Can cooking with biomass be clean?

Measuring the quality of access
or the limitations of the SDG 7 indicator with regards to biomass

Verena Brinkmann GIZ EnDev programme

energising development

Interpretations of CLEAN cooking

- What do we mean with clean?

  Impacting on **climate** as well as **health**

- How can we measure, if cooking with biomass is clean?
  - for climate: adoption and usage and **fuel saving** and
  - for health: adoption, usage, **emission reduction and exposure**

- What shall be clean?
  - **stove/fuel system**: tested in the lab/field
  - **access/cooking energy system**: several parameter measured in the field

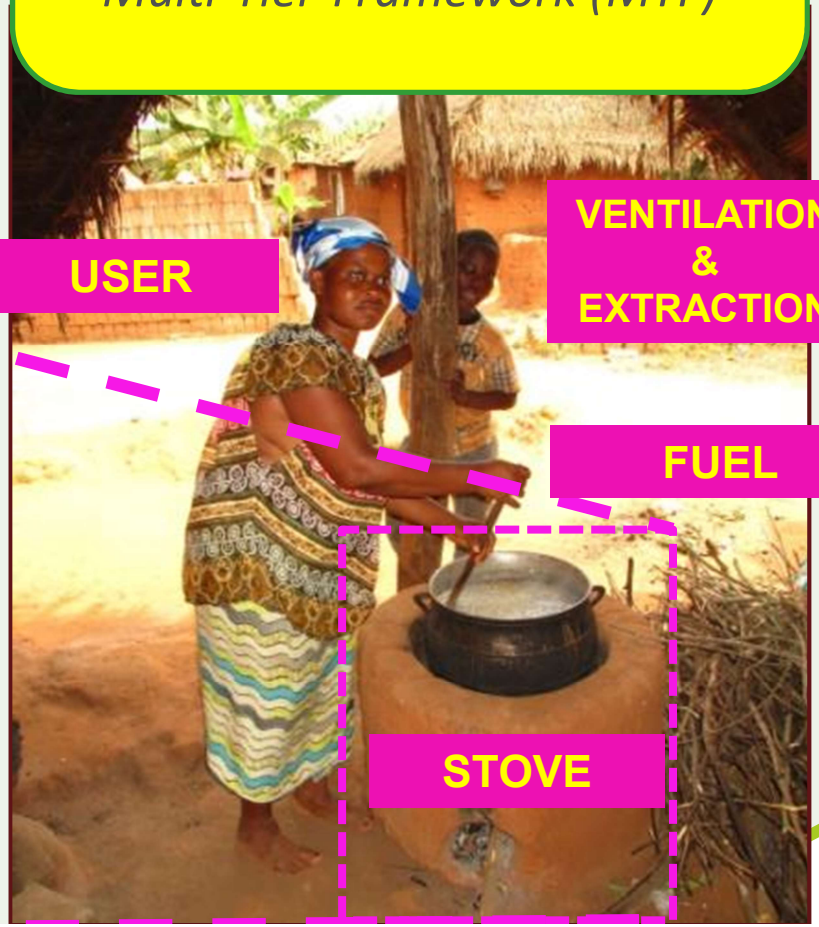
Cooking = service

Quality of cooking service depends on:

- **Stove**
- **Fuel**
- **User**
- **Kitchen design/ventilation**

Quality of the service considered in Cooking Energy System (CES) as well as Multi-Tier-Framework (MTF)

Most quality assessments' focus: Quality of the Stove



SDG Indicator 7.1.2 derivation

- Goal SDG 7
  Ensure access to affordable, reliable, sustainable and modern energy for all
- Target 7.1
  By 2030, ensure universal access to affordable, reliable and modern energy services
  - Indicator 7.1.1:
    Proportion of population with access to affordable, reliable and modern electricity
  - Indicator 7.1.2:
    Proportion of population with primary reliance on clean fuels and technology

➢ What are we measuring with Indicator 7.1.2?

SDG 7.1.2 indicator

- Focus on health
- Fokus on stove/fuel (primary)
- Clean being defined by WHO IAQG:
  Recommends Scaling “Clean” fuels
  & Provides emission rate targets for PM2.5, and CO that determine whether fuel and technology combinations are “clean” for health
- Based on
  Lab testing

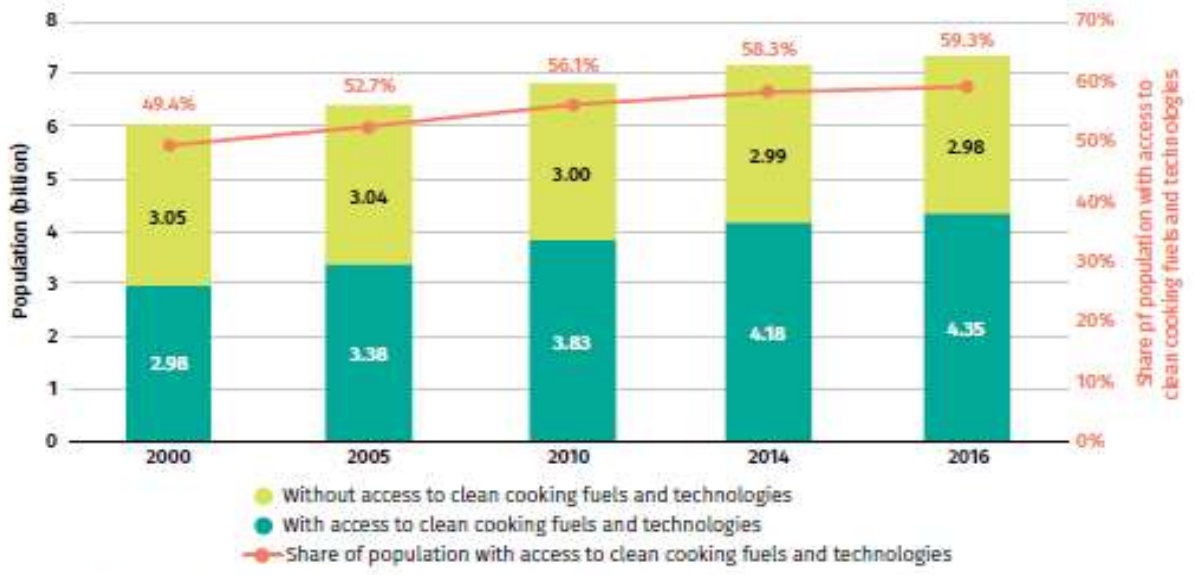
ERT	Emission rate (mg/min) PM 2.5	Emission rate (g/min) CO
Unvented		
ERT	0.23	0.16
Vented		
ERT	0.80	0.59

VPT tier 5

SDG 7.1.2 tracking – 2018 report

The global rate of access to clean cooking has improved gradually reaching 59 % in 2016

FIGURE 3.2 • Progress in clean cooking access from 2000 to 2016 (billions of people and share of population with access to clean cooking)



Source: World Health Organization. Population estimates based on the use UN population data

- Narrow focus and high ambition will make achieving the global cooking target difficult!
- Currently mainly achieved with LPG
- Ignoring the multiple dimensions of the SDG target: affordable, reliable and modern energy services

Multi Tier Framework (MTF)

- MTF contributes details to SE4All GTF & to SDG reporting
- MTF measures quality of ACCEES [1]
- Taking into account several aspects of energy **services** (attributes) and **transitions** (tiers)
- from the traditional binary definition of access to a **multi-dimensional** one
- Describes the **ability to obtain energy** that is: *adequate, available when needed, reliable, of good quality, affordable, legal, convenient, healthy, and safe for all required energy applications* across HH, SMEs, and SI.
- MTF improves **understanding of access situation & identify bottlenecks**

Attributes	
Cooking Exposure	Emission: Fuel
	Emission: Stove Design
	Ventilation: Volume of Kitchen[1]
	Ventilation: Structure
	Ventilation Level
Cookstove Efficiency	ISO's Voluntary Performance Targets (TBC)
Convenience	Fuel acquisition (through collection or purchase) and preparation time (hours per week)
	Stove preparation time (minutes per meal)
Safety of Primary Cookstove	
Affordability	
Availability	

MTF levels for CLEAN: Zooming into Cooking Exposure

Attribute		Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Cooking Exposure		Determined by combination of fuel and stove design, ventilation of cooking space & contact time					
	Emission: Fuel	Firewood, dung, twigs, leaves, rice husks, processed biomass pellets or briquette, charcoal, kerosene				biogas, ethanol, high quality processed biomass pellets or briquettes	Electricity, sola
	Emission: Stove Design	3-stone fire, tripod, flat mud ring, traditional charcoal stove	Conventional or old generation ICS	ICS+ chimney, rocket stove or ICS + insulation	Rocket stove with high insulation or with chimney, advanced insulation charcoal stoves	Rocket stove with chimney (well sealed), Rocket Stove gasifier, Advanced secondary air charcoal stove, forced air	
	Ventilation: Volume of Kitchen1	Less than 5 m3	More than 5 m3	More than 10 m3	More than 20 m3	More than 40 m3	Open air
	Ventilation: Structure	No opening except for the door	1 window	More than 1 window	Significant openings (large openings below or above height of the door)	Veranda or a hood is used to extract the smoke	Open air
	Ventilation Level	Bad			Average	Good	

1. Estimating stove/fuel Emission factor
2. Estimating ventilation levels
3. Adjusting stove/fuel tiers based on ventilation levels
4. Contact time is consídered 24h (cons as in ISO approach)
5. Adjusting cooking exposure tiers in the case of stove/fuel stacking

EnDev – Cooking Energy System*

>15 million household members with modern cooking energy

Overall access quality level

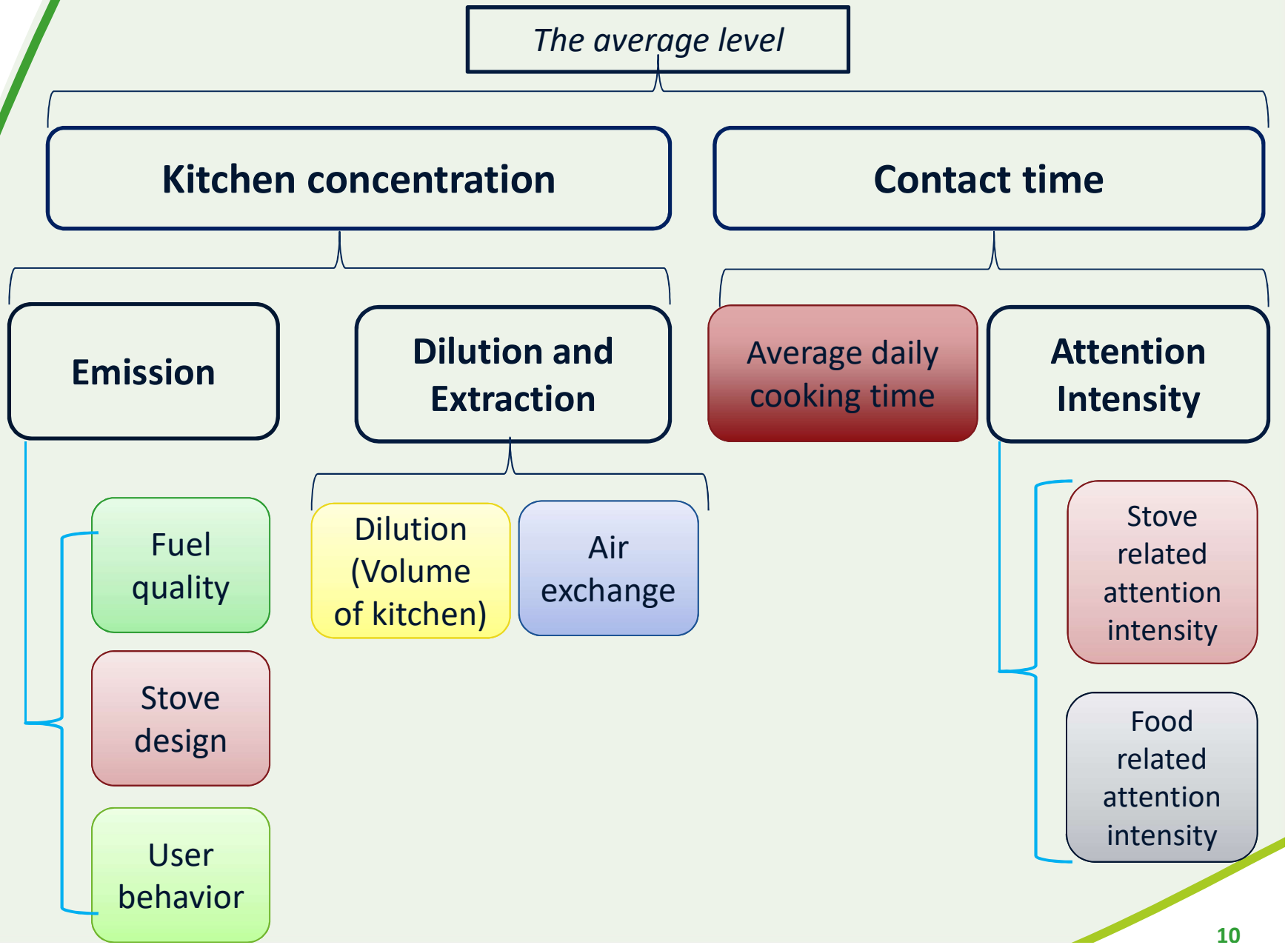
Minimum level

- *Accessibility* — **Minimum level**
  - *Avail-ability*
  - *Afford-ability*
- *Health Protection* — **Minimum level**
  - *Exposure*
  - *Safety*
  - **Average level**
    - *Kitchen concentration*
      - *Emission (fuel, stove, user)*
      - *Dilution and extraction*
    - *Contact time*
      - *Time in kitchen*
      - *Ambient Air*
- *Convenience* — **Joined evaluation**
  - *Reliability*
  - *Hassle factor*
  - *Quality of heat*

** Further evidence creation and validation ongoing in 2019*

– roll-out planned for 2019 / 2020

CES level for CLEAN: EXPOSURE to emissions from own cooking



3 main take away points

How do we want to measure, if cooking with biomass is clean?

Acknowledging that different frameworks report for different purposes, have different custodians, have different scope, and apply different methodologies.

(re-)define, what we mean by CLEAN

take into account the entire Cooking Energy System
& what really changes in the homes and in peoples‘ lives

discuss if the SDG 7 indicator for cooking
is measuring the right thing

Thank you for your attention.

Funded by:

Coordinated by:

Different Frameworks

	SDG 7.1.2	MTF cooking	CES
Reporting level and scope	Reporting to UN, global SDG reporting	Reporting to SE4All Global Tracking Framework (GTF) - 15 high access deficit countries	Reporting to EnDev programme GB ~ 20 EnDev cooking energy projects
Purpose	Global state of access	Multi-dimensional access situation in selected countries	Access quality of EnDev intervention
Custodian	WHO	WB ESMAP	GIZ EnDev
Type of survey	WHO Global Health data and, national HH survey data and modelled country data	MTF global survey – HH interviews of repr sample (~ 3-5000 HH)	Two options: HH Survey and desk study
Scope of survey	all fuels and technologies used for cooking, heating, lighting	all fuels and technologies und cooking environments	all fuels and technologies und cooking environments