Understanding the Terms 'Clean and Efficient'

The Global Alliance for Clean Cookstoves developed a set of definitions for "clean" and "efficient" for the specific purpose of tracking progress. These definitions, developed with feedback from the Alliance partners, are aligned with the interim tiered performance guidelines in the ISO International Workshop Agreement (IWA) developed in February 2012. The Alliance tracks progress for all stoves while requiring minimum tiers for stoves to contribute towards the Alliance targets for "clean" and "efficient":

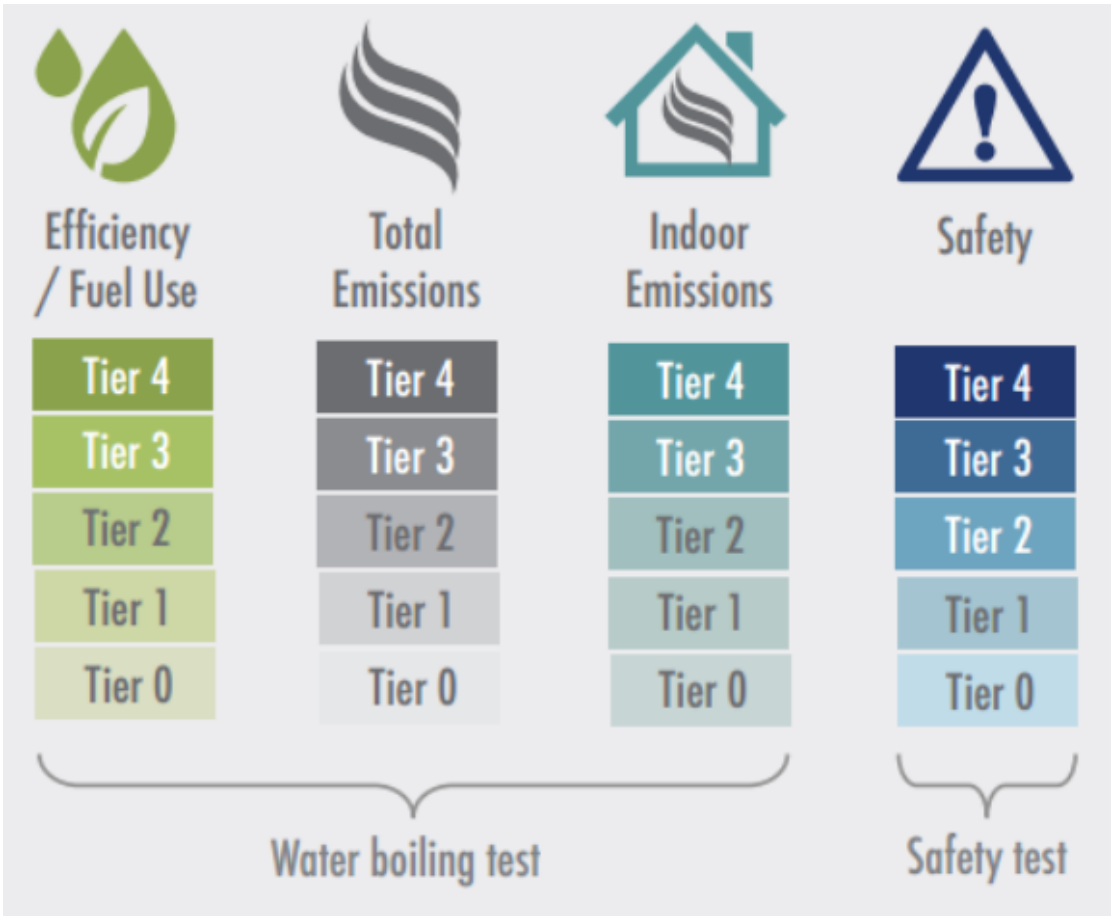
Stoves/Fuels that meet Tier 2 for efficiency or higher will be counted as efficient;
Stoves/Fuels that meet Tier 3 for indoor emissions or higher will be counted as clean, as it relates to potential health impacts; and
Stoves/Fuels that meet Tier 3 for overall emissions or higher will be counted as clean, as it relates to potential for environmental impacts.

Note that Tier 4 is always the highest performing and most likely to achieve the greatest health or environment benefits.

What is it: Interim international guidelines for stove performance, including efficiency, total emissions, indoor emissions, and safety. The goal is to provide a common and easy-to-understand terminology for governments, donors, investors, and consumers to make decisions about technology options.

How was it developed: International Workshop Agreements are a streamlined process in the International Organization for Standardization (ISO) that can be a first step towards formal ISO standards. IWA 11:2012 Guidelines for evaluating cookstove performance was unanimously approved in February 2012 by over 90 participants from 22 countries.

What do the Tiers mean: The IWA framework rates cookstoves on four (4) indicators (efficiency, indoor emissions, total emissions, safety), each along 5 Tiers (0: lowest performing to 4: highest performing). For each indicator, the Tiers boundaries are defined by quantitative values determined by laboratory testing. The protocol that has been mapped to tiers is the Water Boiling Test 4.2.3 and the Biomass Stove Safety Protocol 1.1, although the IWA framework was designed to accommodate other protocols.



The goals of the IWA are to

- set aspirational goals
- provide clarity to non-technical audiences
- communicate progress
- allow organizations and countries to select specific indicators and tiers based on local priorities
- harmonize different protocols.

The emissions rates that define Tier 4 for Indoor Emissions (the highest performing tier) were determined based on the World Health Organization's Guidelines for Indoor Air Quality for pollutant concentrations. Other Tier boundaries for Indoor Emissions were defined to be progressively lower relative to Tier 4. This linkage from WHO and ISO guidelines demonstrates how performance standards can be used as an implementation strategy for health or environment goals.

Tiers

The overall Tier is the minimum Sub-tier value within an indicator category. For example, the Indoor Emissions Tier is the minimum of the Sub-tiers forPM2.5 and CO emissions.

Emissions CO Sub-tiers		
	High power CO (g/MJ_d)*	**Low power CO (g/min/L)**
Tier 0	>16	>0.20
Tier 1	≤16	≤0.20
Tier 2	≤11	≤0.13
Tier 3	≤9	≤0.10
Tier 4	≤8	≤0.09
* grams per megajoule delivered to the pot		

Emissions PM2.5 Sub-tiers		
	High power PM2.5 (mg/MJ_d)*	**Low power PM2.5 (mg/min/L)**
Tier 0	>979	>8
Tier 1	≤979	≤8
Tier 2	≤386	≤4
Tier 3	≤168	≤2
Tier 4	≤41	≤1
* milligrams per megajoule delivered to the pot		

Indoor emissions Sub-tiers		
	Indoor emissions CO (g/min)	**Indoor emissions PM2.5 (mg/min)**
Tier 0	>0.97	>40
Tier 1	≤0.97	≤40
Tier 2	≤0.62	≤17
Tier 3	≤0.49	≤8
Tier 4	≤0.42	≤2

Efficiency/fuel use Sub-tiers		
	High power thermal efficiency (%)	**Low power specific consumption (MJ/min/L)**
Tier 0	<15	>0.050
Tier 1	≥15	≤0.050
Tier 2	≥25	≤0.039
Tier 3	≥35	≤0.028
Tier 4	≥45	≤0.017

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Tier 4	≥45	≤0.017

Safety	
	Scale of 0 to 100*
Tier 0	<45
Tier 1	≥45
Tier 2	≥75
Tier 3	≥88
Tier 4	≥95
* Points from ten weighted safety parameters	