TECHNOLOGY FACTSHEET

BIOGAS FOR HEATING AND ELECTRICITY AND EFFICIENT STOVES

1) **Sector:** Commercial and residential sector

2) **Sub-sector:**

3) **Technology name:** Biogas for heating and electricity and efficient stoves

4) **Option name:**

5) **Scale:** Small-scale

6) **Availability:** Available

7) **Technology to be included in prioritization?** Yes

8) **Background/notes**

Biogas for cooking and electricity and use of efficient stoves is mainly suitable for application in rural areas, mostly remote areas with no gas supply and dependant to wood resources. It will lead to less harm to forest resources and reduce of GHG emission subsequently.

Biogas is a gaseous mixture generated during anaerobic digestion processes using waste water, solid waste (e.g. at landfills), organic waste, e.g. animal manure, and other sources of biomass. Biogas can be produced on a very small scale for household use, mainly for cooking and water heating.

A small domestic biogas system will typically consist of the following components:

- Manure collection: raw, liquid, slurry, semi-solid and solid manure can all be used for biogas production.
- Anaerobic digester: The digester is the component of the manure management system that optimizes naturally occurring anaerobic bacteria to decompose and treat the manure while producing biogas.
- Effluent storage: The products of the anaerobic digestion of manure in digesters are biogas and effluent. The effluent is a stabilized organic solution that has value as a fertilizer and other potential uses. Waste storage facilities are required to store treated effluent because the nutrients in the effluent cannot be applied to land and crops year round.

- Gas handling: piping; gas pump or blower; gas meter; pressure regulator; and condensate drain(s).
- Gas use: a cooker or boiler

9. Advantages of the technology:

Biogas can make a positive contribution to multiple goals in government programmes, it has the potential to increasingly become one of the most efficient and economical sources of renewable fuel with anaerobic digestion an economically viable technology for both small-scale rural applications in developing countries.

10. Disadvantages of the technology:

Possible negative aspects of the biogas installations are the possible reduction in soil fertility since animal dung is now used as feedstock for the biogas installation instead of for fertilisation. Another potential problem is related to the possible build-up of pathogens (worms, protozoa and some fatal bacteria such as salmonella) in the biogas system.

11. Implementation assumptions (How the technology will be implemented and diffused across the subsector)

In Azerbaijan, there is a huge potential for application of biogas in rural areas, especially in remote communities still not supplied with gas. Along with social benefits, application of biogas reduces amount of GHG emission.

There were a number of initiatives under different project for application of biogas in rural areas on the country. Besides, private company - Alten Group is pioneering biogas plant production in Azerbaijan.

12. Impact statements (How the options impact countries development priorities)

a) Countries social development priorities
   - improves livelihood of rural population
   - provides sustainable energy supply

b) Countries economic development priorities
   - contributes to socio-economic development program of regions of the country
   - improves security of energy supply

c) Countries environmental development priorities

- Keeping manure and waste in a confined area and processing them in the digester reduces the amount of pollutants in the immediate environment and increases sanitation;
- Households no longer need to extract wood for cooking, which can reduce deforestation levels where people heavily rely on wood fuel;
- The sludge remaining after digestion is a good fertilizer, increasing land productivity (and farm incomes).
- The release of methane is avoided thus contributing to climate mitigation.

d) Reduction in GHG emission over 30 years
   - 1.7 MT

13. Costs

a) Capital costs over 10 years

A rough estimate of costs of a simple, unheated biogas plant, including all essential installations but not including land, is between 75-100 US$ per m3 capacity. 35 - 40% of the total costs are for the digester Price estimates of the cost of a small household unit somewhat around 2000-2500 US dollars. Rough estimates for capital costs will be 1.800.000.000 USD

b) Operational & maintenance costs over 10 years

The equipment requires on average 10% operational or maintenance expenses – 180.000.000

c) Cost of GHG reduction

0.055 USD per kgCO_2

d) Other costs

Additional expenses will be need for raising awareness of rural population on application of the technology