

LPG in India

Kirk R. Smith, MPH, PhD

Professor of Global Environmental Health
University of California, Berkeley

Collaborative Air Pollution Policy Centre

Indian Institute of Technology Delhi,
Sri Ramachandra University Chennai,
The Energy and Resources Institute Delhi, and
University of California Berkeley

UPES 16th Oil and Gas

Round Table

Mumbai, Sep 15, 2017

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(□)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

Toxic Pollutants in Wood Smoke

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

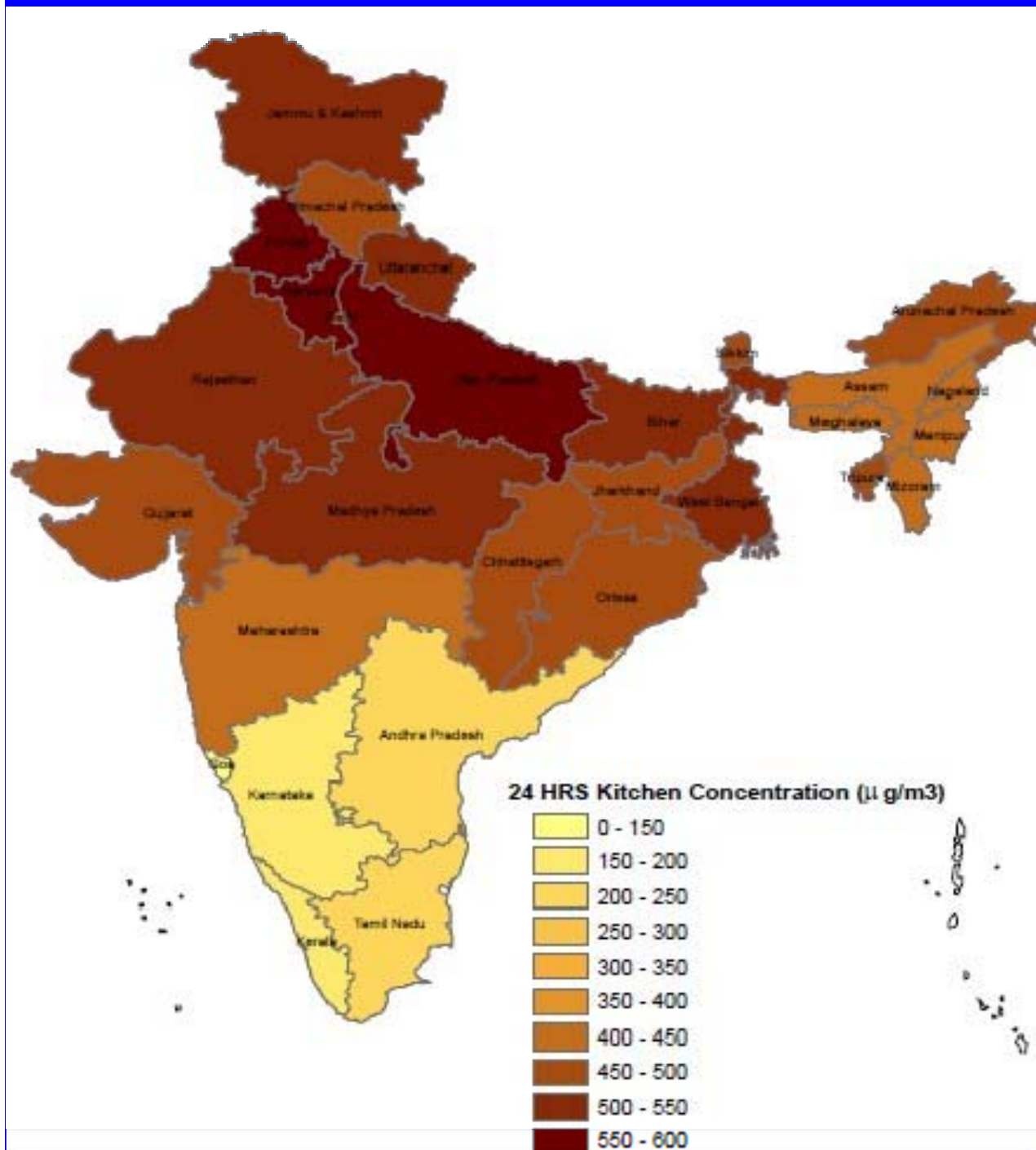
- Chlorinated organics such as *methylene chloride* and *dioxin*

Naehrer et al,
Tox, 2007

First person in human history to
have her exposure measured
doing the oldest task in human history



Kheda District,
Gujarat, 1981



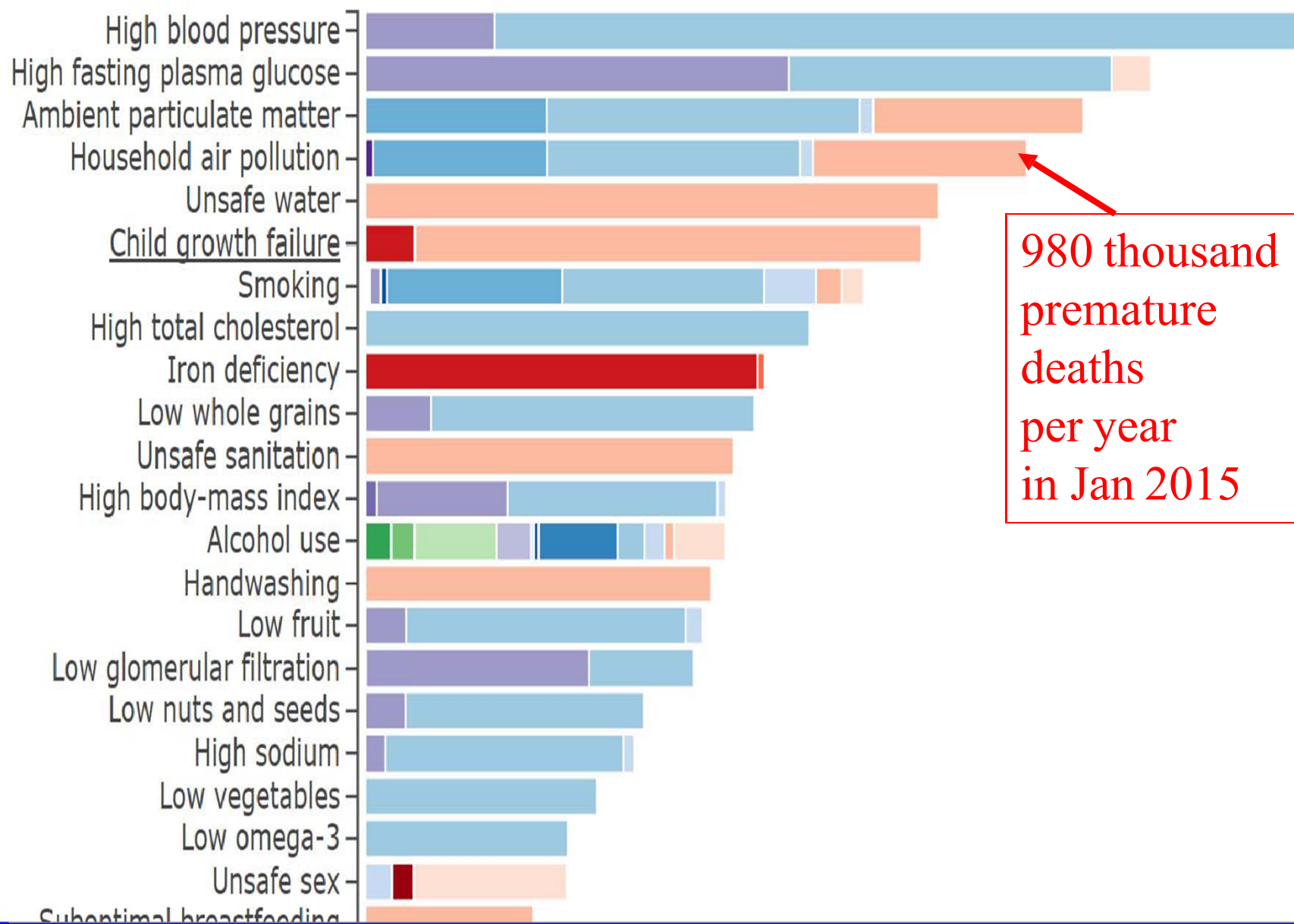
State-wise
estimates of
24-h kitchen
concentrations
of PM_{2.5}
in India

Solid-fuel using
households

Balakrishnan et al.
2013 (SRU group)

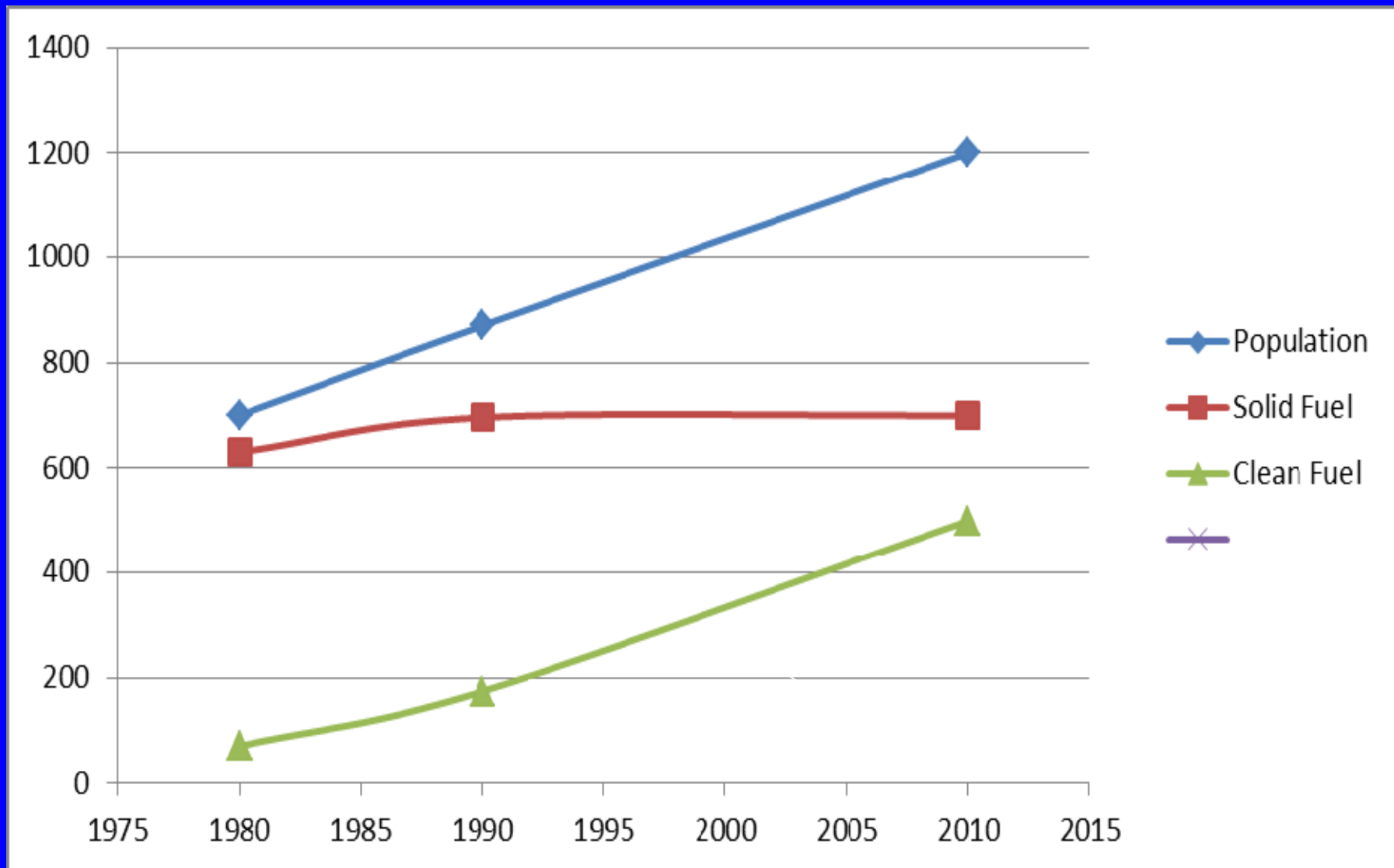
Back

India, Both sexes, All ages, 2015



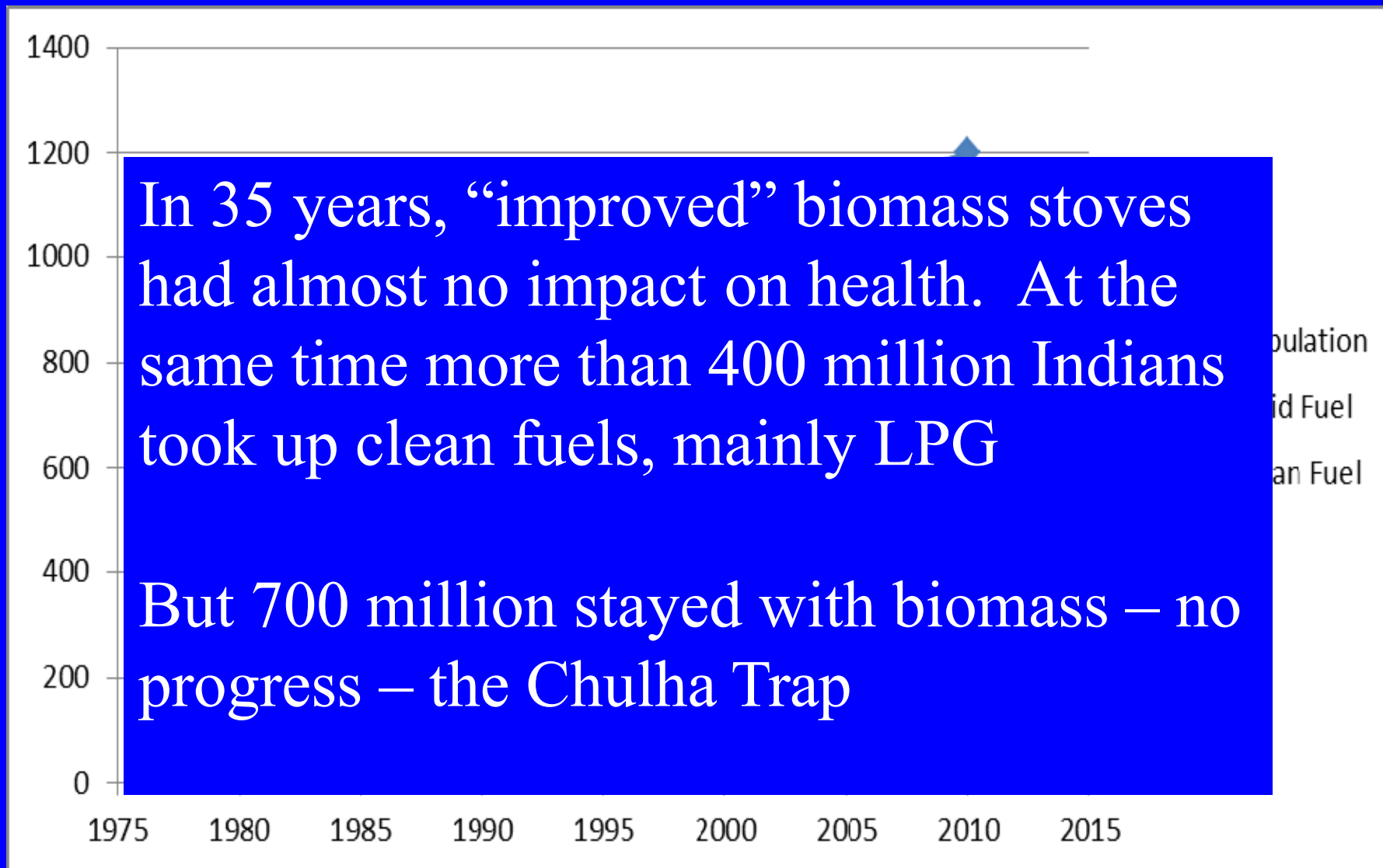
India: What happened?

Millions



India: What happened?

Millions



Associates



तेल उद्योग सुरक्षा निदेशालय
OIL INDUSTRY SAFETY DIRECTORATE

&

Centre for Occupational and Environmental Health (MAMC)

International Conference Occupational and Environmental Health

13-14 December 2013, New Delhi



OIL INDUSTRY SAFETY DIRECTORATE

and



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Environmental Health (MAMC)

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Occupational and
Environmental Health



Blaming the Oil/Gas Industry

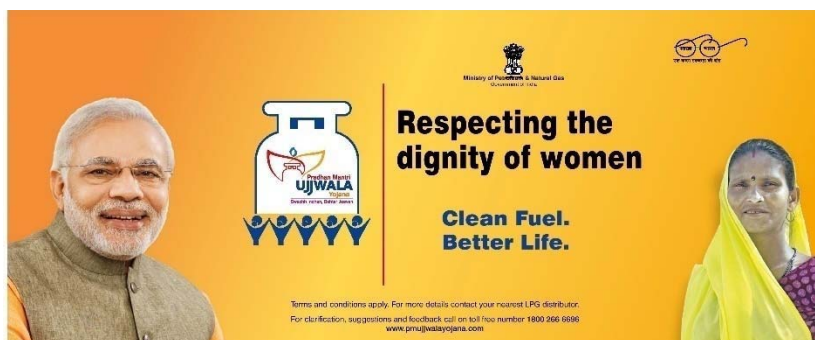
- “Fracking”
- Tanker spills
- Off-shore platform failures
- Pipeline explosions
- Refinery fires
- Air pollution
- And, of course
- Climate change

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
- But to make this case, it needs to do better to make LPG available to poor populations

How does the subsidy 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 and all are protected against market fluctuations



Expanded LPG Coverage Starting Jan 2015

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 – Guinness Book of Records

'Give It Up' – Why?



- LPG being a highly subsidized commodity in India with subsidy amounting to 6 billion USD (~40,000 crore) 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.



Feel the Joy of Giving

: Initiated by



Ministry of Petroleum & Natural Gas
Government of India



MyLPG website: Feb 24, 2016



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

Indane Website – Sep 15, 2017

Below are the number of citizens who have give up LPG subsidy

Total Citizens GiveitUp

4450082

Potential Annual Subsidy Saving

₹ 1762.23 Crores

#Giveitup CHAMPION	BENEFICIARY
MUNIAMMAL	MISHRI DEVI GURJAR
J.RAY CHOUDHARY	BALE . MALLAIAH
KALAISELVI. V. MRS.	SHIV . KUMAR
SHREE RAJA GOVIND SINGH KHANDELA	RIYAJ . AHMAD
MOHD.SHAHID	A. RASHID S/O KARIMULLA
SAFIQ	EESVAR . SINGH
MAHENDRA PRASAD TRIPATHI	VIJENDRA . JATAV

'Give It Up' – Success Story



10.7 million households
as of Sep 2017 and still counting

In financial terms, about equal to 0.7 billion USD (>4000 crore) per year internal "foreign" aid – middle class to poor (more than 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



Ujjwala Program



Ministry of Petroleum & Natural Gas
Government of India



Respecting the dignity of women

Clean Fuel. Better Life.



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.pmujiwalayojana.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 (8000 crore) 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

Modi speech – June 24, 2017

- 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
- LPG is 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

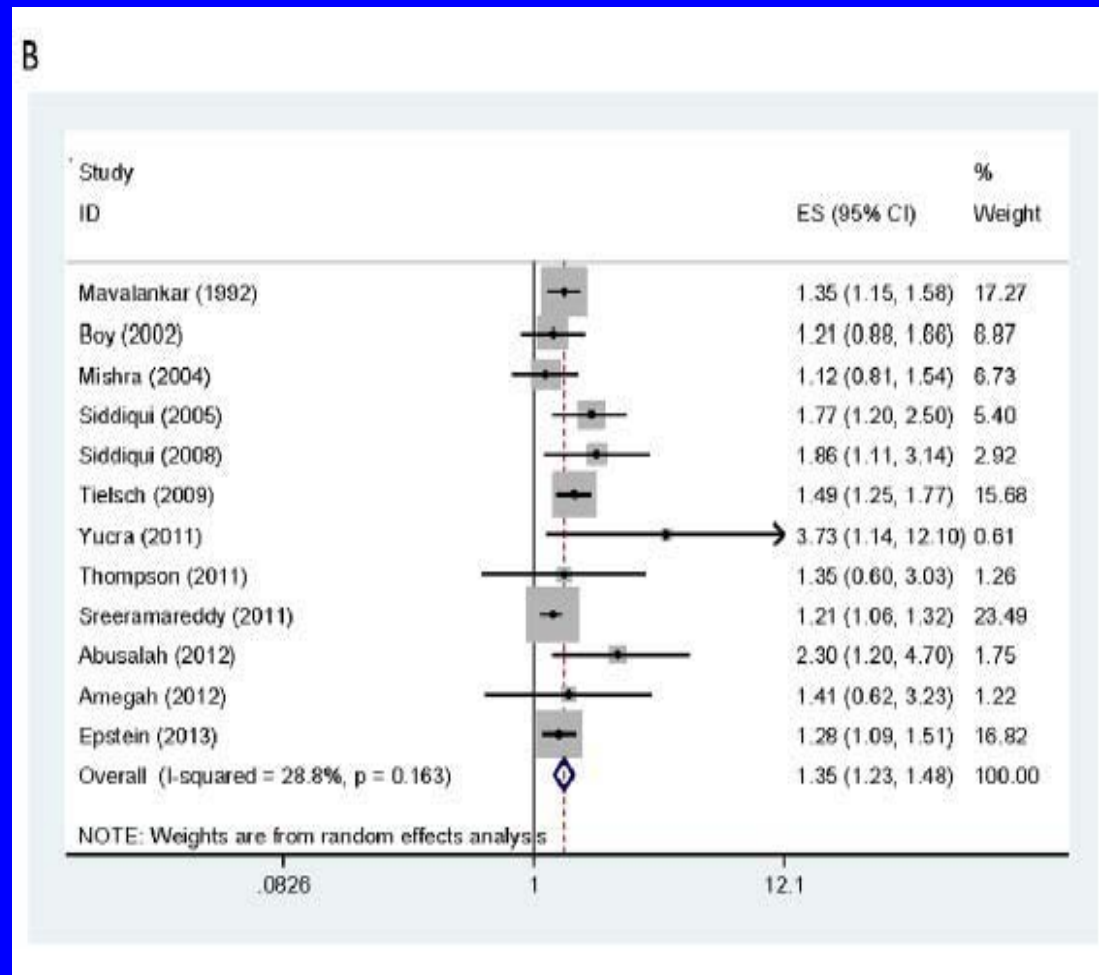
How best to encourage usage?

- 1. 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



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

Ujjwala-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

Decile of Expenditure	Monthly Mean Household Expenditure (MMHE)₹		Percentage of MMHE Required for LPG		Requisite Subsidy (Rs/kg) to Keep Fuel Costs <5% of MMHE		Requisite Subsidy (Rs/kg) to Keep Fuel Costs <10% of MMHE	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
0–10	2,909	3,702*	19.1	15.0	51.7	46.7	33.3	23.3
10–20	3,838	5,143*	14.5	10.8	45.8	37.6	21.6	5.1
20–30	4,432	6,268	12.5	8.9	42.1	30.5	14.1	NS
30–40	4,987	7,474	11.1	7.4	38.6	22.9	7.1	NS
40–50	5,566	8,683	10.0	6.4	34.9	15.3	NS	NS
50–60	6,204	10,030	8.9	5.5	30.9	6.8	NS	NS
60–70	6,991	11,721	7.9	4.7	25.9	NS	NS	NS
70–80	8,062	14,089	6.9	3.9	19.2	NS	NS	NS
80–90	9,837	17,906	5.6	3.1	8.0	NS	NS	NS
90–100	17,242	35,953	3.2	1.5	NS	NS	NS	NS

New Directions, cont.

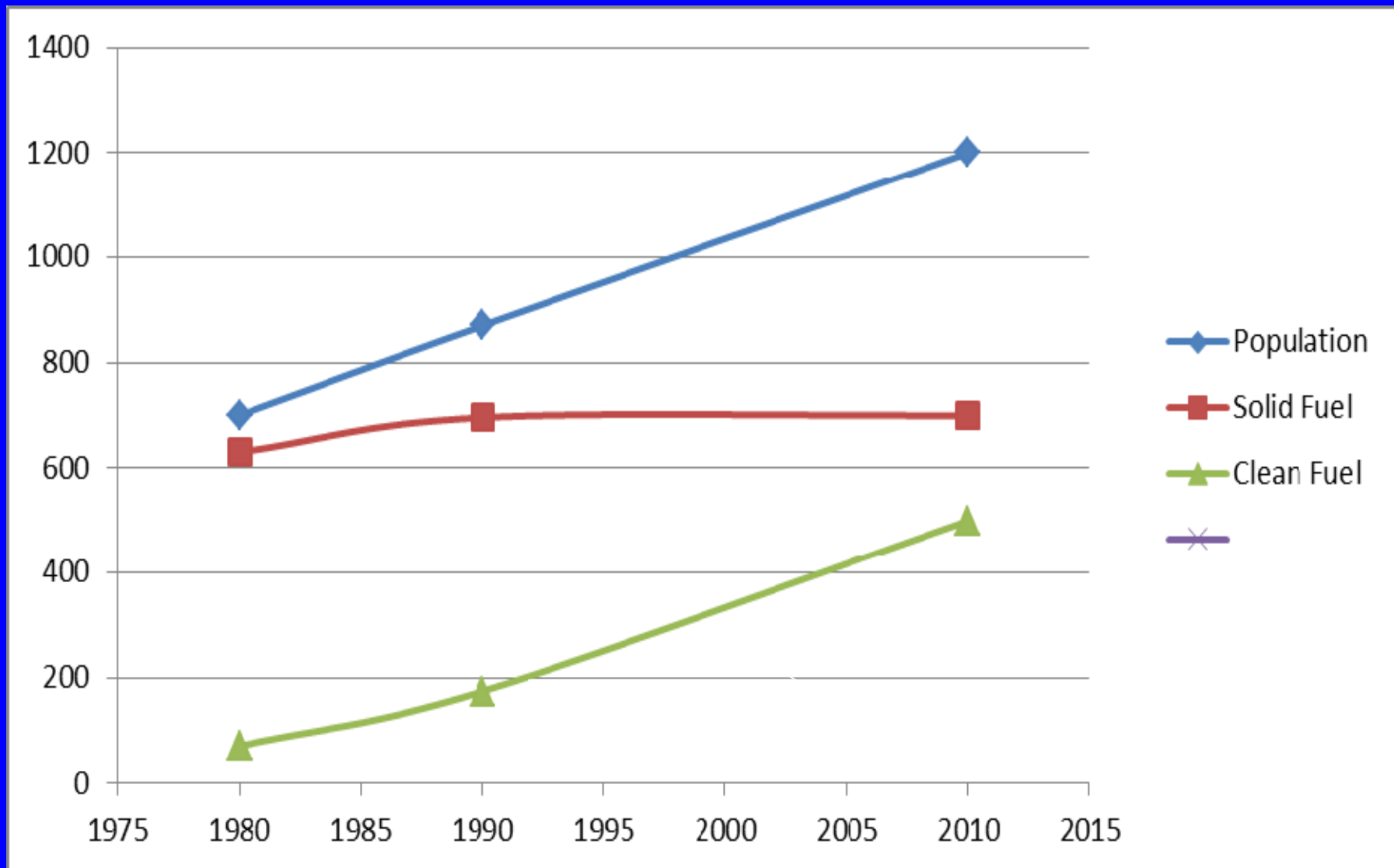
- What are the barriers to usage?
 - Knowledge – information to come separately
 - Reliability of supply (refills) – double cylinder
 - Cost
 - Upfront costs – perhaps add stove and table
 - Refill amount – use JAM to facilitate
 - Recurring cost – big longterm issue

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

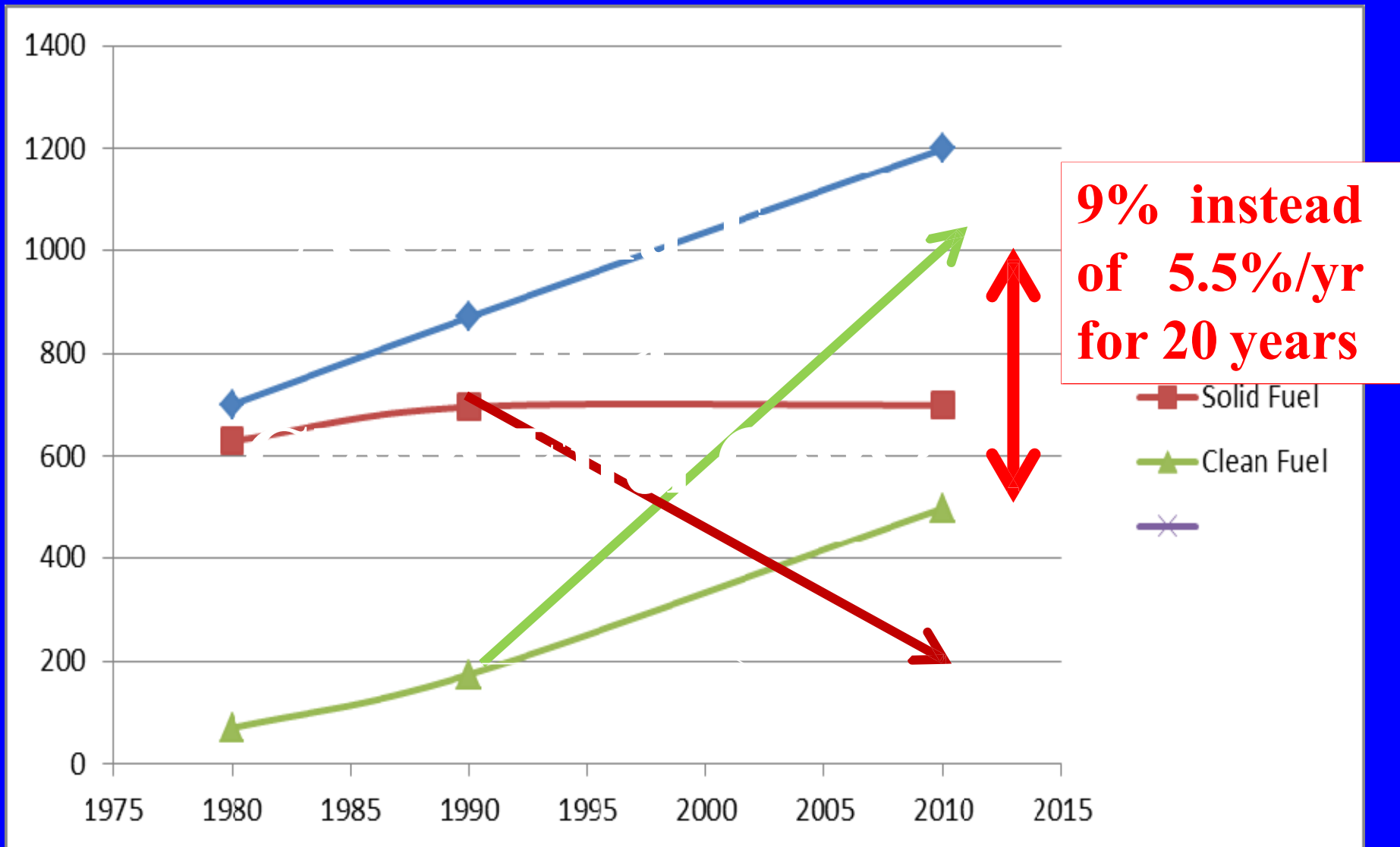
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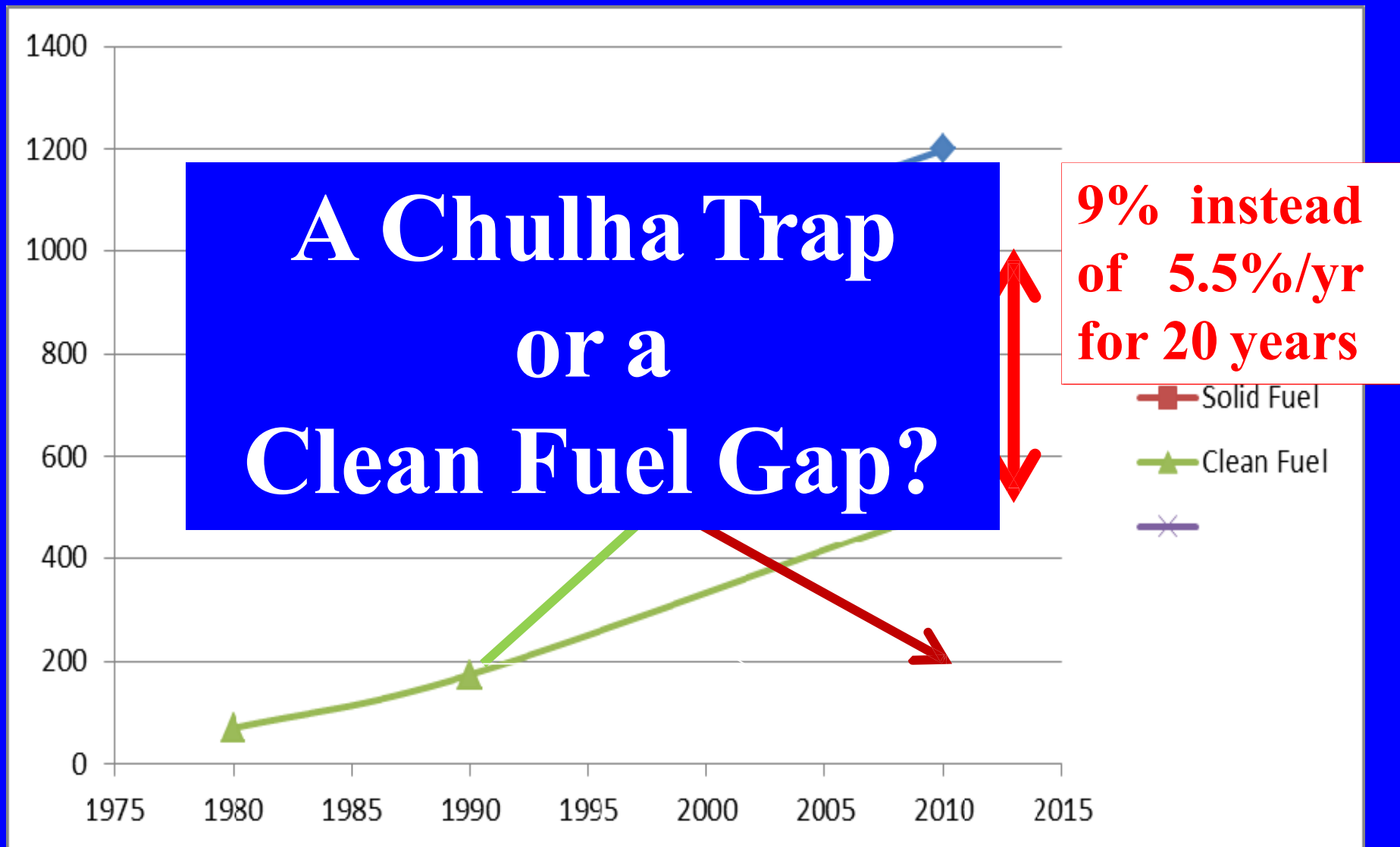
India: What If?

Millions

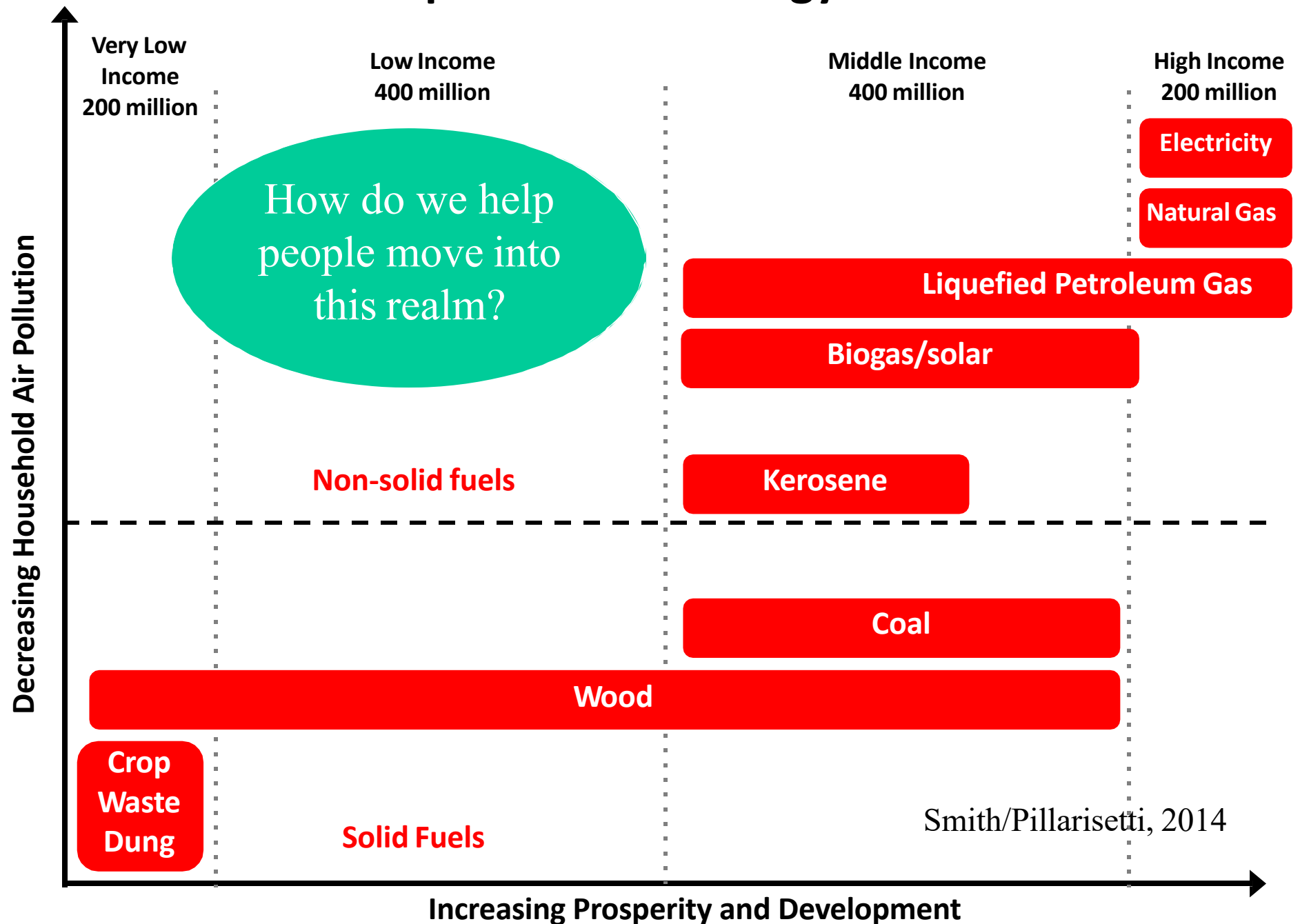


India: What If?

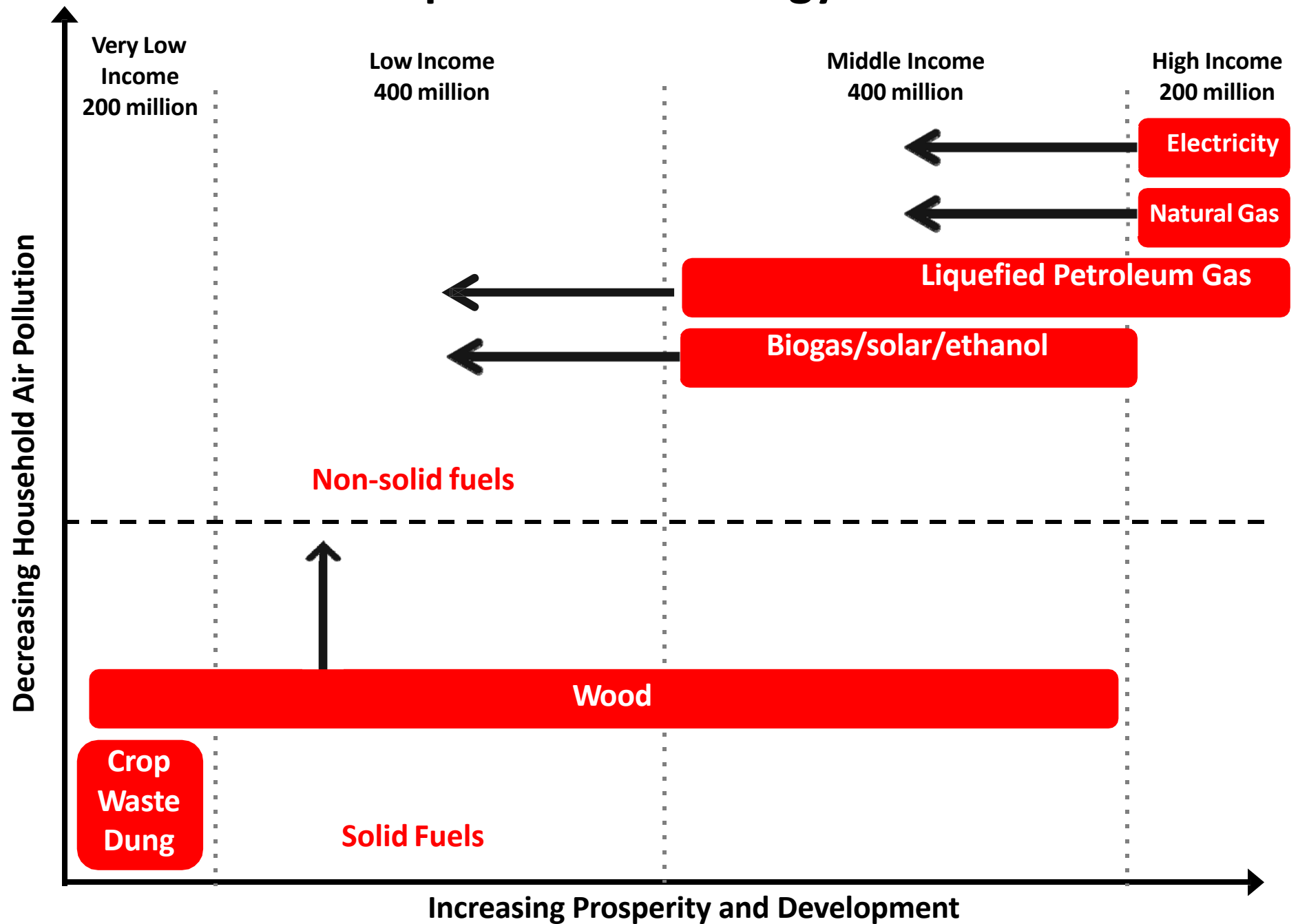
Millions



Conceptual Indian Energy Ladder



Conceptual Indian Energy Ladder



Many thanks

Publications and
presentations on website
– easiest to just
“google” Kirk R. Smith

