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*

ETHOS 2019

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
- 500million 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

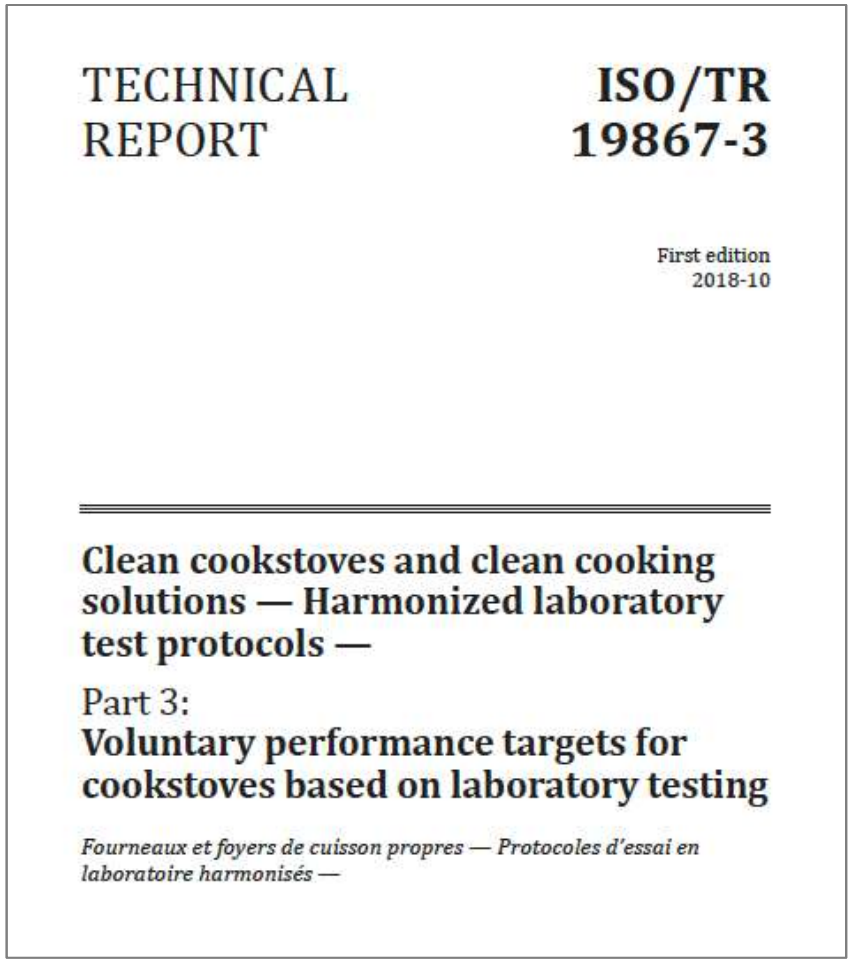
Safety

Tier 4
Tier 3
Tier 2
Tier 1
Tier 0

Water Boiling Test
Additional protocols to be added

Biomass Stove Safety Protocol

Standards – ISO Tiers 2018*



TECHNICAL REPORT

ISO/TR 19867-3

First edition
2018-10

Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols —

Part 3:
Voluntary performance targets for cookstoves based on laboratory testing

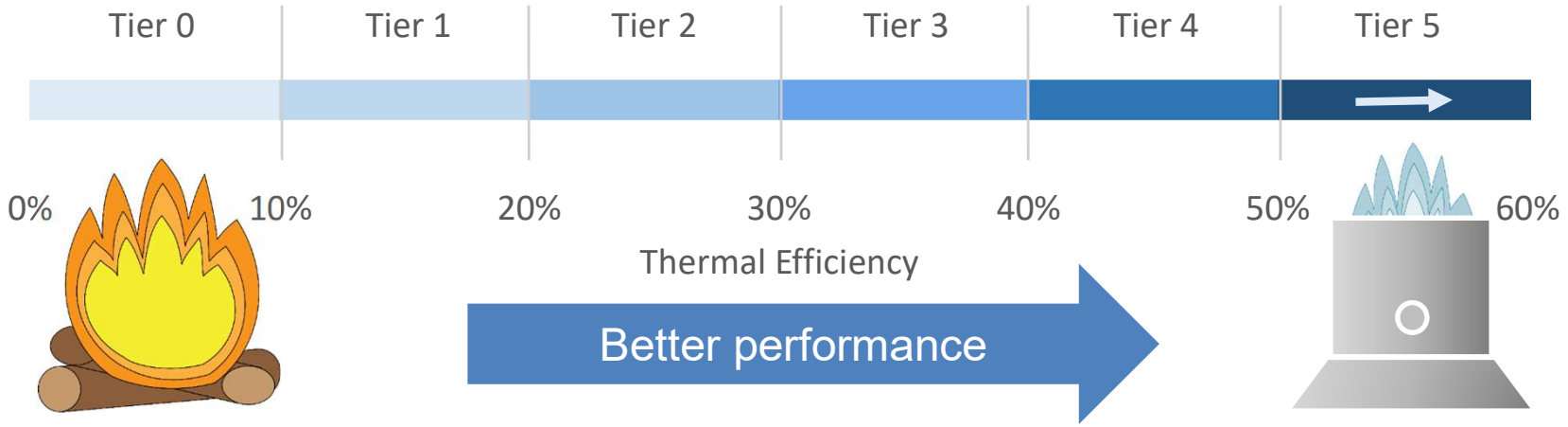
Fourneaux et foyers de cuisson propres — Protocoles d'essai en laboratoire harmonisés —

- 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*

ISO 19867 Tiers	Tier[b]	Thermal efficiency %	Emissions		Safety (score)[c]	Durability (score)[d]
			CO g/MJd	$PM_{2,5}$ mg/MJd		
Better performance ↑	5	≥50	≤3,0	≤5	≥95	<10
	4	≥40	≤4,4	≤62	≥86	<15
	3	≥30	≤7,2	≤218	≥77	<20
	2	≥20	≤11,5	≤481	≥68	<25
	1	≥10	≤18,3	≤1030	≥60	<35
	0	<10	>18,3	>1030	<60	>35



** Michael Johnson, Introduction to the ISO Voluntary Performance Targets, ETHOS 2019*

Cookstoves and Fuels

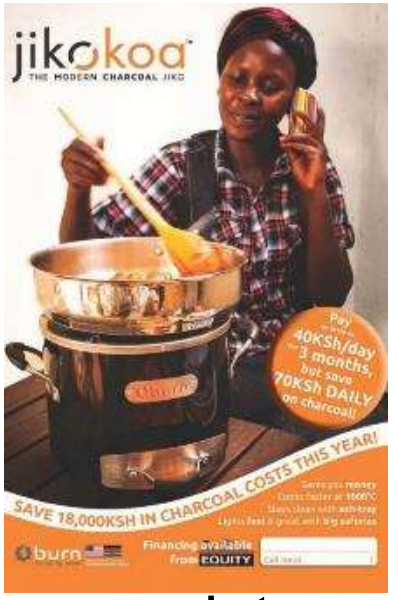
- Cookstoves: household or institutional
- Stoves and fuels cannot be used interchangeably
- Common fuels: unprocessed biomass waste; processed biomass; liquid/gas; solar; electricity
- Technologies must fit the required tasks and cooking styles for any given users

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

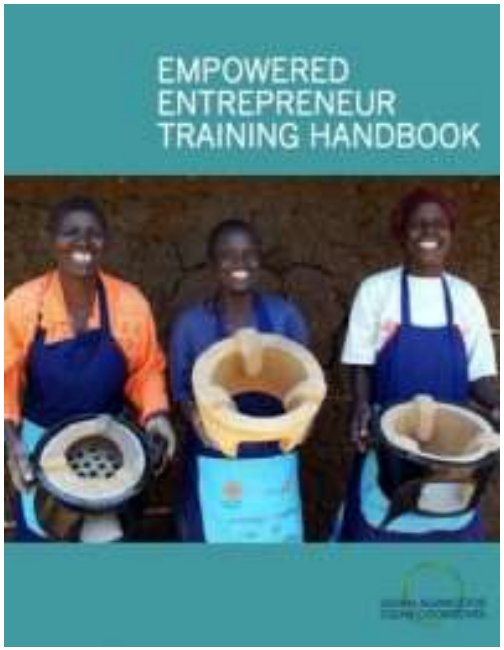
- Long-term sustainability/impacts req thriving local markets
- Markets require reliable supply and distribution chains
- 4 Ps of marketing: Product, Price, Place, Promotion (w/ consumer research!)
- After sales-service: repair, replacement parts, warranty fulfillment
- Sales staff retention: training, mentoring, incentives



- Manufacturers, distributers, 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



M&E

- 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