



World Business Council for  
Sustainable Development

Case study

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## Shell

# Searching for sustainable solutions to indoor air pollution

Indoor air pollution (IAP) kills more than 1.6 million people each year – one person every 20 seconds -- and some two billion more are at risk. It kills more people than malaria and nearly as many as unsafe water and poor sanitation. It is the fourth largest health threat to women and children (in the world's poorest countries) after water-borne diseases, malnutrition and HIV/AIDS.

The smoke from open fires fills homes with a noxious cocktail of particles and chemicals, often 100 times above agreed international exposure standards. These particles double the risk of respiratory diseases such as bronchitis and pneumonia. Recent research also points to links between indoor air pollution and low birth weight, increasing the vulnerability of the newborn.



In October 2004, the World Health Organization (WHO) and the United Nations Development Programme (UNDP) labeled Indoor Air Pollution the “Killer in Kitchen”. IAP is also part of a well-known poverty chain (the poor, not able to afford cleaner commercial fuels, must spend many hard hours collecting “free” biomass fuel) whose indirect costs on time and health are enormous.

Cleaner fuels such as electricity and gas have not reached remote developing markets because of high equipment and distribution costs. But access to cleaner fuel and stoves, improved ventilation and health education can all work in tandem – to benefit even the very poorest.

### The Shell Foundation approach

For these reasons and because IAP is the most serious energy and poverty-related health problem, the Shell Foundation has committed US\$ 10 million to tackle IAP through its Household Energy and Health Programme, branded as “Breathing Space”. Breathing Space’s approach is to identify, test and then ideally diffuse “market-based” schemes for getting killer smoke out of very large numbers of very poor people’s kitchens. Under this program supply- and demand-side interventions based on business and market principles are being piloted in eight developing countries.

Shell adopted this approach for three reasons. First, distorting regulations including price control and subsidies to national companies, health and safety concerns and geography have kept commercial suppliers of cleaner fuels from entering a market segment it perceived as having customers with no money to spend. Second, IAP as an issue has failed to attract much donor funding compared to other poverty/health/environmental problems. It remains a major problem with low visibility since it mainly affects the most disenfranchised – poor women and children.

Finally and most pertinent, interventions which have received donor funding have not produced real progress on a significant scale. This is partly because of limited funding, but largely because the solutions offered were basically subsidized, technical fixes -



mostly “cleaner” stoves. These were often designed elsewhere and bore little relation to what the market (millions of poor households) wanted and could afford, or to what is needed to overcome the IAP problem.

### **A new customer value proposition needed**

A new generation of stoves has been designed to effectively reduce emissions, but they are significantly more expensive than the lower-cost “efficiency stoves”, increasing the barriers to access for poorer customers. In some cases these improved biomass stoves are more expensive than liquid petroleum gas (LPG) stoves. But LPG as a fuel is often not available in rural areas. The combined effect of these product limitations and the low availability of desired alternatives is that there is often a very poor customer-value proposition for new stoves and fuels. Consequently, demand is low and marketing costs are high.

Against this backdrop, the Shell Foundation reasoned that by successfully demonstrating that there might be at least partially market-based approaches to tackling IAP, it might be possible to break the vicious cycle of ineffective international development community interventions by better understanding and tackling the market barriers. This in turn might provide the impetus to attract sufficient donor and/or private sector interest to engage in an avoidable poverty problem that has probably caused 40 million unnecessary deaths over the last 20 years.

## **Partnering to find solutions**

The Shell Foundation started their work with a stakeholder consultation and a typical donor “Request for Proposals” (RFP), asking for potentially commercializable and scaleable ways of tackling IAP. The RFP attracted about 140 proposals, primarily from NGOs, of which most addressed the IAP issue but failed to understand what the Foundation meant by commercializable or scalable solutions to IAP.

The next task was then to set up pilot projects with some very good NGO partners in a number of countries to systematically explore different market-based IAP solutions. These included the development and sale of cleaner stoves, cleaner fuels, use of consumer finance on a micro-credit model, consumer education and reducing costs through mass production and distribution, etc.

## **Key actions for the pilot phase**

Through these pilot projects, the Shell Foundation and its partners have tried to learn whether:

- a. The target market – rural households suffering from IAP – has an interest, willingness and ability to pay for IAP solutions;
- b. The improved products really reduce IAP exposure;
- c. There was some form of business, manufacturing, financing and distribution model that could produce and market appropriate and affordable IAP products to very poor households.

In parallel, the Foundation carried out a systematic review of the only two large-scale household energy programs in the world: the National Improved Chulha Programme in India and the National Improved Stove Programme in China. Lessons from these two programs have been extremely valuable in developing Shell’s approach, both in terms of what has worked and what has not. In both cases the programmes were highly subsidized but had mixed results in reducing IAP.

The China program is largely deemed a success and has led to the establishment of a thriving stove market as well as some excellent technical innovations. The Shell Foundation review was the first of the program since the 1980s and has brought the China experience to the attention of the international community. Neither program is



being continued by the national governments. In the case of China, the government deemed the successful commercialization of stove production and sales a sufficient sign of sustainability in the supply chain. In India and China some state level government agencies have continued the programmes.

### More than money

In addition to providing financial resources to the pilot projects, Shell's Breathing Space program has three features:

- The provision of significant technical and business assistance to partners through intensive hands-on engagement by Foundation staff, local Shell staff and finance and business consultants;
- Separately funded complementary activities designed to answer key developmental and commercialization questions raised by the pilot projects. These include development of a standardized monitoring methodology to assess the key actions described above.
- The development of a second set of tools for market research, demand assessment, supply-chain development and sustainable financing.

### Reducing risk, now and in the future

To date 250,000 households have been removed from risk through efforts in getting smoke reducing products to poor households. This figure will rise to more than a million by the end of the pilot phase in 2005 at a total cost of US\$ 7 million. Although this is the first systematic IAP intervention ever mounted on a global scale, it is still limited compared with the extent of the problem.

However, a number of the interventions tested are robust enough to take to scale. Next stage scale-ups underway in India and Guatemala, based on financially viable business models, are targeting three million households.

By 2008, using the Shell Foundation's own resources as investment capital and "smart subsidies" provided by other international and national organizations through government and non-governmental development programmes, the target is to get 10 million households out of risk. In parallel, they are exploring the feasibility of building strategic partnerships and setting up financially viable intervention mechanisms at the international and national level.

### Having an impact

Overall, experience to date on the impact of the various interventions is mixed. While a wide range of interventions is available, access by the poor is still very limited because of low awareness, poverty and inadequate or inappropriate supply. In addition, too few interventions have been evaluated and, where these impacts have been studied, most of the information relates to changes in indoor air pollution levels, and to some extent, exposure and fuel efficiency, rather than health effects.

It is unfortunate that all too often, monitoring and evaluation of project results are overlooked. It is very important that effort be put into more a systematic evaluation of household energy interventions.

Reductions in pollution achieved by interventions vary markedly. Generally, among poor dependent communities where initial levels of pollution are very high, it has been difficult to achieve extremely low levels of pollution and exposure. When interventions are taken up by only part of a community, reductions in personal exposure will tend to be limited due to – among other factors - exposure from other nearby homes.

## Lessons learned

The Shell Foundation has learned the value of and how to introduce “business DNA” into a development project context and how to help NGOs adapt more business-like practices into their skills and ways of working. This is essential to meeting the demands of financially sound ways of tackling a classic poverty challenge.

This has not been an easy task. The non-monetized nature of the biomass fuel market (it’s free), high distribution costs for new fuels and equipment in rural areas, differences in tastes and diets, and the nature of the product offering mean that the most effective business models are often decentralized. They must bundle together a network of dozens and even hundreds of micro-enterprises. The most successful pilots have combined centralized component production, quality control and supply-chain management with decentralized installation and assembly of products, linked to a network of social service providers (such as local NGOs) which provide the link to communities, social marketing and awareness raising.

**Successful approaches need partnership action**, starting with national level collaboration and agreement on policy. But they must maintain the commercial integrity of the supply chain by keeping it separate from whatever facilitation process is used to get the product to the end customer.

**Interventions must be locally appropriate** and available through (local) market mechanisms. It is important that programmes involve communities, and especially women, in assessing local needs and identifying suitable interventions. There is also increased recognition of the value of micro-credit, particularly where interventions with large up-front costs are being considered.

Other advantages of this combined public-private model is that the NGOs or public institutions can provide some of the ongoing training on stove maintenance and inspect installed products. Links to micro-finance institutions and other financing mechanisms (such as revolving funds that provide both enterprise financing to businesses in the supply chain, and consumer finance to end customers) can enhance market growth and scale up.

The pilots have demonstrated there are some viable business models, supply chains and consumer financing mechanisms that could be brought to bear on the IAP problem on a large scale. This has given the Shell Foundation the confidence to take the next steps in its going-to-scale journey.



In Guatemala alone, for example, this means moving all project personnel involved out of the comfort zone of managing a typical, subsidized, low-risk (to the implementers and funders) poverty project with a target population of 5,000, to planning and implementing a self-financing market entry and distribution strategy to get IAP interventions sold into a significant percentage of the 600,000 at-risk and very poor households. Meanwhile, in one state in India, the scale-up approach will reach over three million people, from a pilot level of 100,000.



## The case of India's smokeless village

The women in the Indian village of Khanav, south of Mumbai, have turned their community into a "smokeless village". These women, led by the village self-help group, don't want to cough and wipe smoke from their red eyes each time they cook. Nor do they want to spend hours collecting wood from surrounding fields.

### Local solutions

The local self-help group lends money to village households so that the 300-rupee (US\$ 7) cost of an improved stove can be paid back over months. The richer households subsidize even the very poorest villagers -mostly migrant workers - so the "smokeless village" goal is achieved.

### Time saved

The self-help group has also demonstrated its entrepreneurial flair by showing how village women can use the time once taken up by finding wood to be more productive and raise incomes. The village has plans to use the community hall as a workshop for producing handicrafts.

"I used to burn 10kg wood each week but now I only need 5kg. It used to take me three days to collect this wood but now it takes only half that time. And cooking time is now one hour instead of two." -- Mrs Shashikala S Patil, a member of the self help group

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### About the WBCSD

The World Business Council for Sustainable Development (WBCSD) is a coalition of international companies united by a shared commitment to sustainable development via the three pillars of economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a Global Network of 48 national and regional business councils and partner organizations involving more than 1,000 business leaders globally.

4, chemin de Conches  
CH – 1231 Conches-Geneva  
Switzerland

Tel: +41 (22) 839 31 00  
Fax: +41 (22) 839 31 31

E-mail: [carpenter@wbcSD.org](mailto:carpenter@wbcSD.org)  
Web: [www.wbcSD.org](http://www.wbcSD.org)