

LP Gas Rural Energy Challenge

A public-private partnership initiative
between the UN Development Programme and the World LP Gas Association



The LP Gas Rural Energy Challenge is designed to create viable and sustainable markets for LP Gas delivery and consumption as a means to generate a wide range of productive services contributing to sustainable energy solutions to improve people's lives in selected developing countries.



LP Gas Rural Energy Challenge - a fabulous fuel for development

Objectives

Access to modern energy provides the productive capacity for stimulating economic development and reducing conditions of poverty while improving health, air quality, productivity, comfort, education, and hardships imposed on women and children.

By delivering cleaner, modern fuel in the form of LP Gas, and creating sustainable markets for its consumption and use, the LP Gas Rural Energy Challenge provides rural communities with the means to generate a wide range of consumptive and productive services in order to deliver vastly improved living conditions.

Because it is portable, clean, safe and extremely efficient in generating heat, LP Gas is major step up on the energy ladder and presents an excellent option for delivering energy services in rural areas where few viable alternatives exist. These characteristics demonstrate immediate value to households by providing more efficient and cleaner means by which to cook food, heat water, or light homes -- services which contribute to a better quality of household life. Importantly, they liberate women and girl children from time spent collecting traditional fuels (e.g. firewood, charcoal, biomass), enabling them to pursue education or value-added economic activities within the community.

An important premise of the LP Gas Rural Energy Challenge is that LP Gas is a resource which generates multiple productive services extending well beyond the household, providing the means by which to improve community life, health and sanitation and also to develop micro-economies and generate income at the community level. Access to LP Gas in these rural communities also extends to the creation and/or modernization of small commercial and manufacturing enterprises such as food preparation and processing, agriculture, cleaning and sanitation, and metal works. To achieve this LP Gas must be affordable, accessible, safe and reliable in the local marketplace.

The LP Gas Rural Energy Challenge partners hold the common conviction that the growing demand for energy services in developing countries presents an historic opportunity to satisfy this demand in ways that are compatible with sustainable development. In particular expanded access to LP Gas can have profound and beneficial effects on the economy, environment and the quality of rural life.

Why LP Gas?



For decades the portable nature of LP Gas has enabled rural communities (in both developed and developing countries) to have access to modern conveniences when and where costly, grid-based energy services are unavailable. LP Gas can be stored, easily transported and used virtually anywhere from downtown urban areas to remote regions of the globe. This comparative advantage, in particular, means that it can deliver immediate benefits related to social, environmental and economic priorities of sustainable development.

It works. Today hundreds of millions of people use LP Gas for cooking. Extending this proven, high-value service to rural communities in the developing world elevates household living conditions and productivity and delivers an immediate opportunity for women and girls to more actively engage in the social and economic fabric of the community outside the household.

It's adaptable. The availability of this multi-purpose fuel presents significant opportunities for extending energy services into the community and for generating value-added commercial and industrial applications.

Airborne Emissions for Household Cooking Stoves, India
(g/MJ delivered energy)

Fuel	CO ₂	N ₂ O
LP Gas	126	0.002
Biogas	144	0.002
Kerosene	138	0.002
Wood fuel	305	0.018
Crop residues	565	0.028
Charcoal	710	0.018
Dung cake	876	0.022

Source: US Environmental Protection Agency

It's clean. LP Gas burns cleanly without smoke or residual particulate matter and with relatively low pollutant emissions. These inherently 'clean' characteristics are especially important for reducing indoor air pollution associated with traditional fuels. At the household and workplace level, the use of traditional fuels for cooking and heating can produce large amounts of air-borne pollutants, which cause serious health problems. Indoor pollution from fuel use is thought to account for as much as 4-5% of global disease, with women and children generally suffering the most. Because LP Gas has negligible emissions of the toxic gases that can cause serious health problems, the health benefits of switching to LP Gas can be considerable (see table).

Lower greenhouse impact. LP Gas may not be a zero-greenhouse gas (GHG) fuel, however, it can make immediate contributions to delivering real GHG reductions. Simple stoves using traditional fuels are not a major contributor to global GHG emissions, however, they do produce substantial GHG emissions per unit of energy delivered. This is because they divert a substantial amount of the fuel into incomplete combustion products, most of which, like methane, rate more strongly as a GHG than carbon dioxide (CO₂). Such fuels can therefore produce substantially more GHG emissions per meal than LP Gas. In commercial and industrial boilers, petroleum fuels emit 32% more GHG emissions compared to LP Gas; coal 43% more, and wood 78% more. Additionally, it is believed that a significant number of households are harvesting biomass fuels unsustainably or taking them from more productive applications, such as soil maintenance. These practices contribute to deforestation, reducing the capacity of forests to sequester CO₂ and threatening bio-diversity.

It's available. Worldwide, more than 200 million metric tonnes are produced each year and supplies are projected to increase 4-5% per year. With LP Gas there is nothing exotic to invent or improve. With LP Gas, the transportation system is in place, the tanks to store it are available, the appliances and equipment that provide heat and power are simple, reliable and proven in hundreds of millions of applications worldwide.

Putting LP Gas to work

Beyond its use in households, there are many other opportunities for LP Gas to contribute to improved living standards for rural communities. LP Gas in combination with simple, reliable appliances and proven technologies is a valuable resource that generates multiple productive services, applicable in several economic sectors: Residential and commercial; industry; agriculture and transportation.

In the household. A compact LP Gas system supplied from a portable bottle of LP Gas gives rural, low-income families access to modern cooking, space and water heating, drying and lighting services. In order to meet these important domestic needs, the LP Gas Rural Energy Challenge will initially focus on delivering these services, thereby providing many households with a first opportunity to replace traditional cooking fuels with modern energy. The introduction of LP Gas into these critical domestic markets can then be leveraged to extend modern energy services to the wider community and for cultivating commercial and industrial growth in the local economy.



In the community. Community planners need not wait for natural gas or electric grid systems to be installed in order to give citizens modern energy services. LP Gas can be used to provide community services which benefit groups of residents. For example, LP Gas can be used for shared refrigeration, building and street lighting (flame and electric), water heating for public shower and sanitation facilities, and even mosquito control. LP Gas, when combined with generator kits, can be used to electrify health care centres and government buildings.

In the economy. Energy use is strongly linked to economic development. At the local and national levels, LP Gas can provide energy services needed to create jobs, develop industries, enhance value-added economic activities and support income-earning activities in rural areas. These can in turn catalyse the creation of micro-enterprises and locally owned businesses.

- **Commercial sector:** Applications include commercial food refrigeration, preparation and processing (restaurants and small and large-scale catering), and water and space heating in offices and other commercial premises.
- **Industrial sector:** LP Gas provides a wide range of industrial processes and services, notably a high degree of precision and flexibility in process temperatures - as well as a strong flame - when required. Common applications include heat treatment furnaces, direct firing of ceramic kilns, glass working, textile and paper processing, paint drying, cotton singeing, metal works, and the brick, glass and pottery making. LP Gas can also provide back-up reliability for industrial electricity generators. These industrial applications catalyse the development of a variety of micro-enterprises and generate income at the community level.
- **Agriculture:** LP Gas is used to increase the production and the quality of farm products through weed flaming, crop harvesting and crop drying. It is also used to heat breeding houses for livestock and poultry and power farm equipment such as irrigation pump engines.
- **Transport:** LP Gas is increasingly used as a low-emission alternative to traditional road-transport fuels such as gasoline and diesel consumption in taxis, buses and private cars.

LP Gas -- Pathway to renewable energy systems

The introduction of LP Gas enables households to progress up the energy ladder toward more sophisticated appliances - thereby creating an energy consumption market and enabling households to utilize modern energy for the first time. This helps to establish a cost effective transition to renewable energy supplies by building a solid base of modern energy users throughout a community. Moreover, LP Gas fosters a habitual system of household energy payments, which reduces market risk perceived by project developers and investors in advanced renewable technologies.

- LP Gas can provide a practical and reliable back-up supply or hybrid energy source to compensate for the intermittent nature of renewable energy during those times when there is insufficient wind or solar power.

The partnership approach

The LP Gas Rural Energy Challenge is a public-private partnership initiative between the United Nations Development Programme (UNDP) and the World LP Gas Association (WLPGA). It is designed to create viable and sustainable markets for LP Gas delivery and consumption in order to generate a wide range of productive services contributing to sustainable energy solutions for rural and peri-urban populations in selected countries.

The partnership draws on combined strengths and collective action to mobilise public and private sectors in ways that benefit society and companies, improving social and economic conditions, and creating viable new markets for LP Gas products and services. The LP Gas Rural Energy Challenge integrates private sector contributions in service delivery and investment financing with government facilitation of the necessary enabling environment. Communities and local NGOs strengthen the effort by providing a critical support function at the project implementation level. The development assistance community contributes by supporting technical assistance and capacity building. As the partnership succeeds, communities and individuals benefit through improved access to LP Gas and modern energy services, governments advance social and economic development objectives and private enterprise expands business opportunities -- resulting in a win-win-win situation that is the ultimate aim of the LP Gas Rural Energy Challenge.

The LP Gas Rural Energy Challenge was formed in active response to sustainable development objectives set forth most recently by the World Summit on Sustainable Development (Johannesburg 2002), which recommended joint actions to "...improve efforts to work together at all levels to improve access to reliable and affordable energy services for sustainable development sufficient to facilitate the achievement of the Millennium development goals, including the goal of halving the proportion of people in poverty by 2015, and as a means to generate other important services that mitigate poverty..." Wider access to energy services is a necessary condition for meeting most of the targets outlined in the Millennium Declaration. WSSD also called upon business to engage with wider stakeholders in public-private partnerships in the field of access to energy, including renewable energy and energy efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies.

The LP Gas Rural Energy Challenge is a response to the UN Secretary-General Kofi Annan's Global Compact, inviting business leaders to come together with UN agencies, labour, and civil society to advance responsible corporate citizenship, create a more sustainable and inclusive global economy, facilitate cooperation among key stakeholders, and promote partnerships in support of UN development goals.

What are the expectations?

- Private companies working with local partners to invest capital and commit human resources toward the creation of economically viable LP Gas rural energy projects.
- Improved livelihoods for the poor by providing increased access to LP Gas and the services it provides - thereby contributing towards achieving Millennium Development Goals and WSSD declarations for reducing poverty and hunger, improving health conditions, contributing to the empowerment of women, and creating economic activity, jobs, and increased value-added production.
- Establishment of new, viable markets for LP Gas delivery and consumption, products and services in rural and peri-urban areas of developing countries, in accordance with industry guidelines on good business and safety practices.
- Enhanced enabling regulatory environments which facilitate the establishment of LP Gas businesses and delivery of LP Gas to markets, e.g. rational energy consumption policies, tax policies and incentive programmes; and a competitive energy market free of barriers which discourage investment in LP Gas distribution.
- Government and consumer awareness of the costs and practical benefits of LP Gas (compared to traditional fuels), as a basis to enable long term market expansion.
- The initiation of at least one outstanding LP Gas rural energy development project in each targeted country for consideration by relevant private investors, development banks and donor agencies as a priority for project financing.
- A valuable and practical learning curve (e.g., lessons-learned and innovative, good practices) useful for replicating the LP Gas Rural Energy Challenge model and projects in rural communities in other developing countries.

The LP Gas Rural Energy Challenge in action

Steering Committee

The LP Gas Rural Energy Challenge is governed at the international level by a Steering Committee, led by UNDP and WLPGA, which provides strategic leadership, oversees programme design and implementation, and provides direction to the activities of National Level Planning Groups (NPG) established in each of the selected 'Challenge' countries. The Steering Committee, for example, ensures that adherence to good business and safety practices are a precondition to any NPG proposal for a pilot project. The Steering Committee will structure a workshop in each country to initiate activities at the national/local level and make decisions regarding the constitution of the resulting NPG, its objectives, work programme, participants and accountability of NPG members. It will monitor progress on project development and implementation and provide feedback to NPGs on addressing barriers and next steps. It will be responsible for approving NPG-proposed projects to ensure that they subscribe to the common objectives of the partners. The Steering Committee will also aim to secure funding for NPG core activities and supplementary project development financing for implementing NPG projects.

National Stakeholders

National Planning Groups. The National Planning Groups are the implementation arm of the LP Gas Rural Energy Challenge tasked with establishing national level partnerships to enhance conditions for the improved access, distribution and safe use of LP Gas services and appliances in rural communities. The NPG is led by the UNDP Country Office and is comprised of LP Gas industry representatives, national government planners, local government agencies, technical experts, consumer organisations, NGOs, communities, financiers and other relevant local representatives committed to expanding LP Gas services. NPGs will be responsible for assembling and working with local LP Gas Rural Energy Challenge partners and devising and implementing rural LP Gas distribution and consumption projects. NPGs will also investigate all formal tenders available for funding potential pilot projects.



Local Partners. The local partners provide the knowledge critical to the design and implementation of the projects. In particular, they can assist with creating regulatory environments which facilitate the delivery of LP Gas, the collection of user fees, and improve purchasing power of rural customers (e.g. micro-credit programmes). They can identify market niches, distribution channels, and communicate the value, health advantages and safety of LP Gas use to local customers. Local NPG partners can also assist with organising local labour resources and developing innovative production and distribution processes, e.g. bottling, small bottle sizes, and capitalising on the use of existing distribution networks of other products. Local partners, working with LP Gas companies, can set up sales organisations, conduct market research, and identify the services that customers want and which they can afford.

Local/National LP Gas Companies. The local LP Gas marketing companies are critical to the successful establishment and operation of rural LP Gas distribution. They will work with local partners to invest capital and commit human resources toward the ongoing creation of viable businesses for delivering LP Gas to new markets. LP Gas companies will focus on building supply and distribution infrastructure, and may play a role in the production of specifically designed equipment, such as small bottles and burners. They will also contribute knowledge and expertise to local governments in designing appropriate tariff systems and establishing operable fee collection systems.

In-Country Operations

The key to creating successful projects and building viable LP Gas markets will be to establish a working dialogue between the different stakeholder groups at the national and local levels. The initial focus of each NPG will be to explore the parameters limiting the delivery of LP Gas to rural communities (e.g. existing conditions; previous efforts; energy sector regulations and policies; partner capabilities). Based on the analysis of restrictive bottlenecks, the NPG will set forward priority areas for action to be addressed in advance of a mature project proposal. The NPG will then move from analysis to concrete identification of joint project level opportunities for LP Gas business development and expanded consumer access to LP Gas. The term project is used “broadly” and refers to any follow-up action intended to address the bottleneck issued identified and the solutions proposed (e.g., policy, investment, further analysis, and training).

Among various potential focus areas, the NPGs may consider recommendations for the rationalisation of taxes and incentive programmes, or mechanisms for reducing fuel costs and improving purchasing power of rural customers (e.g. micro-credit programmes). Specifically, the NPGs may consider practices and projects including those which:

- Reduce the price/deposit of the cylinder and burner (or increase access to credit);
- Instigate the manufacture or introduction of small size LP Gas cylinders;
- Instigate the local manufacture of LP Gas burners;
- Create small local bottling facilities or mobile filling stations;
- Provide training for LP gas operating personnel and customers, including safety and the safe handling of LP Gas cylinders.
- Use/expand existing non-LP Gas product distribution networks;
- Expand the storage capability for imported LP Gas;
- Introduce small business and consumer financing schemes;
- Provide information on LP Gas consumption and sales;
- Assist with developing payment collection plans and collecting information on ability to pay;
- Establish local sales organizations;
- Deliver market research, such as identifying products and services customers want and can afford.



Financing First Costs


One of the principal barriers to the penetration of LP Gas into poor rural communities is the high (relative to income) first cost of the purchase (or deposit) of the cylinder and the burner. These two items, together with a six kg cylinder of LP Gas can cost US\$45 - 60.

An option to overcome the up-front cost would be for a bank or financial institution to offer financing for the cylinder and appliance over a year or more. Likewise, partners may propose projects to reduce the cost of individual outlay by rural users by introducing smaller LP Gas cylinders. Additionally, equipment (and if necessary fuel) subsidies from host governments may be a viable approach for assisting narrowly targeted new rural users. In all cases, there are strong arguments for using the community's associative mechanism as a vehicle for this financing, and making the community jointly and individually responsible for repayment. This approach has been applied successfully by the UNDP in Brazil in establishing a financing mechanism for a Photovoltaic electrification project.

Energy Service Companies (ESCOs) can assist with first cost barriers by providing energy to customers on a fee-for-service basis, retaining ownership of some or all of the energy equipment, collecting subsidies and investment incentives, and amortizing the balance of equipment costs in customer fees. An affordable 'connection fee,' would be collected, offsetting some equipment costs, with the remainder amortized by part of the fee charged for each refill. If the customer returns the bottle for refill, credit risk and collections costs for LP Gas decline significantly.

About the partners

The LP Gas Rural Energy Challenge is a partnership between the United Nations Development Programme (UNDP) comprised of its Sustainable Energy Programme and the network of UNDP Country Offices; and the World LP Gas Association (WLPGA) and its member companies. The partnership is based on a practical mix of complementary competencies and resources.

	
<p>WLPGA provides experience on the global LP Gas industry and expertise with identifying viable project locations and convening capable industry partners. It provides expertise in developing practical business models and market criteria for creating economically viable LP Gas development projects and sustainable markets for LP Gas distribution and consumption. WLPGA delivers a network of technical experts and offers education and communication strategies for explaining and demonstrating the practical benefits and costs of LP Gas to rural communities and stakeholders. WLPGA members include national and international companies that have expertise with the LP Gas energy supply chain, distribution networks, appliances and emerging technologies. Companies also bring investment capital for expanding infrastructure, delivery systems and marketing.</p>	<p>UNDP Sustainable Energy Programme provides experience in addressing poverty-energy linkages, facilitating development projects, formulating sustainable energy development policies and programmes, and in mobilising financial assistance -- both for core funding and project development financing. The UNDP Country Offices provide in-country project development expertise, established and trusted relations with governments, local NGOs and civil society organisations (CSOs), and the facility for community consultation. They also bring experience with establishing financing programmes designed to overcome first cost barriers for the rural poor. UNDP specialises in integrated development solutions working across sectors.</p>

"[Why do] so many of the world's poor still cook on dung and wood in a world where we have LP Gas? LP Gas is a known fuel, it exists in sufficient quantities, there are no technology breakthroughs we are waiting for, and we know how to tap, bottle and distribute LP Gas."

Susan McDade

Manager of the UNDP Sustainable Energy Programme

"LP Gas can play an important role in steering both industrialised and developing countries onto more sustainable energy development paths. It contributes to strengthening the three pillars of sustainable development: the economy, by boosting productivity; social welfare, by improving living standards and enhancing safety; and the environment, by reducing indoor and outdoor air pollution."

Emmanuel Chantelot

Managing Director, World LP Gas Association

"What possible better use for high-efficiency clean-burning fossil fuels such as LPG than providing high-quality energy services for poor households? There are also significant health reasons for helping these households to stop relying upon wood to cook in simple stoves. We know that the indoor smoke the people in these households are being exposed to every day, year after year, is adversely affecting their health In terms of human health...A shift to LPG would actually result in a net reduction of human exposures to air pollution that would be substantially larger than today's total exposure from all fossil fuel emissions." (Note: WHO recently reported that indoor smoke from solid fuels ranked as one of the top 10 risk factors for the global burden of disease, accounting for 1.6 million premature deaths each year.)

Kirk R. Smith

Professor of Environmental Health Sciences, University of California, Berkeley