tank	8	5	3
Charging circuit	7	5	5
Stove	10	10	10
Total	75	33	29

Most TBCS are constructed by the one who cooks in the household. Using locally available materials such as stone, clay and sand, TBCS are fabricated. The construction of a single TBCS requires one man day (~8h). Considering the cost of stove materials and wage of a man day, 7.02US\$ is calculated to be the capital cost for TBCS

In the present study the cost components to account for the cost of LPG cook stove include registration cost, LPG bottled cylinder, LPG cook stove or burner and . For the present study, a standard price of LPG cook stove is considered. Households have to apply for a registration in the Government owned LPG gas agency to own a LPG stove. Considering the cost of registration, cost of a standard LPG burner, the cost of LPG cook stove is calculated to be 57US\$.

## Appendix D

### User's experience of using TIFICS

Sl.No.	Household	Comment
1	Household 1	<p>“My name is Riazuddin Ahmed. I have a house with only one room and a kitchen, I earn my livelihood by selling vegetables at a local market. With the earning, I would procure groceries, firewood, and kerosene. First of all, we are happy to be selected as one of the households for TIFICS testing. During the deployment phase of TIFICS, me and my wife would record daily firewood consumption and kerosene consumption, We were surprised to observe the declining rate of firewood and kerosene use through TIFICS. The lighting provided by TIFICS was mostly utilized in cooking and my children’s study hours. Earlier I used to charge my mobile phone in the local market paying an amount of INR 5 which I no longer required to pay”, says the owner of household 1.</p>
2	Household 2	<p>“My name is Saifuddin. I am a farmer and our household is yet to be electrified. We have found TIFICS to be fuel friendly and firewood efficient. The quality of light provided by TIFICS have reduced our kerosene consumption. Earlier, we used to purchase an extra 0.5 l of kerosene without subsidy. Bur during the addition of TIFICS, we are no longer required to depend upon the extra unsubsidized quantity of kerosene. My younger brother could study near TIFICS and both my mother and sister can cook. My sister finds the stove to be clean. There is no indoor smoke In the cooking area. I can also easily charge my mobile phone during cooking” says the owner of household 2.</p>
3	Household 3	<p>“My name is Muklesh Ali. I run my family through farming. We liked TIFICS for the fact it reduced our firewood consumption and kerosene consumption. The quality of lighting TITICS</p>

		<p>provided was better than our 4.7W Solar PV panel which hardly illuminates a LED bulb. My wife had a concern with the refilling of the water tank. The positing of the water tank could be on the side rather than on the back of the stove as filling water during longer cooking is hectic. I would recommend such a stove” says the owner of household 3.</p>
4	Household 4	<p>“My name is Saha Ahmed and I am a vegetable vendor. I used to collect firewood from the river and sun dry them. Collecting firewood for a week’s cooking is a toil on me as it would take two days for which I am devoid of selling vegetables and earning my daily wage. With TIFICS, I learnt from my wife that the firewood consumption have reduced considerably. We used to procure 2 l kerosene at unsubsidized rate. But after using TIFICS, not only did we prevent the unsubsidized share of kerosene but also prevented 1.5 l of subsidized kerosene. My children could study in cleaner illumination from the LED light. We could also have our dinner under the clean source of light. My wife found the stove to be clean and smokeless. One of the concern we had was refilling the water tank. During long hours of cooking, my wife found it tiresome to refill the water tank.” Says the owner of household 4.</p>