4th IEF OFID Symposium On Energy Poverty

Is Affordability of LPG the Main Driver For LPG Development In Africa?

Access to Clean Cooking with LPG through Microfinance (*Bottled Gas for Better Life*)

By John R Hauge, Chief Financial Officer
The Global LPG Partnership
May 2, 2019

The Global LPG Partnership Supports Large-Scale Clean Cooking Transitions in Developing Countries

- Launched in 2012, GLPGP is the highly specialized non-profit **public-private partnership established by the United Nations** to focus on LPG for clean cooking, working among host and donor governments, UN agencies, NGOs, DFIs and impact investors, and leading international LPG companies.
- It **helps countries** build up and coordinate national LPG ecosystems — support development of national plans, policies, regulation, supply, infrastructure, distribution, capital-raising.
- It **helps consumers** switch to LPG via education, consumer financing innovations (microfinance and Pay As You Go) and other support.
- It **helps academic researchers** pursue evidence-based research around LPG for climate, health and the environment.

Why Greater Use Of LPG is Necessary

- Improved health, less deleterious climate change, reduced deforestation, greater time availability from less wood-gathering
- The International Energy Agency now includes LPG as a key fuel recommended to tackle energy-related air pollution emissions
- CICERO (January 2018 study) estimates that implementation of the Cameroon LPG National Plan by 2030 would **save 23,000 lives, avert 760,000 disability-adjusted-life-years, and reduce emissions of short-lived climate pollutants by more than one-third, creating a net cooling effect**
- The urgency to mitigate deforestation is leading to significant investment by the Central African Forest Initiative (CAFI), as demonstrated by the UNDP/UNCDF/GLPGP project in the Democratic Republic of the Congo

Why Greater Use Of LPG is Necessary

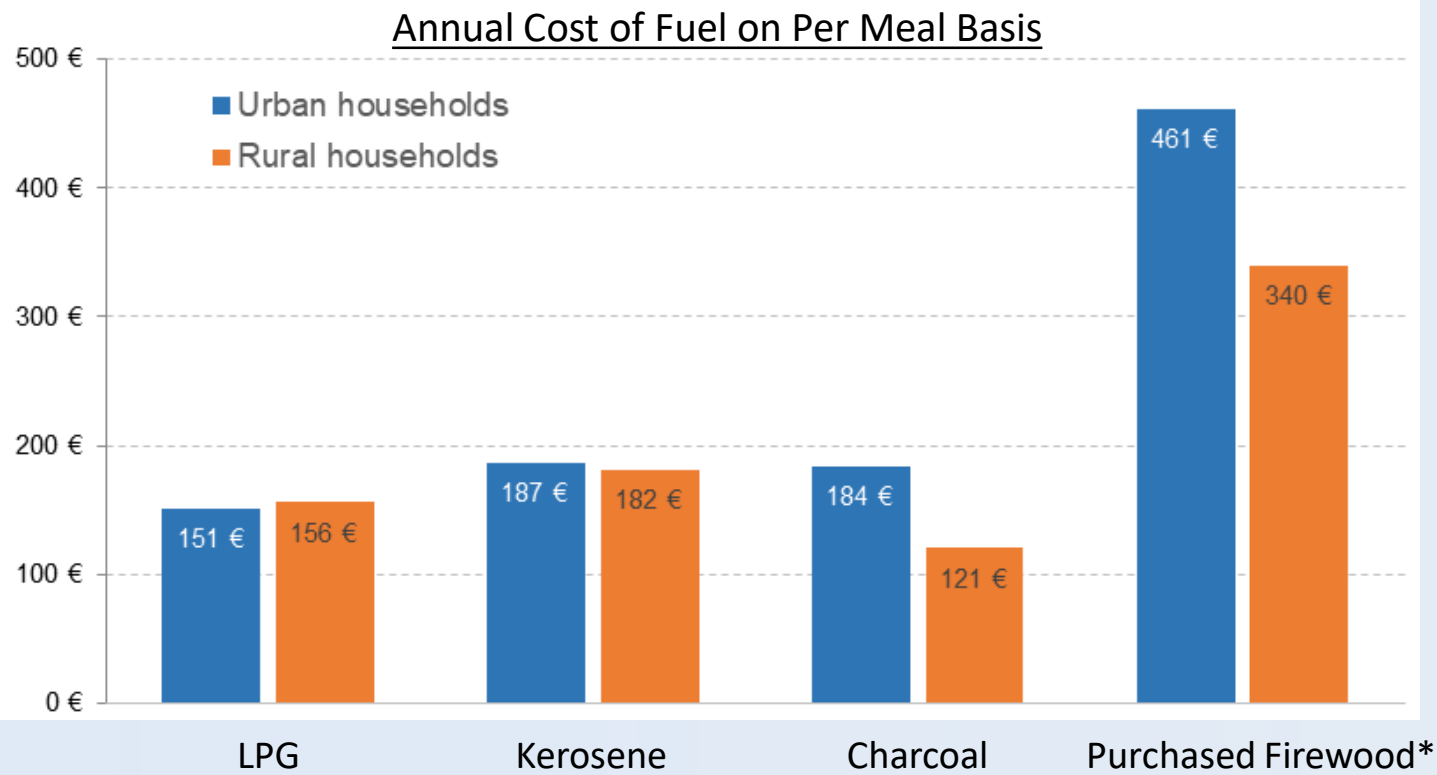
Rachel Kyte (CEO of SEforAll):

”It is the fuel that matters, not the stoves”

Dr. Josh Rosenthal (US NIH):

“Forget improved biomass cookstoves, go to LPG”

Switching To LPG Saves Money And Time



*May be overestimated as price data collected during the rainy season, and 54% of households in the sample collect firewood rather than purchase it.

- Even if LPG were more expensive, additional benefits vs. other fuels help decide the fuel choice. LPG price should go down through greater supply chain efficiencies and scale-up, while the price of wood fuels increases (deforestation)
- Creating access without changing price allows huge populations to switch to LPG

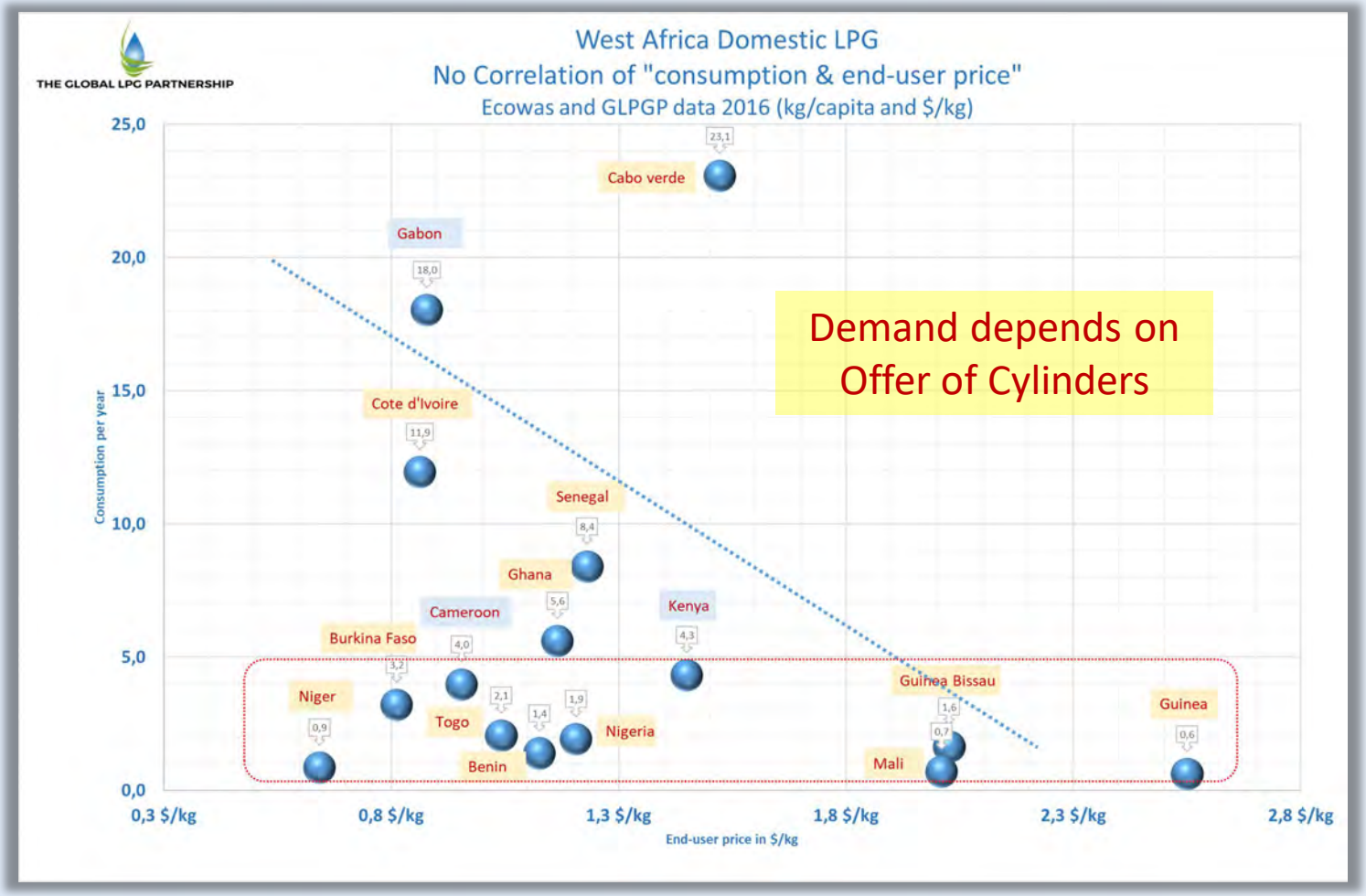
Source: GLPGP-Dalberg 2018 Cameroon survey

LPG Sector Development

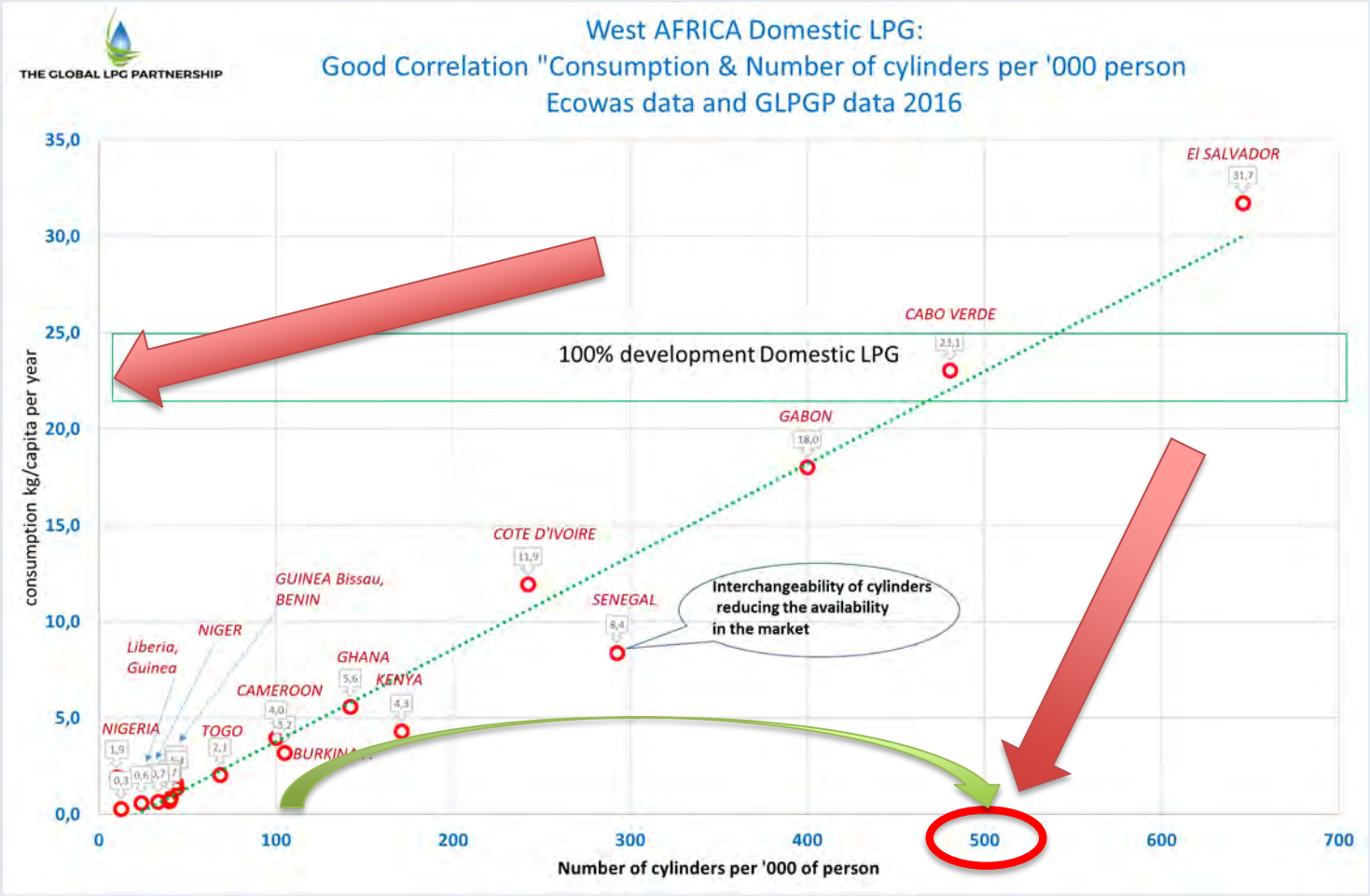
Four key participants in developing the LPG supply chain:

- Government (ministries, SOEs, etc.): create policy/regulatory/enforcement enabling environment, including Branded Cylinder Recirculation Model (BCRM)
- Private sector (manufacturers, marketers, distributors, etc.): know/grow the market
- Funders (MDBs, MFIs, local banks/pension funds/insurance companies, etc.): invest the necessary debt and equity
- Coordinator/Financier (such as GLPGP): help develop master plans, improve the supply chains, and aggregate the necessary capital

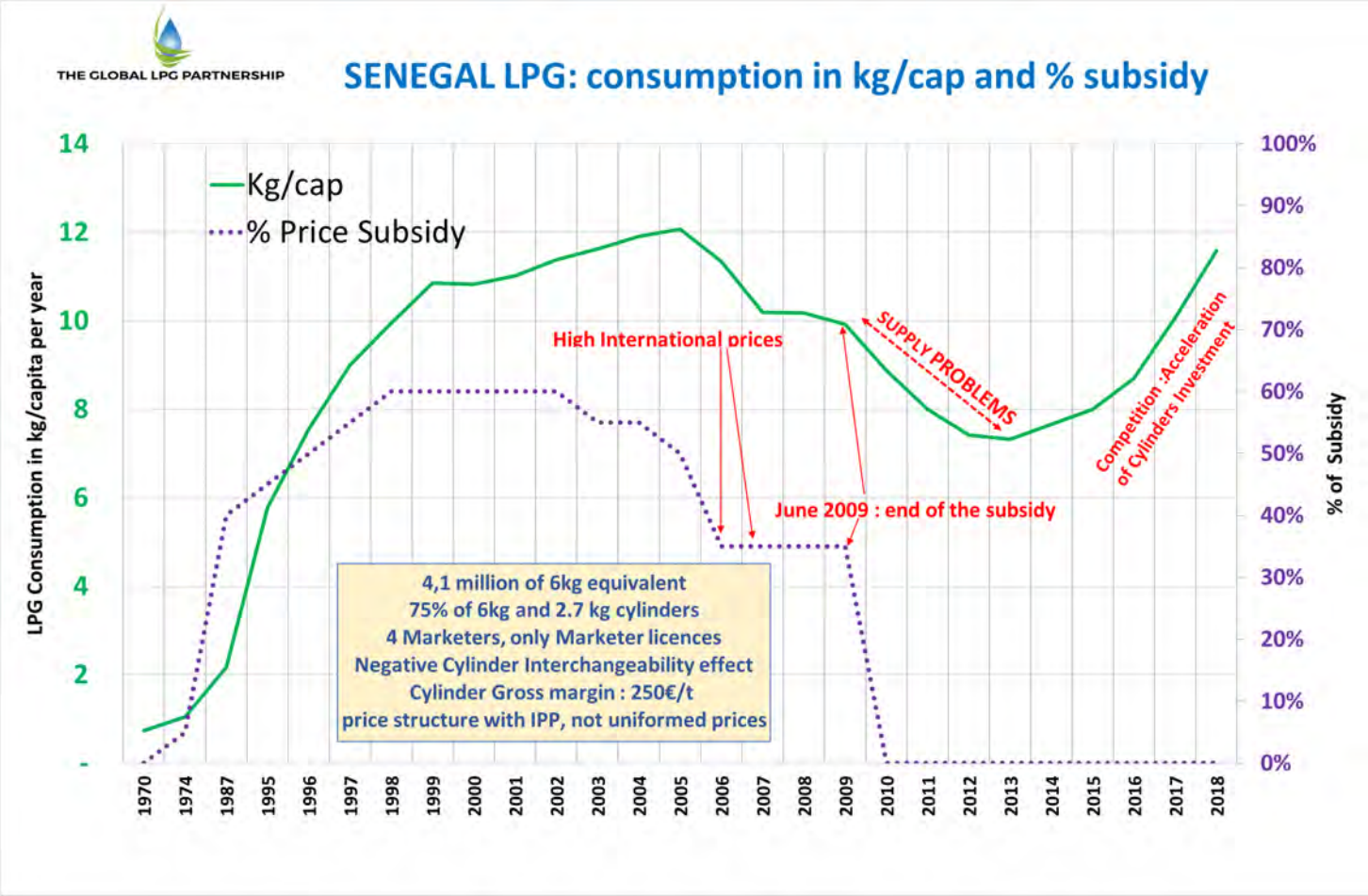
The LPG Price Does Not Correlate With the Low Demand In SS Africa



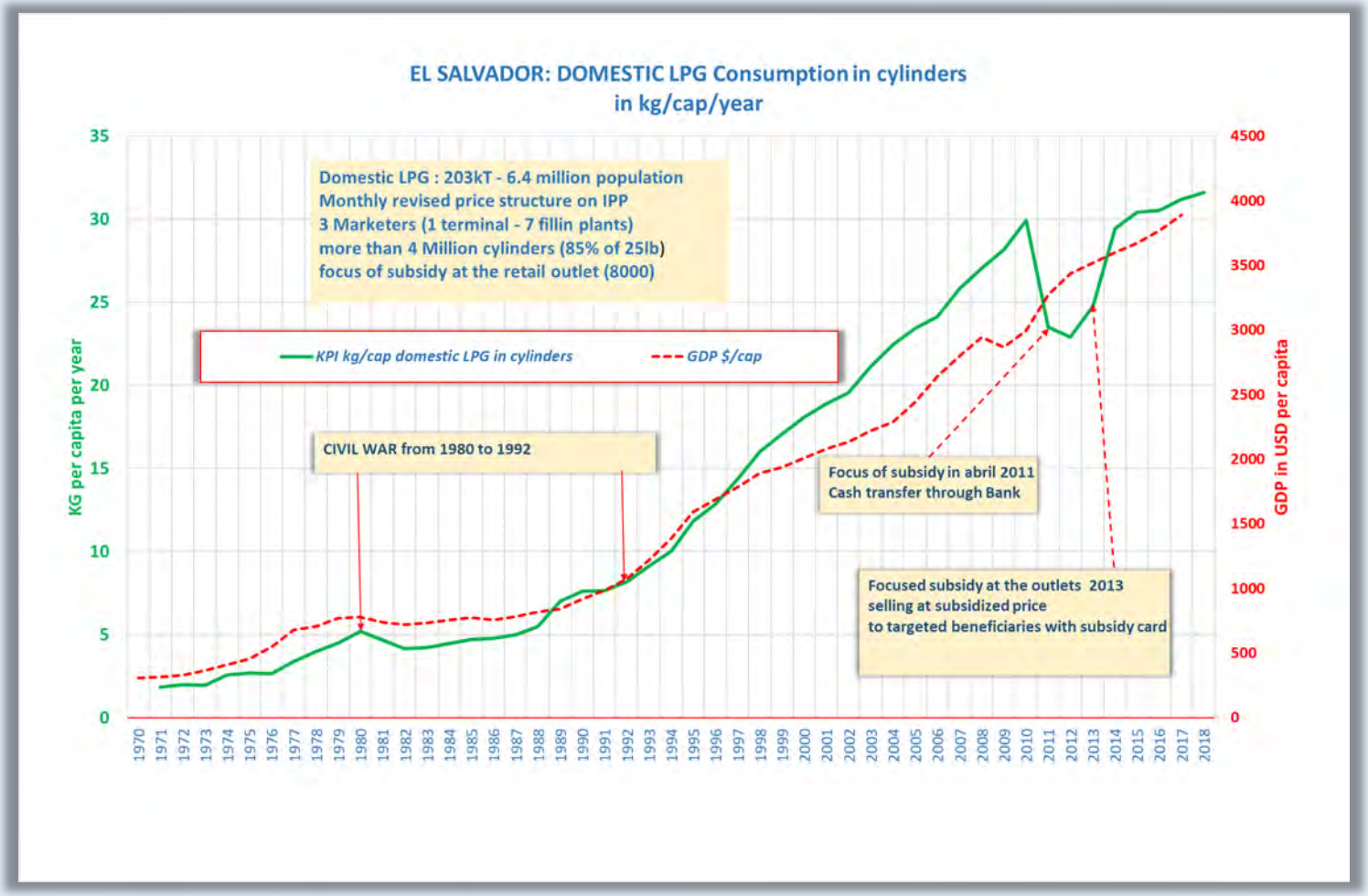
The Number Of Circulating Cylinders Better Correlates With the LPG Demand



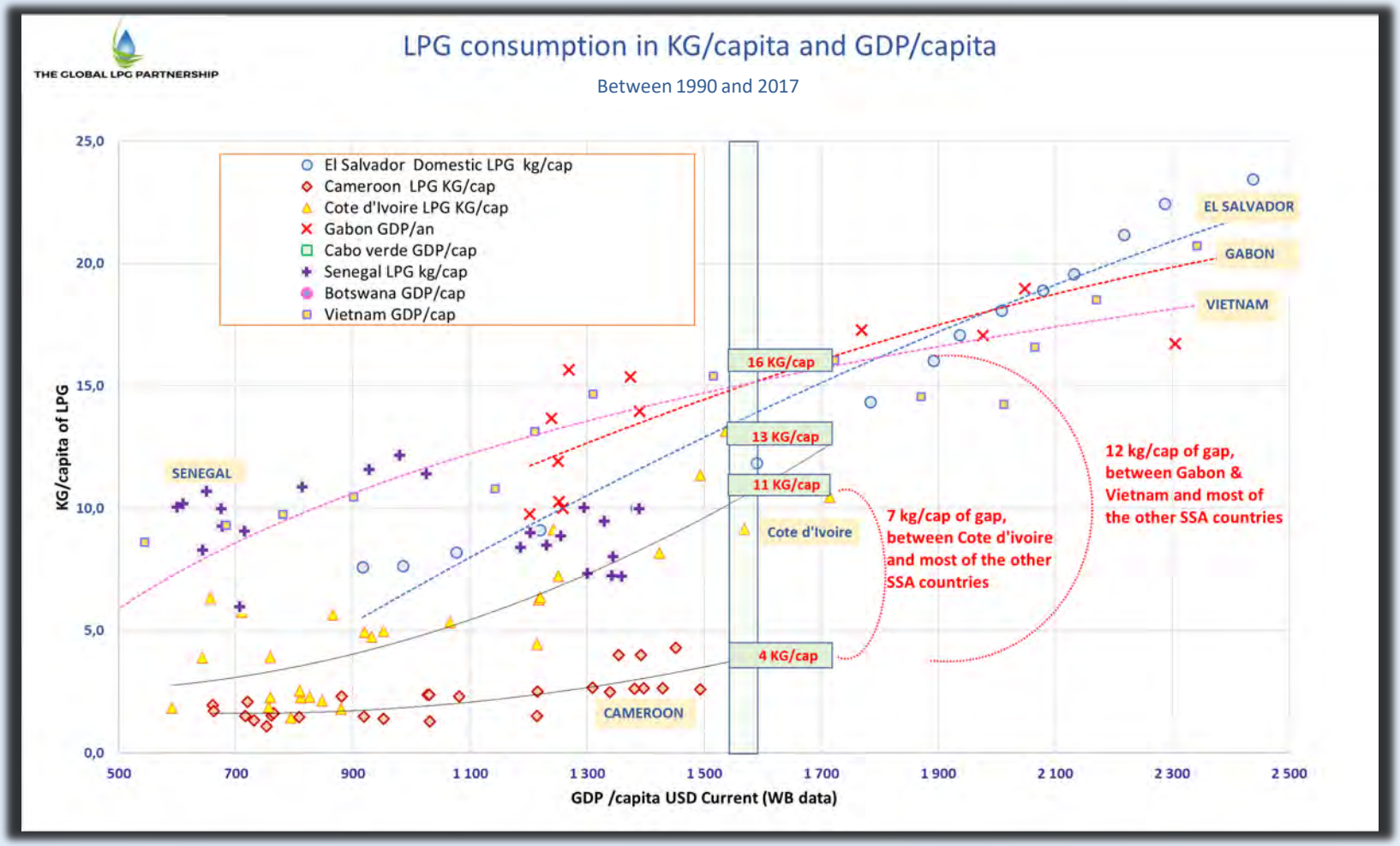
Senegal: Resilience After 22 Years Of Price Subsidy



El Salvador : 100% Cooking With LPG: 30kg/Capita, Achieved In Less Than 20 Years



Some Developed Markets Under Tropical Climate: The 20-25kg/Cap Horizon

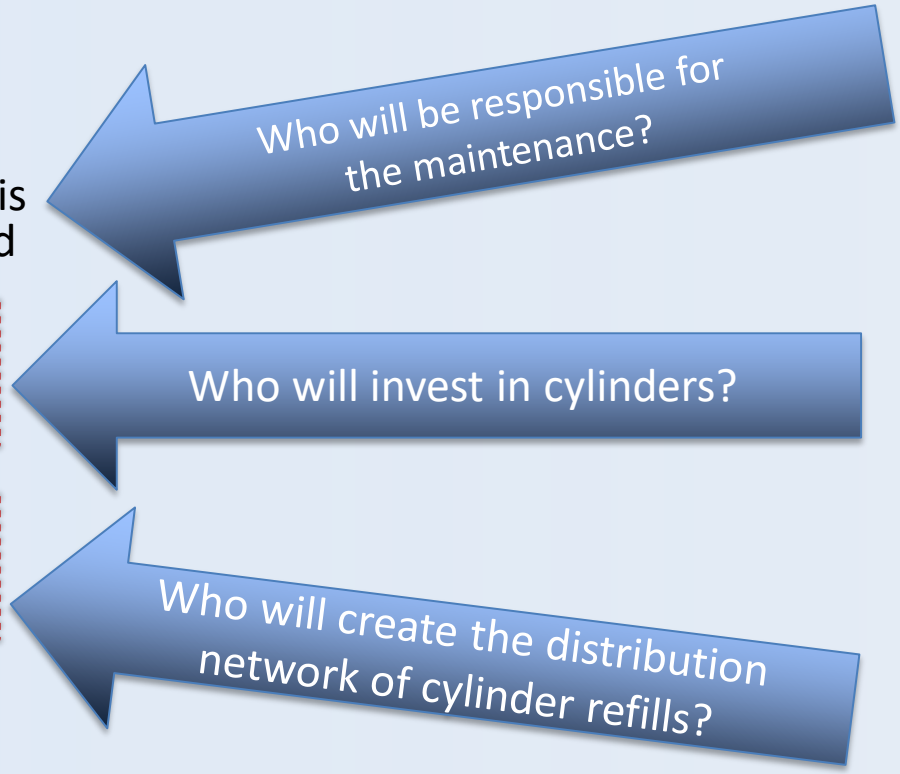


Regional Development As Part Of National Development

- LPG consumption in the capital cities can be at almost 100%:
  - *The greater Abidjan : > 40 kg/capita/year*
  - *The greater Dakar : > 30 kg/capita/year*
  - *The greater Accra : > 23 kg/capita/year*
- But the other regions remain at 2-3 kg/capita

Drivers Of Successfully Developed Markets

1. The confidence that any cylinder is safe and not leaking or underfilled
2. The availability of additional cylinders
3. The availability of gas refills, easy to get within 5mn walk
4. The cost of access to the cylinder (Deposit)
5. The price of the gas refill for the end-user



Safety And Responsibility: The Conducive Drivers

1. All cylinders exchanged empty for a filled cylinder at the exchange point (outlet), only refilled at centralized bottling plants
   - Safety rules applying to the cylinder (hydrotest)
   - Safety rules applying to the refilling (tare weight)
   - The only way to exchange a refilled good cylinder against a dangerous empty cylinder.

2. Centralized Bottling Plants with filling capacity above 50,000 tons/year to ensure no leakage, no risk for the population and elimination of bad cylinders prior to refilling

The Central Roles Of The LPG Marketer

Dynamic of Integrated Roles	Objectives of the Roles
Investing in branded cylinders *(200 million in West Africa in 15 years' time)*	Controlling the investment cost; ensuring a good rotation rate and a good coverage of the fixed costs
Developing efficient and dense branded cylinder distribution networks	Reducing the distribution cost (last mile transportation cost and density of outlets, or direct delivery)
Ensuring cylinder refilling with safety in Marketer's bottling plants without disruption of supply	Reducing the bottling cost and the volatility of the supply cost

The “Branded Cylinder Recirculating Model” (BCRM): the model designed by the developed markets

- BCRM has proven efficiency to develop LPG markets in a safe way.
- Safety norms require the cylinder not to be refilled at the outlet, but exchanged for a refilled one.
- BCRM implies the central role is given to the Marketer (Marketer license), letting Marketers pool for cost reduction in supply and in bottling.
- BCRM implies not to split the Marketer license into various sub-licenses to ensure continuity in the LPG investment: the size of the terminals and of the bottling capacity depends on the expected investment in cylinders made by the Marketers.

Low Prices Require Optimization Of Investment Expenditures And Distribution Cost

- Marketers with capacity to invest and deliver good service should have minimum 30,000 tons of annual sales. (EBITDA capacity)
- Low distribution cost requires Branded Distributors be selling minimum 1,000 tons of refills per year. (density of outlets and cylinders)
- Optimal bottling cost requires bottling plant of 50,000 tons of bottling capacity (ensure bottling investment consistent with cylinder investment).
- Optimal importation capacity (in tons) to adjust the vessel freight, the terminal cost and the price volatility on the LPG stock, should remain below 10% of the market volume.
- Overall gross margin should be about US$320-350/ton, to cover all investments and safety cost at an IRR of 15%.

The End-User Price Components

- A high cylinder rotation rate (>5) under BCRM is the only way to reduce the impact of the cylinder investment on the final LPG price.
- Uniformity of end-user price is key to develop rural areas (same price anywhere in the country, just like Cote d'Ivoire) but requires a transportation equalization mechanism and a price structure based on an Import Parity Price.
  It also helps reduce the risk of price abuses by the distribution system.
- A stock adjusted to less than 10% of the market size (terminal capacity) reduces margin loss in backwardation and limits the gain in contango.

Example Of LPG Price Structure, Revised Monthly

	Month of :	MARGINS	LPG PRICE
1	International Monthly Index of reference		570 $/t
2	importation premium		80 $/t
3	**Import Parity Price IPP**		**650 $/t**
4	Terminaling margin	40 $/t	
5	Ex Terminal price		690 $/t
6	Primary Bulk transportation to the Bottling Plants (Country average)	180 $/t	
7	Bottling Margin	70 $/t	
8	**Marketer Bottling selling price of refill**		**940 $/t**
9	Marketer margin (Cylinder, pallets, cages investment and maintenance - marketing investment)	110 $/t	
10	**Marketer selling price of refills**		**1 050 $/t**
11	Distributor margin	60 $/t	
12	**Distributor selling price of refills**		**1 110 $/t**
13	Retailer (retail outlet) margin	40 $/t	
14	**End-user price**		**1 150 $/t**
	GROSS MARGIN without Variable costs	*320 $/t*	

Bottled Gas for Better Life

Access to Clean Cooking with LPG through Microfinance

Innovative Consumer Financing to Help Low-Income Households Switch to Clean Cooking with LPG

Program:

- Six-month commercial microloans offered to low-income families in Cameroon and Kenya for LPG equipment purchase
- Community sensitization/education on safe LPG use
- Capacity building through close collaboration with local microfinance institutions (MFIs) and LPG marketers
- Target: New LPG users; a small number of loans given to existing LPG users wishing to change suppliers/equipment

Goals:

- Accelerate adoption of LPG by poorer households as the national LPG supply chain is expanded
- Proof of concept for African MFIs to incorporate LPG household lending in their regular portfolios, significantly scaling up household LPG access over time


ADOPTEZ LE GAZ EN BOUTEILLE POUR L'AMÉLIORATION
DE LA QUALITÉ DE VOTRE VIE
Une Bouteille de Gaz pleine(12.5kg), un réchaud
double bruleurs pour seulement 51,600FCFA !
Un plan de remboursement qui s'étale
sur six (06) mois pour ceux qui s'inscri
ront au prochain évènement.
THE GLOBAL LPG PARTNERSHIP
Bottled Ga
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PROGRAM

Cameroon

Bottled Gas For Better Life in Cameroon

697 households served in 11 communities across 5 regions since Feb 2017 in two phases

Loan Offer:

- Partners: MUFFA and MC2 (MFIs); Tradex and Glocalgaz (LPG marketers)
- Loan: 50,000 CFA (US$86) – up to 11,600 CFA (US$20) refundable deposit followed by 6 monthly payments with commercial interest rates (except for initial pilot)
- LPG equipment offered: Filled 12.5kg Cylinder + Double Burner Cookstove + accessories

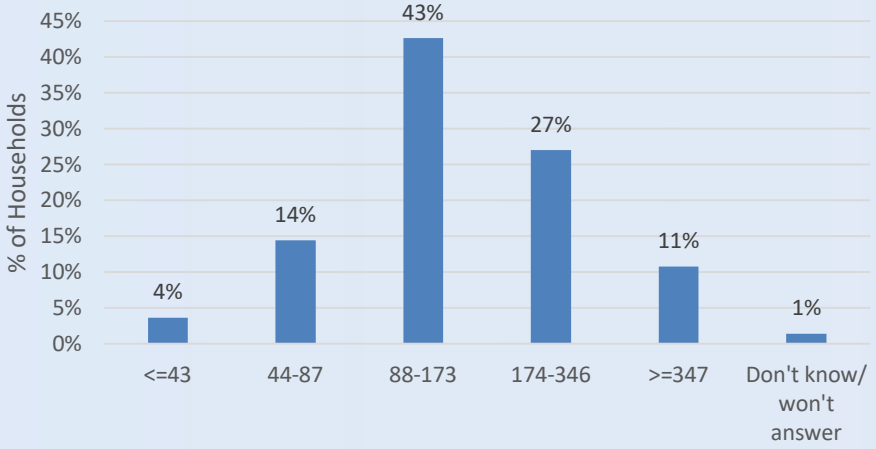
Community Sensitization & Education:

- LPG cooking demonstration
- Leaflets on LPG use and benefits
- Calendars with safety instructions
- Door to door canvassing in rural areas

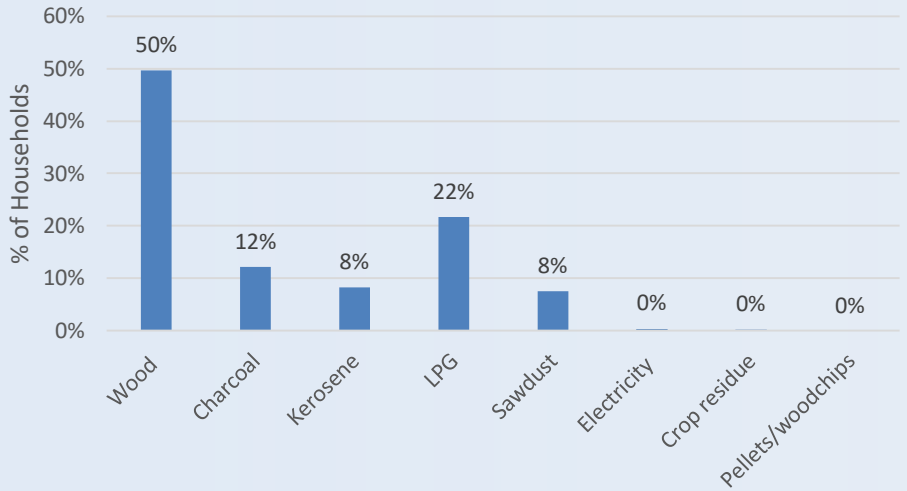
Participant Data For Phase II (April 2018-present)

- 510 households (data available for 492); average household size: 5.3 people; 46% live in urban areas, 23% in peri-urban areas and 31% in rural areas.
- Existing and new customers of the MFIs; all are screened for credit risk
- At least 70% of loan recipients are new LPG users
- Monthly income for 43% of households: US$88-173, or about US$0.60-US$1 per capita per day (Cameroon's average: US$4 per day)
- Most common primary fuel at baseline: Wood – 73% in rural areas, 54% in peri-urban areas, 32% in urban areas
- On average, participants using LPG spent 30 minutes less cooking daily than those using wood

Monthly Household Income (US$) (n=492)



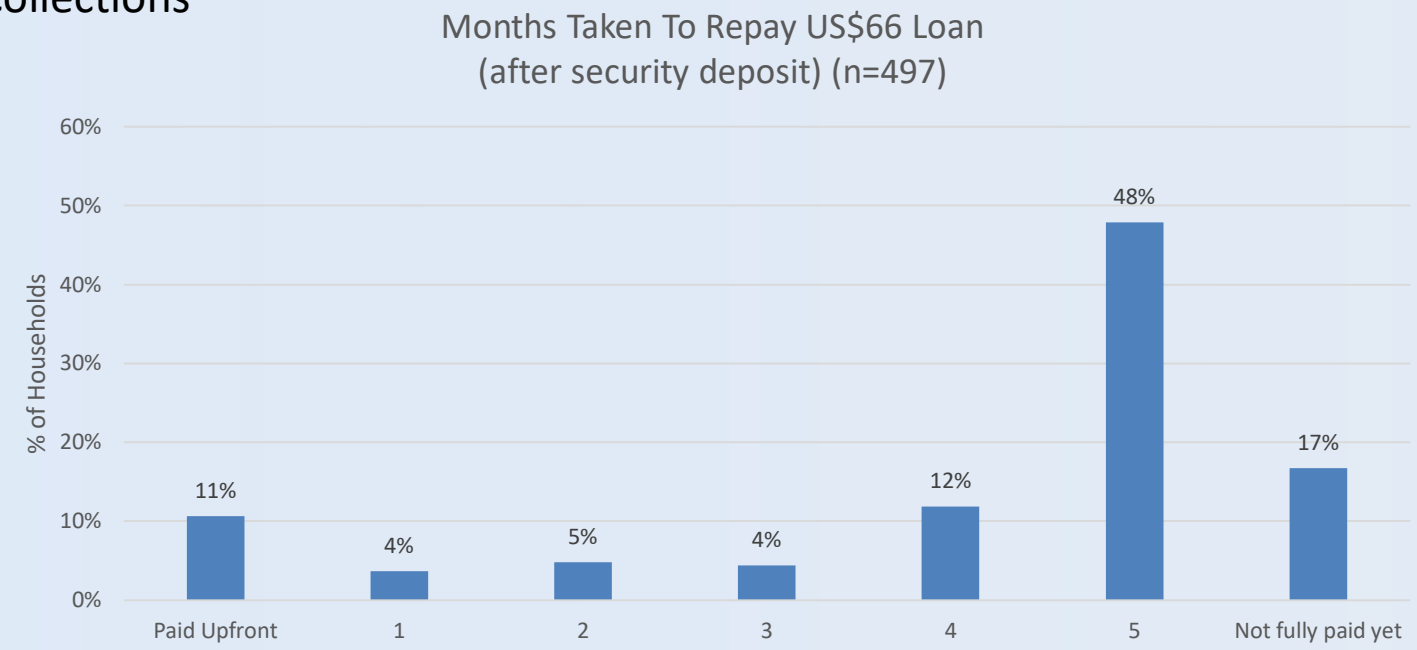
Primary Cooking Fuel Used (n=492)



Phase II Preliminary Findings After 6-month Loan Period

Loan repayment

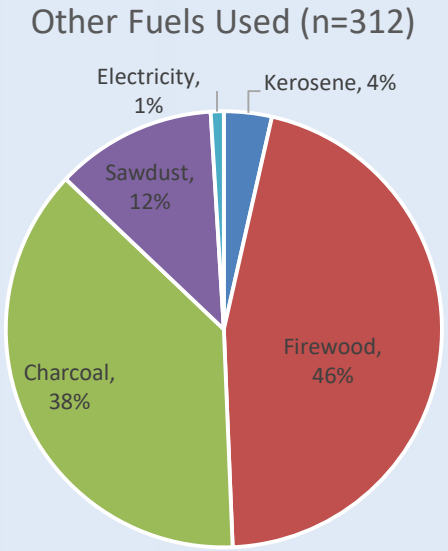
- Repayments ongoing through May 2019
- 95% of loaned capital repaid to date (same as Phase I with 200 households)
- 83% of households have fully re-paid
- Civil disruption in Anglophone regions from mid-2018 affected loan registration and collections

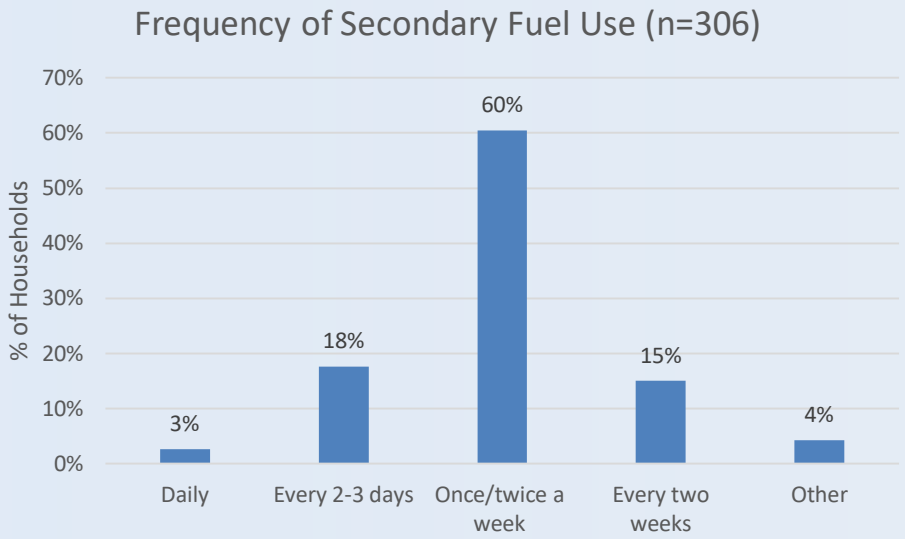


Phase II Preliminary Findings After 6-month Loan Period

Fuel use (available data for 425 households)

- 97% made the switch and were still using LPG after 6-month loan period; 73% reported some stacking with other fuels





- LPG usage: 20kg/capita/year, vs. 19kg/capita/year in Phase I (5 times Cameroon's national average)
- 90% reported time savings from using LPG to cook, of whom 61% used the time saved to rest and 20% for work/business

Kenya

Bottled Gas For Better Life Pilot in Kenya

69 households served since August 2018

Loan Offer:

- Partners: Equity Bank, National Oil Corporation of Kenya (NOCK), Social Economic Mobilisation Agency (SEMA)
- Loan: 9,900 kshs (US$99) – 2,000 kshs (US$20) refundable deposit followed by 6 monthly payments with commercial interest rates
    - Loans fully funded by Equity Bank with partial loss guarantee by GLPGP (unlike in Cameroon, where GLPGP funded loans)
- LPG equipment offered: Filled 13kg LPG Cylinder + Double Burner Cookstove and accessories

Community Sensitization & Education:

- LPG cooking and safety demonstration in July 2018 attended by 70 people
- Briefings at community group meetings by GLPGP/ NOCK/ Equity Bank

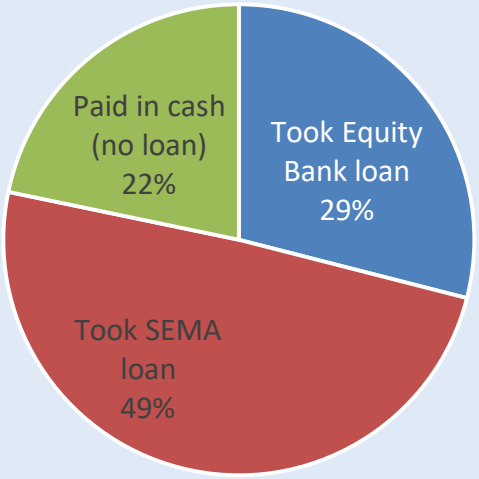
Participant Characteristics at Baseline

- 69 households (data available for 56); average household size: 4.4 people
- Participants are from a rural village in Nyandarua County and environs
- All screened for credit risk
- Charcoal is widely used as a primary fuel

Observations:

- Equity Bank loan offer was less well-received than the offer by SEMA, an informal "table-banking" savings group with simpler approval process

Program Registration (n=69)



Preliminary Findings

- 41 took a loan through either Equity Bank or SEMA; 15 paid in cash upfront
- As of March 31, 2019: 24 of the 41 loan recipients had fully re-paid the loan
- Factors affecting loan registrations:
  - Loan approval processes
  - Income seasonality (for agriculture-dependent households)
  - Prior experience with bank loans – some expressed reservations as they had experienced other banks raising interest rates after loan approval
- Equity Bank group had high rates of repayment, likely attributable to:
  - Thorough credit screening before loan approval
  - Ease of paying through Equity Bank's mobile banking platform
  - Option for members of savings groups to help one another with payments if needed
- Data analysis is ongoing for participant surveys led by the University of California, Berkeley, beginning March 2019

Lessons & Considerations For Future Phases

1. The six-month loan term is appropriate for LPG equipment, and can be re-paid at commercial interest rates as long as proper upfront credit screening takes place

2. Community sensitization/education, on LPG safety and health/economic benefits, is needed in conjunction with loan offer

3. Coordinating registration and equipment delivery (no long delays) is important to maintain confidence in program

4. Commitment to the program and leadership by MFI Branch Managers helps motivate field staff, who in turn convey the program's significance and importance of good loan habits to participants

5. Digital finance tools can simplify data collection and encourage better loan repayment practices

6. Demand for LPG exists beyond current program scope: LPG for businesses, heating, and bundled with other energy services e.g. solar

Quotes from *Bottled Gas For Better Life* Cameroon participants

Thank You!

THE GLOBAL LPG PARTNERSHIP

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