GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Building on the Lima Consensus to Move Forward on Developing Standards for Cookstoves

Morgan DeFoort – Colorado State University

Outline

- Where we started: the Lima Consensus
- Big Picture
- What we've done:
  - Performance Indicators (fuel use, emissions, etc.)
  - Qualitative Tiers of Performance (Rosetta Stone)
  - Quantitative values for the 1st protocol

The Lima Consensus (2011 PCIA Conference)

- Crafted in the spirit of *"Let's see what we agree on"*
- Resolved
  - temporary rating system using **tiers** which reflect desired evolution
  - to work on a more formal consensus standard
  - to use the WBT 4.0 (emissions), Iowa State or Bolivia (safety) as interim protocols
  - minimum equipment for CO, PM
  - to start a more formal data driven process within 18 months
- Contingent upon
  - Finding funds to improve test centers around the world
  - Ongoing support of test centers
  - Additional R&D to harmonize other standards/protocols

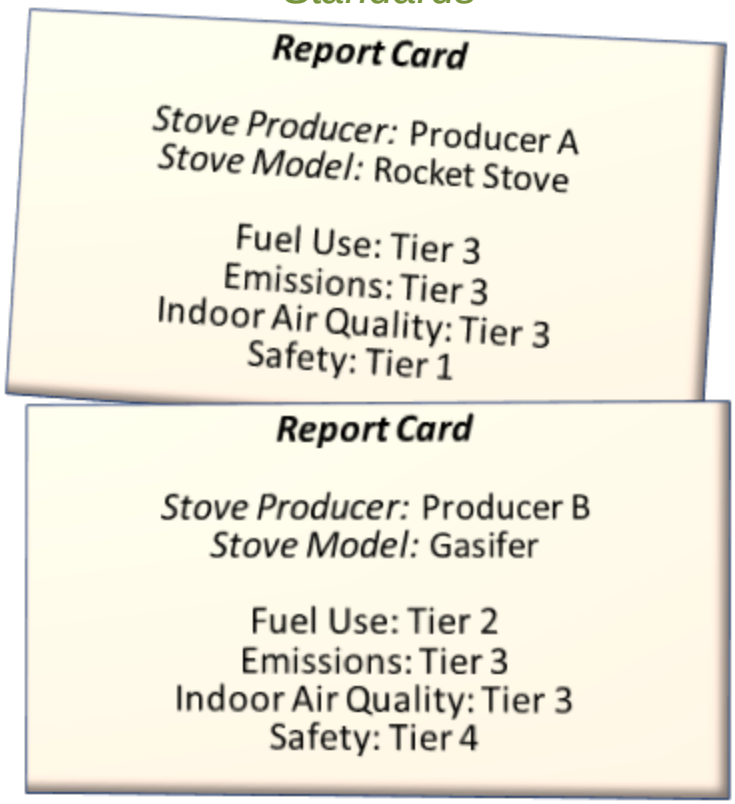
Lima Consensus Signatories

- Tami Bond, U. of Illinois, Urbana-Champaign
- Peter DeCarlo, US EPA
- Morgan DeFoort, Colorado State University
- Jim Jetter, US EPA
- Michael Johnson, Berkeley Air
- Klas Heising, GIZ
- Dean Still, Aprovecho Research Center
- Christa Roth, FoodandFuel Consultants
- Willem Getkate, CREEC (Uganda)
- Timothy Longwell, Zamorano University (Honduras)
- Nathan Lorenz, Envirofit International
- Mouhsine Serrar, Prakti Design Lab (India)
- Carmen Kuroiwa Horiuchi, Laboratorio Peru
- Iwan Baskoro, GERES (Cambodia)
- Chen Xiaofu, CAREI (China)

Advantages of Tiers and Performance Indicators

- Stepped Tiers
  - Differentiate performance
  - Demonstrates improvement possible and desirable
- Different Performance Indicators
  - Reflect the strengths and weaknesses of individual stoves
  - Allow governments and programs to evaluate priorities

Example Performance Reports Based on Tiered Standards



Lima Consensus Continued….

What motivated your organization to sign onto the Lima Consensus?

- Iwan Baskoro, GERES (Cambodia)
- Dr. Guangqing Liu, Bejing Unviversity of Chemical Technology, China Alliance for Clean Cookstoves – China Association of Rural Energy Industry (CAREI) - (China)

Progress from Lima to today…

- Group of stakeholders from the Lima Consensus have met regularly for the last ~ 6 months
- Data from several labs has been aggregated
- A process to relate multiple protocols has been drafted
- The ISO IWA process was initiated
- The group has received input from around the world
- A draft IWA has been developed

Big Picture

What we've done:

1. Choose Performance Indicators (fuel use, emissions, etc.)
2. Define Qualitative Tiers of Performance, allowing different protocols to be compared to each other (Rosetta Stone)
3. For the 1st protocol, define quantitative values which relate to tiers.

What we want to do at this IWA:

- Achieve consensus on work thus far

In the next few months:

- Propose changes to protocols and additional protocols
- Define quantitative tier values for those additional protocols

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Proposed Performance Indicators…

Current Efforts

Fuel Use	Is the stove efficient?
Emissions	How much pollution is emitted by the stove?
Indoor Room Emissions	Does the stove reduce indoor pollutant concentrations with a chimney or have emissions so low that IAQ goals are achieved without a chimney?
Safety	Does the stove reduce the risk of burns, poisoning, and other injuries?

Future Efforts

Climate Impact	What affect will the stove have on the local and global environment?
Durability/Life	How long is the stove going to last with normal use? How does performance change with time?
Field Testing	How does the stove perform in the field? [This is especially important for built-in-place stoves .]

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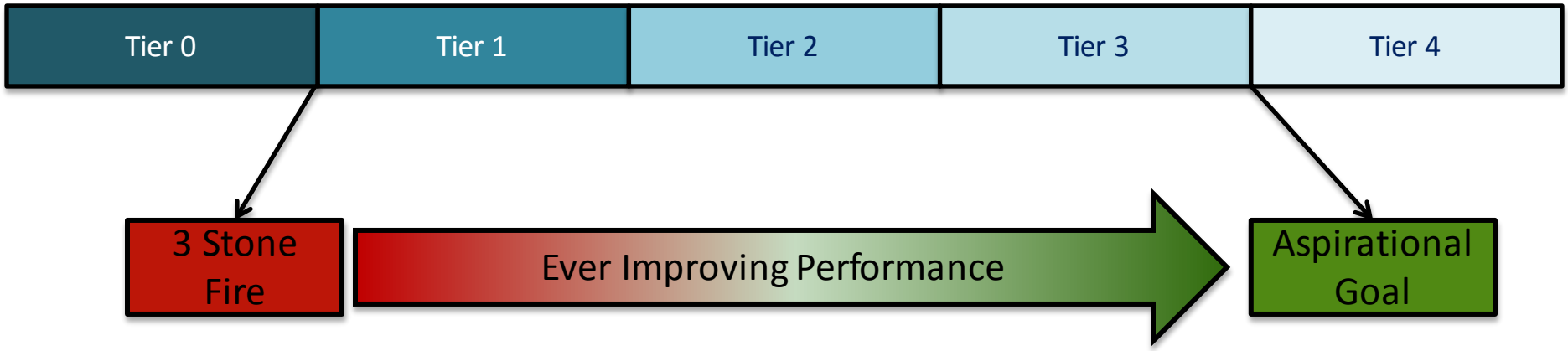
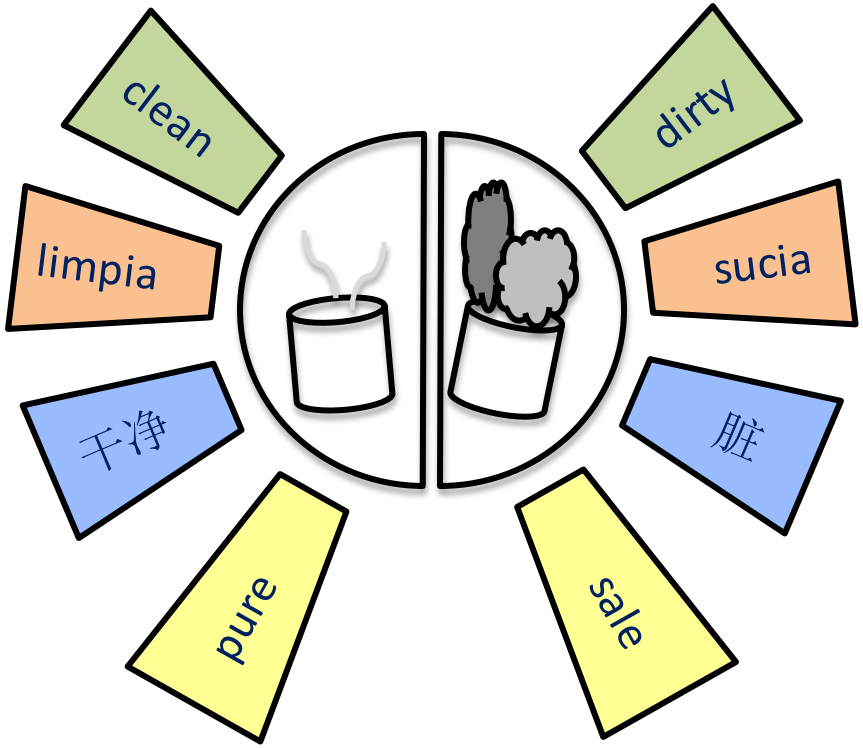
Proposed Tier Levels

- Tiers are being determined by using “book ends”
  - Low end is set by the performance of a traditional three stone fire
  - Upper end is set as an aspirational goal
  - # of tiers is a balance (measurement error, information)



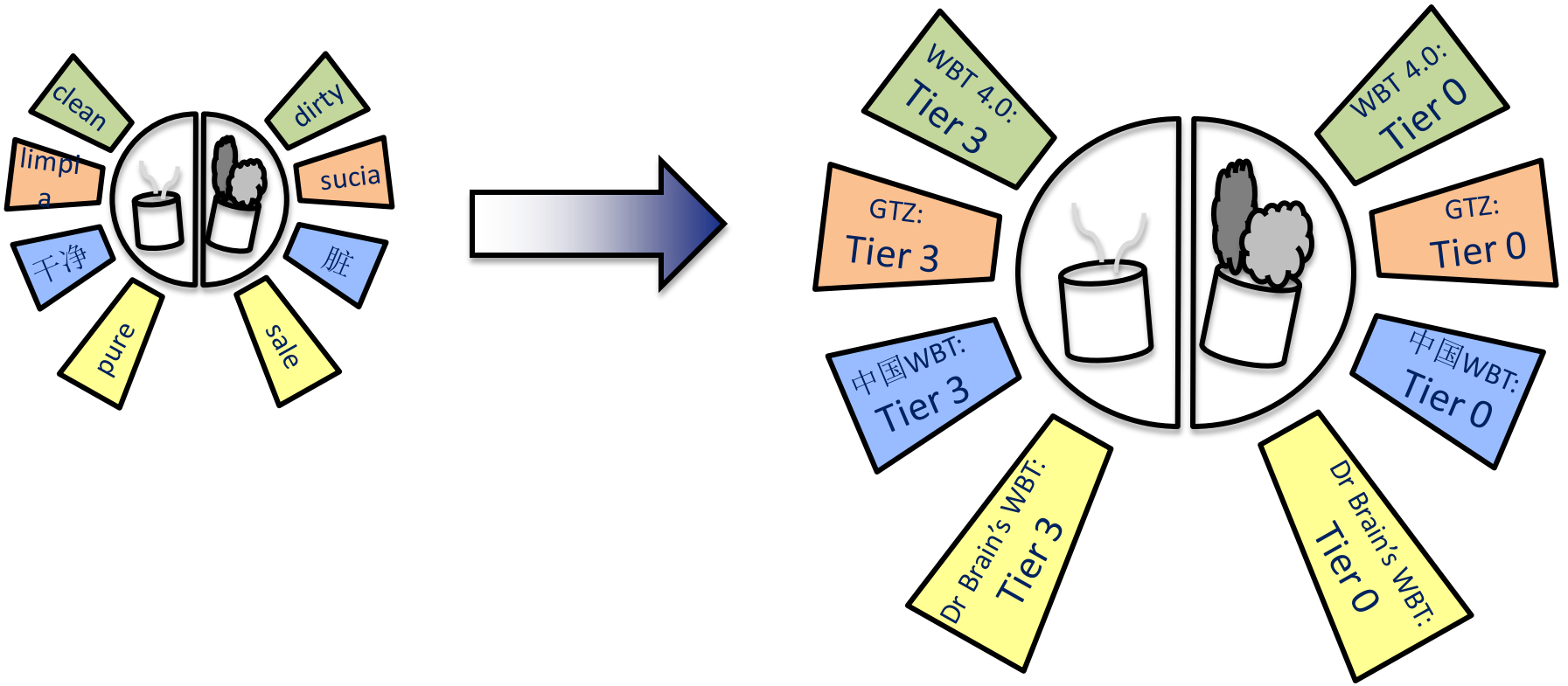
What is the “Rosetta Stone”?

We use the “Rosetta Stone” metaphor
to describe a system in which
multiple “languages” (protocol results)
can be translated to a common basis to foster understanding.

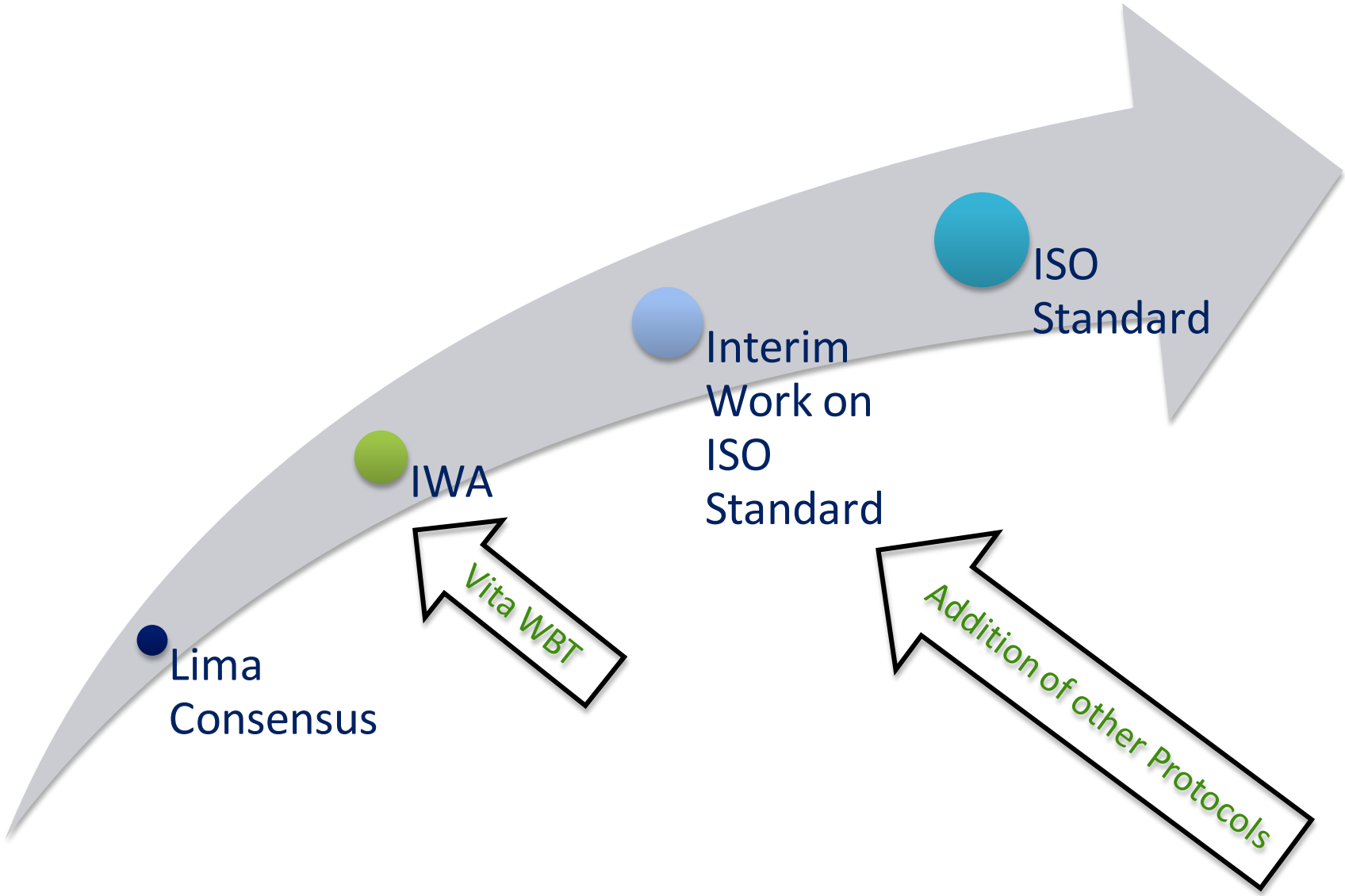


After development of the “Rosetta Stone”

Multiple “languages” or protocol results can be translated to a common basis

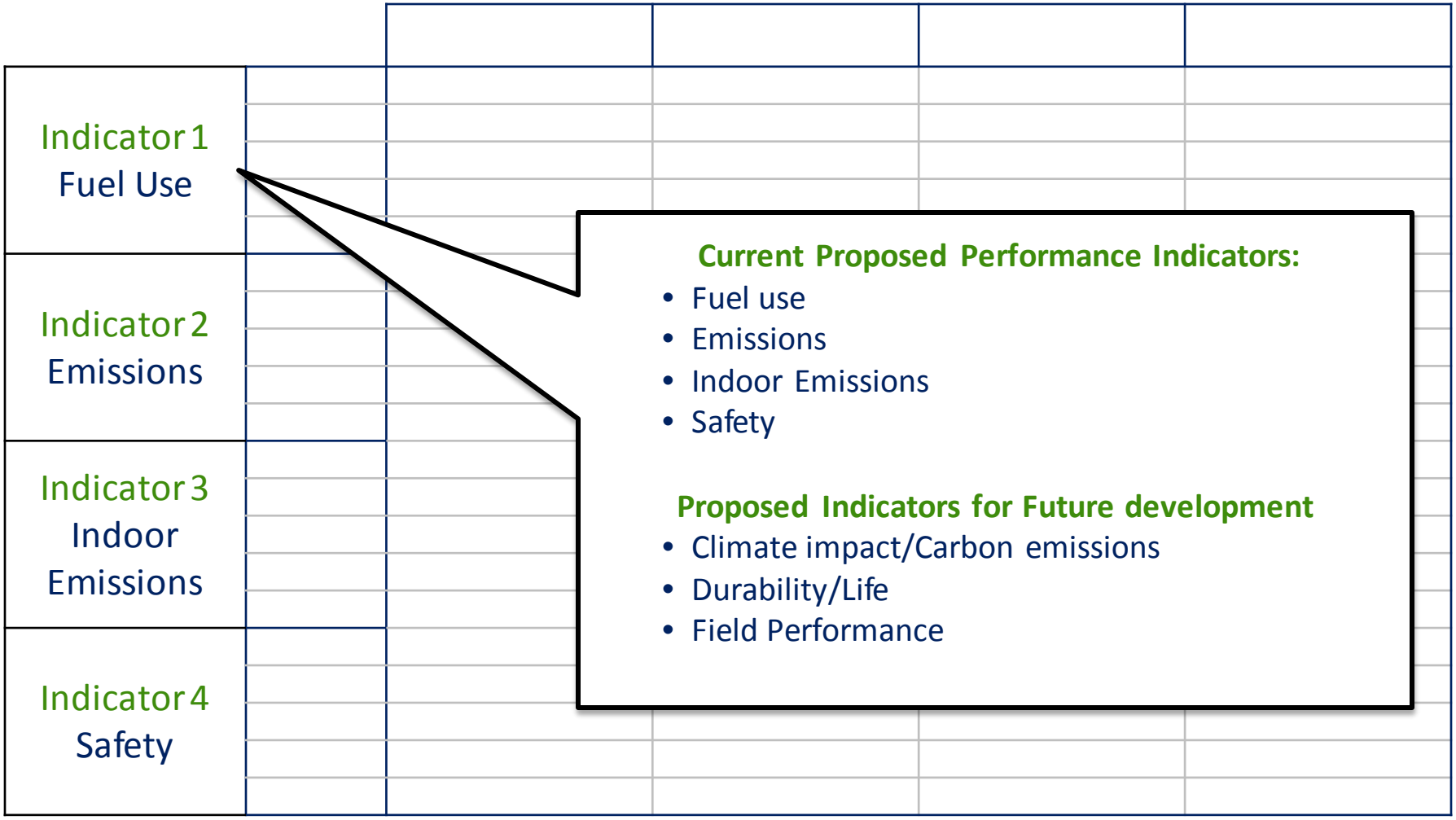


Additional Protocols



An illustration of the process:

Building the Rosetta Stone,
Step 1: Performance Indicators



Building the Rosetta Stone,
Step 2: Laboratory Protocols

	Protocol 1	Protocol 2	Protocol 3	Protocol …
Fuel Use				
Emissions				
Indoor Emissions				
Safety				

Starting Protocols:

- VITA WBT
- Indian Standard WBT
- China Standard WBT

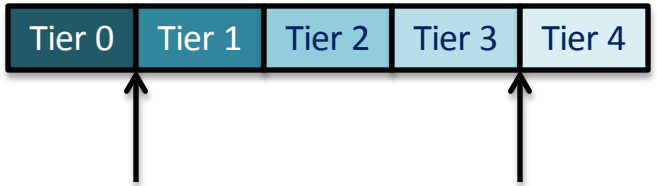
Proposed for Development

- Plancha/Griddle Stoves
- Batch Fed
- Charcoal
- Heating Stove

Building the Rosetta Stone, Step 3: Tiers

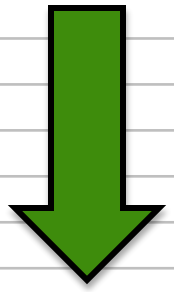
		VITA WBT	…		
Fuel Use	Tier 0				
	Tier 1				
	Tier 2				
	Tier 3				
	Tier 4				
Emissions					
Indoor Emissions					
Safety					

Tiers of Performance:



Step 4: Continue the process for all categories

		VITA WBT	…		
Fuel Use	Tier 0	15%, 20 g/min			
	Tier 1	25%, 15 g/min			
	Tier 2	35%, 13 g/min			
	Tier 3	45%, 12 g/min			
	Tier 4	55%, 10 g/min			
Emissions	Tier 0				
	Tier 1				
	Tier 2				
	Tier 3				
	Tier 4				
Indoor Emissions	Tier 0				
	Tier 1				
	Tier 2				
	Tier 3				
	Tier 4				
Safety	Tier 0				
	Tier 1				
	Tier 2				
	Tier 3				
	Tier 4				



Example "Report Cards"

Stove A

Stove Producer	ACME Stove Co.		
Stove Model	Single Pot		
Indicator	**Tier**	**Test Protocol**	**Test Lab**
Fuel Use	2	WBT 4.0	U.S. EPA
Emissions	3	WBT 4.0	U.S. EPA
Indoor Emissions	3	WBT 4.0	Berkeley Air
Safety	4	Iowa State University Safety Test	Colorado State University

Stove B

Stove Producer	ACME Stove Co.		
Stove Model	Two Pot		
Indicator	**Tier**	**Test Protocol**	**Test Lab**
Fuel Use	4	China WBT	Beijing U of Chem. Technology
Emissions	2	China WBT	Beijing U of Chem. Technology
Indoor Emissions	2	China WBT	Beijing U of Chem. Technology
Safety	2	Iowa State University Safety Test	Aprovecho

Step 5: Add other protocols…

		VITA WBT	Indian WBT	…	
Fuel Use	Tier 0	15%, 20 g/min	15%		
	Tier 1	25%, 15 g/min	25%		
	Tier 2	35%, 13 g/min	35%		
	Tier 3	45%, 12 g/min	45%		
	Tier 4	55%, 10 g/min	55%		
Emissions	Tier 0	X			
	Tier 1	X			
	Tier 2	X			
	Tier 3	X			
	Tier 4	X			
Indoor Emissions	Tier 0	X			
	Tier 1	X			
	Tier 2	X			
	Tier 3	X			
	Tier 4	X			
Safety	Tier 0	X			
	Tier 1	X			
	Tier 2	X			
	Tier 3	X			
	Tier 4	X			

End Goal: The Rosetta Stone – All Stove Test Results on Same Page

		VITA WBT	Indian WBT	China WBT	…
Fuel Use	Tier 0	15%, 20 g/min	15%	Z	
	Tier 1	25%, 15 g/min	25%	Z	
	Tier 2	35%, 13 g/min	35%	Z	
	Tier 3	45%, 12 g/min	45%	Z	
	Tier 4	55%, 10 g/min	55%	Z	
Emissions	Tier 0	X	Y	Z	
	Tier 1	X	Y	Z	
	Tier 2	X	Y	Z	
	Tier 3	X	Y		
	Tier 4	X	Y		
Indoor Emissions	Tier 0	X	Y		
	Tier 1	X	Y		
	Tier 2	X	Y	Z	
	Tier 3	X	Y	Z	
	Tier 4	X	Y	Z	
Safety	Tier 0	X	Y	Z	
	Tier 1	X	Y	Z	
	Tier 2	X	Y	Z	
	Tier 3	X	Y	Z	
	Tier 4	X	Y	Z	

End Goal: Equivalent result regardless of protocol used (X ≈ Y ≈ Z)

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