

## Executive Summary

Based on available studies, there seems little doubt that large-scale substitution of traditional biomass fuels by LPG presents several advantages. For example, it would:

- Improve health for the many poor people directly affected by the indoor pollution caused by household fuels;
- Reduce emissions of total greenhouse-related pollutants compared to solid fuels, such as biomass and coal used in traditional stoves;
- Reduce pressure on natural forests in some parts of the globe (although it is not known exactly what percentage of wood fuel is harvested non-renewably);
- Increase availability of agricultural wastes for soil enhancement and other purposes in some regions;
- Eliminate time and labor now devoted to gathering biomass fuels and reduce efforts devoted to cooking, and cleaning, potentially benefiting women and children in many regions.

Although many of these same benefits would accompany a large-scale switch to kerosene, the air pollution benefits of kerosene are lower than with LPG, with the added negative point for kerosene of the risks of child poisoning and fire.

As indicated in Figure 1, depending on which fuels and stoves are currently in use, substitution of these in favor of LPG could have significant

co-benefits in the form of lower pollution levels in households and lower GHG emissions.

In spite of these significant potential advantages, however, there are two major barriers to any widespread dissemination of LPG to the world's poor:

- Firstly, LPG is relatively expensive, compared to resources available to the poor from their own income or from current levels of international aid.
- Secondly, the methods to disseminate LPG are not well developed because of the mis-targeting and leakage that occurs with subsidies as practiced to date.

Both of these problems, however, can be potentially addressed by additional efforts to develop...

- A complete cost/benefit calculation that takes into account the following:
  - the value of improved health
  - the value of the significant time savings (no more gathering of biomass fuels)
  - ecosystem protection
  - climate protection

A cost/benefit calculation that includes these points may tip the cost equation in favor of LPG, or at least make the needed residual subsidy affordable.

- Clever and institutionally robust means to promote and distribute LPG and other clean fuels.
- Effective public-private partnerships that engage the local and international LPG industry in the on-going effort to promote and distribute LPG.

It seems clear that additional research and development in these areas would be well rewarded because the lives of hundreds of millions of people could be improved as a result.

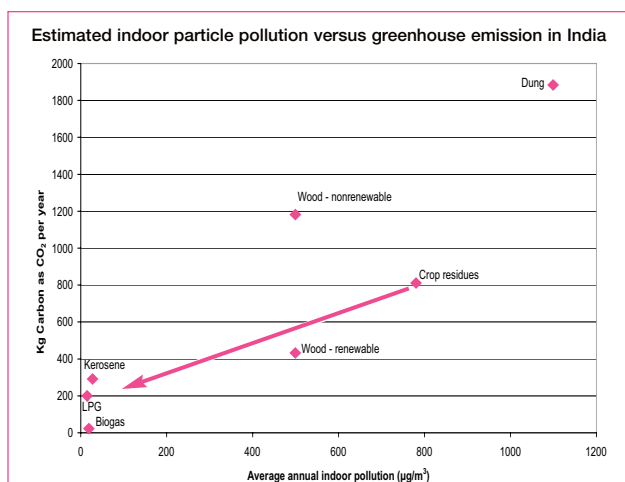


Figure 1. Co-benefits for climate and health of changes in household fuels in India. For comparison, the health-based standard for particle air pollution is about 50 µg/m³. The arrow illustrates a shift from crop residues to LPG for one household, which would decrease indoor air pollution by 95% and GHG emissions by 75%. (Data from (Smith, Uma et al. 2000a; Smith, Zhang et al. 2000b))