WHEN THE SMOKE CLEARS:

Delivering on the Sustainable Development Goals and the Paris Agreement through Clean Cooking

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

CLIMATE BENEFITS OF CLEAN HOUSEHOLD COMBUSTION

UNEA Side Event
"WHEN THE SMOKE CLEARS"

Sunday A. Leonard
Climate and Clean Air Coalition
United Nations Environment Programme

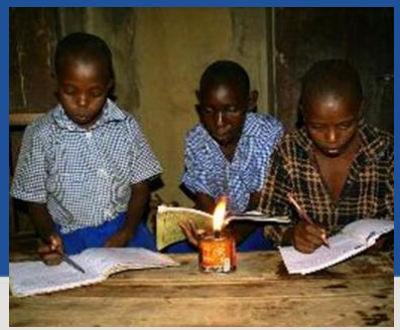
Some Facts

According to the WHO and IEA…

2.7 2.7 billion people use solid-fuel-based traditional stoves or open fires for cooking and heating

1.2 some 1.2 billion light their homes with simple kerosene lamps

10 about three-quarters of those without clean cooking facilities (around 2 billion people) live in just ten countries.



CONSEQUENCE: INDOOR AIR POLLUTION

Indoor Air Pollution from Household Cooking and Heating

Emissions: black carbon, organic carbon, carbon monoxide, methane & non-methane volatile organic compounds, and others…

➡ **PARTICULATE MATTER**

Sources are regional dependent

Developing countries: both cooking and heating

Some developed countries: mainly heating – UNEP 2011

Black carbon and **Methane** are two of the major emissions from household cooking/heating negatively impacting climate

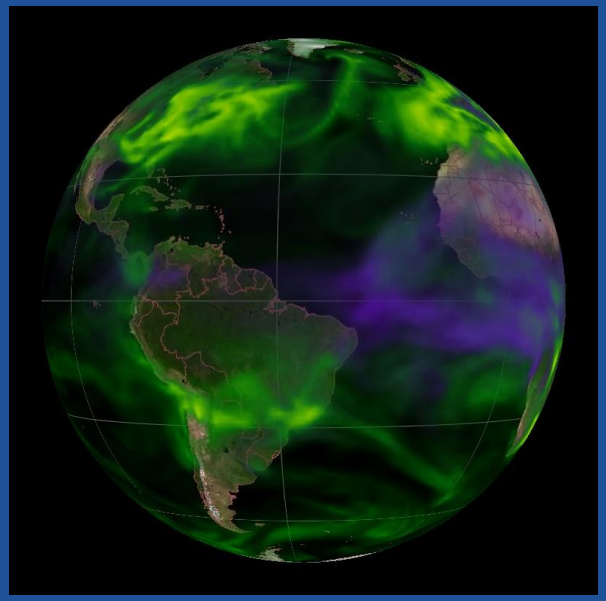
Black Carbon



A major/potent component of soot and particulate matter
From incomplete combustion of fossil fuels or biomass
Between 5 – 15% of fine particulate matter ($PM_{2.5}$)
Short lifetime in the atmosphere – a few days to weeks
Sources: diesel cars and trucks; **residential stoves and heating**; forest fires; agricultural open burning; some industrial facilities
About 25% of BC emissions come from household energy needs.

Black Carbon is a Short-Lived Climate Pollutant (SLCP), with a strong warming potential – **Climate Change** and **Air Quality Impacts**

Climate Impacts of Black Carbon



CLIMATE EFFECTS?

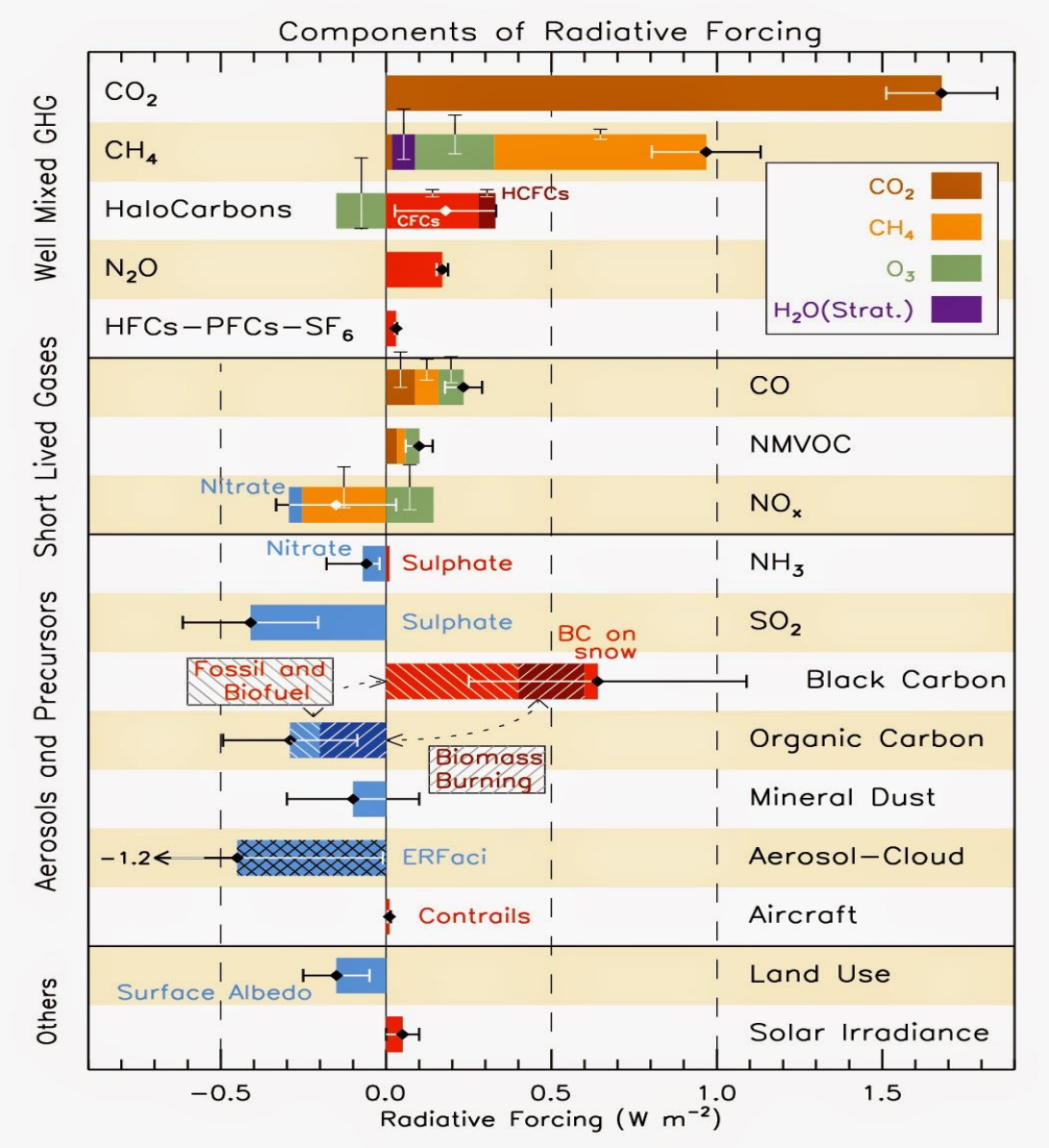
Absorbs visible light due to dark colour

Reduces ability of ice and snow surface to reflect sunlight

Interacts with clouds

High Potential to Cause Global Warming

Short lifetime + strong warming potential → targeted strategies to reduce BC emissions → immediate near-term climate benefits

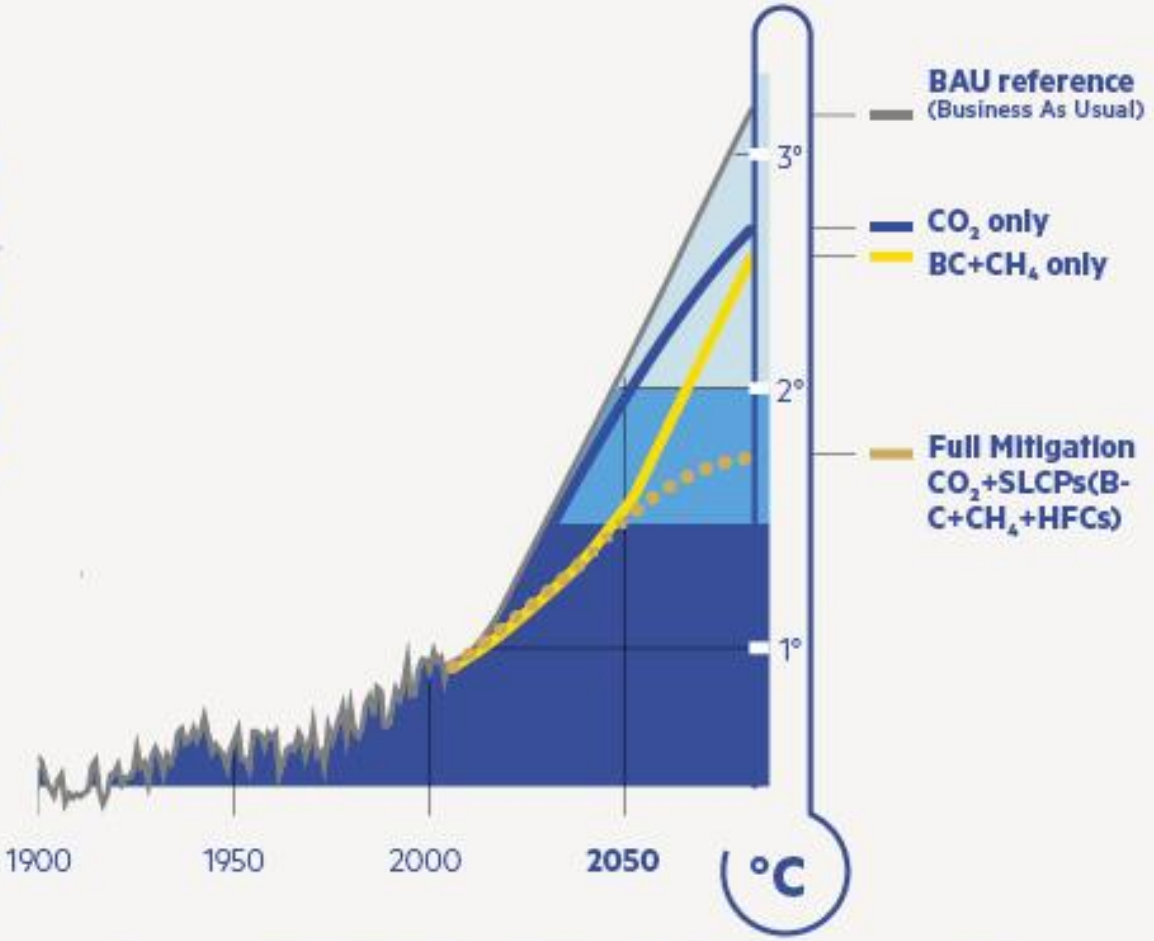


Black carbon is co-emitted with cooling agents like organic carbon. Net warming is dependent on the proportion of the emitted substances.

SLCP CLIMATE BENEFITS

Avoided Global Warming by 2050

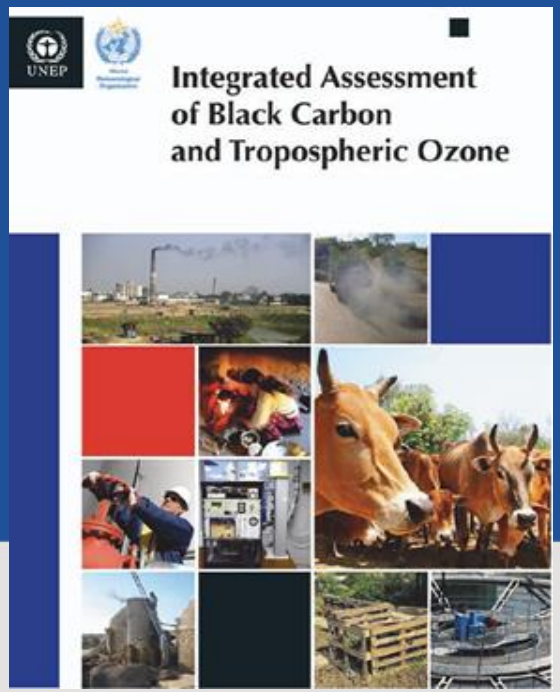
BC + CH_4	0.5°C
HFCs	0.1°C
SLCPs	0.6°C



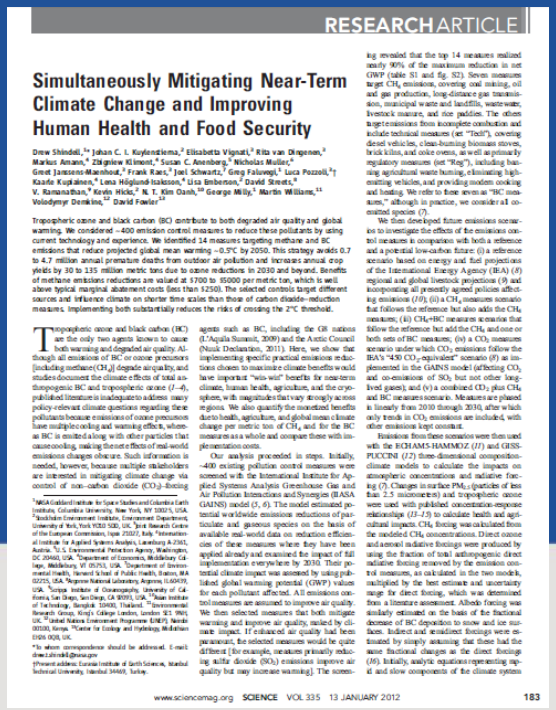
SIMULATED TEMPERATURE CHANGE
UNDER VARIOUS MITIGATION SCENARIOS

IMPORTANT ROLE OF CLEAN COOKING/HEATING

Actions toward clean cooking and heating have been identified in many scientific publications as a win-win measure for global & regional climate change as well as for air quality improvements, with positive outcomes for human health and sustainable development



UNEP/WMO, 2011


RESEARCH ARTICLE

Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security

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Tropospheric ozone and black carbon (BC) contribute to both degraded air quality and global warming. We considered ~400 emission control measures to reduce these pollutants by using current technology and experience. We identified 14 measures targeting methane and BC emissions that reduce projected global mean warming ~0.5°C by 2050. This strategy avoids 0.7 to 4.7 million annual premature deaths from outdoor air pollution and increases annual crop yields by 30 to 135 million metric tons due to ozone reductions in 2030 and beyond. Benefits of methane emissions reductions are valued at 1700 to 15000 per metric ton, which is well above typical marginal abatement costs (less than $250). The selected controls target different sources and influence climate on shorter time scales than those of carbon dioxide–reduction measures. Implementing both substantially reduces the risks of crossing the 2°C threshold.

Tropospheric ozone and black carbon (BC) are the only two agents known to cause significant warming and degrade air quality. Although all emissions of BC or ozone precursors [including methane (CH_4)] degrade air quality, and studies document the climate effects of total anthropogenic BC and tropospheric ozone (*1*–*4*), published literature is inadequate to address many policy-relevant climate questions regarding these pollutants because emissions of ozone precursors have multiple cooling and warming effects, whereas BC is emitted along with other particles that cause cooling, making the net effects of real-world emissions changes obscure. Such information is needed, however, because multiple stakeholders are interested in mitigating climate change via control of non–carbon dioxide (CO_2)–forcing agents such as BC, including the G8 nations (L'Aquila Summit, 2009) and the Arctic Council (Nuuk Declaration, 2011). Here, we show that implementing specific practical emissions reductions chosen to maximize climate benefits would have important "win-win" benefits for near-term climate, human health, agriculture, and the cryosphere, with magnitudes that vary strongly across regions. We also quantify the monetized benefits due to health, agriculture, and global mean climate change per metric ton of CH_4 and for the BC measures as a whole and compare these with implementation costs.

Our analysis proceeded in steps. Initially, ~400 existing pollution control measures were screened with the International Institute for Applied Systems Analysis Greenhouse Gas and Air Pollution Interactions and Synergies (IIASA GAINS) model (*5*, *6*). The model estimated potential worldwide emissions reductions of particulate and gaseous species on the basis of available real-world data on reduction efficiencies of these measures where they have been applied already and examined the impact of full implementation everywhere by 2030. Their potential climate impact was assessed by using published global warming potential (GWP) values for each pollutant affected. All emissions control measures are assumed to improve air quality. We then selected measures that both mitigate warming and improve air quality, ranked by climate impact. If enhanced air quality had been paramount, the selected measures would be quite different [for example, measures primarily reducing sulfur dioxide (SO_2) emissions improve air quality but may increase warming]. The screening revealed that the top 14 measures realized nearly 90% of the maximum reduction in net GWP (table S1 and fig. S2). Seven measures target CH_4 emissions, covering coal mining, oil and gas production, long-distance gas transmission, municipal waste and landfills, wastewater, livestock manure, and rice paddies. The others target emissions from incomplete combustion and include technical measures (set "Tech"), covering diesel vehicles, clean-burning biomass stoves, brick kilns, and coke ovens, as well as primarily regulatory measures (set "Reg"), including banning agricultural waste burning, eliminating high-emitting vehicles, and providing modern cooking and heating. We refer to these seven as "BC measures," although in practice, we consider all co-emitted species (*7*).

We then developed future emissions scenarios to investigate the effects of the emissions control measures in comparison with both a reference and a potential low-carbon future: (i) a reference scenario based on energy and fuel projections of the International Energy Agency (IEA) (*8*) regional and global livestock projections (*9*) and incorporating all presently agreed policies affecting emissions (*10*); (ii) a CH_4 measures scenario that follows the reference but also adds the CH_4 measures; (iii) CH_4+BC measures scenario that follow the reference but add the CH_4 and one or both sets of BC measures; (iv) a CO_2 measures scenario under which CO_2 emissions follow the IEA's "450 CO_2-equivalent" scenario (*8*) as implemented in the GAINS model (affecting CO_2 and co-emissions of SO_2 but not other long-lived gases); and (v) a combined CO_2 plus CH_4 and BC measures scenario. Measures are phased in linearly from 2010 through 2030, after which only trends in CO_2 emissions are included, with other emissions kept constant.

Emissions from these scenarios were then used with the ECHAM5-HAMMOZ (*11*) and GISS-PUCCINI (*12*) three-dimensional composition-climate models to calculate the impacts on atmospheric concentrations and radiative forcing (*7*). Changes in surface $PM_{2.5}$ (particles of less than 2.5 micrometers) and tropospheric ozone were used with published concentration-response relationships (*13*–*15*) to calculate health and agricultural impacts. CH_4 forcing was calculated from the modeled CH_4 concentrations. Direct ozone and aerosol radiative forcings were produced by using the fraction of total anthropogenic direct radiative forcing removed by the emission control measures, as calculated in the two models, multiplied by the best estimate and uncertainty range for direct forcing, which was determined from a literature assessment. Albedo forcing was similarly estimated on the basis of the fractional decrease of BC deposition to snow and ice surfaces. Indirect and semi-direct forcings were estimated by simply assuming that these had the same fractional changes as the direct forcings (*16*). Initially, analytic equations representing regional and slow components of the climate system

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Shindell et al., 2012


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Atmospheric Chemistry and Physics

Evaluating the climate and air quality impacts of short-lived pollutants

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Abstract. This paper presents a summary of the work done within the European Union's Seventh Framework Programme project ECLIPSE (Evaluating the Climate and Air Quality Impacts of Short-Lived Pollutants). ECLIPSE had a unique systematic concept for designing a realistic and effective mitigation scenario for short-lived climate pollutants (SLCPs; methane, aerosols and ozone, and their precursor species) and quantifying its climate and air quality impacts, and this paper presents the results in the context of this overarching strategy. The first step in ECLIPSE was to create a new emission inventory based on current legislation (CLE) for the recent past and until 2050. Substantial progress compared to previous work was made by including previously unaccounted types of sources such as flaring of gas associated with oil production, and wick lamps. These emission data were used for present-day reference simulations with four advanced Earth system models (ESMs) and six chemistry transport models (CTMs). The model simulations were compared with a variety of ground-based and satellite observational data sets from Asia, Europe and the Arctic. It was found that the models still underestimate the measured seasonality of aerosols in the Arctic but to a lesser extent than in previous studies. Problems likely related to the emissions were identified for northern Russia and India, in particular. To estimate the climate impacts of SLCPs, ECLIPSE followed two paths of research: the first path calculated radiative

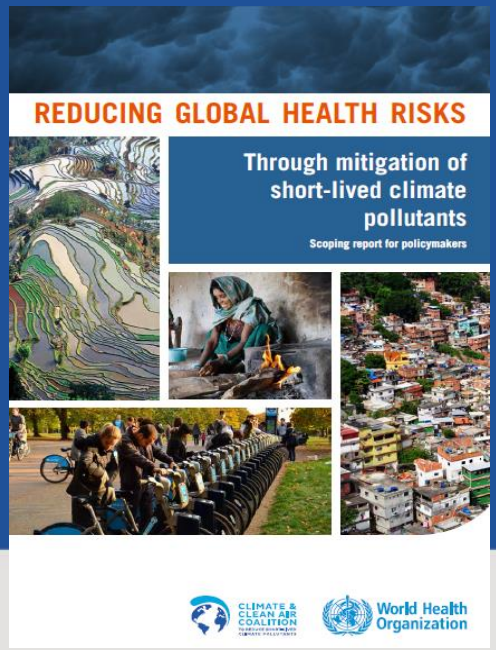
Published by Copernicus Publications on behalf of the European Geosciences Union.

Stohl et al., 2015

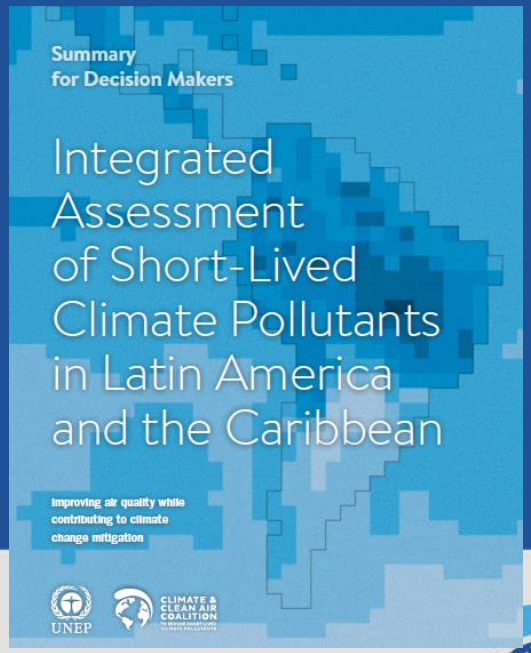
IMPORTANT ROLE OF CLEAN COOKING/HEATING

Actions toward clean cooking and heating have been identified in many scientific publications as a win-win measure for global & regional climate change as well as for air quality improvements, with positive outcomes for human health and sustainable development

AMAP, 2015



WHO/CCAC, 2015



UNEP/CCAC, 2016

IMPORTANT ROLE OF CLEAN COOKING/HEATING

Table 1. Four SLCP mitigation actions with potential to produce major climate and health benefits.

Sector and mitigation action	Certainty of major SLCP-related climate benefit	Aggregate level of potential health benefit	Potential level of CO_2 reduction co-benefit
Support active travel (aided by rapid mass transit)	High	High	High
Promoting healthy diets low in red meat and processed meats and rich in plant-based foods	High	High	Medium-high
Low-emission stoves and/or fuel switching to reduce solid fuel use	Medium-high	High	Medium
Stricter vehicle emissions/ efficiency standards	High	Medium-high	High

Source: WHO/CCAC, 2015

Important Role of Clean Cooking/Heating

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Avoided emissions of a fuel-efficient biomass cookstove dwarf embodied emissions

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ABSTRACT

Three billion people cook their food on biomass-fueled fires. This practice contributes to the anthropogenic radiative forcing. Fuel-efficient biomass cookstoves have the potential to reduce CO_2-equivalent emissions from cooking, however, cookstoves made from modern materials and distributed through energy-intensive supply chains have higher embodied CO_2-equivalent than traditional cookstoves. No studies exist examining whether lifetime emissions savings from fuel-efficient biomass cookstoves offset embodied emissions, and if so, by what margin. This paper is a complete life cycle inventory of "The Berkeley–Darfur Stove," disseminated in Sudan by the non-profit Potential Energy. We estimate the embodied CO_2-equivalent in the cookstove associated with materials, manufacturing, transportation, and end-of-life is 17 kg of CO_2-equivalent. Assuming a mix of 55% non-renewable biomass and 45% renewable biomass, five years of service, and a conservative 35% reduction in fuel use relative to a three-stone fire, the cookstove will offset 2.5 tonnes of CO_2-equivalent. A one-to-one replacement of a three-stone fire with the cookstove will save roughly 440 times more CO_2-equivalent than it "costs" to create and distribute. Over its five-year life, we estimate the total use-phase emissions of the cookstove to be 13.5 tonnes CO_2-equivalent, and the use-phase accounts for 99.9% of cookstove life cycle emissions. The dominance of use-phase emissions illuminate two important insights: (1) without a rigorous program to monitor use-phase emissions, an accurate estimate of life cycle emissions from biomass cookstoves is not possible, and (2) improving a cookstove's avoided emissions relies almost exclusively on reducing use-phase emissions even if use-phase reductions come at the cost of substantially increased non-use-phase emissions.

1. Background and motivation

Three billion people rely on biomass combustion to cook their food which contributes to the increasing stock of anthropogenic greenhouse gases and aerosols (The World Bank, 2011; Bond et al., 2004). Renewable biomass (RB) and non-renewable biomass (NRB) distinguish harvested products that leave net standing biomass stocks unchanged or depleted, respectively. Either RB or NRB can be utilized in cooking. While biomass-burning stoves generate over 1 billion tonnes of CO_2 annually (The World Bank, 2011), some of these CO_2 emissions come from combustion of RB and therefore do not increase the anthropogenic stock of CO_2. However, in many parts of the developing world biomass resources are not sustainably harvested. This is true in the regions around internally displaced peoples' camps in North Darfur, Sudan where 55% of fuel wood is NRB (Codipietri and Driga, 2010). Incomplete combustion of RB or NRB will generate non-CO_2 climate-forcing products of incomplete combustion (PIC) such as methane, non-methane hydrocarbons, and black carbon aerosols. These PICs have significant radiative forcing properties, and black carbon is estimated to be the second or third largest anthropogenic contributor to radiative forcing after CO_2 and methane (Bailis et al., 2003; Ramanathan and Carmichael, 2008). In the case of NRB combustion, displacement of traditional cookstoves such as three-stone fires (TSF) (Fig. 1) and inefficient earthen stoves with fuel-efficient cookstoves has the potential to reduce net CO_2 emissions by as much as 25–50% (The World Bank, 2011; Barnes et al., 1994). In this paper, the combined 100-year global warming potentials (GWP) of anthropogenic CO_2 and PICs are referred to in terms of CO_2-equivalent (CO_2-e) emissions.

Unlike a TSF or basic mud stove, a fuel-efficient cookstove has embodied CO_2-e stemming from the use of modern materials in

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2352-7285/

Wilson et al. 2016

Embodied CO_2eq. in cookstoves associated with materials, manufacturing, transportation, and end-of-life is 17 kg of CO_2-eq.

A one-to-one replacement of a three-stone fire with clean cookstove will save roughly 440 times more CO_2eq than it "costs" to create and distribute.

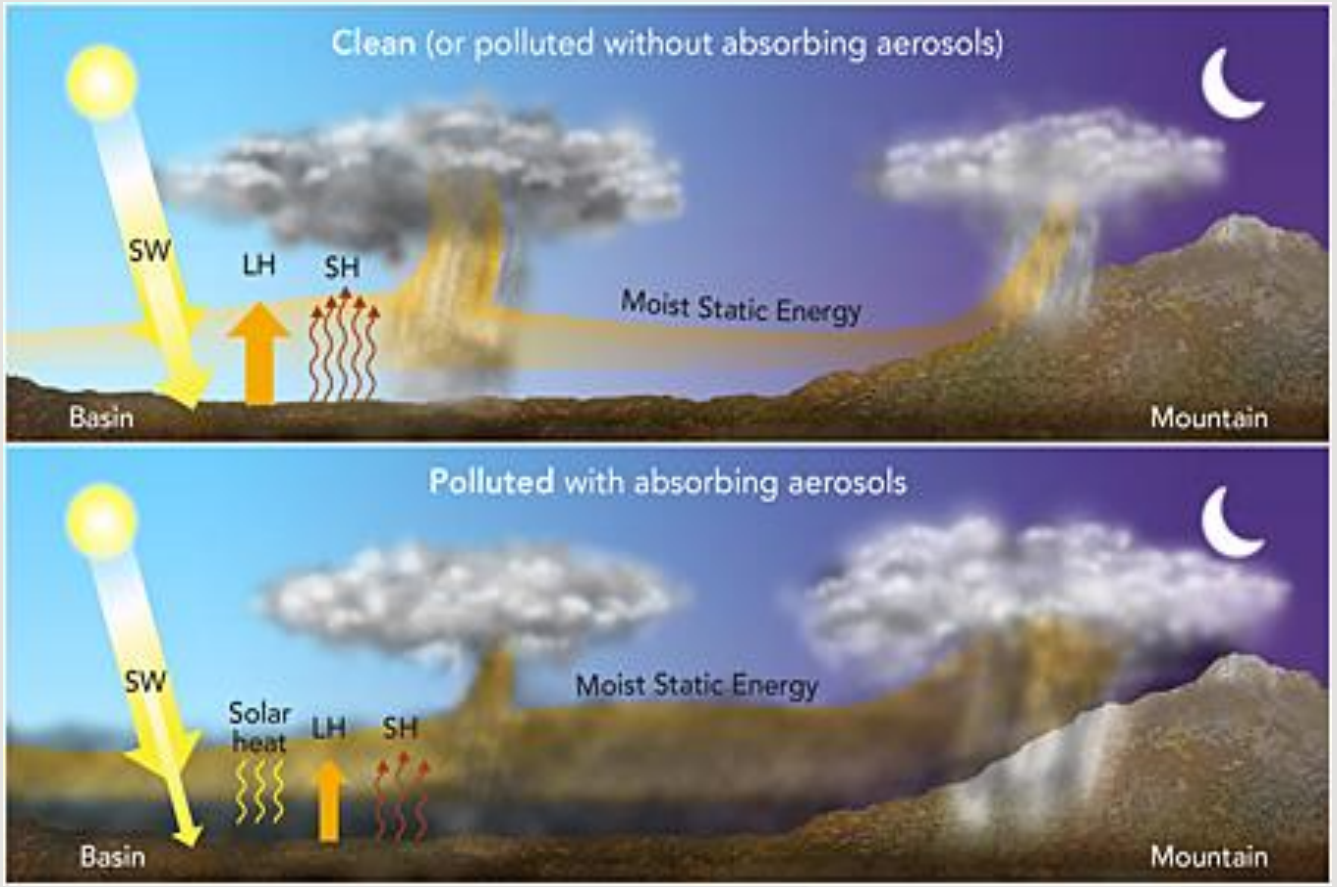
IMPORTANT ROLE OF CLEAN COOKING/HEATING

Up to 34% of wood fuel harvested for cooking/heating is unsustainable thereby contributing to forest degradation, deforestation, and consequently climate change.

Global Mitigation Potential Estimates: **1 – 1.6** Gt CO_2e

- SEI Policy Brief, 2013 and GACC Facts Sheet

Other Climate Benefits Of Black Carbon Mitigation



Fan et al. 2015 – The 2013 flood in Sichuan was linked to absorbing air polluting aerosols including black carbon - *Geophysical Res. Lett.*

Regional Climate Benefits of SLCP Mitigation

0.64 ˚C avoided warming in the Arctic depending on the season – ***Stohl et al. 2015 – Atmos. Chem. Phys***

15 (6–21) mm/yr increase in precipitation in Southern Europe (more than 4% of total precipitation)

Alleviate expected future drought and water shortages in the Mediterranean area
Stohl et al. 2015 – Atmos. Chem. Phys

Further Benefits of SLCP Mitigation

Help slow down the rate of climate change

Climate Change is Already On Us

Arctic sea ice vanishing in fall; Glaciers retreating worldwide
Permafrost retreating poleward; Species moving upward and poleward
SW US & Mediterranean drying out; More heatwaves in Europe, Asia, Australia

Current **rates** of climate change could trigger instability in a major Antarctic glacier, resulting in more than 2m of sea-level rise

Contribute to achieving the sustainable development goals

BENEFITS FROM SLCP MITIGATION…

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

INITIATIVES

mitigating SLCPs emissions by catalyzing practical actions in 7 sectoral and 4 cross-cutting areas

CCAC Initiative
Household Cooking & Domestic Heating

Reducing emissions of SLCPs and black carbon from household cooking and heating through agenda focused on:

- **a**dvocacy
- **r**esearch
- **s**tandards and testing
- **i**ncentivizing investment
- **p**roject development & **i**mplementation

CCAC Initiative
Household Cooking & Domestic Heating

CCAC Supported Activities…

Capacity building underway at three testing centers in Nepal, Uganda, and Senegal to evaluate the best way to measure black carbon and SLCPs emissions from cooking technologies.

Accounting methodology developed by the Gold Standard Foundation focused on measuring emissions reductions of short-lived climate pollutants.

Multi-laboratory trials of standardized black carbon testing protocols in coordination with the Nordic Council.

CCAC Initiative
Household Cooking & Domestic Heating

CCAC Supported Activities…

Spark grantee SME funds now have two ethanol gel plants in Nigeria with more than 4 million liters of gel sold and 200,000 stoves on the market as of January 2015, providing a clean and cheaper fuel alternative to traditional biomass and kerosene cooking

Educational "Burn Right" campaigns, in regions that use solid fuel stoves for heating - target regions northern Europe and North America, the Andes region and southern New Zealand and Australia

SimGas BV – Spark Fund grantee of the Global Alliance for Clean Cookstoves, with support from CCAC – the GesiShamba for livestock holders, for producing affordable cooking gas as alternative to biomass burning

Future Project Plans

Investigating an innovative finance mechanism for clean cookstoves to be modeled after the World Bank Pilot Auction Facility (PAF) – together with the CCAC Finance initiative

Support peer-to-peer learning between the Rural Women Energy Security (RUWES) in Nigeria and Project SURYA in India

Explore end-user finance mechanisms for clean cookstoves / heatstoves – Nigeria Mongolia and Bangladesh

Household energy approach to integrate clean lighting

Thank you!

Sunday A. LEONARD

Scientific Programmes Officer

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WHEN THE SMOKE CLEARS:

Delivering on the Sustainable Development Goals and the Paris Agreement through Clean Cooking

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Global Alliance for Clean Cookstoves

UNEA 2, Nairobi, 23 May 2016

When the smoke clears:

Mitigation of Black Carbon – a short-lived climate pollutant

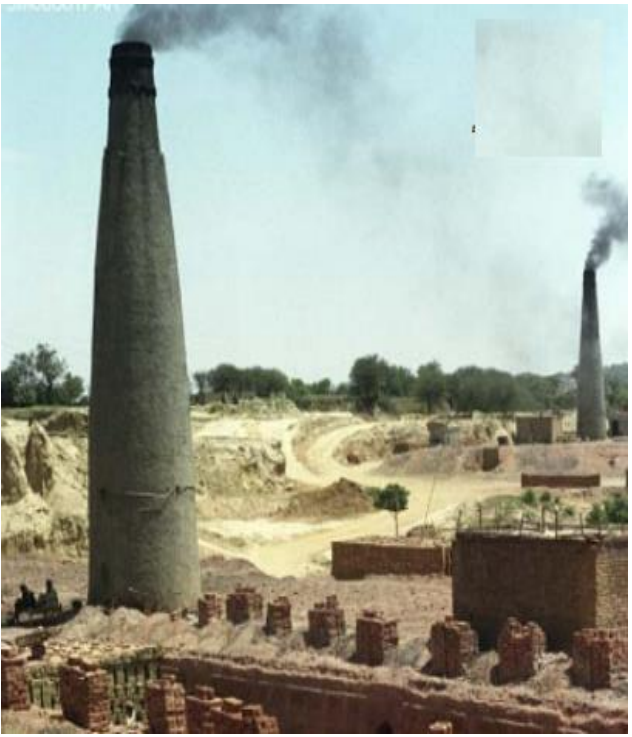
STAP gef UNEP

Prof Ralph Sims, Massey University, New Zealand
R.E.Sims@massey.ac.nz

- **Black carbon causes millions of premature deaths every year and, being a short-lived climate pollutant, also contributes to the warming of the planet.**
- **It arises from the incomplete combustion of biomass and coal in cook stoves, as well as from diesel fuel, coal-fired heat and power plants, vegetation burning in open fields, brick kilns, etc.**
- **The importance of reducing emissions of black carbon, while simultaneously continuing efforts to mitigate carbon dioxide emissions, is the subject of a recent advisory document:**

"Black Carbon Mitigation and the Role of the Global Environment Facility (GEF)" **produced by the STAP.**

What is the STAP?



- The Scientific and Technical Advisory Panel (STAP) has provided independent advice on projects, programmes and policies to the Global Environment Facility and GEF partners since 1994.

- The STAP is administered by the United Nations Environment Program (UNEP) and is supported by a Secretariat based in Washington D.C.

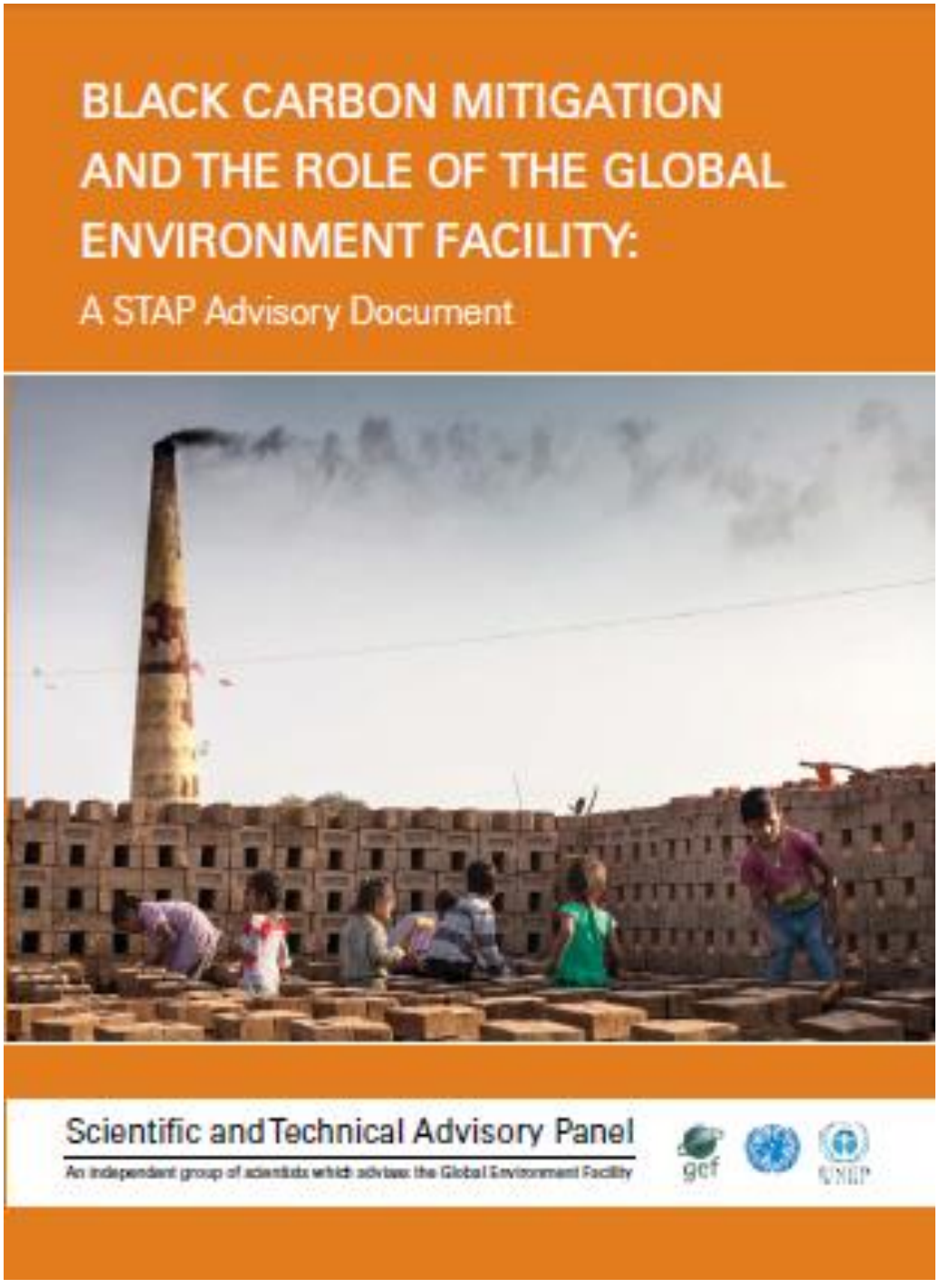
http://www.stapgef.org/

STAP gef UNEP

STAP provides strategic advice:

- on cross-cutting areas, such as adaptation and resilience, sustainable forest management, management of chemicals;
- in support of the GEF Partnership when developing integrated approaches such as on Sustainable cities, Land use, Water/energy/food security etc;
- on *Knowledge Management* based on past projects and experiences learned;
- by reviewing emerging global environmental issues….

  - such as on black carbon emissions.



"Reducing the emissions of short-lived climate pollutants, such as black carbon, can help slow the rate of global warming – particularly over the next two to four decades."

http://www.stapgef.org/black-carbon-mitigation-and-the-role-of-the-global-environment-facility/

Source of Black Carbon	Examples	Share of total global emissions
Open biomass burning	Natural wildfires and anthropogenic forest fires, grassland fires; burning of agricultural wastes.	36%

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Yesterday:

Karero village,
Loodokilani
location,
Kajiado County.

Courtesy:
Dr Benard Muok
JOOUST

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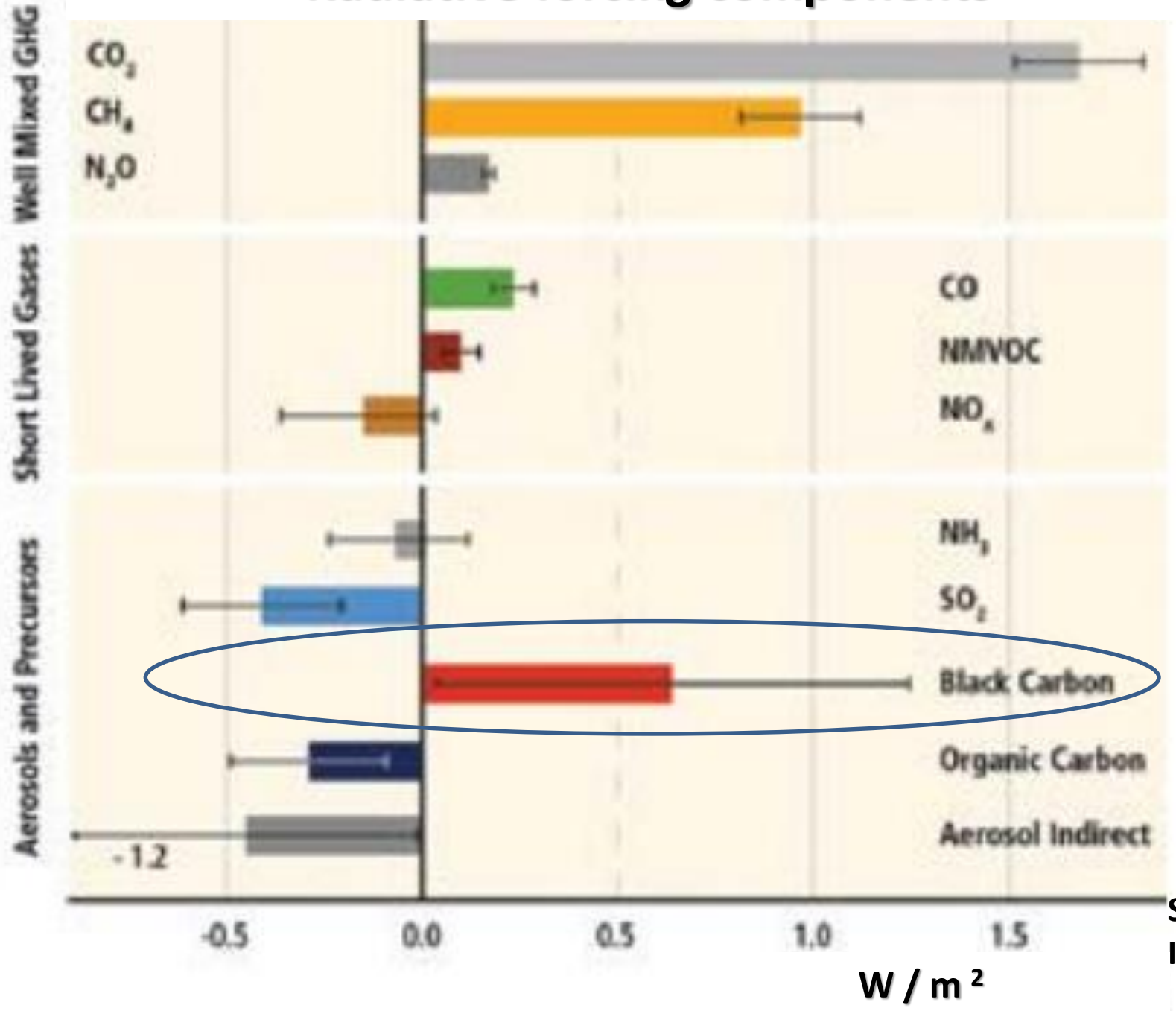
Transport fuels	Diesel used in on-road and off-road vehicles; heavy fuel oil used in ships; aviation fuels.	19%
Industry	Stationary heat sources- including for brick kilns; iron and steel production; thermal power generation plants; industrial boilers; gas flaring.	19%

Adverse impacts resulting from black carbon emissions

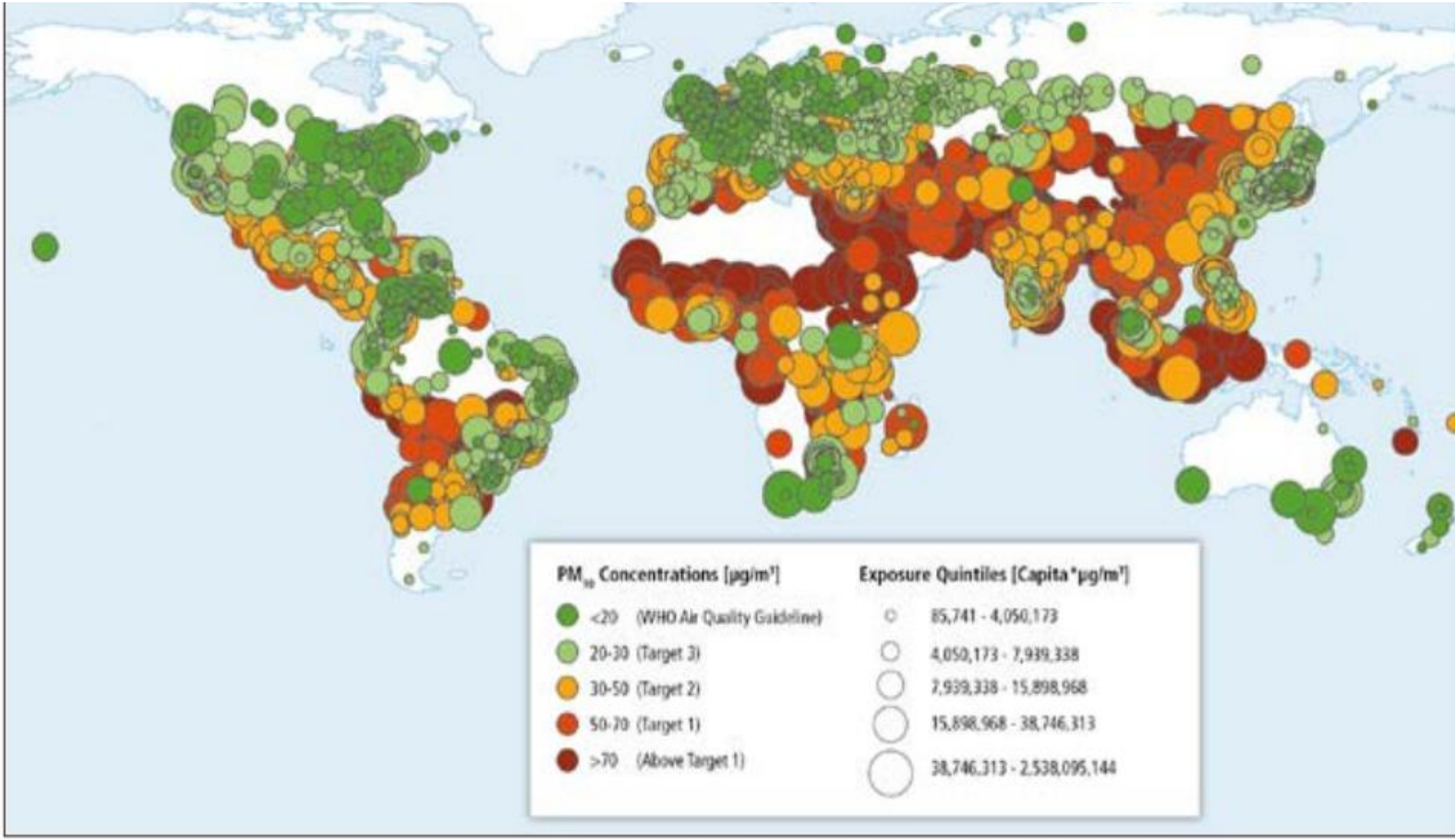
- Black carbon has been linked to a range of climate impacts including accelerated ice and snow melt in sensitive regions such as the Arctic and the Himalayas.
- Emissions have adverse impacts on human health, with women and children at particular risk.
- Crop yields reduced by dimming and leaf covering.
- Black carbon absorbs solar energy at very high rates so, although typically only lasting in the atmosphere for a few days, it adds to the global warming process.

Radiative forcing components



Source:
IPCC AR5, 2013

Human risk from exposure to black carbon

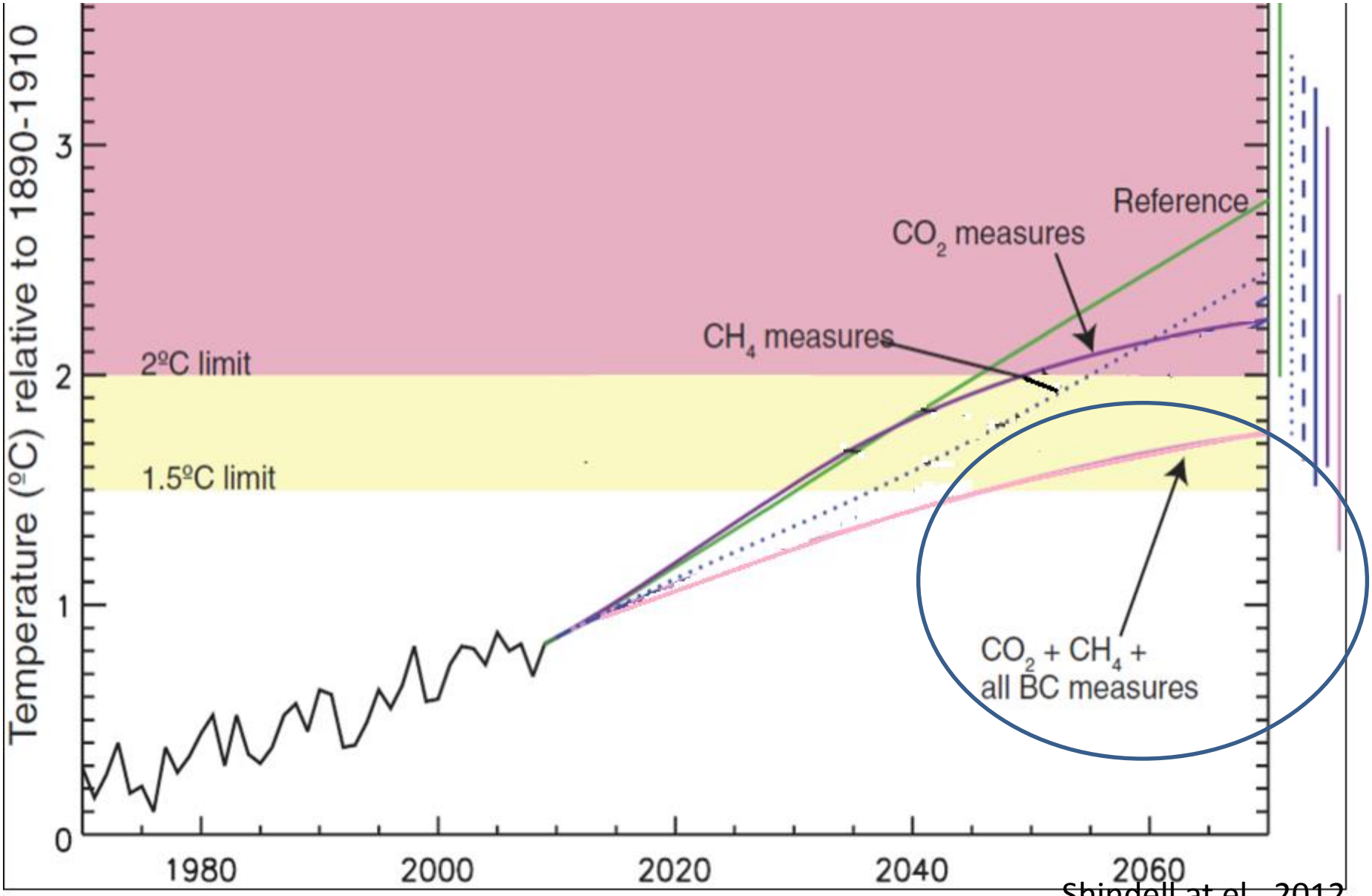


Sources: IPCC, 2014 based on Doll, 2009; Doll and Pachauri, 2010; Grubler *et al.*, 2012.

- **Several emission reduction measures targeting black carbon and ozone precursors are already available and in use in some parts of the world.**
- **If implemented globally, these measures alone could:**
  - **avoid millions of deaths annually from indoor and local outdoor air pollution exposure;**
  - **reduce millions of workdays lost to illness;**
  - **reduce losses of crop yields; and**
  - **reduce global warming by about 0.2°C by 2050.**

UNEP/WMO 2011

Reducing black carbon is essential if we are to keep global temperature rise to well below 2ºC as agreed in Paris



Shindell at el., 2012

STAP recommends that the GEF Partnership should:

- **make investments to accelerate the reduction of black carbon to directly support the *Sustainable Development Goals* in the areas of improved air quality, climate change mitigation, reduced climate vulnerability, and transfer of low-carbon technologies;**
- **mainstream black carbon mitigation measures into the GEF project portfolio;**
- **support programmes and stand-alone projects that focus on the reduction of black carbon emissions;**
- **measure, account for, and report on the amount of black carbon emissions avoided or reduced as a result of GEF-funded projects; and**
- **increase awareness to address black carbon emissions by engaging with stakeholders involved in national, regional and international mitigation efforts.**

“Given the large climate change mitigation potential of using cleaner and more efficient cook-stoves, which also provide co-benefits such as reduced demand for fuelwood and improved local air quality and public health, the GEF should scale up financial support for clean cook-stove design initiatives.“

WHEN THE SMOKE CLEARS:

Delivering on the Sustainable Development Goals and the Paris Agreement through Clean Cooking

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

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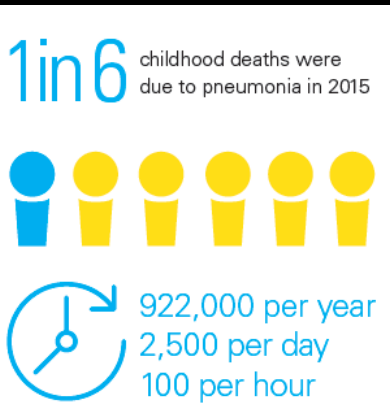
Every Breath Counts

Hayalnesh Tarekegn
Program Officer on Pneumonia and Diarrhea Child Health
United Nations Children's Fund

LEADING CAUSES OF CHILD DEATHS

Pneumonia – 16%
1 child dead every 35 seconds

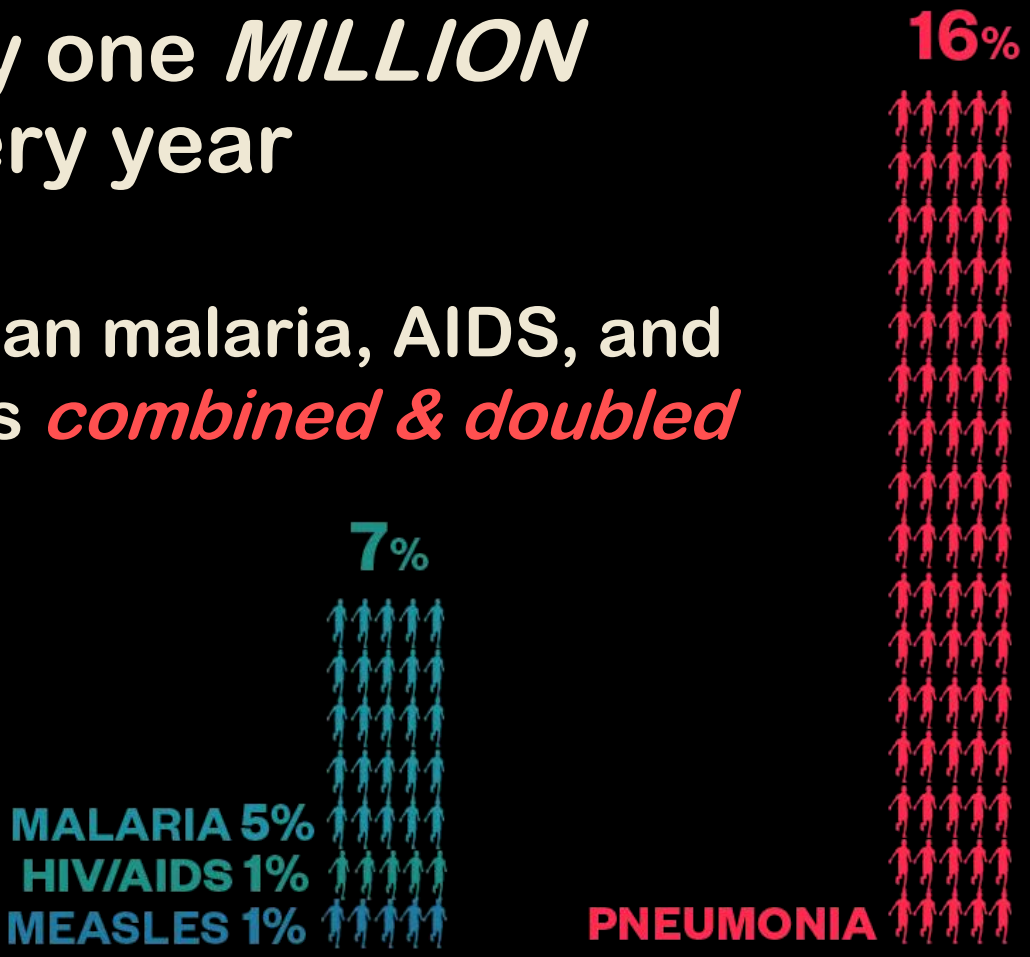
Diarrheal diseases – 9%
Malaria - 5%
Meningitis – 2%
Measles – 1%
HIV/AIDS – 1%



SOURCE: UNICEF Committing to Child Survival: A Promise Renewed APR 2015

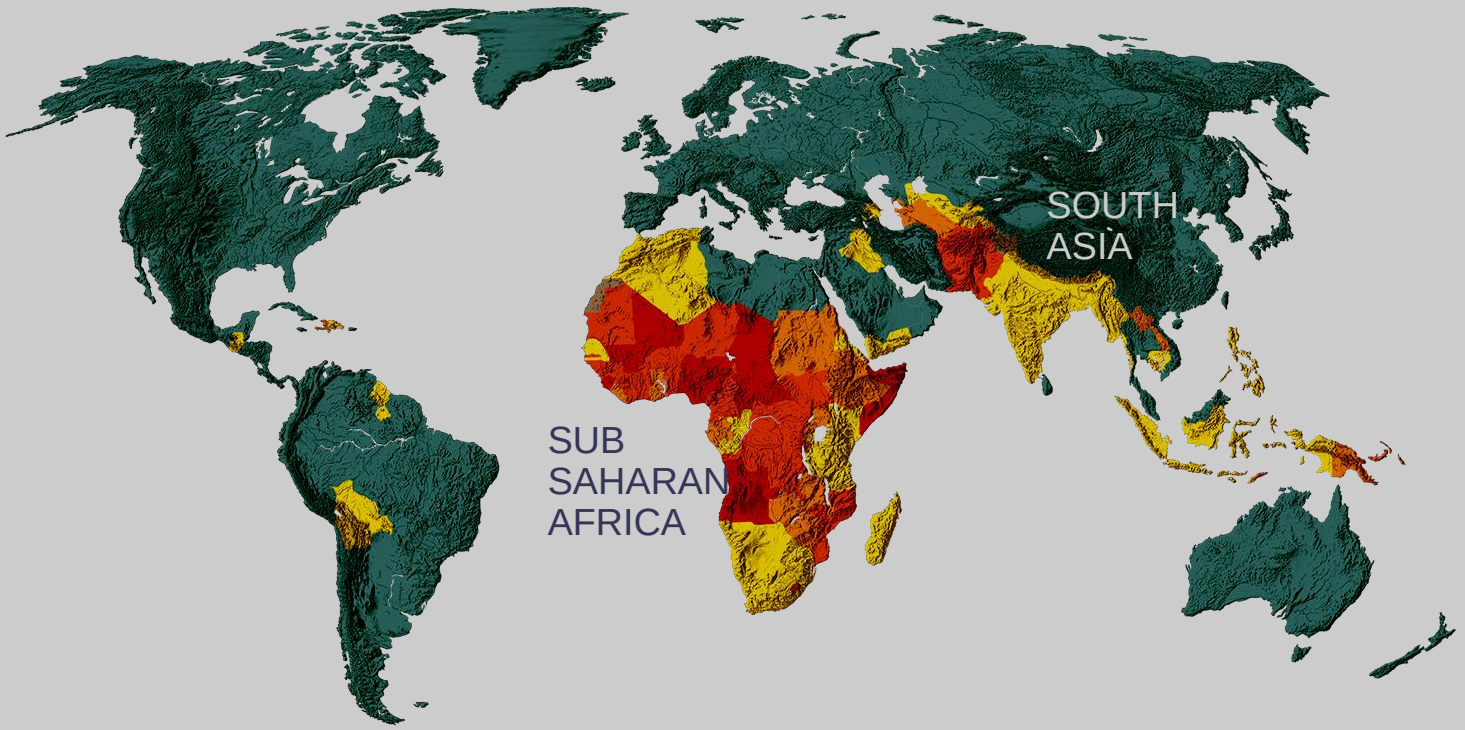
It kills nearly one *MILLION* children every year

more than malaria, AIDS, and measles *combined & doubled*



SOURCE: WHO AND MATERNAL AND CHILD EPIDEMIOLOGY ESTIMATION GROUP (MCEE) PROVISIONAL ESTIMATES 2015

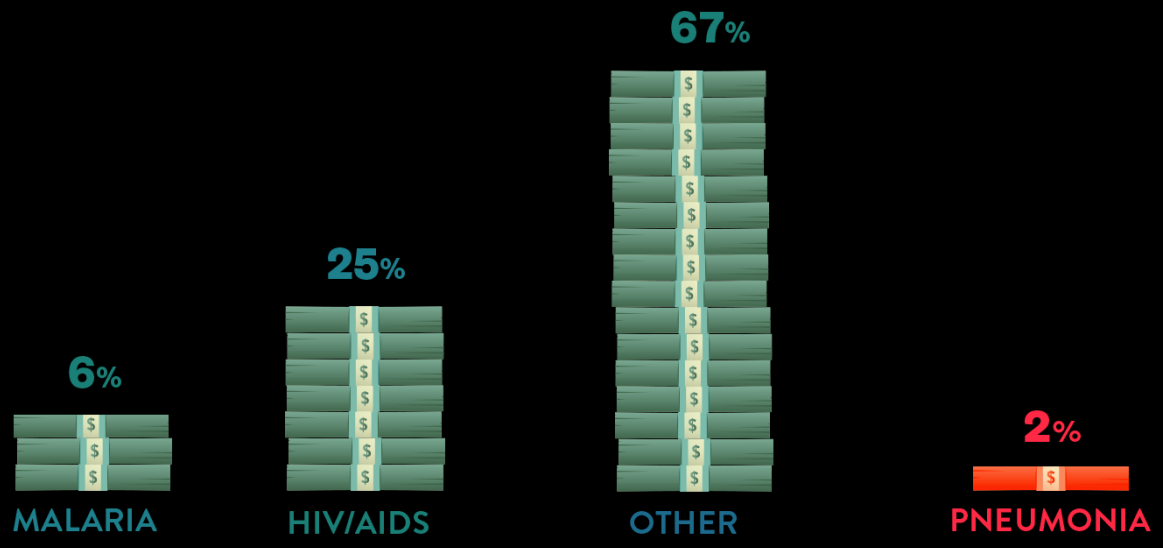
South Asia and Sub-Saharan Africa carry the heaviest burden of pneumonia (80%)



SOURCE: UN IGME 2015

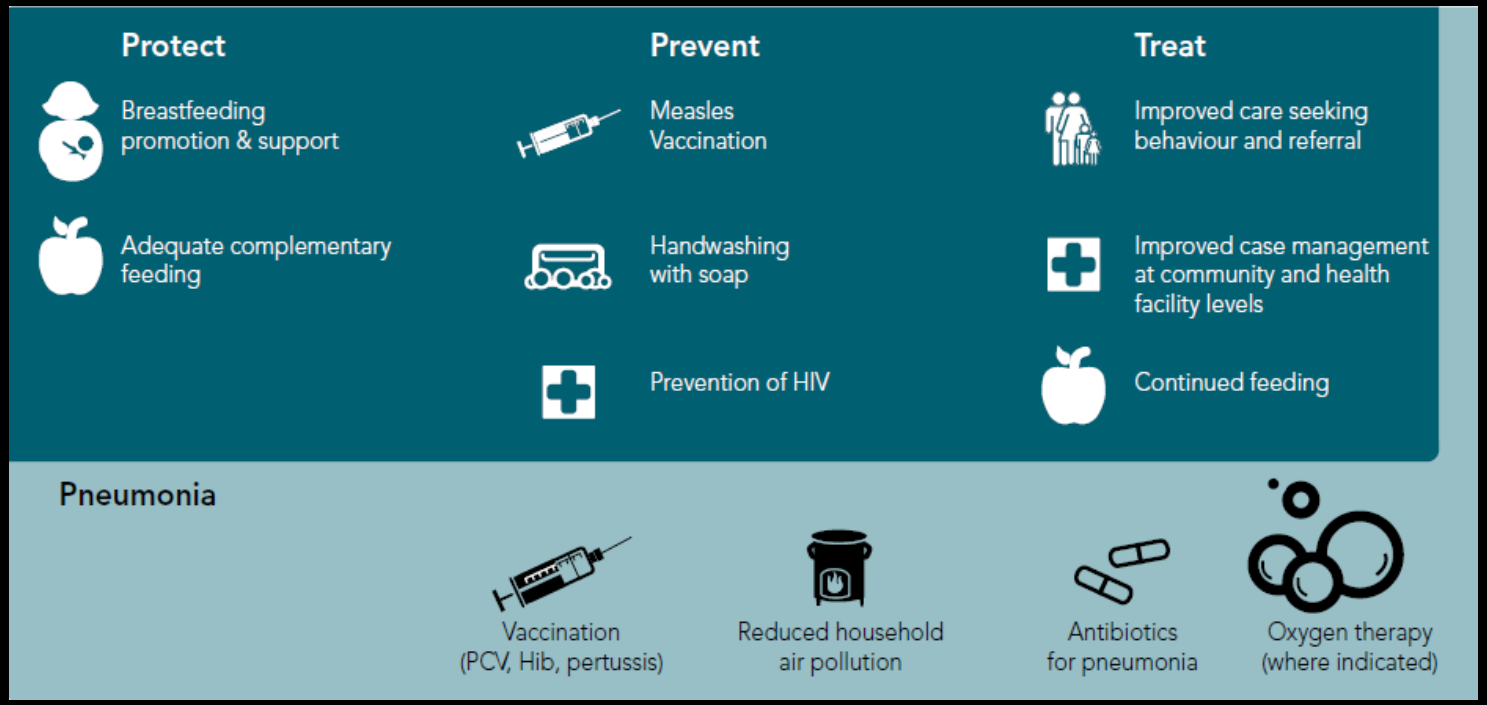
In the last 15 years, pneumonia received less than 2% of all global health development funding

even less from domestic health budgets.



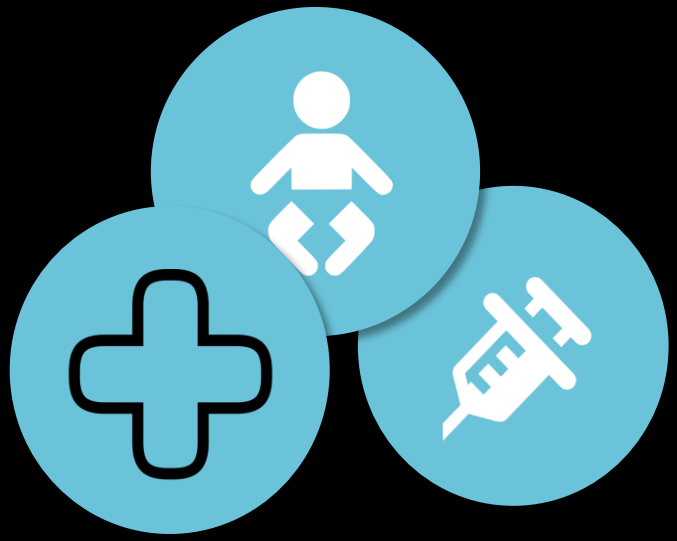
SOURCE: FINANCING GLOBAL HEALTH 2013:TRANSITION IN AN AGE OF AUSTERITY. SEATTLE, WA: IHME, 2014

GAPPD: Prevent, Protect & Treat



Prevent, Protect & Treat

- Greater focus must be placed on behavior change, health system strengthening, community access to care, and life-saving commodities.




PROTECT
• Exclusive breastfeeding for 6 months can reduce pneumonia by 23%.
• Adequate complimentary feeding

PREVENT

- **Vaccinations** avert an estimated 2-3 million deaths every year.
- Improved sanitation and reduction of **ambient and household air pollution** reduces vulnerability to infection.
- Household air pollution leads to 4.3 million deaths globally, and 13% (534,000) of these are deaths of children under 5. (WHO, CCAC, 2015).

DIAGNOSE & TREAT

- Correct diagnosis:
  - Fast breathing
  - Difficult breathing
  - Cough

- Improved access to community-based case management, with Amoxicillin DT, results in 70% reduction in pneumonia mortality and 35% reduction in child pneumonia.

Household Air Pollution and Pneumonia

- **Household air pollution** leads to **4.3 million** deaths globally, and 13% (534,000) of these are deaths of children under 5. (WHO, CCAC, 2015).
  - **12%** of these are due to pneumonia
- Exposure to household air pollution almost **doubles** the risk for childhood pneumonia.
- HAP ranks **fourth** in terms of the risk factors that contribute to disease and death

HAP – Clean Cookstoves

- **Solid fuel** – deforestation - build-up of greenhouse gasses (carbon dioxide) - global climate change. (UNEP 2005)
- Half of the world's households use unprocessed solid fuels for cooking, up to 80 per cent for China, India and Sub-Saharan Africa. (Rehfuess et al. 2006 Holdren et al. 2000)
- Children & women receive highest exposures
- UNICEF clean cookstove projects in Rwanda, Cambodia, India, China, Mongolia and Zimbabwe

UNICEF - Zimbabwe

- 73.9% of households use solid fuels
- Deforestation, children missing school
- Solid biomass more than twice as likely of pneumonia than LPG, natural gas or electricity

- 2015/16 - 2 districts using improved cookstoves
  - Women constructed the stoves, trained others in the use and construction - developing entrepreneurship
  - More efficient stoves, using less wood
  - 3,480 households reached so far – 17,400 indirect
  - Tsotso stoves reduced fuel consumption by 39%

.

GOAL

Raise awareness of pneumonia as a leading cause of death relative to other childhood diseases and relative to available financing.

TARGET

Policymakers, donors, and African leaders.

OBJECTIVE

Strong country ownership; broad-based support at the highest level, ambitious multi-stakeholder action; and alignment with the SDGs.

EVERY BREATH COUNTS

COALITION

- Comprised of NGOs, academic institutions, government agencies and foundations

- Providing a platform for pneumonia-related work:
  - Raise awareness
  - Promote interventions
  - Generate action in country

- Encouraging holistic, collaborative country implementation of pneumonia activities, following GAPPD triad

world pneumonia day

Every breath counts. Stop pneumonia now. November 12th.

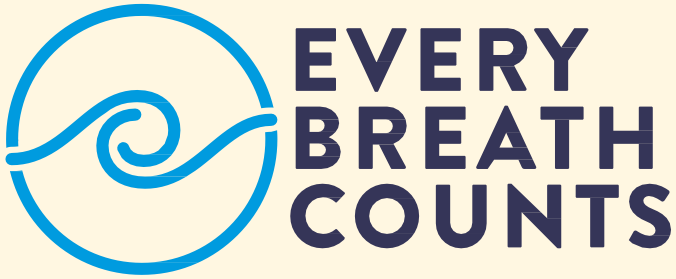
http://www.worldpneumoniaday.org

- H.E. Aisha Muhammadu Buhari, Wife of the President of Nigeria is the first pneumonia ambassador for the campaign.
- High profile pneumonia ambassadors will appear in short PSAs to highlight the importance of the issue.
- Campaign materials will be broadcasted on TV & radio, posted on billboards, and featured at high level policy events.

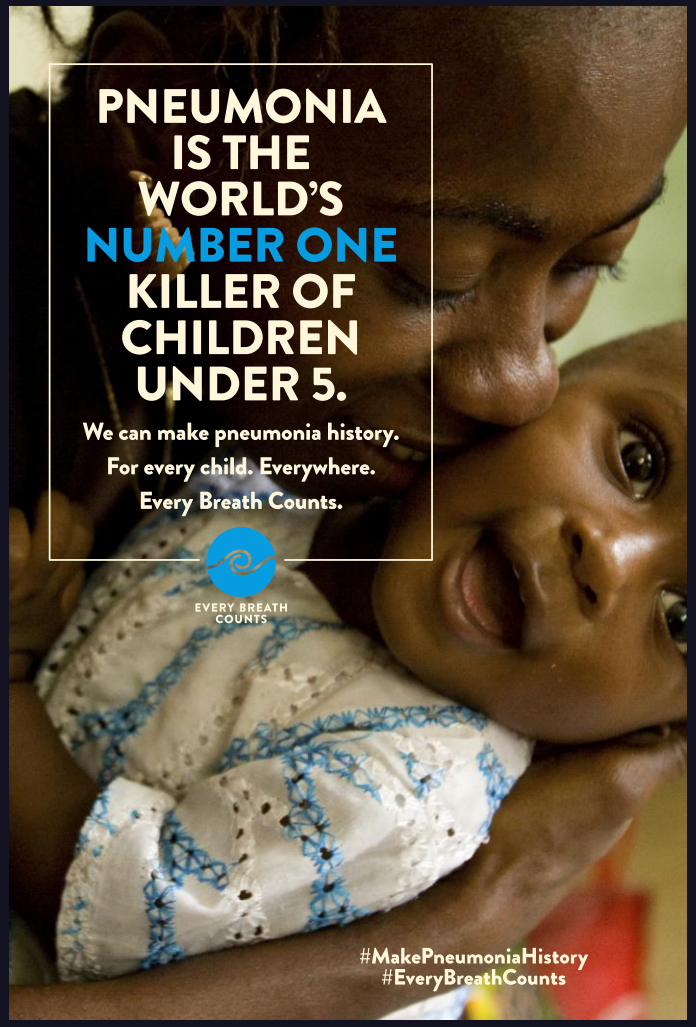
BRAND IDENTITY

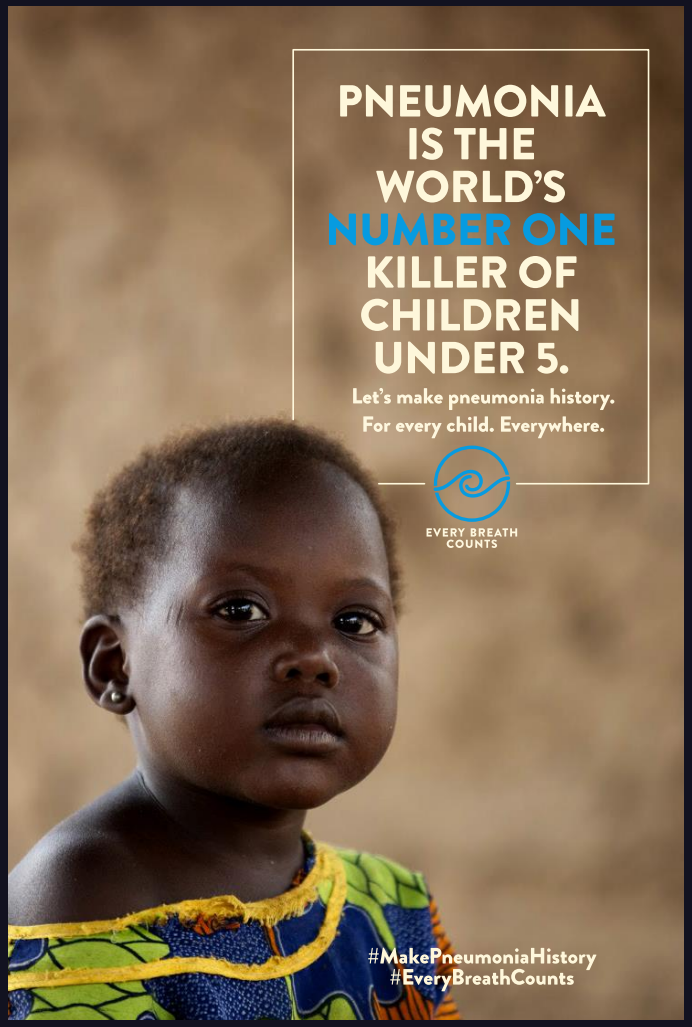
NO CHILD SHOULD DIE FROM PNEUMONIA


EVERY BREATH
COUNTS


EVERY
BREATH
COUNTS

POSTERS


PNEUMONIA IS THE WORLD'S NUMBER ONE KILLER OF CHILDREN UNDER 5.
We can make pneumonia history.
For every child. Everywhere.
Every Breath Counts.
EVERY BREATH COUNTS
#MakePneumoniaHistory
#EveryBreathCounts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#EveryBreathCounts

THANK YOU!

http://www.everybreathcounts.info/

WHEN THE SMOKE CLEARS:

Delivering on the Sustainable Development Goals and the Paris Agreement through Clean Cooking

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

ACCELERATING CLEAN COOKING SOLUTIONS: LESSONS FROM KENYA

Faith Wandera Odongo
Deputy Director of Renewable Energy
Ministry of Energy & Petroleum

Background

- SE4All is UN led Initiative
- Kenya was selected as a pilot country for SE4All
- The Kenyan Government joined the initiative in 2012
- A High Level Mission from New York to Kenya 19th - 21st March 2012
- The mission concluded that there was a very strong basis for launching an ambitious energy scale up programme in Kenya
- Preparation of reports done through a consultative process
- The reports were technically validated on 1st Dec, 2015
- Political validation of the AA & IP will be done through signing of the AA/IP by CS and PS

GDP and Population Growth

- The growth target for GDP is 10%
- Economic growth in 2015 was 6.0%
- Projected population is 66.9 million by 2030, based on the population for 2012 of 43.1 million compounded annually
- Average annual intercensal growth of 2.5

Source: 2009 Census report

STATUS OF THE SE4ALL INITIATIVE IN KENYA

Country Opt-in

Stock-taking & Gap Analysis

National Action Plans & Programmes

Implementation & Monitoring

Renewable Energy for Process Heat

- Industries that need thermal energy for their processes are switching to biomass due to the increasing cost of fuel oil e.g. food processing
- The second highest consumer of woodfuel are the cottage industries which include brick making, tobacco curing, fish smoking, jaggaries and bakeries
- Most of the biomass in Kenya originates from forested and non-forested lands (crop and grasslands)

SE4All AA & IP Target for Clean Cooking

Universal access to modern energy services

- 100% access to modern cooking solutions by 2030

Modern cooking solutions

- The baseline year 2013: access to improved cook stoves was 36.1% of 3.2 million households (CCAK- Kenya Country Action Plan 2013)
- The bioenergy & LPG strategy targets for improved cook stoves and clean fuels 57.7% and 42.9% of the households respectively by 2030

Trajectory : Modern cooking solutions

% Access to Energy Types	2014	2017	2020	2022	2027	2030
LPG	8.6	13.6	15.0	18.6	25.6	35.3
Biogas	0.1	0.2	0.3	0.4	0.6	0.8
Bioethanol	0.0	0.0	1.0	1.5	3.0	4.5
Electricity	0.6	1.0	1.2	1.5	2.0	2.3
Clean fuels	9.3	14.8	17.5	22.0	31.2	42.9
Improved cook stoves	37.2	42.9	47.7	52.7	57.6	57.7
Total: modern cooking services	46.5	57.7	65.2	96.7	88.8	100.0
Unclean cooking services	53.5	42.3	34.8	25.3	11.2	0.0

Strategies: Modern cooking solutions..1

- *2013 CCAK - Kenya Country Action Plan*
- 2015 Bioenergy and LPG Draft strategy
- *Promote industry standards for efficiency, safety, and emission reduction, based on testing and certification for clean cooking appliances, such as ICS*
- *Establish inter-ministerial taskforces (national and district) for:*
  - effective coordination of biomass related activities
  - national awareness-raising to increase demand for higher tier stoves and fuels

Strategies: Modern cooking solutions..2

- Development of strategy for the use of denatured bioethanol as household cooking fuel
  - *conducive legal and regulatory framework for companies operating in the sector*
  - *communication to potential users on the benefits of using the technology*
  - *definition of credit facilities to improve access to finance by users*
- Support continuous research on consumer use and demand for efficient stoves and on the design of products that meet user needs.
- Succeeded in lobbying for removal of taxation on technical alcohol which is useful as a household fuel

Strategies: Modern cooking solutions..3

- Develop financing schemes to provide credit to households that cannot afford the upfront costs of access to modern energy services;
- Provide regulatory support for scalable and sustainable business and financial models

HII on Clean cooking

- Kenya National Domestic Biogas Programme
- Promotion of efficiency in the conversion and utilization of biomass energy
- Promotion of LPG use by households and institutions
- PIMA Gas, the initiative of pay-as-you-go LPG
- Promotion of liquid biofuels for households, Institutions and transport sectors
- Sustainable Biomass Energy Production
- Development and promotion of efficient biomass conversion and end-use devices
- Promotion of Biomass Gasification technologies for households, institutions and industries
- Innovative finance to support financial closure and financing access to energy services and improved cook stoves
- Results Based Financing projects on clean cooking in collaboration with GIZ

HII: Nexus Issues

- Energy and women's health
- Clean Energy Mini-Grids, or self-contained systems
- Universal adoption of clean cooking solutions, a goal that will be pursued under the umbrella of GACC, A behaviour Change Communication Strategy Planned in Collaboration with GACC
- Advocate for and educate consumers on the importance of health, environment and gender benefits of clean cooking
- The National Water Master Plan (NWMP) estimates total irrigation potential to be 352 400 ha
- Water, Food and Energy

Investment Prospectus:

Project/programme investment opportunities

- *Energy Access*
  - *Electricity*
  - *Clean cookstoves and fuels*
- Renewable Energy
  - *Power generation*
  - *Transmission line*
- Energy Efficiency
- Nexus Issues
- Other areas

Summary of the IP

- Objective: to **attract investment** in the country's energy sector
- Composition- presents **investment environment to priority requirements** in terms of support and incentives
- Energy sector- **strong institutional framework**, supported by government agencies and healthy private sector
- Snap shot of **investment opportunities** – government projects, private sector pipeline projects
- Opportunities for scaling up ongoing initiatives

The Process Heat Sector highlights

- *Use of biomass at industrial and at household level*
  - Gasification
  - Biogas –domestic and institutional
  - Bioethanol
  - Briquettes

Investment Projects : Energy Access

Project	High impact initiative (AA)
LPG storage and bottling facilities in Nairobi	• **Improving Access to Modern Clean Cooking**
Scale up Kenya National Domestic Biogas Programme	• **Improving Access to Modern Energy services & Electricity**

Investment Projects : Energy Access

Project	High impact initiative (AA)
Development of cookstove sector	• **Improving Access to Modern Clean Cooking**
Setting up of bioethanol distillers	• **Improving Access to Modern Energy services & Electricity**

Investment Projects : Energy Access

Project	High impact initiative (AA)
Scale up of Bioethanol as an alternative household fuel	• **Improving Access to Modern Clean Cooking**
Establishing briquetting plant	• **Improving Access to Modern Electricity**

Investment Projects : Nexus Issues

Project	High impact initiative (AA)
Energy, women, children and health	• **Universal adoption of clean cooking solutions**
Energy and gender	• **Gender mainstreaming**
Energy and education	• **Rural electrification**
Energy, water & food	• **Energy for mechanization**

Essence of the SE4All AA & IP

- A platform for monitoring progress in the Energy sector
- A road map for SDG 7
- Opportunity to develop County capacity to effectively plan, implement & monitor energy programmes in collaboration with the National Government in line with the provisions of 2010 Constitution
- Opportunity to enhance energy delivery to nexus sectors thereby contributing to Global Goals of SE4All
- Opportunity to pool resources, minimize duplication and create harmony in activities of various partners
- AA & IP are living documents to be reviewed every 2 yrs

Identify a National Champion for Clean Cooking

Deputy 1st Lady Mme, Ruto suggested as a champion for Clean Cooking Initiatives in Kenya

Asanteni !!
Thank you!!

WHEN THE SMOKE CLEARS:

Delivering on the Sustainable Development Goals and the Paris Agreement through Clean Cooking

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Scaling clean cooking to achieve the SDGs

Jessie Durrett, Senior Program Associate
jdurrett@cleancookstoves.org

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

A GLOBAL PROBLEM

NEARLY

3 BILLION

people rely on open fires and simple stoves that burn solid fuels like wood, animal dung, and coal to cook their food.

4.3 MILLION

people die prematurely from illnesses attributable to the household air pollution from cooking with solid fuels every year.

UP TO

25 PERCENT

of black carbon emissions come from burning solid fuels for household energy needs.

$123 BILLION

in annual costs to health, environment, and economies in the developing world because of solid fuel use for cooking.

The Alliance is part of collaborative efforts to ensure consistent measurement of progress towards achieving SDGs to track achievement of tangible benefits for millions of households around the world.

Clean Cooking Directly Supports Achievement of 10 SDGs

Clean cooking is part of basic services necessary to lead a healthy and productive life and saves households time and money.

Efficient cookstoves reduce the amount of fuel needed to cook, thus reducing the burden on families who would otherwise have to collect it, buy it, or trade their food for it. Emissions of short-lived climate pollutants from inefficient cooking also hamper agricultural productivity.

Reducing smoke emissions from cooking decreases the burden of disease associated with household air pollution and improves well-being, especially for women and children.

Children, particularly girls, are often kept out of school so that they can contribute to household tasks, like cooking and collecting fuel.

Unpaid work, including collecting fuel and inefficient cooking, remain a major cause of gender inequality.

Clean cooking is essential to addressing energy poverty and ensuring sustainable energy security for billions of people.

Energy access enables enhanced productivity and inclusive economic growth. The clean cooking sector offers many job opportunities.

Clean cooking addresses household and ambient air pollution, resource efficiency, and climate vulnerability.

Up to 25% of black carbon emissions come from burning solid fuels for household energy needs. Clean cooking solutions address the most basic needs of the poor, while also delivering climate benefits.

Up to 34% of woodfuel harvested is unsustainable, contributing to forest degradation, deforestation, and climate change.

And contributes to an enabling environment for achieving the entire Agenda 2030.

Clean Cooking & the Paris Agreement

At COP21, clean cooking was widely touted as a critical and scalable solution already contributing to climate change mitigation and environmental sustainability, while also providing energy, health, and empowerment gains that particularly benefit girls and women.

Clean cooking is an important component of **mitigation** efforts that directly address the needs of the poor. The Alliance's approach is in line with the Paris Agreement's emphasis on **Technology Development and Transfer** and **Capacity Building**.

7 Alliance focus countries – Bangladesh, Ghana, Guatemala, India, Kenya, Nigeria, and Uganda – included clean cooking in their NDCs.

Partner countries – Central African Republic, Ethiopia, Honduras, Liberia, Malawi, Nepal, Rwanda, among others – also included clean cooking as part of their implementation efforts.

Recommendations:

1. Incorporate clean cooking into SDG planning and implementation
2. Support enabling policies, including the establishment of beneficial tax and tariff rates and competitive carbon pricing
3. Ensure financial and programmatic support, including within efforts dedicated to energy access, climate change mitigation, environmental protection, women's empowerment, and public health
4. Promote the measurement and review of SDG indicators related to clean cooking and household energy under Goal 3, Goal 5, and Goal 7 at a global, regional, and national level

The Alliance projects that by reaching our 100 million by 2020 goal, we can deliver the following impacts: