Key learnings from LPG sector development in Morocco, Senegal & Côte d’Ivoire

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LPG Markets – Demand Appraisal

- Segments: Cylinders – Bulk – Autogas
- In the tropical belt (in SSA), LPG in cylinders is used mainly for cooking
- Outside the tropical belt (Morocco): LPG is used for cooking and for heating where NG is not available
- Most developing countries do not have reliable and cheap electricity, and LPG is generally the modern fuel replacing biomass
- Cooking (3 meals max per day) limits the quantity of LPG per capita per year
- Actual data gives 25kg/capita/year as the limit for cooking
- When the kg/capita is above 25, LPG is also used for water heating and space heating (e.g., Morocco, Tunisia, Egypt, Algeria)
- Very few governments track the number of cylinders in use and the growth in the number of cylinders
BRAZIL Domestic LPG consumption (<13kg cylinder) in kg per capita per year (Sindic Gas-AnP)

- MB avg index propane
- kg/cap - Cylinders

Consumption of LPG in KG per capita per year

Propane average FOB price Mton Bellview $/t

Auxilio Gas** created in 2002
cash transfer of 90BRL/yr per HH (85$ in 2002).
4.6 million HH received this cash transfer in 2002

Bolsa Familia* created in 2003 by Pres. LULA

* Lula formed the conditional cash transfer program called Bolsa Familia by combining Bolsa Escola**** with Bolsa Alimentacao***
and Cartao Alimentacao and Auxilio Gas** (a transfer to compensate for the end of federal gas subsidies)
** Programa Auxilio-Gás (Decreto no 4.102, de 24 de janeiro de 2002 - Governo Fernando Henrique Cardoso)
*** Bolsa Alimentacao (Medida Provisoria nº 2.206-1, de 6 de setembro de 2001 - Governo Fernando Henrique Cardoso)
**** Bolsa Escola (Lei nº 10.219, de 11 de abril de 2001 - Governo Fernando Henrique Cardoso)
LPG Demand Assessment 1990-2020
Consumption KG/cap vs GDP/cap

Bad BCRM-no price subsidy-KT/marketer very low:
Kenya - Ghana
Good BCRM no price subsidy - fair KT/marketer: Vietnam
Good BCRM - price subsidy/capped - high KT/marketer
Côte d'Ivoire - Senegal - Cabo Verde - El Salvador

Senegal
Côte d'Ivoire
El Salvador
Cabo Verde
50% PENETRATION RATE

KENYA (no subsidy)
VIETNAM (no subsidy)
El SALVADOR (focused subsidy)
KENYA (subsidy stopped)
Morocco
MOROCCO LPG
1996-2020
Cylinder LPG in Kg/cap vs GDP/cap
<table>
<thead>
<tr>
<th><strong>MOROCCO</strong></th>
<th><strong>Year 2020</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder Market 2020 KT</td>
<td>2 708 kt</td>
</tr>
<tr>
<td>Number of LPG Marketers (group)</td>
<td>9</td>
</tr>
<tr>
<td>5 companies represent 89% of the market</td>
<td></td>
</tr>
<tr>
<td>Number of LPG Marketer licences</td>
<td>13</td>
</tr>
<tr>
<td>Number of Brands</td>
<td>17</td>
</tr>
<tr>
<td>Number of cylinders 12 kg equiv</td>
<td>28</td>
</tr>
<tr>
<td>Number of Distributors</td>
<td>650</td>
</tr>
<tr>
<td>Number of retail outlets (estim)</td>
<td>100 000</td>
</tr>
<tr>
<td>Number of Filling Plants</td>
<td>38</td>
</tr>
<tr>
<td>Number of Filling plants shared between marketers</td>
<td>19%</td>
</tr>
<tr>
<td>Filling capacity 2 shifts (KT)</td>
<td>3 200 kt</td>
</tr>
<tr>
<td>Import and filling plant storage capacity</td>
<td>311 000 t</td>
</tr>
<tr>
<td>SOMAS common facility</td>
<td>underground cavern of 200KT capacity - 6 marketers own the company</td>
</tr>
<tr>
<td>SALAMGAZ common facility</td>
<td>filling company of 11 filling plants owned by 4 companies, out of which 3 marketers</td>
</tr>
<tr>
<td>Gross Margin value chain / Price structure</td>
<td>204 $/t</td>
</tr>
<tr>
<td>End user price of 12kg refill since 1990</td>
<td>3333 Dh/t</td>
</tr>
</tbody>
</table>
Cote d’Ivoire
COTE D'IVOIRE LPG Market (1990-2020)
source DGH - Beenergy

Distribution model regulated: the BCRM strictly
6 Marketers represent 96% of Tonnage and of the
investment in cylinders + infrastructure.
Storage capacity rotation >22
2015: Greater Abidjan fully developed (>25kg/cap)
Regional development in progress
Number of cylinders: about 8 million 6kg equivalent
about 4 million cylinders injected in 5 years
Price structure on Import Parity

April 2013: same price 6 & 12kg nationwide
new perequation due to the 360km pipe line
5200 CFA for 12,5 kg (0,76 $/kg)
2000 CFA for 6kg (0,61 $/kg)
import parity average 2020 0,36$/kg

1993: Butanization Policy
against deforestation
1995-2008 LPG Price structure
with fixed subsidized prices for all
size of refills (variable subsidy)

Increase of subsidy
for 6kg refills

same prices nationwide for
6kg and 12,5 kg only

Storage rotation rate of 22,5
COTE D'IVOIRE LPG growth potential:
kg/cap LPG Cylinders vs GDP/cap (2019)

trend:
15kg/cap (60%) at 2,220 $/cap
20kg/cap (80%) at 2,784 $/cap
25 Kg/cap (100%) at 3,340 $/cap
COTE D'IVOIRE LPG consumption
in kg/capita per year

source DGH - Beenergy

1993: Butanization Policy against deforestation
1995-2008 LPG Price structure with fixed subsidized prices for all size of refills (variable subsidy)

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Same prices nationwide for
6kg and 12,5 kg only

Increase of subsidy for
6kg refills

Subsidized prices all refills

kg/cap cylinders-domestic — kg/cap cylinders+bulk

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Cote d’Ivoire
LPG map of consumption

- An expansion from the city capital area.
- Regional development improved with the perequalization of the primary and second transportation.
- Investment in regional filling capacities not yet at the level of the greater Abidjan.
SENEGAL LPG
consumption kg/cap and end-user price

- 4.1 million of Cylinders 6kg equivalent
- 75% of 6kg and 2.7 kg cylinders
- 4 Marketers, only Marketer licences
- Negative Cylinder Interchangeability effect
- Cylinder Gross margin : 250€/t
- price structure with IPP and capped margins
  no uniformed prices

- June 2009 : end of the subsidy
- High international prices
- Supply Problems
- Acceleration of Cylinders Investment

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SENEGAL LPG consumption in kg/cap and % subsidy

- Kg/cap
- % Price Subsidy

High international prices
SUPPLY PROBLEMS

June 2009: end of the subsidy

4.1 million of Cylinders 6kg equivalent
75% of 6kg and 2.7 kg cylinders
4 Marketers, only Marketer licences
Negative Cylinder interchangeability effect
Cylinder Gross margin: 250€/t
price structure with IPP and capped margins

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### KPIs for objectives of LPG development in SSA in 2030

<table>
<thead>
<tr>
<th>KPI</th>
<th>Target</th>
<th>Vs</th>
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<tbody>
<tr>
<td>Population (million)</td>
<td>1 400</td>
<td></td>
</tr>
<tr>
<td>K Ton of LPG / year</td>
<td>21 000</td>
<td>vs 2.8</td>
</tr>
<tr>
<td>Number of circulating cylinders</td>
<td>470 M</td>
<td>vs 20 M?</td>
</tr>
<tr>
<td>Number of Marketers’ Distributors</td>
<td>17 500</td>
<td>vs 900?</td>
</tr>
<tr>
<td>Number of Retail Outlets</td>
<td>1 100 000</td>
<td></td>
</tr>
<tr>
<td>Number of Filling Plants</td>
<td>420</td>
<td>vs 110?</td>
</tr>
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The BCRM: the Model to Successfully Develop LPG Cylinder Markets

1. Investment in branded cylinders by licensed Marketers; cylinder deposit scheme
2. Reliable, dense distribution network, making the refilled cylinders available within 10mn from the user’s home
3. Safe refilling: implementation of the LPG ‘cylinder re-circulation’ model: LPG cylinders refilled in Marketer’s centralized filling plants under the responsibility of the Marketers
4. This Model (1+2+3) with a proper licensing mechanism centered on Marketers must be defined in a consistent LPG regulation
5. Solutions of affordability for the end-users
6. Solutions of financing of the investments for the private sector (Marketers)
The LPG Model, Used by the Professionals

The WLPGA, the voice of the LPG industry, has analyzed and compiled the rules that have fully proved to enable the development of the LPG market in cylinders. These Guidelines describe The LPG Model: please follow them.
Key Messages

• Get the LPG structure/offer to develop:
  – investment in million of cylinders, and in a distribution network of shops or last-mile system.
  – Respect the BCRM, the branded cylinder recirculation model, with centralized filling plants.
  – Avoid breaking the flow of investment in cylinders by allowing interchangeability of cylinders, exchange pool schemes, illegal cross filling.

• Adjust demand by providing affordability solutions (capping the deposit, regulated prices, microfinance for the equipment and the retailer, pay-as-you-go system if proved to be efficient, etc.)

• Ensure to license only Marketers with a business plan matching the country’s LPG master plan.
Thank you