

12th Oxford Energy Day Addressing Cooking Poverty for an Equitable Energy Transition

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Outline

- 1. Cooking poverty: the "orphan" sector
- 2. A multitude of barriers
- 3. Gender equity
- 4. What is finance's role?
- 5. Outlook



Cooking poverty: the "orphan" sector





Energy access as equity

• Access to affordable, reliable, sustainable and modern energy a prerequisite to a just, equitable and sustainable energy transition

JUST Framework: elements of justice that aim to ensure human rights applied through energy value chain

- **Distributive justice**: the distribution of benefits and costs from the transition
- Procedural justice: observation of legal process
- **Recognition justice**: are rights recognised for different groups in society?
- Cosmopolitanism justice: have we considered effects beyond our borders?
- Restorative justice: rectifying injustice

Sources: Muñoz Cabré, M, Vega-Araújo, J (2022) Considerations for a just and equitable energy transition. Stockholm+50 background paper series. Stockholm: Stockholm Environment Institute; Droubi, S, Heffron, R.J., McCauley, D (2022) A critical review of energy democracy: A failure to deliver justice? *Energy Res. Soc. Sci.* 86: 102444



Sustainable Development Goal 7 (SDG7) recap



Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services

Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology

Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix

Target 7.3: By 2030, double the global rate of improvement in energy efficiency



What is clean cooking?

A "clean" household cooking fuel or technology meets World Health Organization emission rate targets for fine particulate matter and carbon monoxide

Improved cookstoves



Burn solid or liquid fuels more efficiently than three-stone or traditional stoves, typically made of mud or metal

Clean fuels



"BLEENS"

- Biogas
- LPG
- Ethanol
- Electricity
- Natural gas
- Solar fuels

Sources: WHO (2021) Global Air Quality Guidelines Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. Geneva: World Health Organization; Bhatia, M, Angelou, N (2015) Beyond Connections: Energy Access Redefined ESMAP Technical Report 008/15. Washington DC: World Bank Group



SDG7: where we stand

In 2022, 733 million people unconnected to electricity + 2.1 billion without access to clean fuels and technology for cooking (~26% global population)...

residing in 128 countries, with 923 million in sub-Saharan Africa (up from 600 million in 2000) As of 2023, 72 low and middle-income countries with clean cooking targets in Paris Agreement Nationally Determined Contributions; <20% backed by clear financing schemes Action on cooking poverty underway, but...

- is fragmented
- is underfunded
- is incremental
- BAU estimated to result in 1.8 billion without access in 2030

Systems level changes required

Sources: IEA, IRENA, UNSD, World Bank, WHO (2024) Tracking SDG 7: The Energy Progress Report; Washington, DC: World Bank Group; IEA (2023) A Vision for Clean Cooking Access for All. Paris: IEA; UN-Energy (2023) Achieving Universal Access and Net-Zero Emissions by 2050: A Global Roadmap for Just and Inclusive Clean Cooking Transition. New York: United Nations CRICOS code 00025B



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Why is this important?

Lack of access to clean cooking facilities globally costed at **USD 2.4 trillion per annum through to 2030**, comprised principally of negative health, gender and climate externalities

Household air pollution (HAP) from use of open fires and inefficient stoves powered by kerosene and solid fuels (charcoal, wood, animal dung, crop waste) estimated to cause 3.2 million premature deaths annually

Sources: ESMAP (2020) The State of Access to Modern Energy Cooking Services. Washington DC: World Bank Group; World Health Organization (2023) Household air pollution: Key facts; Puzzolo, E et al. (2024) Estimated health effects from domestic use of gaseous fuels for cooking and heating in high-income, middle-income, and low-income countries: A systematic review and meta-analyses. *Lancet Respir. Med.* 12:281–293



Clean cooking co-benefits

Partnership: strong global partnerships and cooperation by supporting national plans

Promote peaceful and inclusive societies for sustainable development: facilitate building effective, accountable and inclusive institutions

> Environment: sustainable forest management; reduce land degradation and biodiversity loss

> > deforestation; reduce emissions





Policy momentum

"It's really a remarkable space. When you think that over the last years, annually, there's just a few hundred million [dollars] being invested in this sector, while there are huge implications for climate as well as a whole raft of other SDGs. It's one of the highest impact potential investments but still it's received such little focus and attention." – Multilateral funder (2023)





A multitude of barriers



Summary clean cooking barriers



Source: Coldrey, O, Lant, P, Ashworth, P (2023) Elucidating Finance Gaps through the Clean Cooking Value Chain. Sustainability 15:3577



Gender equity

Cooking is gendered



Potential impact metrics

- Reduced HAP related deaths
- Reduced maternal and neonatal deaths
- Reduced time spent collecting biomass
- Increased time on productive economic activity
- Number of women owned SMEs
- Increased household earnings
- Increased school retention/completion rates for girls
- Increased safety and security

Economic and social impact

"I spent time in the field talking to a woman who said 'my day is only about cooking. It starts early in the morning collecting wood, and then I cook for ten people and then clean up. And that's my day'." - Philanthropic funder (2023)



Time spent collecting cooking fuels, Hours, % of population

Hours/day Share of population relying on biomass for cooking (right axis)

Without clean cooking...

- Average 1.4 hours/day fuelwood collection time
- Up to 4 hours/day cooking time using traditional methods
- Women susceptible to gender-based violence (GBV) while searching for fuelwood, restricting their movement and limiting income potential



Electric/solar cookstoves require no biomass collection

Benefits of access expansion



Clean fuels available within communities via distributors and retailers

Reduced incidence of GBV

Where access results in better education outcomes for girls, can help prevent child marriage

Increased opportunities for women's economic participation outside the household

Sources: Sciences Po, ESMAP (2020) The Smart Economics of Clean Cooking: Placing Women at the Center of the Energy Access Development Agenda; Rewald, R, (2017) Energy and Women and Girls: Analyzing the Needs, Uses, and Impacts of Energy on Women and Girls in the Developing World," Oxfam Research Backgrounder series; Dutta, S, Kooijman, A, Cecelski, Elizabeth W (2017) Energy access and gender get access and Gender Based Violence"; Global Alliance for Clean Cookstoves (2016) Gender-Based Violence in Humanitarian Settings: Cookstoves and Fuels

Energy access finance for women at the last mile

- 2019: OECD official development assistance (ODA) records for energy sector projects with a Principal or Significant gender equality marker ~13% of development finance for all energy projects. This is ~half the volume of development finance targeting gender equality across all sectors (25%)
- Improving clean cooking access for women requires concerted effort to overcome financing barriers uniquely experienced by them
 - Targeted financial solutions to address legal and customary headwinds: lack of access to formal financial institutions; lack of credit history or collateral; discriminatory social norms and laws
 - Focus on outcome, impact metrics
 - Engage end users at every stage of policy, project and financing cycle

Source: Sustainable Energy for All and Climate Policy Initiative (2021) Energizing Finance: Understanding the Landscape. Vienna: Sustainable Energy for All.





What is finance's role?



An adapted version of Porter's value chain to frame the cooking poverty sector



Source: Biser Kaluz, A-M, Thomas, D, Hodges, J.A., Ghaffari, L, Rossano, N, Schott, P.C., Guo, Z (2021) Killed by Breathing—Addressing Cooking Poverty: Current State, Gaps and Challenges, and Proposed Solutions to Achieving SDG 7.1. An Independent Study within the Sustainability Management Program. New York: Columbia University



<1%

USD 8 billion required

annually to close the

access gap. In 2019,

USD 133.5 million

committed to clean

cooking in twenty countries in Africa and

Asia with largest access

deficits

A chronic shortfall of finance

Total Finance Commitments for Clean Cooking in High Impact Countries (HICs), by Country, 2018-2019 (USD mn), and % of Country Population with No Access to Clean Fuels and Technology for Cooking



Sources: Sustainable Energy for All and Climate Policy Initiative (2021) Energizing Finance: Understanding the Landscape. Vienna: Sustainable Energy for All. IEA (2023) A Vision for Clean Cooking Access for All. Paris: IEA.

CRICOS code 00025B



A dynamic financing market

"[Public finance] has to unlock. The big money comes from private investors." – Clean cooking entrepreneur (2023)

- Historical dependence on public funds
- Growth in private investment
- Critical role for (public) climate and development finance as catalyst

Clean Cooking Commitments in HICs by Source and Financial Institution, 2013-2019 (USD mn)



Sources: Sustainable Energy for All and Climate Policy Initiative (2021) Energizing Finance: Understanding the Landscape. Vienna: Sustainable Energy for All



Who pays?

- COP29: "New Collective Quantified Goal" (NCQG) to succeed developed countries' current commitment to provide USD 100 billion in climate finance each year to help developing countries combat climate change
- Draft UN negotiating text presents seven options, of which:
 - Arab nations calling for developed countries to commit min. USD 441 billion in grants annually between 2025 and 2029, to mobilise non-grant finance and private investment of USD 1.1 trillion
 - Donor countries (1992 Rio Summit) incl. the U.S., UK, EU, Japan, and Australia, suggest expanding list of donors to include China and Gulf states
 - Canadian proposal that new financial targets be met by original Rio list countries + those with GNI>USD 52,000 per capita or top 10 cumulative GHG emitters with GNI of USD 20,000 per capita
- Loss and Damage Fund
 - COP28: decision to establish dedicated fund to compensate developing countries for loss and damage incurred due to adverse effects of climate change
 - As of June 2024, World Bank acting as interim trustee of this additional climate financing mechanism



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But if we had the money, could we spend it?

"There's all this talk about the financing gap in clean cooking, but not nearly enough conversation around what it is you're trying to finance, and what you're trying to do with that finance." – Clean cooking entrepreneur (2023)

- Committed finance can only have field impact if efficiently disbursed
 - Between 2002 and 2018, 58% percent of planned disbursements of development finance to the energy sector in HICs were delayed; disbursements of USD 32 billion substantially lagged commitments of USD 52 billion from 2013–2018
- 23 expert interviews with clean cooking entrepreneurs, private and impact investors, development financiers, multilateral organisations, climate policy experts
 - Development finance institutions (DFI), as public banks, are principal institutional channels of climate and development finance but approach is overall bureaucratic, slow and inflexible
 - DFI financing marked by risk aversion, limited toolkit of financial instruments and structures
 - Perceived strategic misalignment between DFIs' approach and market needs



Theory of change for clean cooking finance



Source: Coldrey, O, Lant, P, Ashworth, P, LaRocco, P, Eibs Singer, C (2024) Reforming Climate and Development Finance for Clean Cooking. *Energies* 17:3720 CRICOS code 00025B



Monetising impact: Clean Impact Bond

- > Innovative results-based financing (RBF) instrument, developed by public-private consortium
- Similar to carbon credits; places monetary value on measurable and certified health and gender outcomes arising from use of clean cooking solutions
- Tradable and verifiable credits can be sold to willing buyers to generate additional cash flow for small and medium enterprises that manufacture and distribute solutions



Source: International Finance Corporation (2023) Clean Impact Bond: Mobilizing Finance for Clean Cooking. Washington DC: International Finance Corporation CRICOS code 00025B



Monetising impact: Peace Renewable Energy Certificates (P-RECs)

- High-impact renewable energy certificate: 1 MWh = 1 P-REC, issued by NFP Energy Peace Partners
- Places monetary value on verified social and environmental benefits of RE generated from qualifying projects
- Sales provide additional revenue stream for project developers
- Purchases help multinational companies meet ESG goals

P-REC project criteria

- New or emerging RE project
- Located in countries that are fragile, energy poor and climate vulnerable
- Provides clear social benefit, typically first-time community electrification



Impact as of Q2 2024

- 16 communities reached in 5 countries (Chad, DRC, Nigeria, Somalia, South Sudan); 216,000 people benefit from first-time electrification, public streetlights, hospital electrification
- 6 RE project developers, primarily local companies, have sold P-RECs to fund projects
- > **\$1.1+ million** in revenue for high-impact projects in fragile states
- Corporate buyers include Microsoft, Google, Block and Oriflame



Reforming the global financial architecture

Escalating calls, led by developing countries, to comprehensively reassess international financial architecture to fund solutions to address climate change

- Government of Barbados, 2022 Bridgetown Initiative for the Reform of the Global Financial Architecture
- French Presidency, 2023 Summit for a New Global Financing Pact: Multilateral Development Banks Vision Statement
- African Heads of State and Government, The African Leaders Nairobi Declaration on Climate Change and Call to Action, 6 September 2023
- United Nations, Our Common Agenda Policy Brief 6: Reforms to the International Financial Architecture, 2023



Outlook



Policy outlook



Prioritise Governments key to expanding access through clear targets, integrated energy plans, supportive policy and regulation, strong investment climate

Engage with end users! And invest in consumer-facing research

Data Sharpen focus on data collection, sharing, knowledge exchange

Strategic approach Project-by-project approaches to investment by public banks require strategic rethink across the value chain; includes donor resources for technical assistance and institution building

Reduce siloes Break down siloes between public and private actors and consider optimal blend of capital

Innovate Continued innovation in financial instruments needed to deploy scale of capital necessary for universal access

Global financial architecture Expect continued reform within major climate and development funding institutions (World Bank, Green Climate Fund); scrutiny of carbon markets and crediting methodologies; new international financing targets

Thank you





Clean cooking finance through the innovation cycle



Source: Coldrey, O; Lant, P, Ashworth, P (2023) Elucidating Finance Gaps through the Clean Cooking Value Chain. Sustainability 15:3577



Case study: Advanced Cookstoves in Mekong region

Program period	March 2015 – March 2019
Funder	Energising Development (EnDev); Blue Moon Fund (BMF); Winrock International Institute for Agricultural Development (WINROCK)
Funding amount	EUR 3,839,704
Implementation	Implementors and partners: SNV, GIZ, Vietnamese Women's Union (VWU) Local Distributor: Lightning Engineering Solutions, Fresh Innovation Cambodia, EcoSun, ACE Energy Solutions Co. Sector Enablers: C-Quest Capital Co. Ltd (CQC) International Manufacturers: Mimi Moto, Solar Serve, Prime Cookstoves
Objective and Scope	Objective To accelerate a sustainable market for clean smokeless cookstoves through the sale of 120,000 devices in Cambodia, Laos and Vietnam. Scope Results Based Financing (RBF) scheme to strengthen involvement of supply chain actors in the nascent clean cookstove market. The innovative RBF approach used in this project is an 'Auction Platform' in each country – this is a dynamic, market-based mechanism to determine required RBF incentive levels for the development of self-sustaining markets for cookstoves.
Results	 Vietnam integrated 5 local producers, promoting 8 different advanced biomass cookstove (ABC) models. 33,000 ABC sold over 3-year period. More than 600 jobs were created in two-years after project commencement. 115 full time and 494 part time jobs. 41% held by women 23% held by youth under 30 Project cost per job = EUR 1,310 Over \$660,000 in enterprise investments were leveraged by the project and \$1.3M in ABC sales revenues



Case study: KOKO Networks (Kenya)

Profile	For-profit, privately-owned company. "SmartCook" two-burner clean cookstove with integrated bioethanol fuel canister
Funding sources	Commercially funded: family offices, high net worth individuals and venture capital, including Microsoft Climate Innovation Fund equity investment in 2022
Financial, business model, supply chain innovation	 Partnership with Vivo Energy Kenya, owns and operates Shell-branded fuel distribution infrastructure Fuel sold to customers pay-as-you-go (PAYG) through cloud-connected "KOKO Points', fuel ATMS located in corner stores close to target customers, who top up accounts via mobile money Last mile distribution to KOKO Points by "smart micro-tankers", IoT enabled trucks designed for local road conditions To address affordability challenges, customers can purchase cookstove via interest-free layaway scheme: small deposit and incremental instalments with no minimum payment or time limit Operates wholly owned manufacturing facility in India
Lessons learned	 Market entry strategy informed by local context, including Kenyan consumers' typical spending patterns of frequent, small transactions and openness to new technology; good physical infrastructure and strong base of local engineering skills; government willing to make policy changes to recognise ethanol as cooking fuel Agile fuel distribution model eliminates centralised bottling and single-use plastic bottles; focuses on customer convenience to compete with charcoal and kerosene Real time, technology-enabled data improves supply chain management and despatches fuel to customers as required Customers enjoy greater agency through monitoring and managing their fuel use Commercial financiers will invest in innovative companies with sound business models, even in nascent markets
Replication and scale	 Serves more than 750,000 household customers in Kenya 2022 agreement with Government of Rwanda to develop nationwide, world first, renewable cooking fuel utility. Government to strengthen policy environment, through tax and import duty concessions on hardware and fuel, with cost reductions flowing through to household consumers