COOKING FOR LIFE

ROADMAP TO A BILLION
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ABOUT THIS ROADMAP

This report was prepared for the World LP Gas Association (WLPGA) by Ross Brindle and Lindsay Pack of Nexight Group under the direction of Michael Kelly, Deputy Managing Director of WLPGA. The Cooking For Life Roadmap to a Billion Working Group provided essential inputs and guided the roadmap development process. Working Group members include: Alex Evans (ETG International), Bessem Enochong (Kosan Crisplant), Christian Fredberg (Kosan Crisplant), Andrew Ford (SHV Gas), Sam Hart (Nigerian National Petroleum Corporation), and Özge Ağar Uysal (Aygaz). Information on LP Gas supply forecasts was provided by Walt Hart, IHS.
EXECUTIVE SUMMARY

Three billion people rely on traditional fuels—wood, coal, charcoal or animal waste—for cooking. Exposure to indoor air pollution from this manner of cooking causes the deaths of four million people annually, more than the deaths from malaria, HIV/AIDS, and tuberculosis combined.

LP Gas offers a solution to this problem. LP Gas is a clean-burning fuel used for cooking, heating, transportation, and countless other uses in all parts of the world and delivering particular value in regions not served by electricity or natural gas infrastructure.

Cooking For Life aims to transition one billion people from traditional fuels to cleaner burning LP Gas by 2030. This goal is both highly ambitious and possible to achieve if governments, industry, and NGOs work together. WLPGA, through Cooking For Life, is working to stimulate such cooperation.

This Roadmap to a Billion outlines the problem, opportunity, and plan for achieving the Cooking For Life goal. The WLPGA, working closely with its member companies and other partners, will develop and share information, engage with the global community addressing this problem, and conduct targeted policy advocacy that leads to supportive global and national policies. These policies, and the commercial investment that they will stimulate, will lead to widespread LP Gas cooking initiatives that ultimately allow one billion people to transition to a cleaner cooking fuel and lead healthier, more productive lives.
COOKING FOR LIFE IS AN INITIATIVE THAT WILL INFORM, EDUCATE AND INFLUENCE GOVERNMENTS TO CREATE POLICY ENVIRONMENTS THAT ARE CONDUCIVE TO COMMERCIAL SUSTAINABLE BUSINESS OPPORTUNITIES IN THE LP GAS SECTOR.
THE PROBLEM
Three billion people rely on “traditional fuels”—wood, coal, charcoal or animal waste—for cooking on antiquated stoves or open fires. Exposure to indoor air pollution from cooking this way causes the deaths of four million people annually and countless other preventable illnesses—more than the deaths from malaria, HIV/AIDS, and tuberculosis combined. Women and children are the most affected. Burning solid fuels for cooking is also linked to concerns on gender development, deforestation and the environment.

The problem is focused in three main regions: East Asia, the Sub-Continent and Sub-Saharan Africa (see Figure 2).

FIGURE 2. NON-SOLID FUEL ACCESS DEFICIT (MILLIONS OF PEOPLE)

WHY LP GAS?

LP Gas has a high-energy content on a per tonne basis (in a liquid state) compared to traditional fuels and most other oil products and burns readily in the presence of air giving off a hot flame. These characteristics have made LP Gas a popular fuel for household and commercial heating and cooking, for industrial processes and as an alternative automotive fuel. It is also used as a feedstock in the petrochemical industry.

LP Gas has a number of practical and environmental advantages over other fuels. The physical properties of LP Gas enable significant amounts of energy to be transported easily as a liquid under moderate pressure in specially designed bottles. This portability makes it particularly suitable for applications in remote locations that cannot economically be supplied with natural gas or electricity via a pipeline network or a grid. Its high calorific value in liquid form reduces transportation costs and makes it easier to handle than traditional fuels and coal. For example, a 13 kg cylinder provides around 180 kWh of energy; 25 kg of coal and 91 kg of wood would be needed for the same amount of energy.

In use, LP Gas shares similar advantages as natural gas. Because it is a clean-burning fuel, it can be used in direct contact with food and fragile articles such as ceramics. The environmental benefits of switching to LP Gas from traditional fuels and most other fossil fuels can be considerable. It produces virtually no black carbon (BC) or soot (particulate matter, PM) and, relative to most other non-renewable fuels, low emissions of carbon monoxide (CO), unburned hydrocarbons (HC) and oxides of nitrogen (NOx)—the principal precursors of ozone, which produces smog. There are negligible emissions of toxic gases that can cause serious health problems if breathed in close to the point of combustion, which makes LP Gas highly suitable as a household cooking fuel.

THE OPPORTUNITY

While LP Gas does have an economic cost to users, experience around the world demonstrates that there is significant untapped potential for middle-income and low-income countries to increase the use of LP Gas as a cooking fuel, with the appropriate policy environment.

Figure 4 provides LP Gas consumption data (on a per capita basis) versus gross domestic product (also on a per capita basis) for select countries. Morocco, Egypt, Algeria, and Tunisia all experience per capita LP Gas consumption of greater than 50 kg/year and a GDP per capita of approximately US$5,400 or higher. Nations with comparable GDP per capita but far lower LP Gas consumption rates include Indonesia, Angola, China, Peru, Colombia, and Brazil. Although the economy and energy sector of every country is unique, if only these nations, which represent more than 500 million people, were to achieve a per capita LP Gas consumption of 50 kg/year, global LP Gas consumption would increase by approximately 13 million tonnes annually. This figure excludes other nations with somewhat lower GDP per capita figures, notably India, which likely will be able to sustain LP Gas consumption rates higher than current rates with the right policy environment. Finally, many of the nations with the largest opportunity to increase LP Gas cooking also have some of the world’s highest population growth rates, placing the goal of reaching one billion people well within reach.

FIGURE 3. LP GAS: THE ENERGY ADVANTAGE

180 kWh = 13kg = 25kg = 91kg

LP GAS CYLINDER COAL WOOD
FIGURE 4. LP GAS CONSUMPTION PER CAPITA VS. GDP PER CAPITA IN SELECTED COUNTRIES

[Graph showing the relationship between LP gas consumption per capita and GDP per capita for various countries, with points for countries like Morocco, Algeria, Tunisia, Brazil, Peru, China, Indonesia, Morocco, Algeria, Tunisia, Egypt, China, Colombia, and others.]
LP Gas is the abbreviated name for liquefied petroleum gas—the generic name for mixtures of light hydrocarbons that change from a gaseous to liquid state when compressed at moderate pressure or chilled. The chemical composition of LP Gas can vary, but is usually made up of predominantly propane and butane (normal butane and iso-butane). Other compounds, such as propylene and butylene, may also be present in small quantities. LP Gas sold commercially can range from virtually pure propane to pure butane, but in most cases propane is the dominant component.

LP Gas is derived either as a by-product from crude oil refining or from natural gas or oil production. With both processes, LP Gas must be separated out or removed from the oil product or natural gas streams. LP Gas is generally liquefied for bulk storage and transportation, because its density is much higher as a liquid. This requires pressurised or refrigerated vessels. LP Gas is normally pressurised or refrigerated for shipment by sea and storage of large volumes at receiving terminals.

LP Gas is lighter than water as a liquid but heavier than air as a gas. In their liquid state, both propane and butane have the appearance of water with only about half the density of water. Propane and butane boil at different temperatures: propane at around -42°C and butane at close to 0°C. The gas produced when both boil (or vaporise) is invisible and has no natural odour. An odourant is usually added to aid the detection of leaks. In liquid form, the volume of LP Gas changes significantly in response to changes in temperature. Consequently, storage containers are never filled to capacity to allow expansion to take place without causing an uncontrolled release of gas or damage to the container. LP Gas is easily stored as a liquid under moderate pressure. One unit of liquid expands to about 250 units of vaporised gas.

**FIGURE 5. A CLOSER LOOK AT LP GAS**

TRANSFORMING THE LIVES OF 250 MILLION INDONESIANS WITH LP GAS

Several initiatives around the world have encouraged the use of LP Gas in domestic applications. The Indonesian government’s programme to switch users of kerosene to LP Gas is one such initiative that attracted much attention due to the sheer size of the project, its very ambitious target, and its ultimately successful implementation.

In 2007, Indonesia undertook this massive energy programme with the goal of converting its primary cooking fuel from kerosene to LP Gas in more than 50 million households—or, more than 250 million end users—within five years. This megaproject provided the country’s households with an improved cooking fuel that held cost, cleanliness, and convenience benefits for end users. In addition, the switch to LP Gas held environmental benefits for the entire country and reduced the government’s huge subsidy for petroleum fuels. By achieving its goal of converting over 250 million users of kerosene to LP Gas, the programme gained the attention of many other countries who expressed an interest in understanding the issues involved and adopting a similar initiative.

Said Pak Jusuf Kalla, the former Vice President of Indonesia who led the initiative: “Since 2007 when we began the programme, more than 54 million households have made the switch, resulting in a cumulative 6.9 billion dollar savings in government revenues, a reduction in CO₂ emissions equal to all the new cars circulating on Indonesian roads each year, and our investments in the LP Gas industry have translated into 38,000 new jobs. In short, we have transformed the lives of any of as many as 250 million Indonesians in just five years by switching them to LP Gas.”
LP GAS SUPPLY UP TO 2030

As a by-product of the production of crude oil, natural gas, and refined products, the global supply of LP Gas is expected to continue to increase steadily through 2030. This is good news for the Cooking For Life initiative, since adding a billion new LP Gas consumers—even at a relatively low per person usage of 30 kg per year—would add 30 million tonnes of new LP Gas demand annually.

Figure 6 provides a projection of regional LP Gas production through 2030. In 2013, about 270 million tonnes of LP Gas have been produced (and consumed) in the world, and more than 65 million tonnes of LP Gas have been shipped to distant markets via waterborne vessels. From 2013 to 2030, global annual LP Gas production is expected to increase by more than 120 million tonnes per year. Regional production increases in excess of 10 million tonnes per year are expected in the Middle East, the United States and Canada, and Northeast Asia. While production in these regions creates a global surplus, the surplus is not all within the areas with the most opportunities to replace solid fuel usage. LP Gas delivery from the regions with surpluses to the areas where so many peoples’ lives could be improved requires infrastructure such as ships, LP Gas marine terminals, land transportation, bottling plants, and millions of cylinders.

While the amount of incremental infrastructure needed may seem daunting, nearly all of the LP Gas that is produced in the world every year gets consumed in some manner. Consequently, the infrastructure will surely be available to consume the LP Gas somewhere, but not necessarily where it is most desperately needed. About half of the LP Gas produced in the world is already consumed in residential and commercial applications, but more than a third of global LP Gas demand is used as industrial and chemical fuels and feedstocks. In fact, a portion of chemical demand serves as the market-clearing mechanism for surplus LP Gas around the world each year, which is expected to average around 15 to 20 million tonnes per year through 2030. For this portion of chemical LP Gas demand, the chemical industry is able to use an alternative feedstock such as ethane or naphtha, but chooses LP Gas because it is available and more economical.

Clearly there will be commercial, political and logistical challenges to provide LP Gas to the people who need it the most, but the global supply of LP Gas should be sufficient to support the Cooking For Life initiative.

FIGURE 6. GLOBAL LP GAS PRODUCTION
Despite the significant opportunity, creating new LP Gas markets that allow one billion more people to cook with LP Gas will not be easy. Some of the most important barriers that must be overcome to successfully create new LP Gas markets include the following:

**Policy Environment**
- Lack of regulations, enforcement protocols, and government support
- Lack of standards

**Accessibility**
- Lack of necessary Infrastructure

**Affordability**
- First cost barriers
- Recurring fuel costs barriers
- Lack of incentive tax structures to encourage LP Gas use

**Lack of Awareness**
- Low awareness of the health, environmental, and socioeconomic issues
- Lack of awareness of the benefits of LP Gas as a solution
- Lack of cultural awareness and how to effectively educate end users
- Negative perceptions regarding safety of LP Gas cooking
- Negative perceptions among the development community regarding LP Gas as a fossil fuel
- Lack of specific data on positive health impacts of LP Gas cooking

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**FIGURE 7. BARRIERS TO THE CREATION OF LP GAS MARKET**
WLPGA is the authoritative voice of the global LP Gas industry representing the full LP Gas value chain with over 200 members in over 125 countries around the world. The primary goal of the association is to add value to the sector by driving premium demand for LP Gas, while also promoting compliance to good business and safety practices. The WLPGA brings together private and public companies involved in one, several or all activities of the industry; develops long-term partnerships with international organisations; and implements projects on local and global scales. The association was established in 1987 and granted Special Consultative Status with the United Nations Economic and Social Council in 1989. WLPGA signed a letter of agreement with Sustainable Energy for All in October 2013 and is an active member of the Global Alliance for Clean Cookstoves.

Cooking For Life is a platform which aligns with WLPGA’s mission. Specifically, Cooking For Life:

- Demonstrates the benefits of LP Gas and informs stakeholders.
- Supports development of LP Gas markets
- Promotes good safety practices.
- Facilitates knowledge transfer within the industry.

The initiative can play an important role in enhancing the global image of LP Gas, developing new markets where high growth is possible, and doing lasting good for society.

FIGURE 8. THE ROLE OF WLPGA

The role of WLPGA in the Cooking For Life campaign is to accelerate the conversion of one billion people to LP Gas by 2030 by working with partners to address the barriers highlighted above. The WLPGA is the global voice of the sector and recognises that achieving the target of 1 billion people switching to LP Gas will entail working specifically with WLPGA members and, in certain cases, non-members.
DEFINING COOKING FOR LIFE
SCOPE, BOUNDARIES, AND
MAJOR ACTIVITIES

While the goals of Cooking For Life are ambitious, WLPGA recognises that it operates as a part of the world system seeking the conversion of one billion people to LP Gas, versus WLPGA leading this conversion. Accordingly, Cooking For Life has established clear boundaries for its work.

WLPGA, working with its member companies and national LP Gas associations, where they exist, will conduct the following types of activities in support of Cooking For Life:

- Advocacy, leveraging WLPGA’s role as the authoritative voice promoting LP Gas for a cleaner, healthier, more prosperous world.
- Information development and sharing, with an emphasis on sharing research, best practices, and standards globally; identifying gaps in information; and pursuing research and studies to fill these gaps with credible new information.
- Stimulating global organisations to incorporate LP Gas into their research, policy, and advocacy work, thereby building greater credibility for LP Gas as a preferred cooking fuel.

The ultimate goal of WLPGA’s work is to influence the global and national policy environment to create the conditions necessary to stimulate commercial investment required to provide one billion people with access to LP Gas for cooking.

WLPGA has explicit guidance regarding the type of recommendations it will make to governments regarding policy. WPLGA will advocate for LP Gas as part of broader strategic thinking of national energy policy but would not recommend specific energy policies or business models, including whether a country should enact an LP Gas subsidy or how much that subsidy might be. WLPGA will share information about business models used around the world and results. Generally, WLPGA will provide information but will avoid making recommendations. Further, WLPGA does and will continue to work side-by-side with members and with national associations where they exist in all Cooking For Life activities. Where national associations do not exist, WLPGA will recommend that they are created and offer information that can be useful in establishing one.

FIGURE 9. COOKING FOR LIFE GUIDING PRINCIPLES

- Appropriately balance Cooking For Life activities with core WLPGA initiatives that benefit all members.
- Always remain competition neutral, taking care to avoid offering advantage to any one member, supplier, or equipment provider (e.g., cookstove manufacturer).
- Act as the industry’s voice while seeking to complement Cooking For Life’s capabilities and resources with those of partners.
- Carefully vet Cooking For Life partners to ensure WLPGA only collaborates with credible organisations.
- Start small, learn through experience, and gradually expand and increase efforts as results merit.

FIGURE 9. COOKING FOR LIFE GUIDING PRINCIPLES
When meeting with national representatives as part of Cooking For Life, it is recognised that WLPGA will be asked often to provide policy recommendations. WLPGA will respond by providing information without offering specific recommendations that may create competitive concerns.

WLPGA will not help to design or launch specific conversion programs, other than by providing information within the above boundaries upon request. At all times, WLPGA will remain aware that engaging in any competitive activities holds potential to alienate some members and damage WLPGA’s reputation.

Cooking For Life will restrict activities to the global and national levels, avoiding sub-national initiatives with two notable exceptions: India and China. In these large countries, sub-national engagement may be appropriate but only when working closely with the appropriate national association.

One significant challenge facing Cooking For Life is assessing how countries apply and monitor regulations. Safety practices often drive business models, which WLPGA will not recommend. Rather, WLPGA will provide information about appropriate distribution models, while recommendations regarding specific business models (e.g., customer segments, subsidy structures, etc.) are out of scope for WLPGA. Cooking For Life may also consider promoting minimum safety practices that it encourages all national programs to adopt. In doing so, WLPGA must be sensitive to the real and perceived barriers to entry that such minimum practices can create.
PARTNERSHIPS

The goals of Cooking For Life are too large for any one organisation to achieve alone. WLPGA must work not only with its members and national associations but also with partners at the global, regional, and national levels as part of a larger system working to provide a clean, affordable cooking fuel to underserved populations.

Partnerships require resources to be effective and thus WLPGA intends to be strategic in deciding which partners merit focused effort. Cooking For Life will rely on the following guidelines when partnering with other organisations:

- WLPGA will exchange information with nearly any partner.
- WLPGA will pursue active partnerships that advance the initiative with organisations with whom partnership can create synergy, based on pre-defined goals that WLPGA sets for the specific partnership. WLPGA may partner with member companies, governments, NGOs, academic institutions, and media organisations.
- WLPGA will prioritise partnerships with credible organizations like the World Health Organisation and Center for Disease Control, which can provide evidence that supports WLPGA’s mission.
- WLPGA will avoid interactions with UN-sanctioned countries.
- Partners that attempt to restrict or unduly influence WLPGA in exchange for funding or other partnership contributions will be avoided.
- Some organisations also working to provide clean cooking options to underserved populations may not be suitable or strategic as Cooking For Life partners. Such organisations may be recognised as supporters who share the goals of Cooking For Life but are not engaged in an active partnership with WLPGA.

Securing funding is not the primary aspiration for Cooking For Life partnerships. Rather, partnerships are intended to provide WLPGA with stronger information and a greater reach in promoting LP Gas as a viable and positive choice for nations looking to improve the health of their citizens. The global LP Gas industry, not WLPGA, will be the driving force behind whether Cooking For Life goals are actually achieved.

TACTICS

The detailed tactical steps that WLPGA will undertake to implement the Cooking For Life Roadmap to a Billion are not addressed in this document but rather in operational plans that the WLPGA is developing. However, some example tactics that may be useful in advancing the Cooking For Life goals include the following:

- Respond to requests to intervene in a country or market as part of regulatory educational process, in coordination with interested local WLPGA member companies and relevant national associations.
- Identify information gaps that exist and conducting studies to fill them, partnering with appropriate academic and research organisations as appropriate.
- Target marketing activities to raise the Cooking For Life profile among critical audiences, working with media networks and celebrity endorsers as appropriate.
- Cooperate with white goods appliance producers such as makers of gas stoves and burners.
- Provide a mechanism for voluntary contributions from LP Gas customers to member companies to support activities that advance Cooking For Life.
- Capture success stories of conversions happening around the world, with an emphasis on scalability and sustainability within these case studies.

During this early phase in the Cooking For Life campaign, WLPGA will work closely with members and partners to explore new ideas and approaches, build experiences, and learn how best to be effective in reaching Cooking For Life’s goals.
The coming time period between 2014 and 2016 represents an important early phase of Cooking For Life, during which WLPGA will work aggressively to gather and create information about LP Gas’s potential as a cooking fuel and advocate for policies that allow and encourage commercial investment.

However, Cooking For Life is a new kind of initiative for the WLPGA and with its 2030 goal carries uncertainty regarding longer-term outcomes.

WLPGA’s near-term vision is that by 2017 the global and national policy environment will have shifted sufficiently to begin attracting significant commercial investment in LP Gas market development for cooking use which will lay the groundwork for long term growth in the sector.

2014-2016 PROJECT PLAN

The 2014-2016 project plan will present four major objectives and related actions that will guarantee the initiative is on solid footing in its early stages and will therefore be able to achieve its goal of facilitating the conversion of one billion people by 2030.

The objectives of the project plan are divided into four areas that are designed to highlight important components of the initiative and provide a solid grounding for future growth.

A. IDENTIFY THE OPPORTUNITIES
Identify target countries for intervention and then create a series of steps responding to requests for intervention as part of an advocacy and/or regulatory educational process, in coordination with interested local WLPGA member companies, relevant national associations, development agencies or government bodies.

B. DEVELOP THE PARTNERSHIPS
Lead an outreach effort by the sector identifying and creating ties with partner organisations operating in the clean cooking space.

C. BUILD THE EVIDENCE CASE
Identify information gaps that exist and create and house studies, data, statistics, reports, research and case studies to fill them, partnering with appropriate academic and research organisations as needed.

D. CHAMPION THE ISSUE
Become the global communications hub on the benefits of switching to LP Gas in a development setting.
Beyond 2017, WLPGA’s actions in support of Cooking For Life may or may not expand beyond the four objectives to include other activities that the members deem valuable from the association. Such activities may require additional resources, necessitating WLPGA to raise additional funds from members and/or external organisations.

At this early stage, it is difficult to know with certainty what these additional roles are likely to be and what, if any, additional funding would be required. Therefore, WLGPA is committed to regularly reviewing Cooking For Life to assess progress and impact and evaluate whether additional activities would accelerate progress toward the Cooking For Life goals.