Household air pollution from solid cookfuel use

From Assessing Impacts to Advancing Solutions

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Solid Cookfuel Use

...still an everyday reality for 2.8 billion people

Source: Bonjour et al. EHP 2013
Solid Cookfuel Use

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Black carbon (BC) is a component of fine particulate matter (PM$_{2.5}$). Solid biomass fuels used for cooking and space heating, contribute to about 25% of the global emissions of BC, 50% of anthropogenic emissions of BC and significant amounts of CO and VOC emissions.
CRA results from GBD 2010: Ranking Household Air Pollution (HAP) burdens across regions
SS Lim et al Lancet 2012

• Highest attributable disease burdens from HAP for South Asia and Africa

• HAP also among the highest ranking risk factors* in many countries

*among those examined
GBD 2010: Results for Household Air Pollution

- 3.5 million deaths; 110 million DALYs
- Nearly doubled since last GBD assessment in 2000 despite total number of SF users being ~constant at 2.8 billion
  - More diseases included
  - Increasing contributions from NCDs
  - Defined (lower) counterfactual (7µg/m³ PM$_{2.5}$)
  - Contributions to 16% of outdoor air pollution deaths (~500,000)

GBD 2010 goes beyond

(i) Non-solid fuel use (for defining counterfactual levels)
(ii) Women & children (for impacts)
(iii) Acute and chronic respiratory outcomes (for disease)
(iv) Indoor & Rural (for exposures)
GBD 2010: Results from country level estimates (India)

Women:
472,802 deaths
14,430,400 DALYs

Source: IHME, 2013

Men:
549,323 deaths
16,985,500 DALYs

Source: IHME, 2013

Total: 1,022,130 Deaths; 31,415,900 DALYs

Primarily NCD
## Potential SLCP Actions

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<th>Justification</th>
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| **Promote LPG by increasing affordability and access** | ❖ Currently forms the basis for disease burdens attributable to solid fuel use  
❖ Highest reductions in PM, BC emissions when substituting for solid fuel using stoves  
❖ Consistently meets WHO air quality guidelines under (virtually) all conditions of use  
❖ Has been used by households in every region of the world and represents (a near) universal aspirational household energy standard for women  
❖ Would require least amount of testing and maintenance to achieve life-time reductions in exposure, especially required to impact non-communicable disease burdens (assuming continued affordability)  
❖ Allows parity on energy access between developed and developing regions  
❖ Allows CDM modalities (Experience available from individual projects to explore scaling) |
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| **Promote R&D on advanced combustion biomass based cook-stove design** | ❖ Imminently needed to fill gaps that cannot be filled by LPG in the near term  
❖ Limited evidence of substantive exposure reductions and sustained use from available technologies  
❖ Laboratory based emission reductions show promise of being able to attain desirable exposure benchmarks but currently need refinements through iterative inputs from field measurements (*Forced-convection stoves equipped with a fan to increase combustion efficiency have been shown to cut particulate emissions by 80–90%, black carbon by 60–90% and ozone-producing gases by 50–90%*)  
❖ Field efficacy needs to be established before challenges of efficiency/effectiveness can be addressed  
❖ Facilitates inter-sectoral dialogue between, health, energy and environment as well as using CDM modalities  
❖ WHO-IAQG guidelines (becoming available shortly) will enable all the above |
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| Interface household air pollution with ambient air quality within existing National Air Quality Programs | - Ambit of outdoor air quality regulation in many countries needs to cover rural areas (People do breathe everywhere!)  
- Cannot meet ambient air quality guideline values without controlling solid fuel use related emissions in many countries  
- Routine ambient monitoring in high solid fuel use regions may inform required density for intervention efforts to achieve and demonstrate health and climate benefits (especially for NCDs) |
| Increase local human resource capacities to conduct action research    | - Will allow taking advantage of natural intervention experiments occurring within local and regional programmatic efforts concerning air quality  
- Facilitate critical mass of risk communication efforts                |
The combined public health impact of air pollution, (ambient and household) is substantial

Marching towards cleaner household energy is necessary for health, efficient for climate and profitable for both!

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