

### WHO WILL GAIN FROM PRODUCER GAS? THREE QUESTIONS

The SIDO/THI Progress Report of July 1980 on the Gasification by Partial Combustion Project in Tanzania<sup>1/</sup> states (p.2):

"Typically the efficiency of a well operated gasifier is around 70%, meaning that the combustion heat of the gas produced is about 70% of the combustion heat of the original dry solid fuel. As a result of this the gas obtained from 3.5 kg of dry solid waste will deliver the same amount of energy as 1 kg. of diesel oil or petrol, when applied in an internal combustion engine".

Without going into details, it looks as though there is here a very promising technology with many desirable features:

- uses local organic material (wood, wastes etc.)
- fairly simple to construct, maintain and operate
- fairly small-scale
- probably cheaper than diesel/oil/electricity in most places
- substitutes local renewable resources for imports, at a time when many countries face severe foreign exchange problems.

At this stage the natural tendency will be to concentrate attention on technical and economic aspects, and on the acceptability, adaptability, and field operation of producer gas power sources. These pose such important,

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<sup>1/</sup> H.E.M. Stassen and T.Zijp, The Gasification by Partial Combustion Project in Tanzania, Progress Report July 1980, Small Industries Development Organization, P.O.Box 1278, Arusha, Tanzania, and Twente University of Technology, P.O.Box 217, Enschede, The Netherlands.

interesting and challenging questions that, as with other technology which has impacted on rural societies, it could be only later that "who benefits?" questions are asked. This note is a plea that the "who benefits?" questions be asked now while there is still time to influence R and D decisions.

The danger is that, wittingly or unwittingly, those engaged on the R and D will generate technology which will once again fit the resources and interests of those who are less poor and more powerful, and miss opportunities for so designing and introducing it so that those who are poorer and weaker are major beneficiaries.

There are three potential uses where the "who benefits?" question can immediately be raised:

(i) Lift Irrigation in South Asia. Which farmers will benefit from water lifted by producer gas power? At present there may be a "power gap" between on the one hand human and animal energy for lift (up to perhaps one HP), and on the other hand the conventional diesel and electric pumpsets, usually of 5 HP and coming down in scale no further than 3 HP. Evidently below 3 HP there are serious diseconomies of small scale. This means that a farmer who has more land than can be irrigated by animal lift but less land than a 3 HP pump can irrigate may find there is no appropriate scale of lift technology available. Such farmers, in India alone, must number hundreds of thousands, and probably millions.

The work done so far has apparently been in the range of 15-300 kw, or roughly 20-400 HP.

QUESTION ONE: Can Producer Gas Units and the Pumps they operate be so developed that they fill the lift irrigation gap and meet the needs of many small farmers?

(ii) Road Transport in East Africa. It is precisely in the remoter areas of countries such as Tanzania and Zambia that the poorest people are often to be found, and that income-earning opportunities are least in the dry seasons. These are also areas which have suffered more and more acutely from rises in the cost of transport. If transport in these areas was run off producer gas, one question is: who would supply the feedstock, and who would benefit from its sale? One danger might be that the R and D would be based on forms of preprocessing of feedstock, e.g., wood, which were beyond the means of poor rural people. On the other hand, if it were possible for the feedstock to be prepared without expensive or complex preprocessing, then one can envisage a scenario in which during the agricultural off-season (when most rural travel takes place anyway, because the roads are dry), people would cut and prepare wood and other organic material which they would then sell (much as charcoal is sold) at the roadside to passing vehicles. Each poor rural person could, in effect, become a gas station selling fuel.

QUESTION TWO: Is it possible to develop producer gas generators for road transport so that rural people (with axes, pangas, cutlasses only) can cut, gather, prepare and sell the feedstock?

(iii) Domestic Cooking. Producer gas appears potentially more efficient than either charcoal or woodfuel as a source of energy for cooking, even with improved charcoal or woodfuel stoves. But the scale required may over-produce the gas, leading to the familiar biogas problems of large-scale which either require difficult and improbable arrangements for sharing or are suitable for only large consumers like institutions.

QUESTION THREE: Is it possible to develop a producer gas generator suitable for cooking by a single family?

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