



Measuring Progress during Phase I: Building on the IWA Interim Guidelines

Discussion Paper (November 2012)

Incorporates feedback from September 2012 public comment period

Executive Summary

The Global Alliance for Clean Cookstoves is developing a framework to be used in Phase I of its activities for measuring progress and success towards the key milestone of 100 million households adopting clean and efficient stoves and fuels by 2020. This framework is aligned with the interim tiered performance standards for the sector initiated at through the ISO International Workshop Agreement (IWA) in February 2012. It proposes to track progress for all stoves while requiring minimum tiers for stoves to contribute towards the Alliance target for **efficient** and **clean**:

- Stoves that meet the tier 2 efficiency standard or higher will be counted as efficient;
- Stoves that meet the tier 3 standard for indoor emissions or higher will be counted as clean for health impacts; and
- Stoves that meet the tier 3 standard for overall emissions will be counted as clean for environmental impacts.

This framework will be re-evaluated at the end of Phase 1 in light of new scientific evidence and sector capacity. The Alliance acknowledges that parallel progress is needed to define adoption metrics and measurement approaches and to refine the exact indicator(s) for each IWA performance category.

Background and Purpose

The Global Alliance for Clean Cookstoves seeks to save lives, improve livelihoods, empower women, and combat climate change by creating a thriving global market for clean and efficient household cooking solutions. The Alliance's strategic business plan underpinning this mission envisions activities undertaken in three-year phases, culminating in the key milestone of 100 million households adopting clean and efficient stoves and fuels by 2020.

The objective of the Alliance's monitoring and evaluation activities is to provide a credible and pragmatic framework to measure the outputs, intermediate outcomes, and long-term impacts that

result from the sector’s activities. There is broad consensus that evidence of cookstove sales alone does not guarantee beneficial impacts. When sales are paired with evidence of sustained adoption, however, they represent the first event in the results chain (see figure 1). As such, it is valuable to track the number of cookstoves sold and adopted as an important indicator of progress, without losing sight of the need to also assess outcomes and impacts through other approaches and measures.

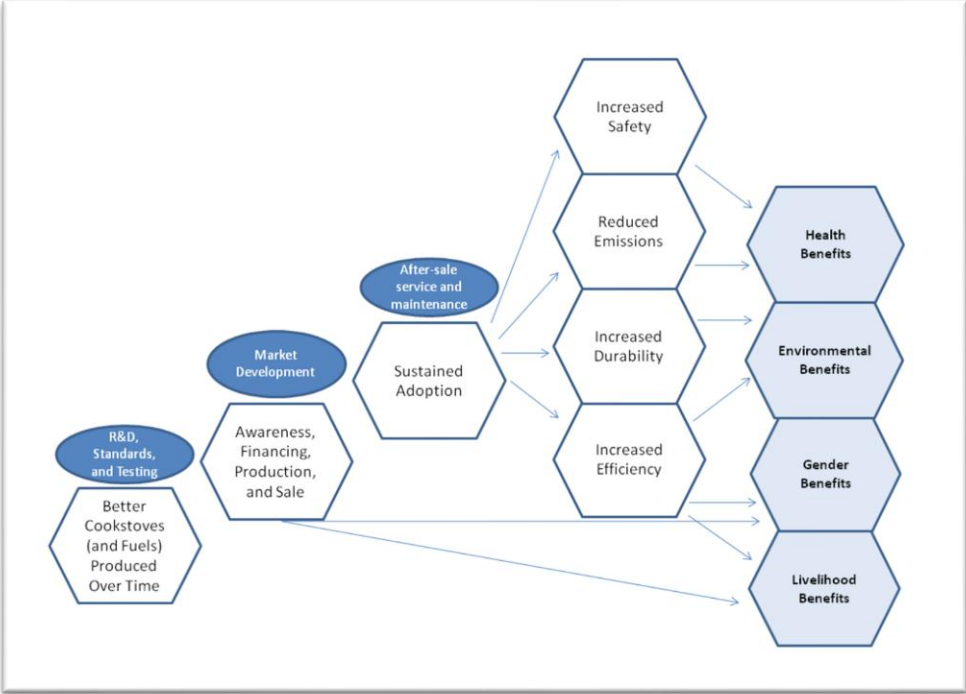


Figure 1: Simplified results chain for adoption of clean cookstoves and fuels

Alignment with Interim Standards for the Sector

One of the Alliance goals for the development of the cookstove sector is the development of performance standards. Standards are particularly important because they provide policymakers, donors, investors, stove experts, and program managers with a credible basis for comparing stove performance and safety. They also provide experts with a common set of terms for communicating and understanding stove performance. Furthermore, standards can give stove makers affirmation of product quality, let users know they are making a worthwhile investment, and drive industry innovation.

The international standards process made a significant step forward with the development of an [ISO International Workshop Agreement \(IWA\)](#) in February 2012, which defined multiple indicators related to efficiency, emissions, indoor emissions, and safety across five performance tiers. The stepped tiers (0 to 4+) provide recognition for advances that have already been made while also setting aspirational targets to achieve additional needed improvements. The tiers 0 and 4 are the ends of the performance spectrum for cookstoves, with tier 0 representing the poorest performing technologies and tier 4 setting an aspirational goal. The multiple performance indicators demonstrate strengths and

weaknesses of each stove/fuel and allow programs to promote stoves with strengths that are aligned with their priorities. The IWA also created a framework to allow for a fair comparison of testing results from multiple stove types using a variety of tests that are regionally and technologically appropriate.

Alliance Proposed Framework for Annual Reporting During Phase I

Underlying the Alliance's proposed framework is the recognition that stoves and fuels can deliver one or more of a wide spectrum of benefits, including fuel efficiency, time savings, improved health and/or safety. M&E must be context specific and hold technologies accountable only for achieving the outcomes for which they were designed. At the same time, the Alliance encourages continuous improvements across the range of performance indicators over time. Thus, in Phase I, the Alliance's M&E approach will be aligned with the performance tiers recently defined by the ISO International Workshop Agreement (IWA).

Building on existing sector efforts, the Alliance is developing a web-based system for tracking households adopting new cookstoves across all tiers of performance. It is important for the Alliance to monitor stoves across all performance tiers in order to monitor the sector's overall growth and shift to higher quality stoves. However, only stoves meeting specific requirements will be counted towards the 100 M 'clean **and** efficient cookstoves and fuels' target. Further the Alliance proposes to track these two goals separately, in order to link more closely the goals of 'clean' and 'efficient' to appropriate IWA tiers and metrics.

Developing consensus on appropriate measures of field performance, adoption and usage, as well as harmonized methods for assessing these measures will be critically important to monitoring the Alliance's progress. Achieving significant and consistent use of a given stove is the first condition for attaining its performance benefits and stoves must be measured under real conditions of use. The initial framework focuses on cookstoves, but monitoring the adoption of clean fuels will also be important. The Alliance fully acknowledges the current gaps in the monitoring and evaluation plan, and is taking steps to spur progress in these areas for annual tracking.

Monitoring Progress towards 100M *Efficient Stoves*

The IWA framework offers a way to set performance tiers for fuel efficiency across the various test protocols appropriate to specific fuels, geographies, and stove types. For each test protocol, the tier values are established to recognize comparable performance in fuel efficiency across the framework. Intermediate tier boundaries are drawn uniformly between Tier 0 and 4 based on the fact that every unit of energy saved is equally valuable, whether at the household, community or global level. Figure 2 below shows the approximate distribution of common cookstove technologies across the performance tiers drawn for one of the most common protocols to test fuel efficiency, the water boiling test.

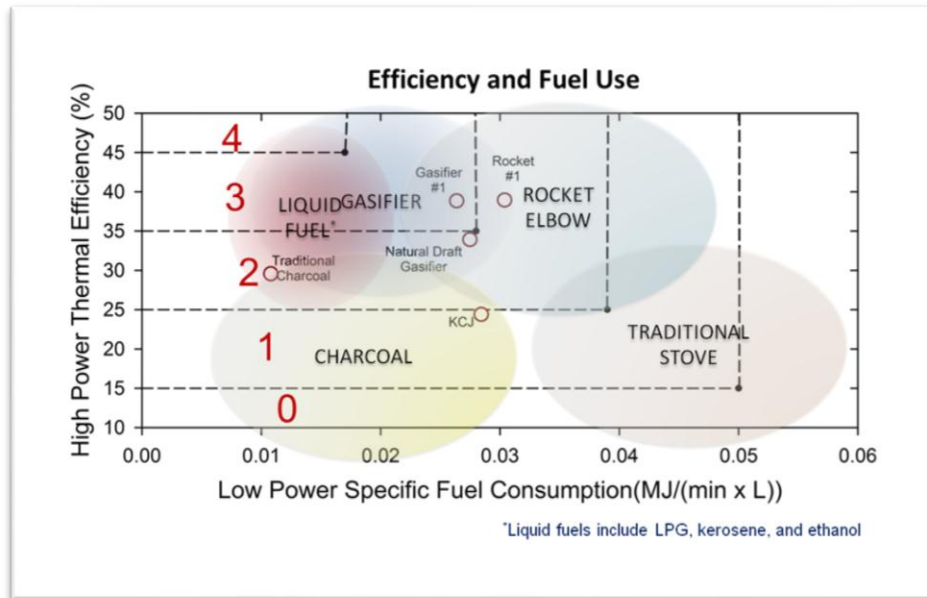


Figure 2: Efficiency and fuel use tiers of performance

During Phase I, stoves that meet the efficiency requirements for Tier 2 or above will be considered 'efficient' and counted towards the 100M target. Many stoves have already progressed to Tier 2 or better, and the sector's current technological capacity is estimated to be sufficient to allow any Tier 1 stove to be upgraded to meet the Tier 2 requirements, thus delivering enhanced benefits to households and the environment.

Monitoring Progress towards 100M Clean Stoves

The IWA indoor emissions metrics provide a means for determining which stoves can be counted as 'clean' by focusing on the amount of carbon monoxide (CO) and fine particulate matter (PM_{2.5}) that is introduced into the room when the stove is on. For indoor emissions, the aspirational performance for tier 4 was based on the World Health Organizations air quality guidelines, which define global health-protective limits for CO and PM. The intermediary boundaries for indoor emissions were set between Tier 0 and Tier 4 to reflect the (exponential) relationship between exposure to indoor air pollution and the health response, using currently available evidence.

Also central to the discussion of how to track progress towards the target of 100M **clean** cookstoves is the emerging scientific consensus regarding the relationship between exposure to cookstove smoke and ill-health, particularly for child pneumonia. Cookstove smoke is a prime contributor to child pneumonia in the developing world, causing approximately 1M deaths per year in children under five. Unlike the case for energy efficiency (discussed above), changes in exposure to household air pollution are not associated with constant decreases in the incidence of child pneumonia across a wide range of exposures. Rather, major reductions in pneumonia are likely to be achieved only at very low levels of exposure, with fewer health benefits expected at higher levels of exposure (see figure 3 below).

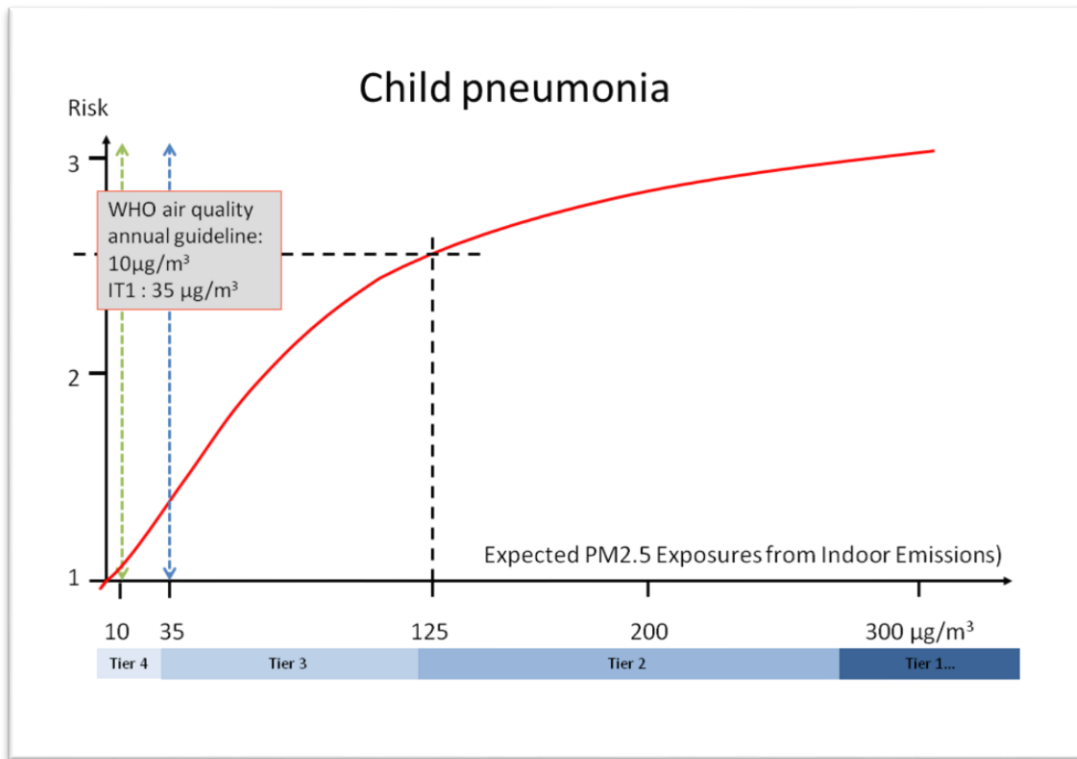


Figure 3: Example exposure-response relationship for child pneumonia

The existing body of evidence suggests that to achieve powerful reductions in child pneumonia, a leading cause of illness and death associated with household air pollution, clean stoves and fuels must have very low indoor emissions. Therefore stoves that meet the indoor emissions requirements for Tier 3 and above will be considered ‘clean’ during Phase I and will count towards the 100 M target.

Other health impacts follow different dose response relationships, and some may potentially be considerably mitigated with less stringent indoor emissions performance. At present, however, we do not have sufficient empirical evidence to estimate how changes in exposure would impact other health outcomes.

The IWA framework also presents tiers of performance for total stove emissions of CO and PM2.5, not just those emitted indoors. Regardless of whether a stove has a chimney, total stove emissions contribute to outdoor air pollution, which can “repenetrate” the indoor environment, and which impacts local, regional, and global air quality and climate. Including total emissions in the evaluation of clean stoves will help sustain health-protective air quality in densely populated areas where outdoor air has a strong effect. It will also support climate protection by recognizing technologies and fuels that result in the elimination of cooling non-black particles, and provide further reductions that have a net climate benefit.

Therefore the Alliance will evaluate total emissions and indoor emissions separately, as they have different implications for the environment and for health. Stoves that meet the tier 3 standard for indoor emissions will be considered **clean for health impacts** during Phase I. Stoves that meet the tier 3 standard for total emissions will be considered **clean for environmental impacts** during Phase I. Efforts are ongoing to establish the best approach for implementing this requirement, either by establishing a weighted average of some or all of the IWA emissions metrics or selecting one to represent the stove's total emissions profile.

Next Steps: Outlook for Further Phase I and Phase II Activities

In the short term, the priority focus is on establishing indicators and methods for measuring adoption and usage. These methods will include piloting of tools to track dissemination and sales and surveys for organizations to report on their results with dissemination, adoption, and usage.

In Phase II, the Alliance will continue to evaluate the evidence supporting the framework for measuring progress towards the target of 100M efficient and clean cookstoves. Expert opinion will be sought on whether growth in the sector's technical, financing, and distribution capacity makes the Tier 3 efficiency standards sufficiently accessible to key populations and geographies. A positive determination would likely lead the Alliance to tighten the requirements for stoves that are counted as 'efficient' towards the 2020 target.

A similar evaluation will be conducted before Phase II to reassess the strength of the health evidence for additional child and adult health outcomes. It is possible that evidence will emerge suggesting that some health benefits may be achieved with higher indoor emissions. This could lead to an updating of the definitions of 'clean' and a re-evaluation of the tiers that would be counted towards this component of the 100M target.

In Phase II, and within the context of the IWA, efforts will be made to refine and enhance the indicators of stove safety by building a larger set of safety data. Similarly, stove durability will also be a focus, with metrics and laboratory protocols being developed to allow this dimension to be added to stove standards in the future.