Welcome to the Cookstoves Sector!

An introduction and overview for newbies and veterans alike

*Content developed under the USAID/Winrock Developing a Sustainable Cookstove Sector project*
Overview topics 1

• Health Evidence Base
• Climate Impacts
• Standards and Testing
• Technological innovations in Cookstoves and Fuels
• Consumer Preference and Adoption
Overview topics 2

• Market-based Approaches and Financing

• Cross-cutting collaborations
  – Gender
  – Humanitarian
  – Commercial Cooking and School Feeding

• Monitoring and Evaluation
Why do we care?

- Half the world’s population
- 3x # annual HIV/ AIDS deaths
- 500 million tons non-renewable wood/yr
- GHGe = 170 million vehicles
- Lost productivity, time, and income-generation opportunities for women
- Up to 30-50% of household incomes
- Safety and security
Health

- 4.3 million premature deaths/year
- ALRIs, including pneumonia; COPD; stroke, ischemic heart disease (IHD), cataracts, and lung cancer
- Pneumonia #1 cause of death in children <5y
- 265,000 burn-related deaths/yr
- Health impacts = near exclusive use of very high quality stoves/clean fuels
- Many more options to reduce burns
Climate

- Some of the most significant contributors to global climate change
- Climate impacts require further research and exploration
- Clean/efficient stoves can save 1-3 tonnes of CO2e/stove/year
- Over half of all wood harvested is used as fuel
- Biomass for cooking is 27-34% unsustainably harvested
- 25% of global black carbon emissions
- Carbon finance markets/prices low
Performance Testing

- Untested “improved” stoves can be worse than trad’l baseline
- Laboratory testing = compare performance between stoves, NOT predict performance in actual use
- WBT is the lab test for which we have the most global data
- CCT/UCT are semi-controlled tests for comparing stove performance to baseline stove
Performance Testing

- KPT = field test that evaluates the stove in real-world settings
- ~44 RTKCs test stoves around the world
- Testing:
  - fuel use
  - emissions
  - safety
  - durability
Standards

- International voluntary performance standards for cookstoves under way via ISO process
- Started in 2011 through informal agreement; official ISO/IWA in 2012
- ISO TC 285 = Clean cookstoves and clean cooking solutions (for now). 29 participating and 14 observing countries
- Working groups:
  - (1) harmonized protocols,
  - (2) lab-based testing,
  - (3) field testing
  - (4) social impacts
- Tiers of performance
Standards – IWA Tiers (2012)

Efficiency/Fuel Use
- Tier 4
- Tier 3
- Tier 2
- Tier 1
- Tier 0

Total Emissions
- Tier 4
- Tier 3
- Tier 2
- Tier 1
- Tier 0

Indoor Emissions
- Tier 4
- Tier 3
- Tier 2
- Tier 1
- Tier 0

Safety
- Tier 4
- Tier 3
- Tier 2
- Tier 1
- Tier 0

Water Boiling Test
Additional protocols to be added

Biomass Stove
Safety Protocol

ETHOS 2019
Standards – ISO Tiers 2018*

• Performance metrics are linked to ISO laboratory test protocols
  • Thermal efficiency
  • Emissions (PM$_{2.5}$ and CO)
  • Safety
  • Durability

• Tiers 0-5 rate simple/traditional stoves (0) through aspirational targets (5)

* Michael Johnson, Introduction to the ISO Voluntary Performance Targets, ETHOS 2019
# Standards – ISO Tiers 2018*

<table>
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<th>ISO 19867 Tiers</th>
<th>Tier&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Thermal efficiency</th>
<th>Emissions</th>
<th>Safety (score)&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Durability (score)&lt;sup&gt;d&lt;/sup&gt;</th>
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* Michael Johnson, *Introduction to the ISO Voluntary Performance Targets*, ETHOS 2019
Cookstoves and Fuels

• Cookstoves: household or institutional
• Stoves and fuels cannot be used interchangeably
• Common fuels: unprocessed biomass waste; processed biomass; liquid/gas; solar; electricity
• Technologies must fit the required tasks and cooking styles for any given users
Consumer Preference

• If it doesn’t meet their needs, users won’t use it
• High performing stoves can be high maintenance/annoying to use (fuel savings vs. fuel prep trade-off)
• Inconsistent use/stove stacking = few benefits
• Consumer research – in-home trials w/ local cooks
• Market research informs consumer education needs
• Target segmenting allows for specialized messaging
• Stacking/monitoring: use technology plus surveys; self-reporting alone is unreliable but provides needed context
• After-sales service is key
Markets and Financing

• Long-term sustainability/impacts req thriving local markets
• Markets require reliable supply and distribution chains
• 4 Ps of marketing: Product, Price, Place, Promotion (w/ consumer research!)
• After sales-service: repair, replacement parts, warranty fulfillment
• Sales staff retention: training, mentoring, incentives
• Manufacturers, distributors, customers need appropriate financing options (stock capital, installment plans, group savings)
• RBF = Results Based Financing
Cross-cutting

- Women can play key role along stove/fuel value chain
- Gender-informed strategies: women and men experience impacts of household changes differently
- Agency based empowerment training can boost sales for women entrepreneurs: EETH
- Humanitarian settings—scarce firewood, high personal safety risks outside of refugee camps
- Institutional stoves: commercial cooking/product production, school feeding, significant fuel savings, low hanging fruit
• You can’t claim impacts unless you monitor them
• M&E for health impacts, stove performance, stove/fuel sales, environmental impacts, consumer behavior/ adoption business and social impacts all require different tools and approaches
• Do both lab and field testing – don’t always correlate
• Stove use monitoring – use sensors to track stacking and surveys to understand reasons for use/disuse
• Quantitative (what) and qualitative (how and why) methods
M&E

Maxim iButton

Infrared thermocouple

kSUMs

Nexleaf StoveTrace

SWEETSense

EXACT

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