LPG in India: Past, Present, and Future of Ujjwala

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Toxic Pollutants in Wood Smoke from Simple (poor) Combustion

• Small particles, CO, NO₂
• Hydrocarbons
  – 25+ saturated hydrocarbons such as n-hexane
  – 40+ unsaturated hydrocarbons such as 1,3 butadiene
  – 28+ mono-aromatics such as benzene & styrene
  – 20+ polycyclic aromatics such as benzo(α)pyrene
• Oxygenated organics
  – 20+ aldehydes including formaldehyde & acrolein
  – 25+ alcohols and acids such as methanol
  – 33+ phenols such as catechol & cresol
  – Many quinones such as hydroquinone
  – Semi-quinone-type and other radicals
• Chlorinated organics such as methylene chloride and dioxin

Source: Naeher et al, J Inhal Tox, 2007

Typical biomass cookstove releases
300-400 cigarettes per hour worth of smoke

Not like smoking these cigarettes!
But like in a very smoky pub with lots of smokers
First person in human history to have her exposure measured doing the oldest task in human history

Kheda District, Gujarat, 1981
State-wise estimates of 24-h kitchen concentrations of PM2.5 in India

Solid-fuel using households

Balakrishnan et al. 2013 (SRU group)
980 thousand premature deaths per year in Jan 2015
India: What happened?

Millions

- Population
- Solid Fuel
- Clean Fuel

Year:
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015

Values:
- Population: Increasing (from 0 to 1400)
- Solid Fuel: Increasing (from 600 to 800)
- Clean Fuel: Increasing (from 100 to 1400)
In 35 years, “improved” biomass stoves had almost no impact on health. At the same time more than 400 million Indians took up clean fuels, mainly LPG.

But 700 million stayed with biomass – no progress – the Chulha Trap.
Blaming the Oil/Gas Industry

- “Fracking”
- Tanker spills
- Off-shore platform failures
- Pipeline explosions
- Refinery fires
- Air pollution
- And, of course
- Climate change
The industry needs to push back

- It produces the fuel that could save millions of lives every year.
- By definition!
- All among the poorest and most vulnerable populations in the world
- But to make this case, it needs to do better to make LPG available to poor populations
Vivek Rae, Cont.

• Double LPG distributors for next year – 10 million people covered!

• Called a meeting of all the Chairs and heads of LPG for the 3 major oil companies to have them design a national plan under guidance of the Ministry of Petroleum in Feb 2014

• Modi, elected in May 2014, but did not stop this initiative --- expanded it!
How did it work?

• People need to pay their own “connection” cost ~$30 for deposit on first cylinder, etc.
• Price of LPG to consumer set at 450 INR (~7 US) per refill (14 kg)
• If international market price is 600 INR, 150 INR is paid by government
• If price goes up or down, government adjusts its contribution – people pay no more
• Everyone gets this subsidy
Expanded LPG Coverage Starting Jan 2015

Suresh Nair, GM Sales (LPG) BPCL
Pahal

- Direct deposit of refill subsidy into electronic bank accounts
- All LPG sold at market prices
- Much less leakage to other sectors
- Largest bank transfer to a population in human history – Guiness Book of Records
LPG being a highly subsidized commodity in India with subsidy amounting to 6 billion USD during 2013-14.

This subsidy could be used for development purposes benefitting the nation.

LPG consumers who can afford to pay the market price for their LPG supply to be a part of this nation building exercise by giving up LPG subsidy to benefit those who can’t afford.
#GiveItUp

Feel the Joy of Giving

Initiated by

Ministry of Petroleum & Natural Gas
Government of India

#GiveItUp

A GIFT OF GOOD HEALTH TO OTHERS AND A CLEANER ENVIRONMENT TO YOURSELF.
Give It Up campaign

• Middle class gives up their LPG subsidies
• Health is the message – “make a poor man’s kitchen clean”
• Extensive social marketing
  – Modi and other celebrities in speeches, media ads, bill boards, etc
  – SMS messages
  – Fairs, athletic events, posters, skits, etc
  – Website linking those giving up to those receiving: middle class to poor
<table>
<thead>
<tr>
<th>#Giveitup CHAMPION</th>
<th>BENEFICIARY</th>
</tr>
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<tbody>
<tr>
<td>MUNIAMMAL</td>
<td>MISHRI DEVI GURJAR</td>
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<tr>
<td>J.RAY CHOWDHARY</td>
<td>BALE MALLAIAH</td>
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<tr>
<td>KALAISELVI. V. MRS.</td>
<td>SHIV . KUMAR</td>
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<td>SHREE RAJA GOVIND SINGH KHANDELA</td>
<td>RIYAJ . AHMAD</td>
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<td>MOHD SHAHID</td>
<td>A. RASHID S/O KARIMULLA</td>
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<td>SAFIQ</td>
<td>EESVAR . SINGH</td>
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<tr>
<td>MAHENDRA PRASAD TRIPATHI</td>
<td>VIJENDRA . JATAV</td>
</tr>
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</table>

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10.5 million households
as of June 2017 and still counting

In financial terms, about equal to 0.5 billion USD/year internal
“foreign” aid - middle class to poor
(half as much net real foreign aid)
Budget Speech, Feb 2016

• “In our country, cooking gas cylinders were considered an upper middle class luxury. Gradually it spread to the middle class. But the poor do not have access to cooking gas. Women of India have faced the curse of smoke during the process of cooking. According to experts having an open fire in the kitchen is like burning 400 cigarettes an hour. The time has come to remedy this situation.”
• “We have decided to embark upon on a massive mission to provide LPG connection in the name of women members of poor households.... The Scheme will be continued for at least two more years to cover a total of 5 crore (50 million) BPL (below-poverty-line) households.”
• “This measure will empower women and protect their health. It will reduce drudgery and the time spent on cooking. It will also provide employment for rural youth in the supply chain of cooking gas.”
Pradhan Mantri Ujjwala Yojana

Ujwalla Program

Respecting the dignity of women


Terms and conditions apply. For more details contact your nearest LPG distributor.
For clarification, suggestions and feedback call on toll free number 1800 266 6696
www.pmujjwalayojana.com

Suresh Nair, GM Sales (LPG) BPCL
Objectives of Ujjwala Scheme

1. Empowering women and protecting their health.

2. Reducing the serious health hazards associated with cooking based on biomass fuel.

3. Reducing the number of deaths in India due to unclean cooking fuel.

4. Preventing young children from significant number of acute respiratory illnesses caused due to indoor air pollution by burning the biomass fuel.
Ujjwala

- Adding 10,000 distributors to the 18,500 now existing. Now 5700 in rural areas (only ~800 added the first year)
- National no fault insurance scheme for accidents – 6 lakh per accident – toll-free national number to call
- 1.2 billion USD earmarked for one-time connection costs
- All transactions only to women’s accounts
Ujjwala, cont

• Goal is 50 million new connections by 2019
• Minus those double connections deleted from PAHAL scheme: – 34 million
• Plus those from Give it Up: 10+ million
• Plus from normal growth in middle class
  – Which was 26 million from Jan 2015 to April 2017
• Currently nearly 200 mil active accounts
• >70% of country already
In 2019

• 60 million new BPL connections to be added since 2015
• Plus 50+ million in middle class
• Perhaps >80% of country to be covered
• Now starting to design program for moving to >90%
Why India?

• Vast infrastructure already in place: pipelines, 189 bottling plants, cylinder manufacturing, port facilities, 18,500 distributors, etc.

• Largest Indian company and two other large companies do the marketing: Private sector but government owned and thus can be focused on social programs

• Massive commitment from top to bottom: PM to distributor
• There were 3 crore 'ghost clients' with gas subsidies under their names. Now those have disappeared and those who really needed it have received a Connection

• Now anyone can transfer their gas subsidy to those who are in need of them.

• 5 crore (50 million) rural families will receive a gas connection

• When I think of a developed India, I think of a healthy India, particularly the good health of the women and children of our nation
JAM is important

- Jan Haar: electronic bank accounts
- Aadhaar cards: biometric ID card system
- Mobile phones: and rapid growth of smart phones
- Cashless transactions now possible for LPG purchase – six separate systems currently
- Leading national effort
Of course

• Just providing affordable access to LPG or other clean fuel does not mean people instantly switch 100%.

• However, since 60% of world uses gas and/or electricity it argues strongly that the others will eventually follow.

• Is clearly what is needed in long term – why not sooner rather than later?
What else?

• India moving directly to eliminate kerosene subsidies – already several states have done so. LPG is helping. Many thousand crore saved

• India is pushing a large-scale introduction of piped natural gas (PNG) in cities – hopes to reach 100 million people by early 2020s

• Displaces LPG and makes it available to others down the energy/income ladder
Subsidy or?

- Health sector does not refer to programs to vaccinate or provide maternal care to the poor as “subsidies” but rather

- **Social investments**

- In order for public support of clean fuels to be termed social investments, they need to be far better targeted than in the past.
New Directions

• Work to help target subsidies even better
  – Embrace modern IT to do so
  – JAM: bank accounts, ID card, mobile phone

• Work with others to explore entirely different distribution modes
  – Example being explored: women’s groups
  – Safety must be maintained
In essence, India

- Has found ways to provide LPG access to hundreds of millions now using solid fuels
- We know, however, that initially people tend to continue to use biomass fuel as well, reducing the health benefit of LPG use
- How can we accelerate the natural transition to nearly complete usage?
Promoting Usage

• Is a common requirement for household health interventions, however
• Just providing access to latrines, condoms, low salt foods, bednets, institutional delivery facilities, is not enough
• Need to encourage their use to obtain the health benefits
1. How best to encourage usage?

• Choose an already identified vulnerable population that is particularly open to behavioral change
• Pregnant women in biomass-using households: 15 million per year
Low Birthweight (< 2,500 grams)
12 studies – half in South Asia

Cookfire smoke associated with a 35% increase in low birthweight

Amegah, *PLOS One*, 2014
Low Birthweight

• Low birthweight associated with a range of problems including
  – Infant mortality
  – Low cognitive function
  – Adult chronic disease risks
• According to UNICEF, India has world’s third highest rate – 27% (after Pakistan and Yemen)
What benefits are now available to poor pregnant women?

- Conditional cash transfer (CCT) is a well-developed way to encourage healthy behaviors
- India has a CCT for pregnant women operated via rural health system, including ASHAs – 2000 Rs.
- Now (Dec 31, 2016) 6000 Rs./pregnancy
- Delivered through electronic bank accounts to women alone
Ujjwalla-Mamta Initiative
“Bright Motherhood”

• Provide full refund of LPG to all pregnant women using biomass fuels - ~ 15 million/year.
• Use ASHA workers as primary contact plus coordination with local LPG distributors.
• Use existing electronic bank accounts of the women to facilitate payments.
• Cost ~2000 ($30) Rs per pregnancy, a third of current CCT payments
• Engender a lifetime behavioral change to LPG
The LPG and Health Sectors

• Each has a large cadre of workers in the field close to households
  – 6000 LPG distributors, soon to be 12,000, each with 30-40 workers – about half a million
  – >900,000 local health workers

• Can do more together to promote healthy kitchens than either can do separately
2. Further revision of subsidies

## Promoting Clean and Affordable Cooking Smarter Subsidies for LPG

ALOK TRIPATHI, AMBUJ D SAGAR, KIRK R SMITH

### Table 1: Monthly Mean Household Expenditure on LPG

<table>
<thead>
<tr>
<th>Decile of Expenditure</th>
<th>Monthly Mean Household Expenditure (MMHE)</th>
<th>Percentage of MMHE Required for LPG</th>
<th>Requisite Subsidy (Rs/kg) to Keep Fuel Costs &lt;5% of MMHE</th>
<th>Requisite Subsidy (Rs/kg) to Keep Fuel Costs &lt;10% of MMHE</th>
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<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
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<tr>
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<td>3,702*</td>
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<td>10–20</td>
<td>3,838</td>
<td>5,143*</td>
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<td>20–30</td>
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<td>17,242</td>
<td>35,953</td>
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<td>1.5</td>
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</tbody>
</table>
New Directions, cont.

• What are the barriers to usage?
  – Knowledge – information to come separately
  – Reliability of supply (refills) – double cylinder
  – Cost
    • Upfront costs – perhaps add stove and table
    • Refill amount – use JAM to facilitate
    • Recurring cost – big longterm issue
Ideas being pursued

– 1. Combine with pregnancy benefits in public health system
– 2. Target subsidies even more effectively – turn them into social investments
– 3. Combine with employment benefits in the Rural Employment Scheme
– 4. Change to full opt-in system – reduce subsidies even more from middle class
– 5. Do not, however, stop subsidies to the poor yet: Preserve at least for Ujjwala users for 5 years, perhaps expand for very poorest
India: What happened?
India: What If?

A Chulha Trap or a Clean Fuel Gap?

9% instead of 5.5%/yr for 20 years
How do we help people move into this realm?

Very Low Income
200 million

Low Income
400 million

Middle Income
400 million

High Income
200 million

Solid Fuels

Wood

Coal

Kerosene

Biogas/solar

Liquefied Petroleum Gas

Natural Gas

Electricity

Non-solid fuels

Crop Waste Dung

Very Low Income
200 million

Low Income
400 million

Middle Income
400 million

High Income
200 million

Conceptual Indian Energy Ladder

Smith/Pillarisetti, 2014
Increasing Prosperity and Development

Decreasing Household Air Pollution

Very Low Income 200 million

Low Income 400 million

Middle Income 400 million

High Income 200 million

Conceptual Indian Energy Ladder

Crop Waste Dung

Solid Fuels

Wood

Coal

Kerosene

Biogas/solar/ethanol

Liquefied Petroleum Gas

Natural Gas

Electricity

Non-solid fuels

Coal

Kerosene

Biogas/solar/ethanol

Liquefied Petroleum Gas

Natural Gas

Electricity
Many thanks

Publications and presentations on website – easiest to just “google” Kirk R. Smith
## Distributors By Performance Rating in the District: PUNE (POONA)

<table>
<thead>
<tr>
<th>Distributor Name</th>
<th>Distributor Address</th>
<th>Rating</th>
<th>Performance</th>
<th>Meaning</th>
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<tr>
<td>MARUTI HP GAS GRAMIN VITRAK</td>
<td>AT POST - SAHAY APRUDAY 1/2ND MAIN ROAD</td>
<td>⭐️⭐️⭐️⭐️⭐️</td>
<td>⭐️⭐️⭐️⭐️⭐️</td>
<td>85% delivery in &lt;= 2 day 'Excellent'</td>
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<tr>
<td>SHAH GAS AGENCY</td>
<td>1/68J SHUKRAWAR VILL PUNE</td>
<td>⭐️⭐️⭐️⭐️⭐️</td>
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<td>SANT DYNAPERSWARIcemal GAS AGENCY</td>
<td>5/4 AADIWARIYACHI TAL. KHEP DIST. PUNE</td>
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<td>⭐️⭐️⭐️⭐️⭐️</td>
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<tr>
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<td>GR-VII DAUND PUNE</td>
<td>⭐️⭐️⭐️⭐️⭐️</td>
<td>⭐️⭐️⭐️⭐️⭐️</td>
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<td>POLICE SUDHALA</td>
<td>H P GAS DISTRIBUTORS S &amp; RPF GROUPS I &amp; II RAMTEKDI PUNE 22</td>
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SHAH BROTHERS
1, MARKET YARD COMM. COMPLEX, PARDESHPURA, JUNNAR, MAHARASHTRA
Excl Mum/Thane/NMu, Pin Code: 410502

Refills delivered between 29/05/2017 to 05/06/2017

Distributor Time To Delivery

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<th>Delivery Time (in days)</th>
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<th>Cumulative % Delivered</th>
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The national average of consumption of domestic LPG cylinders is 7 cylinders per consumer for a year. Consumers with Above Consumption are those consumers who have availed more than 7 cylinders in a financial year.

* Calculation basis 80% of bookings cleared