

Quantifying household energy programs' black carbon mitigation under the Paris Agreement

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Renewed focus on black carbon

Has accounted for about 10% of warming

Multiple impacts: warming, glacier/snow melt, impact on rain patterns, water/agricultural/energy security, air quality and health

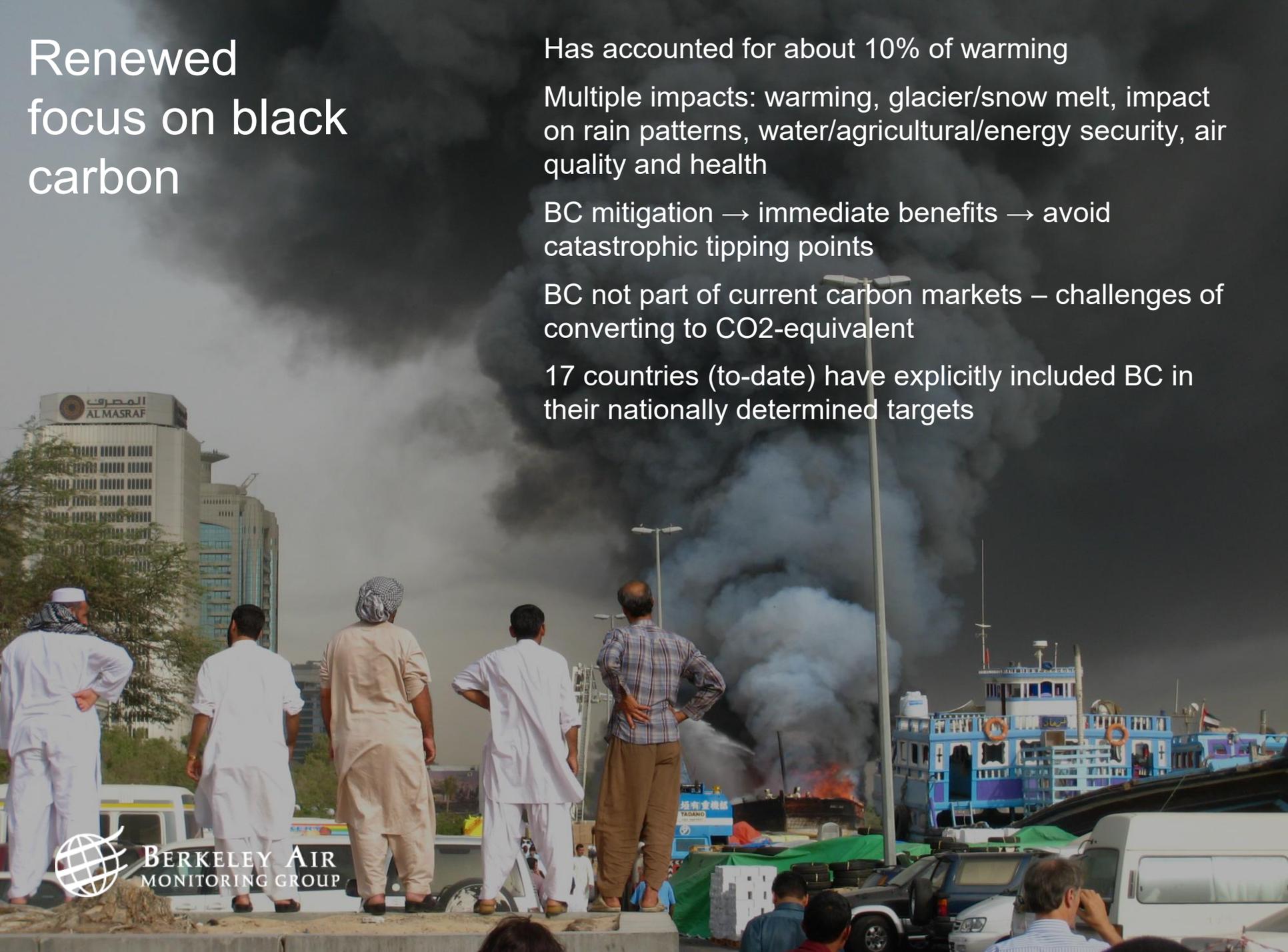
BC mitigation → immediate benefits → avoid catastrophic tipping points

BC not part of current carbon markets – challenges of converting to CO₂-equivalent

17 countries (to-date) have explicitly included BC in their nationally determined targets



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BC mitigation opportunity in household energy sector energy

30-50% of BC emissions from use of solid residential fuels

Simple kerosene wick lamps emit ~10% of their fuel mass as black carbon with almost no co-emitted cooling species

250 million people underserved by current solar lighting markets

Potential for tremendous climate AND health impacts



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Accelerating BC mitigation

More countries include household energy and lighting programs in their climate action portfolios

Buyer countries (article 6.2) can prioritize decarbonization actions in BC-rich sectors

Programs are complimented with strong monitoring, reporting, and verification

Make BC quantification part MRV (easily layered onto methods that CO₂e emissions reductions)



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Harmonized and updated emissions reduction methodology

$$\text{Emissions reductions} = \text{Baseline emissions} - \text{Project emissions}$$

Baseline emissions:

$$\left(\text{Renewable emission factor}_{\text{base}} \times \text{Renewable energy consumption}_{\text{base}} \right) + \left(\text{Non-renewable emission factor}_{\text{base}} \times \text{Non-renewable energy consumption}_{\text{base}} \right) + \text{Upstream emissions}$$

Project emissions:

$$\left(\text{Renewable emission factor}_{\text{proj}} \times \text{Renewable energy consumption}_{\text{proj}} \right) + \left(\text{Non-renewable emission factor}_{\text{proj}} \times \text{Non-renewable energy consumption}_{\text{proj}} \right) + \text{Upstream emissions}$$

Why develop something new?

- Concerns of overestimated emission reductions from stove projects
- Countries can propose their own approaches for estimating emission reductions

Key updates:

- Holistic whole-household approach that works for any project fuel/technology
- Combination of conservative assumptions/defaults and best practices to estimate parameters
- Better accounting for impact of stacking multiple stoves

Technologies and business models provide solutions



Lighting Africa has provided innovative market-based approaches

New IoT embedded within electric cooking to verify emission reductions

Target geographies where impact is greatest: South Asia/Himalayan region, Andean Region, West Africa



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Thanks!

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