

# A study of “Pay as you cook” pellet stoves

PATHWAYS TO CLEAN COOKING II  
Wexford, Ireland May 30-31, 2019

Prepared by Rob Bailis (SEI – US Center)

Working with:

Fiona Lambe & Ylva Ran (SEI-Stockholm)

Hannah Wanjiru, Elvine Kwamboka & Faith Saalu  
(SEI-Kenya)

In collaboration with

Burn Manufacturing LLC

Mimi Moto





# Outline

---

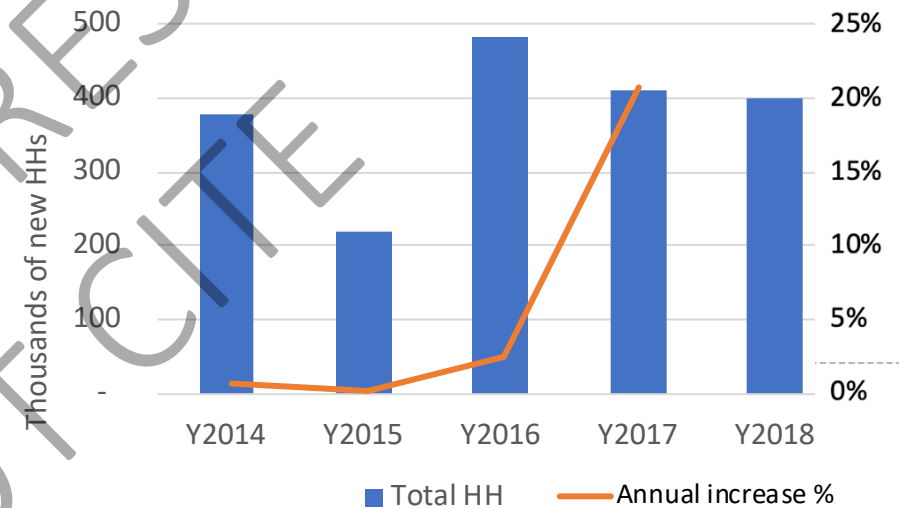
- Status of “clean cooking” in Kenya
- Motivations & Study design
- Lessons

PRELIMINARY RESULTS  
DO NOT CITE

# Status of “clean cooking” in Kenya

- ~14k biogas systems (2017)
- 600k Burn stoves; 70k Ecozoom
- LPG access is increasing rapidly
  - Used by 30% of all HHs
    - > 50% urban ~18% rural
- How did this happen?
  - Introduction of the 6 kg “Meko”
  - Cylinder standardization
  - “last-mile” distribution

No. of new LPG connections and annual growth in LPG consumption



# But polluting fuels are still the norm

Unpublished results from a nationally representative survey of 3,500 Kenyan HHs funded by SNV

Only clean	8%
Clean + polluting stack	19%
Only polluting fuels	73%

Primary cooking option	Secondary cooking option							
	Sample %	No 2 <sup>nd</sup> stove	LPG	Electric	Kerosene	Charcoal	Wood	Other
LPG		7%	1%	0.3%	2%	7%	2%	0.1%
Electric		0.1%	0.1%	0%	0%	0%	0%	0%
Kerosene		3%	0.2%	0%	0%	2%	0.2%	0%
Charcoal		5%	2%	0%	1%	0.3%	2%	0%
Wood		35%	5%	0%	1%	23%	1%	0%
Other		0%	0%	0%	0%	0%	0.1%	0%



# Motivation and study design

- Long history of interventions:
  - Kenya Ceramic Jiko, Kuni Mbili...
- Extensive electrification
  - 80% urb; 30% rur - rarely use for cooking
- Good business environment:
  - Supportive policies; large middle class; extensive mobile banking; decent industrial capacity
- Lack of options for a “clean stack”
  - Pellets can be very clean (Andy!)
  - Early pilot projects not encouraging



# Will people buy and use advanced pellet stoves?

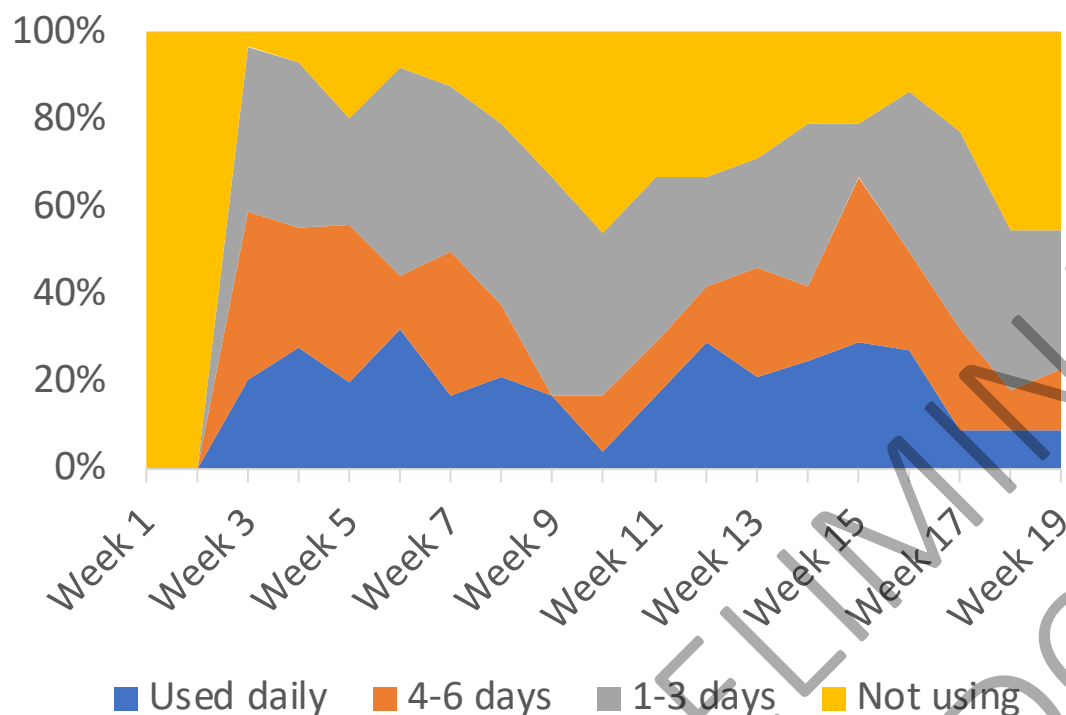
- Pilot project between Burn and Mimi Moto
- Stoves sold at a high subsidy
  - Include 2kg of pellets and 2kg of macadamia shells
- Two study arms
  - Site A: 120 families buy stoves with “no strings”
  - Site B: 30 families buy **“Pay-As-You-Cook” (PAYC) stoves**,
    - “activated” with RFID card included in each pellet package
    - Users must buy fuel from known vendors
    - Ensures stove provider profits from pellet sales





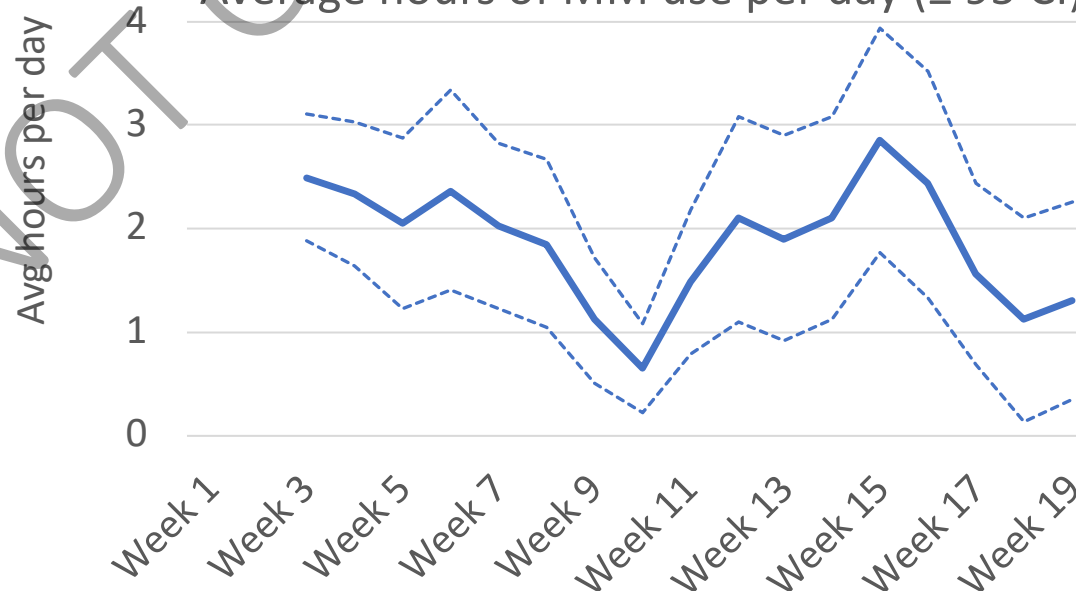
# Key results – PAYC users

Weekly MM usage



Average daily use varied between 1 and 2.5 hours

Average hours of MM use per day ( $\pm$  95 CI)



During the first 3 weeks over half of the HHs used the MM over half the time.

# 3 take-away lessons

---

- About ½ liked and used the MM regularly
  - Nobody used it exclusively, but ~25% reduced baseline stove use
- People favored mac shells over pellets
  - A combo of price and fuel quality (ease of lighting, smokiness, etc)
- Fuel supply and distribution is critical
  - Avg. distance to cooking fuels for urban Kenyans nationwide is 1-2 km
  - Novel stove/fuel combo will fail without a robust fuel supply chain





# Thank you!

Acknowledgements:

Funded by CCAC and SEI's "rapid response" co-funding  
Participating families in Githunguri and Gachie



# Extra slides

PRELIMINARY RESULTS  
DO NOT CITE



# Study design

- PAYC participants are studied in detail
  - Stove-use Monitors (SUMs) are installed on all cooking devices for the duration of the project
  - Customer Journey Mapping
    - In-depth interviews and focus groups help us understand user experiences as they decide whether or not to adopt the stove
  - Users are compensated for their time.



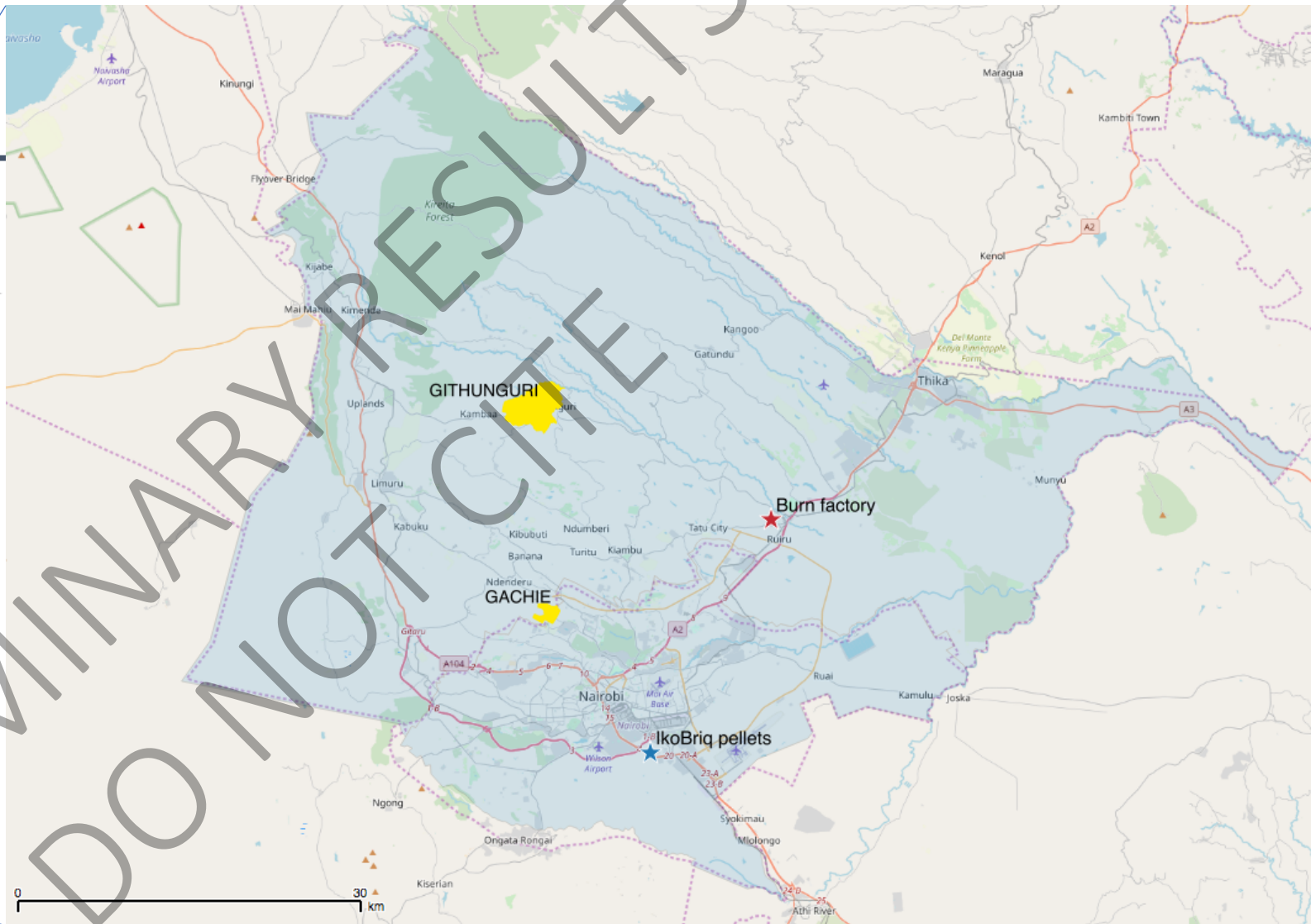
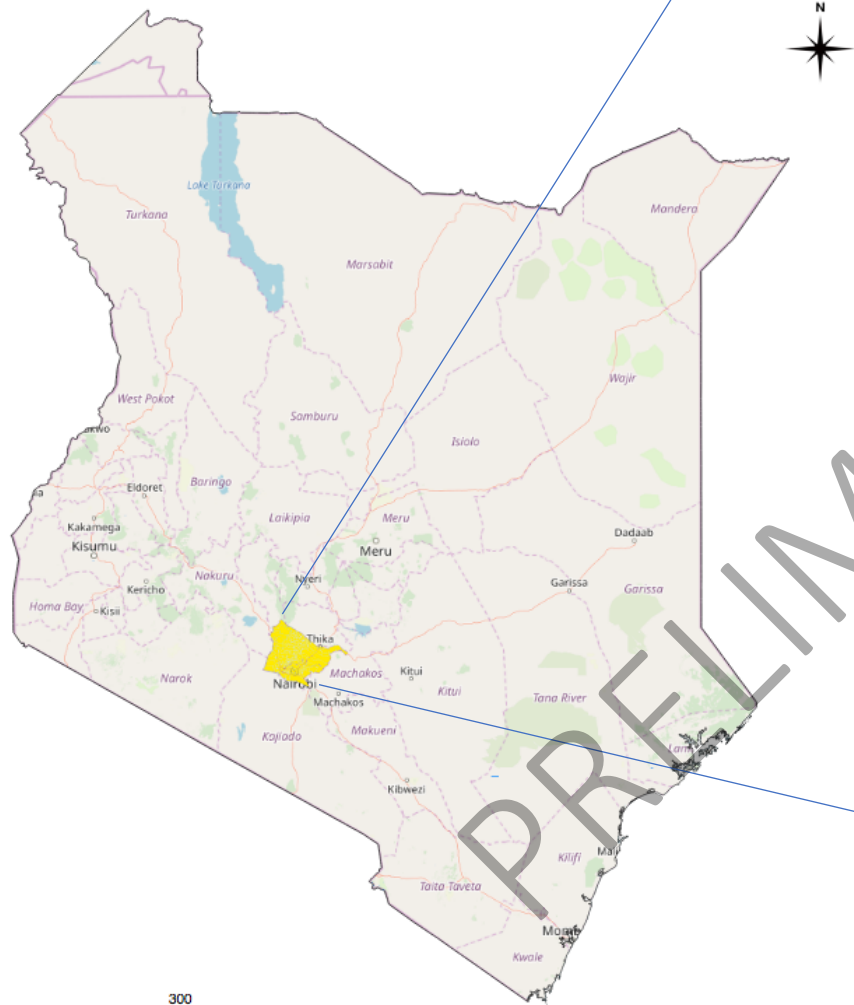
# Timeline

---

- Mid-November 2018
  - Families recruited
  - Stoves activated
  - SUMs installed (PAYC only)
- Early December 2018
  - Mid-line surveys
  - In-depth interviews (PAYC only)
- May 2019
  - Final surveys
  - End SUMs deployment
  - Follow-up interviews (PAYC only)

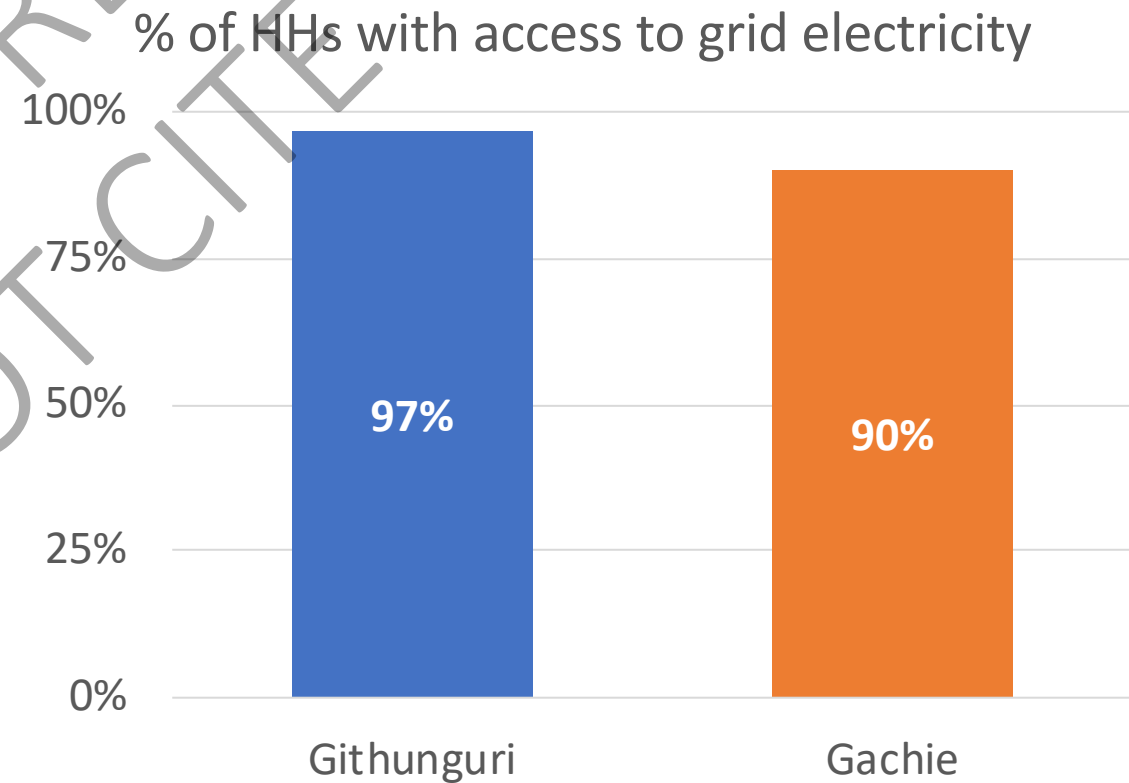


# Study sites

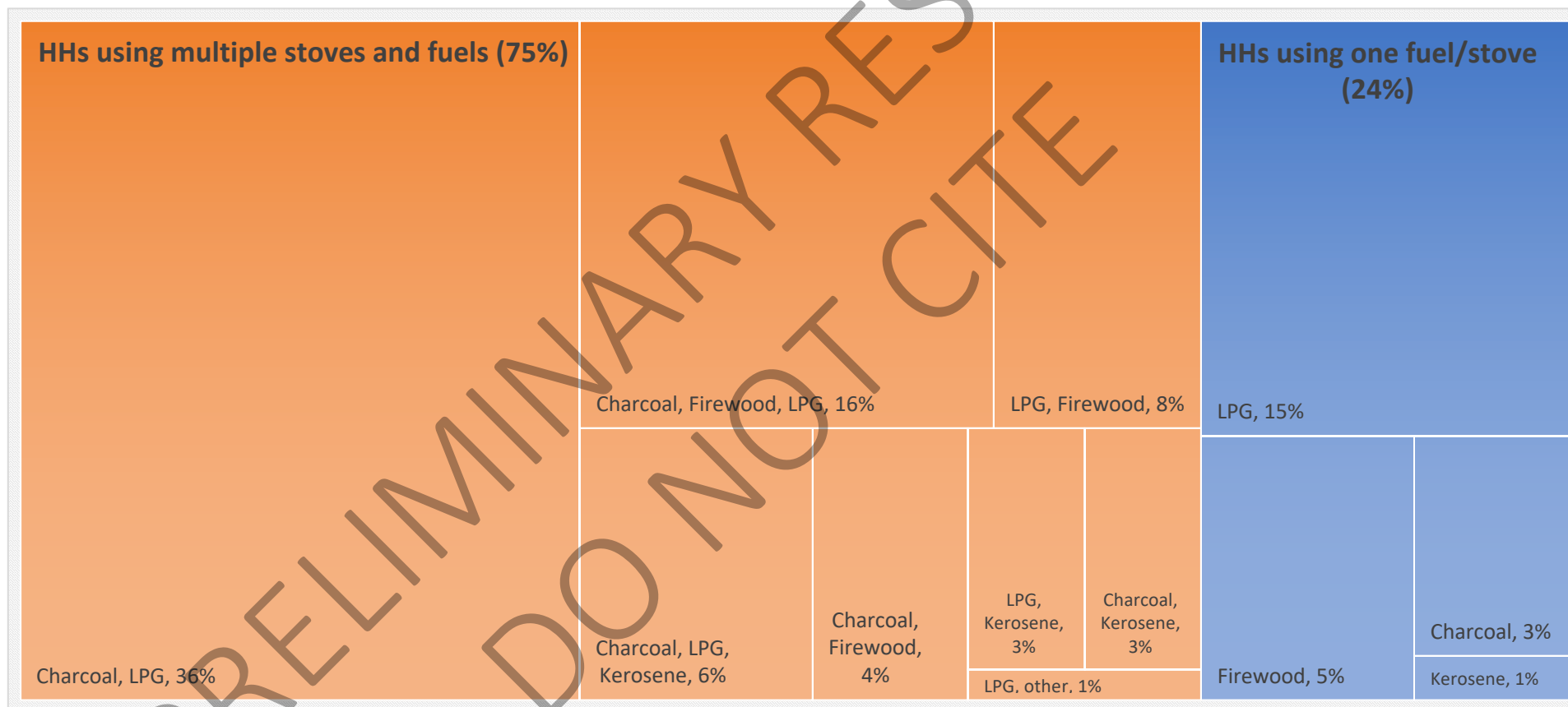


# Household characteristics

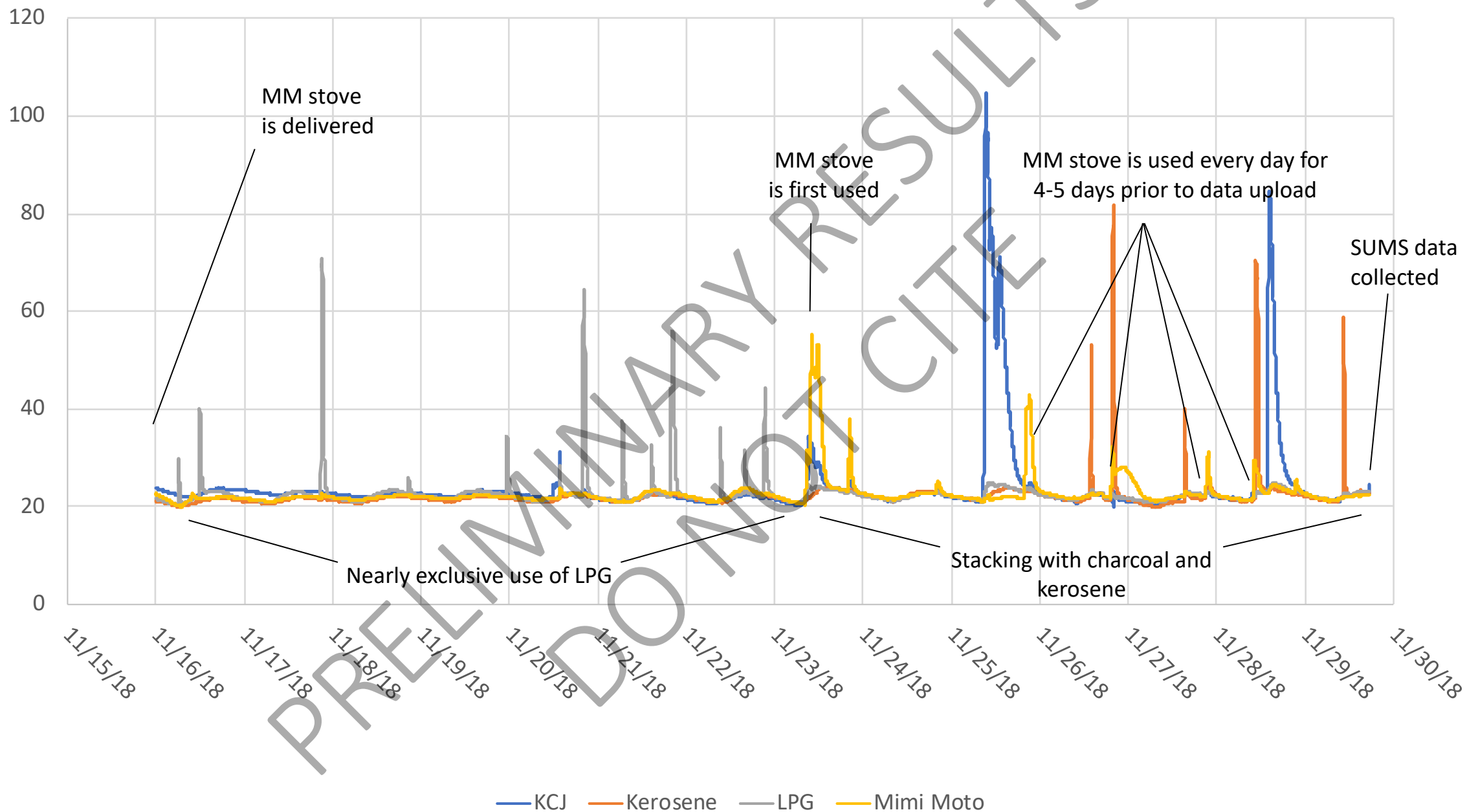
- Over 90% have grid access
- Livelihoods: mix of agriculture, wage labour, SMEs
- Range of living conditions from 1-room rentals to home ownership
- Over  $\frac{3}{4}$  “stack” more than one stove or fuel (next slide)



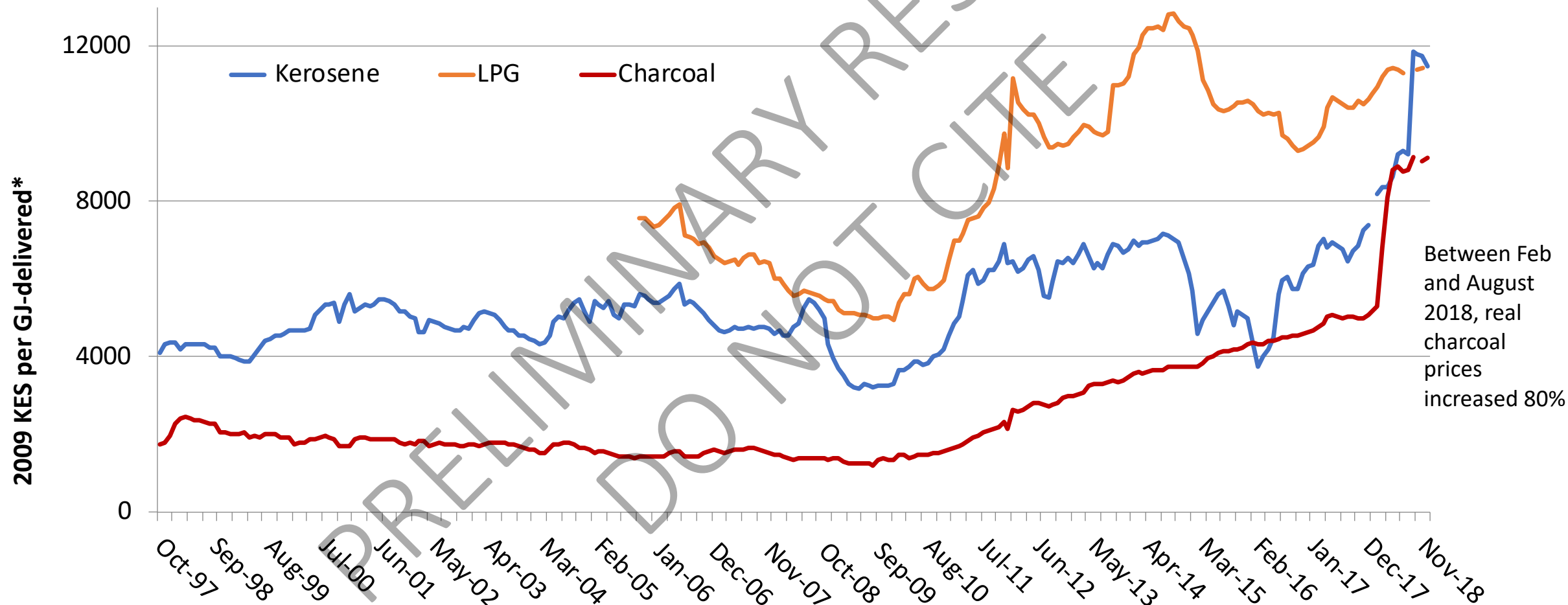
# Pre-intervention Stove/fuel “stacking”







# Prices for common urban cooking fuels



\* Prices are adjusted to constant 2009 KES based on Kenya's CPI. In 2009 1 USD was roughly 75 KES

# Pellet stove emissions compared to other cooking options

