

# MODERN ENERGY COOKING

IN CAMBODIA

Ensuring access  
to affordable,  
reliable, sustainable  
modern cooking energy  
for Cambodia

13-14 DECEMBER 2021  
THE FACTORY PHNOM PENH

IN PARTNERSHIP WITH



ATEC<sup>®</sup>  
SNV



ORGANIZED BY



ENABLERS







VISION 2030

Ensuring access to affordable, reliable,  
sustainable modern cooking energy  
for ALL in Cambodia

# Modern Cooking Ecosystems

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## 1. Discovering enablers/barriers to modern cooking adoption

- In-depth HCD research to understand context, knowledge gaps, triggers, enablers, barriers
- Prototype and test early solutions

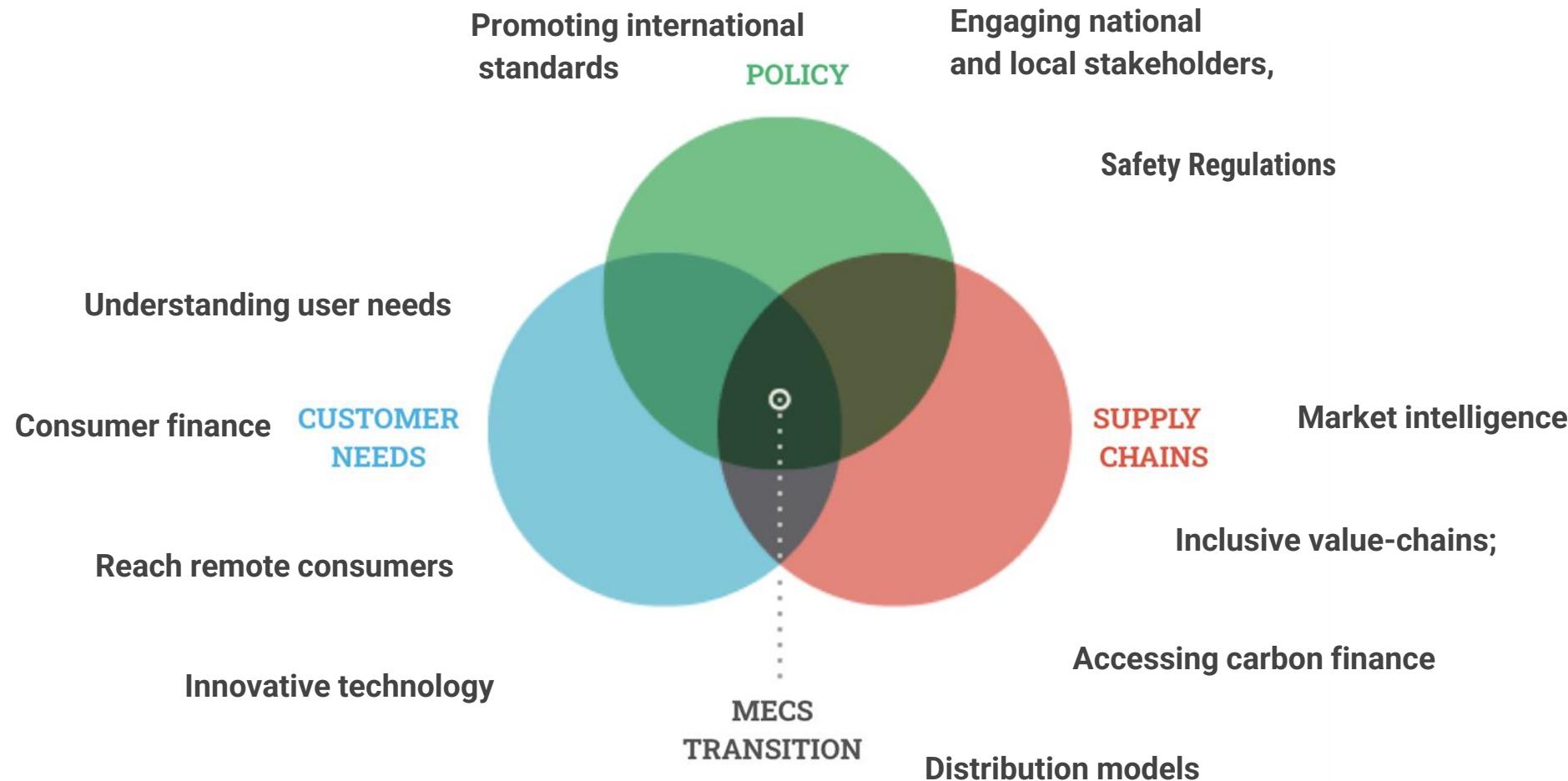
## 2. Market-based pilots for electric cooking

- Sales of PAYGO-enabled induction cookstoves
- Other e-cooking devices: pressure cookers, grills, slow-cookers
- Testing smart energy meters
- Testing Behavior change strategies

## 3. Strengthening clean cooking ecosystems in Cambodia

- Building on existing momentum
- Deepen understanding of MECS relating to future customer needs, government policy landscape, trends in cooking and supply chains, etc.

# The MECS theory of change: building blocks



# Research overview

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**Policy  
Analysis**

2020- Q1 2021

**Cooking  
Diaries  
Studies**

Q2 2021

**Discrete  
Choice  
Modelling**

Q2 2021

**PwD  
Research**

Q3 2021

**Supply Side  
Research**

Q3 2021

# Research overview

- Mixed qualitative and quantitative research methods to deepen understanding of mecs adoption in Cambodia

264  
INTERVIEWS

1200  
COOKING  
SURVEYS

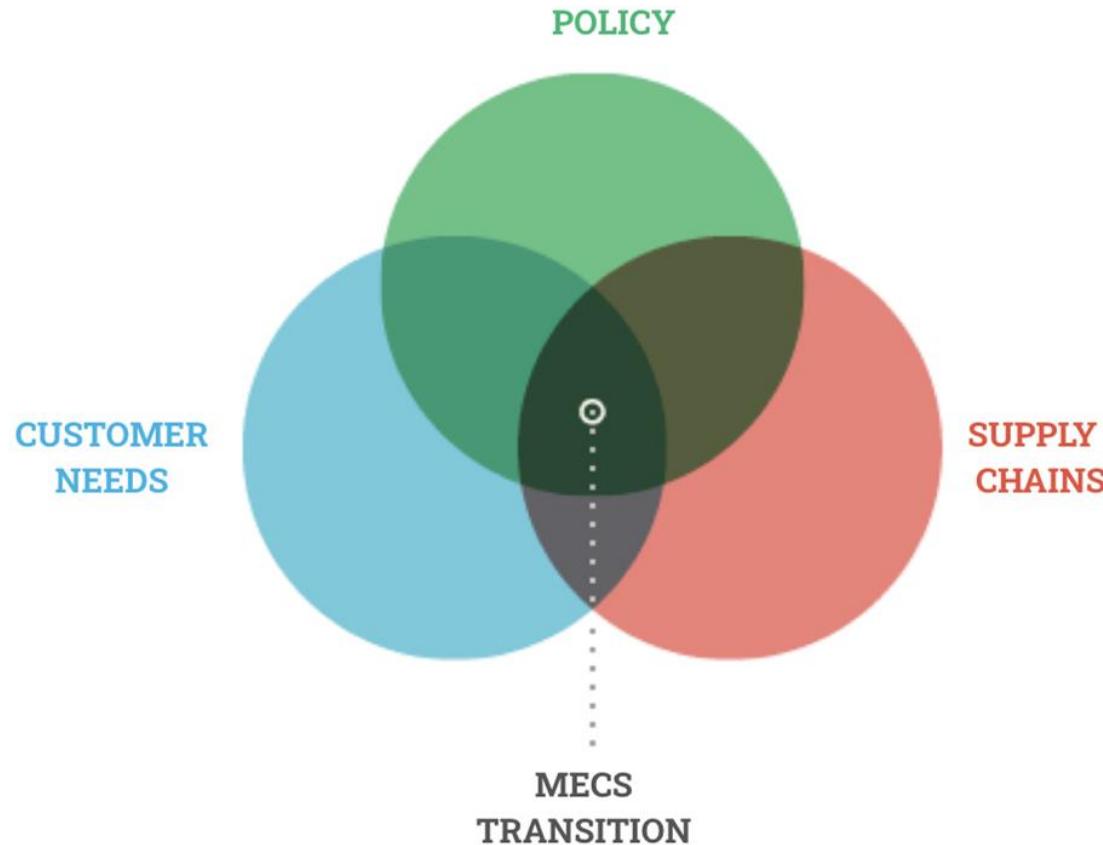
5 Research  
Studies

2020-2021

2844  
COOKING  
EVENTS

10,000+  
ENERGY USE  
DATA POINTS

# Key findings: Customer Needs



# Biomass is still the most common cooking fuel

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- Finding a reliable and clean source of cooking fuel in developing countries is a persistent obstacle for poor households. **80% of the rural population in Cambodia do not have access to clean cooking<sup>1</sup>**
- **Social, environmental and economic issues** associated with the use of unreliable and unclean fuels

**14,000 annual deaths  
600,000 tons of wood  
20.3 hours collecting wood**

# Challenges remain for accessing modern cooking solutions

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- Strong negative perception and fear of LPG
- Rising costs of LPG and Charcoal, slide backs to free wood
- Low quality and availability of electric cooking solutions
- Fragmented supply chains, unregulated service providers drive costs to customers

**Over 100 fires reported due to LPG explosions**

**Charcoal Costs increased by 12.5% in the last 5 years  
(1800R/KG)**

# Electricity as an opportunity for modern cooking in Cambodia

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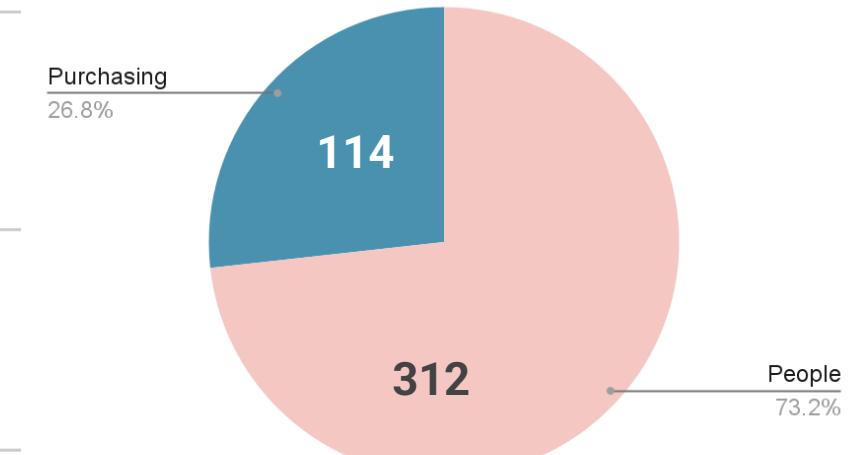
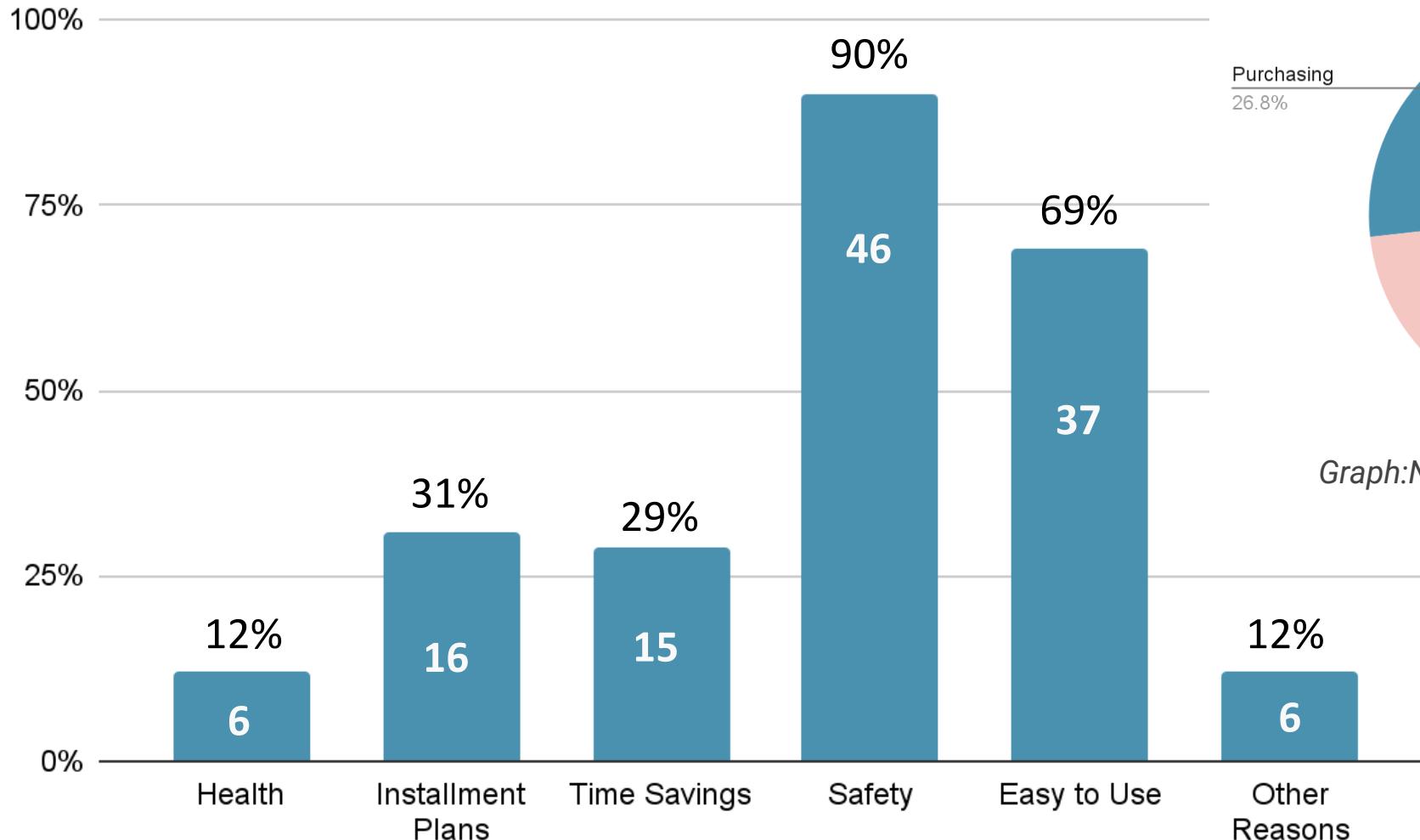
- Cooking with electricity is in a nascent stage in Cambodia but showed great promise
- Ease, convenience and aspirational cooking were key motivations for improving their cooking experience through electricity
- High national grid coverage at over 80%





***"It's very easy to go to the wing shop nearby to pay the monthly installment. I like paying in this way, especially now that we have to be more careful due to COVID"***

# Demand is triggered by making solutions accessible

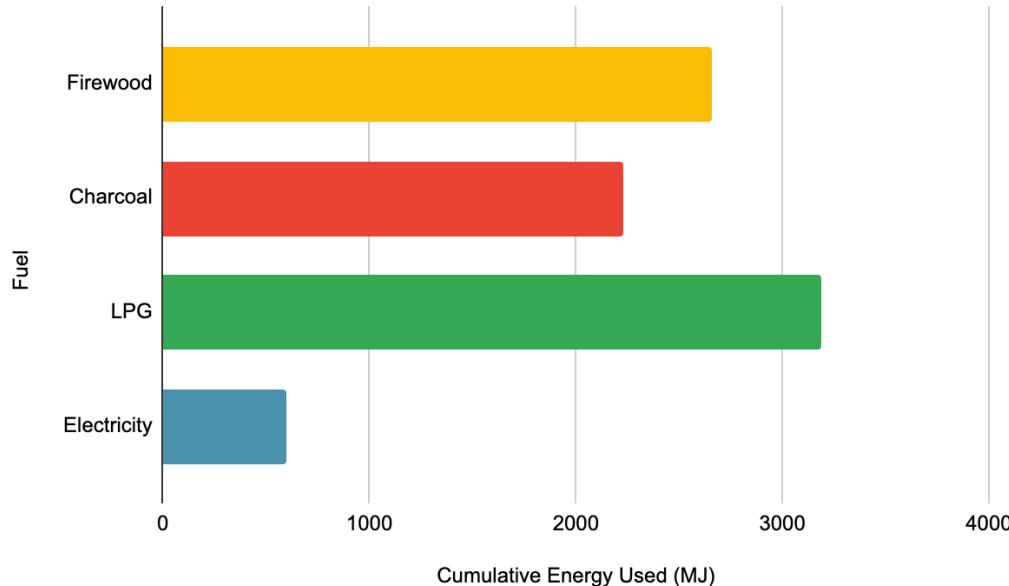


Graph: Number of paying customers

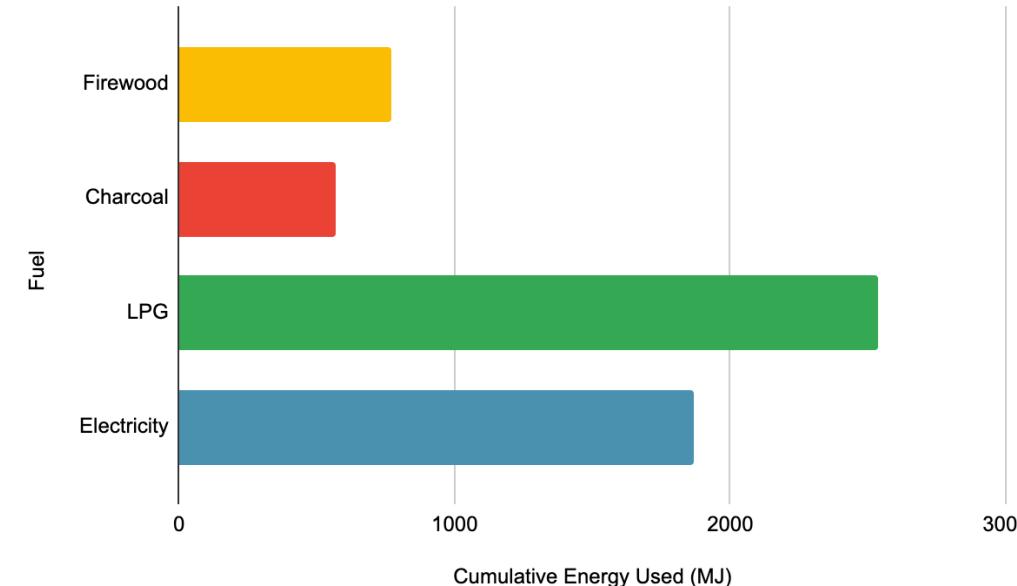
Graph: Reasons for purchasing electric cooking device

Early adopting customers: roughly 1 in every 4 people in peri urban and urban locations

# Electric cooking uptake substitutes biomass use

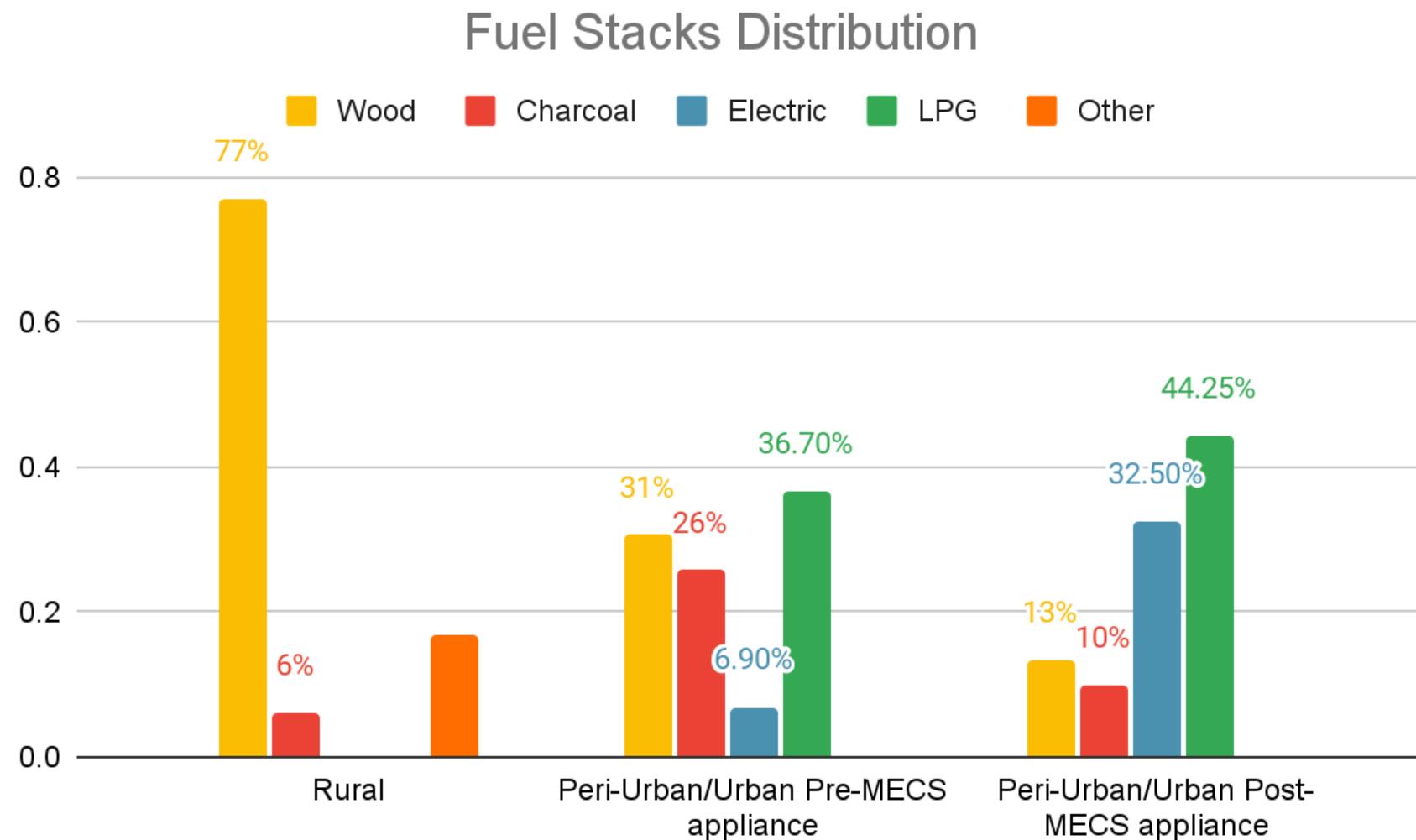


Graph: Total cooking fuel consumption Phase 1  
(before introducing e-cooking)



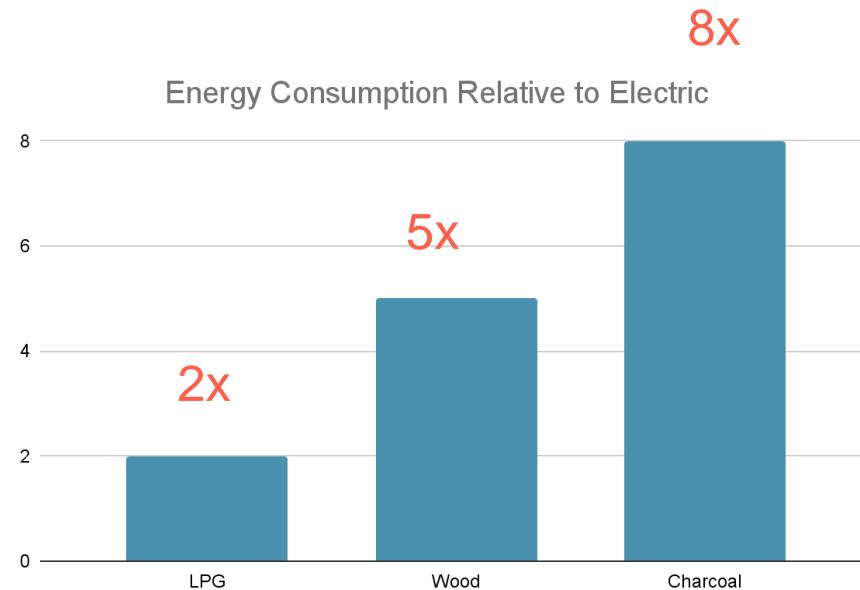
Graph: Total cooking fuel consumption Phase 2  
(after introducing e-cooking)

# Electric cooking uptake substitutes biomass use



Graph: Cooking fuels comparison between rural HH to peri urban and urban households

# Electric cooking offers the highest fuel efficiencies



Graph: Energy used for cooking rice and soup

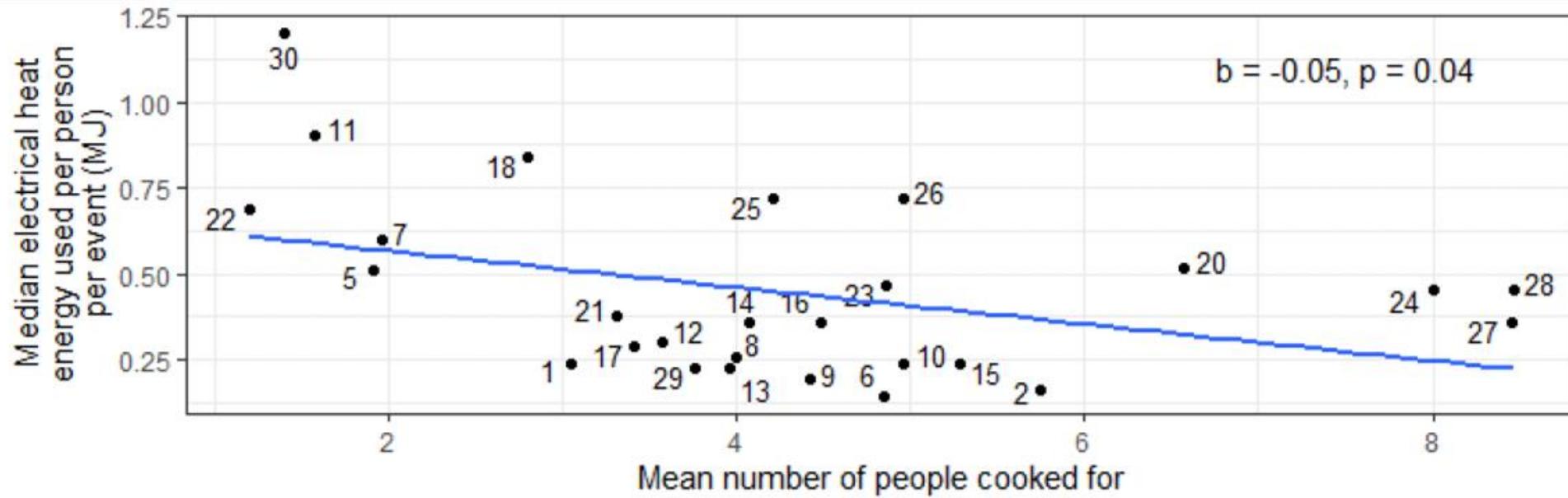
A fraction of energy used compared to previous fuel charcoal, wood or LPG.

Meal	Frequency	Mean Calorific Value (MJ/meal)			
		Firewood	Charcoal	LPG	Electricity
Soup (sour or non-sour)	206	18.4	9.1	5.3	2.8
Rice, & Soup (sour or non-sour)	182	19.7	14.1	4.0	2.2
Dried fish, pork, or beef, & Soup (sour or non-sour)	139	4.6	7.2	6.5	2.2

Table: Cooking energy use for typical food types cooked

# Electric cooking offers the highest fuel efficiencies

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Graph: Energy used compared to number of people cooked for

# Electric cooking is compatible with popular foods

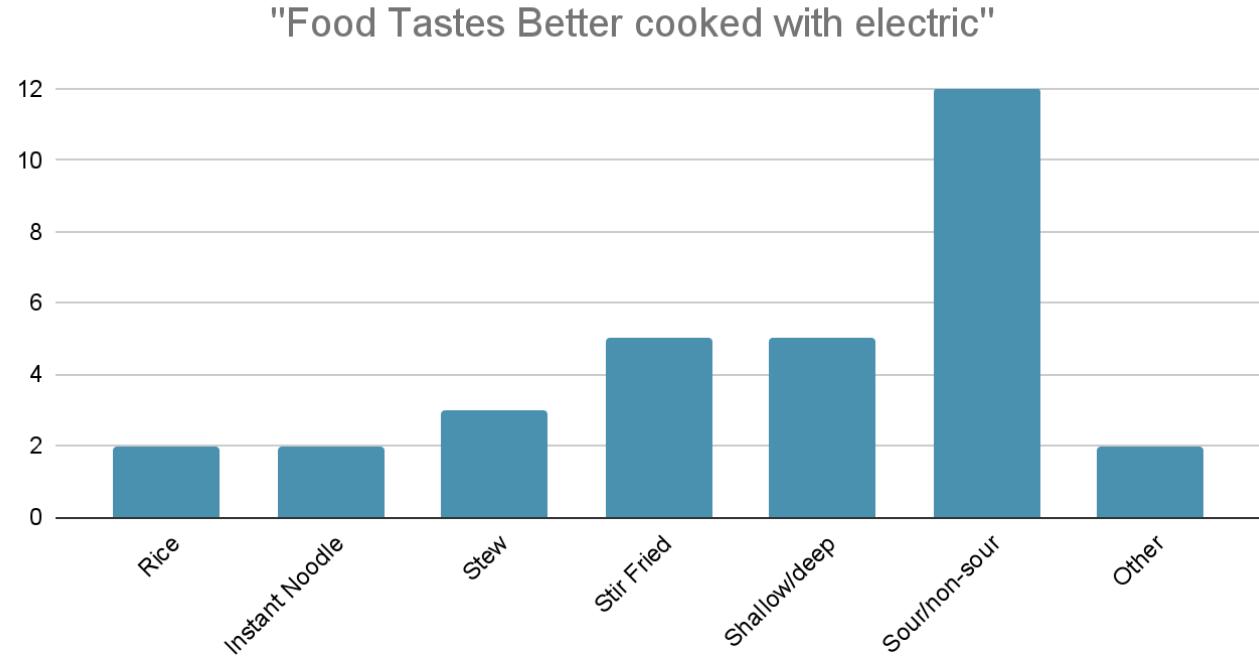
- Electricity is compatible with Cambodian cuisine and that modern cooking appliances and fuels are desirable to household Cambodian cooks.

Food	Frequency				Change Phases
	Phase 1		Phase 2		
Dried fish, pork, or beef	117	15%	231	17%	2%
Egg	36	5%	71	5%	0%
Fermented food	18	2%	39	3%	1%
Food did not require cooking	4	1%	14	1%	0%
Fried rice or noodle	9	1%	34	2%	1%
Instant noodle	14	2%	25	2%	0%
Other	17	2%	38	3%	1%
Porridge	12	2%	15	1%	-1%
Reheated food	13	2%	38	3%	1%
Rice	530	41%	-	-	-
Salad (nhorm or phlea)	1	0%	3	0%	0%
Seafood	3	0%	9	1%	1%
Fried food (shallow or deep)	48	6%	76	5%	-1%

Table: Foods cooked for breakfast, lunch and dinner by phase and relative changes between phases

# And associated with positive experiences

- All study respondents said that some food tastes better with electric
- Participants were willing to buy the appliance even after they knew the price.

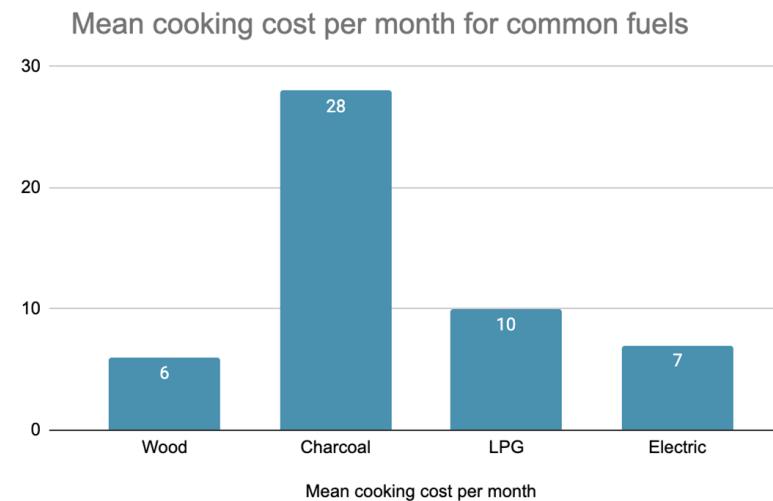


Graph: Changes in taste for food types

# Most importantly: cooking with electricity is cheaper

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- Cost of cooking with electricity from pilot  
5.72-7\$\* per month for cooking two meals per day



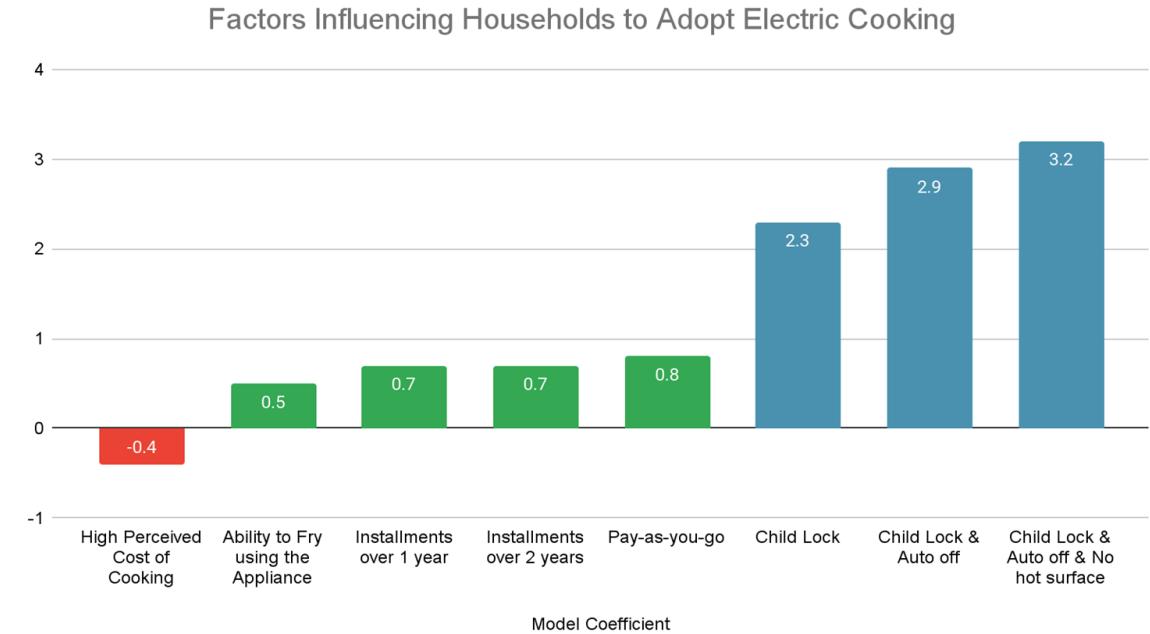
Statistic	Heat Source Used for Cooking		
	Wood	Charcoal	LPG
Mean monthly cost (\$ USD)	\$6	\$28	\$10
Mean amount purchased (kg)	18	17	5
Mean unit cost (\$ USD/kg)	\$0.17, or free via collecting	\$0.48	\$1.25
Most common amount purchased (kg)	5	10	1
Most common purchase frequency	Once per year	Once per month	Once per week

Table: Wood, charcoal and LPG and Electricity Cost Comparisons

# For non adopters, willingness to cook with 'Modern Fuels' exists **iDE**

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- Safety features and payment plans were seen as enablers to try electric cooking
- Electricity was perceived to be the safest of the four heat sources used for cooking, particularly compared to LPG



*Graph: Reasons for considering adoption to electric cooking*

# However, high cost perception is a barrier

- High perceived costs of electric cooking is a barrier

Bigger pot **Consume less** Can use with any of my pots  
 Better if we can grill **electricity** Safety function x2  
 Can cook different type of food Stronger heating capacity  
 Can adjust the heat level easily

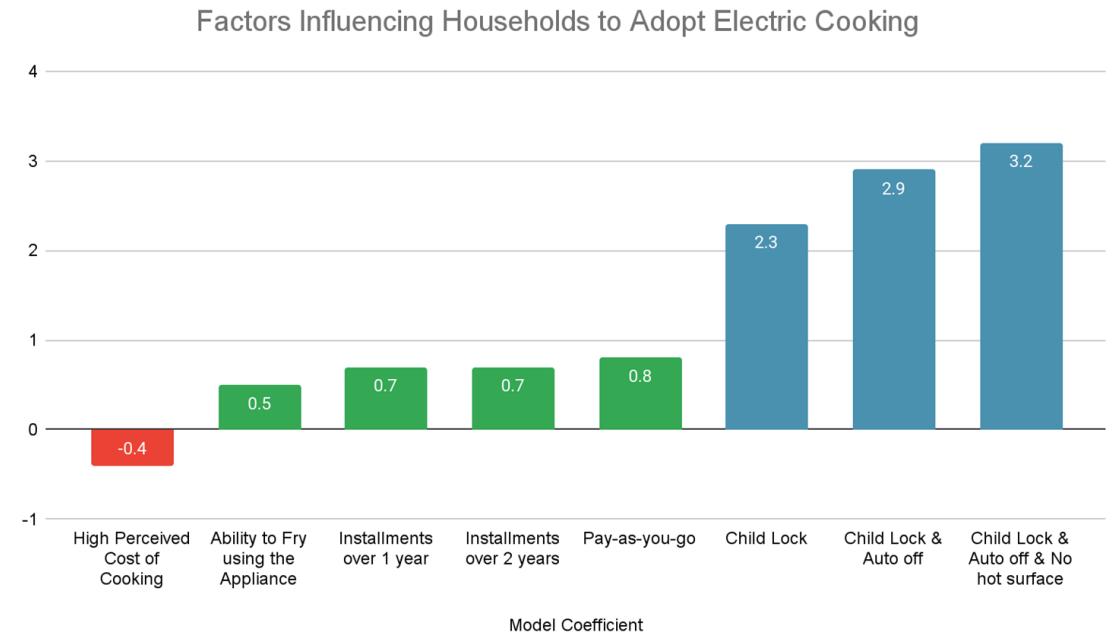


Figure: Word mapping from qualitative customer feedback

1: Reasons for considering adoption to electric cooking

# Scaling electric cooking requires overcoming key issues



High level of safety issues associated with LPG : A driver to switch to electric

No proven solutions lead to continued use of LPG



High perceived cost of electric cooking

Rising costs of electricity in summer



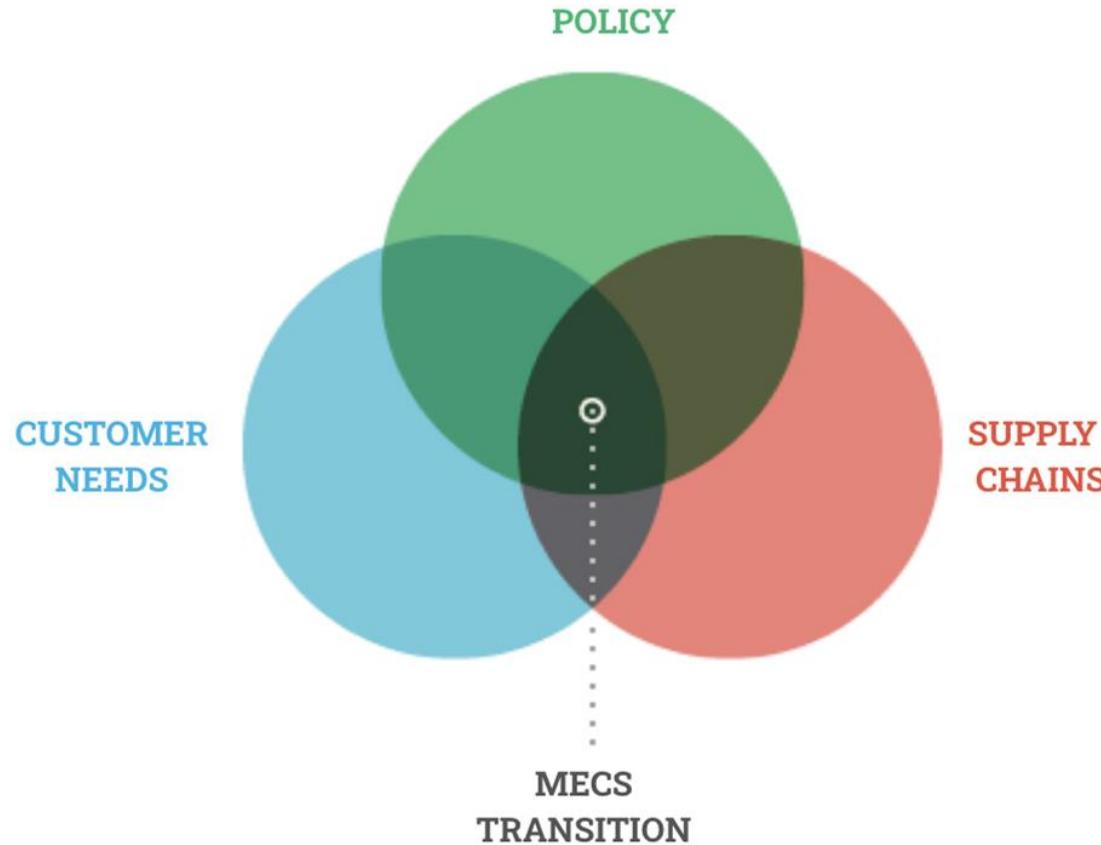
Disparities in cost of electricity between rural and urban dwellers



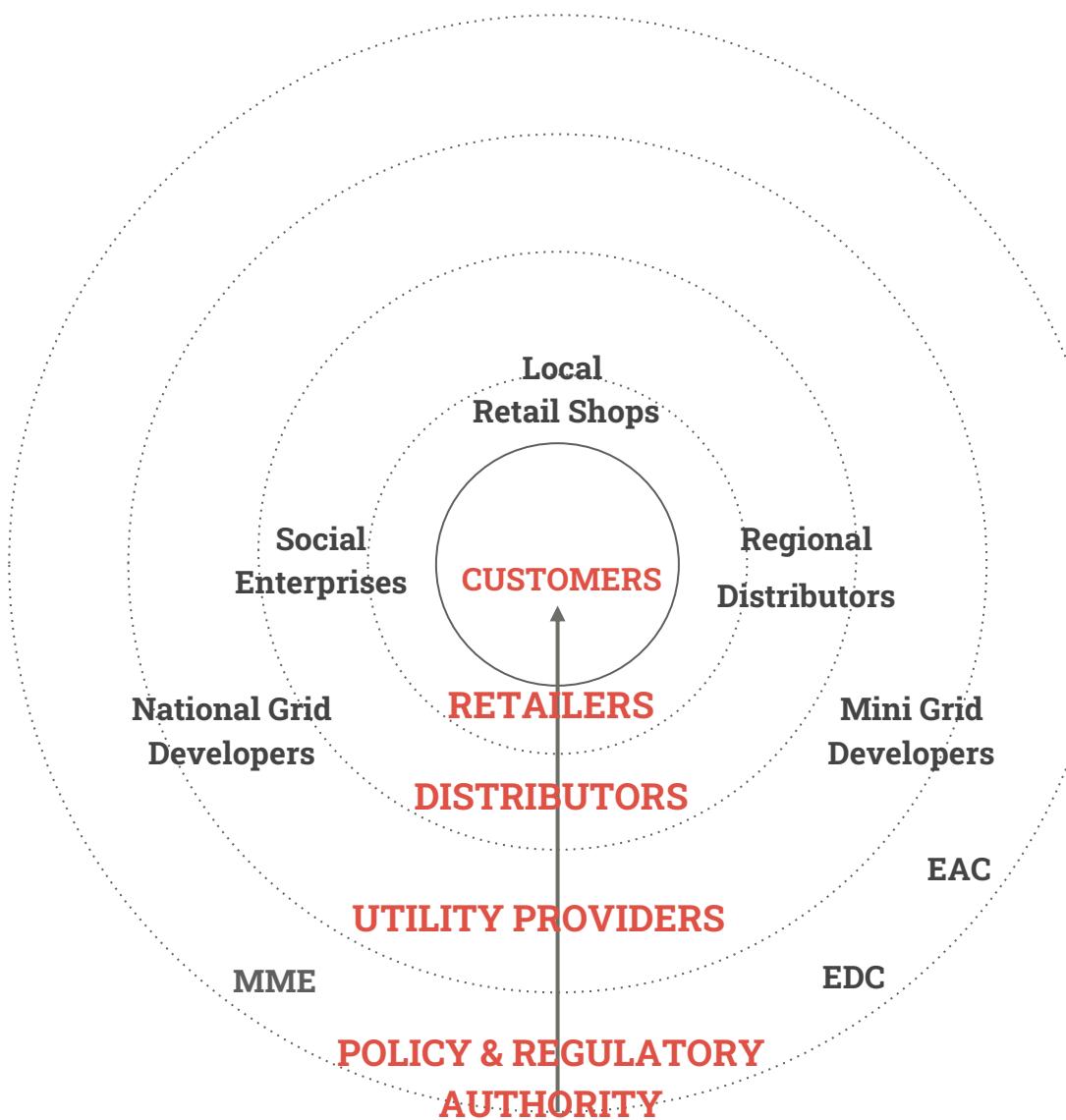
Load shedding in summer months when demand outstrips supply

Especially in peak times (day time) which coincides with peak cooking energy demand

# Key findings: supply side factors



# Actors influencing the supply side



# Emerging opportunities modelled by Social Enterprises iDE

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## National Grid Developers

- Trying to stimulate consumption by reducing tariffs
- Grid extension projects promise more reach and reliability
- Supply issues in dry season

## Mini Grid Developers

- Less cost to set up than traditional grids
- Offering of electric devices is profitable for developers, there is incentive to market them
- Energy from current micro-grids is insufficient to power e-cooking
- Customers prioritise cold chain or other applications of productive use

# Distributors are constrained to urban markets

- Technology distributors limited to **urban customers**
- No **credit lines or risk sharing mechanisms** for smaller retailers
- Reluctance to expand into rural areas due to lack of reliability of supply, and no markets
- **Understanding of technology**



# Last mile distribution networks are limited

- **Positioning electric cooking** as an aspirational alternative
- Missing **sales and marketing** skills
- **Flexibility in their commercial partnerships** restricts test marketing new, aspirational electric cooking products.
- **Limited range** of rice cookers, kettles most commonly accessible



*iDE Sales Agent closing a sales pitch*

# Emerging opportunities modelled by Social Enterprises iDE

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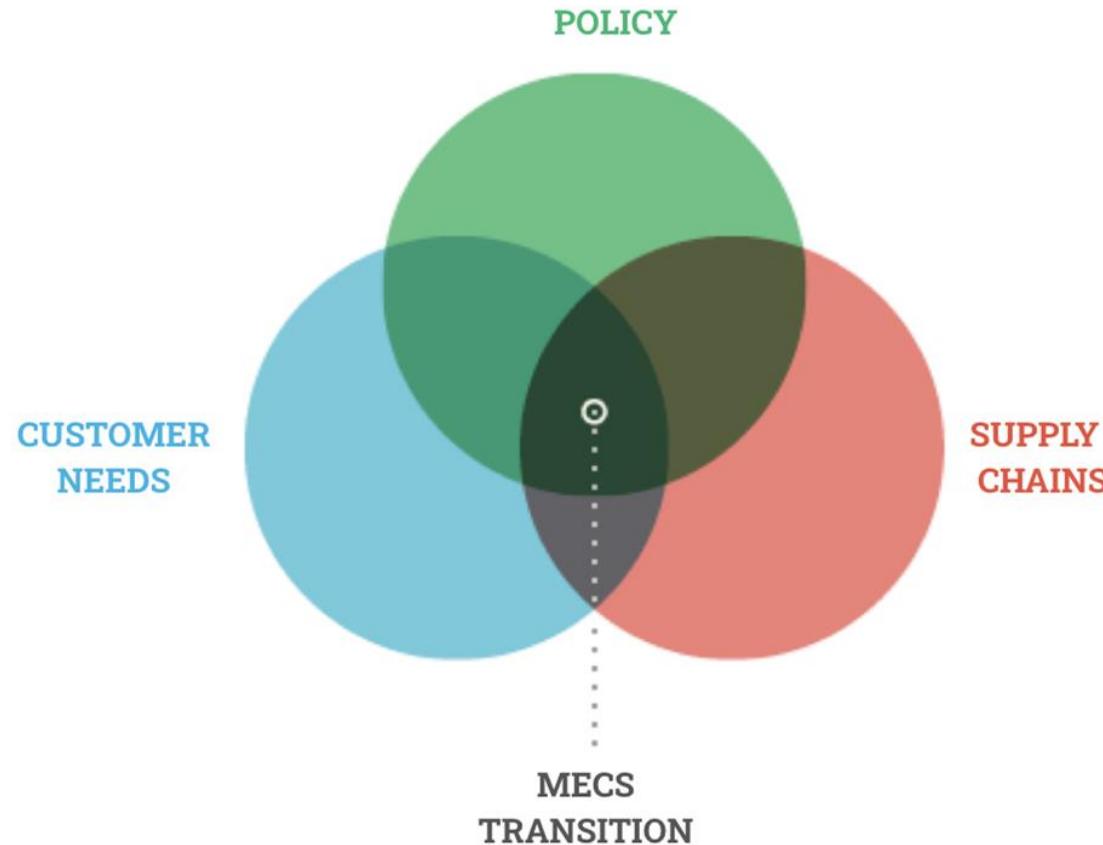
## Breaking Affordability barrier by:

- Specialized products
- Paygo technology and digital marketing
- Addressing customer concerns about payments and costs

## Breaking Accessibility barrier by:

- Specialized products
- Direct links with foreign manufacturers, product messaging in Khmer
- Local sales agents and after sales support

# Key findings: policy



# Energy policies overlap well with modern cooking

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- **MME Energy Policies**

- Nationally Determined Contribution (NDC)

- National Energy Efficiency Policy collaboration with MoE 2018-2035

- **MoE**

- National Green Growth Policy

- Natural resources Management Guidelines

- Cambodian Climate Change Strategic Plan

- 2014-2023 (CCCS)P

- **MISTI**

- Standards and IP Laws

- Incentivizing local product development

- LPG safety standards, ISO standards

# Policy side barriers prevent scaling electric cooking

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- Clean cooking does not fit into any specific ministry currently
- Energy sector strategy co-created by the sector, linking policy, infrastructure, investment and innovation to support further economic growth and competitiveness is required
- Financial limitations prevent scaling clean cooking solutions successfully
- Risk of cheaper copycat alternatives that can damage the electric cookstove market potential
- Limited dialogue on Clean Cooking impacts

# Convening of multi sectoral stakeholders

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## GOVERNMENT POLICY



## FINANCIAL INSTITUTIONS



## DEVELOPMENTAL ORGANIZATIONS



## CIVIL SOCIETY/ KNOWLEDGE & RESEARCH

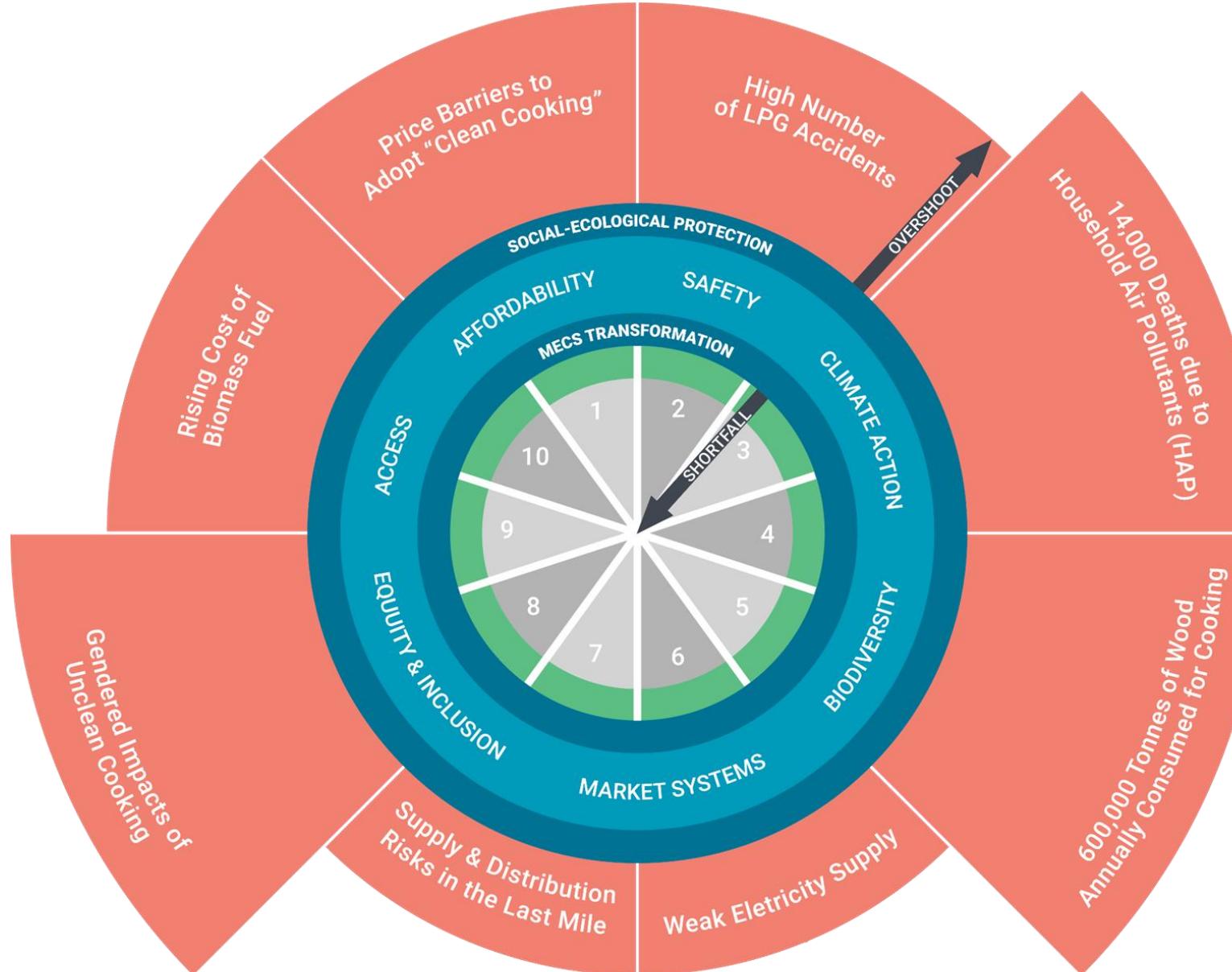


## TECHNOLOGY / DISTRIBUTION ENTERPRISES





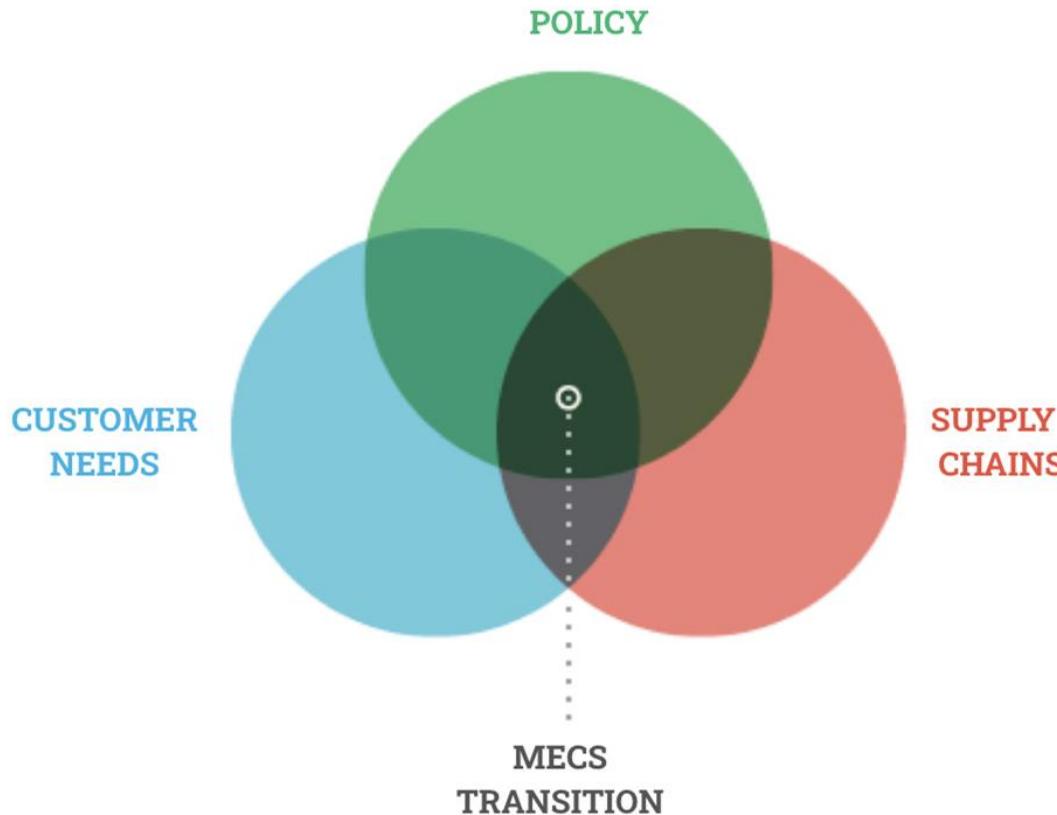
# Summarizing challenges and opportunities



- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1 - Innovative Modern Technology  | 6 - Evidence & Market Intelligence |
| 2 - Behavior Change Communication | 7 - Smart Subsidies                |
| 3 - Distribution Models           | 8 - Carbon Markets                 |
| 4 - Reliable Electricity          | 9 - Policy Innovation              |
| 5 - Safety Standards              | 10 - End-user Finance              |

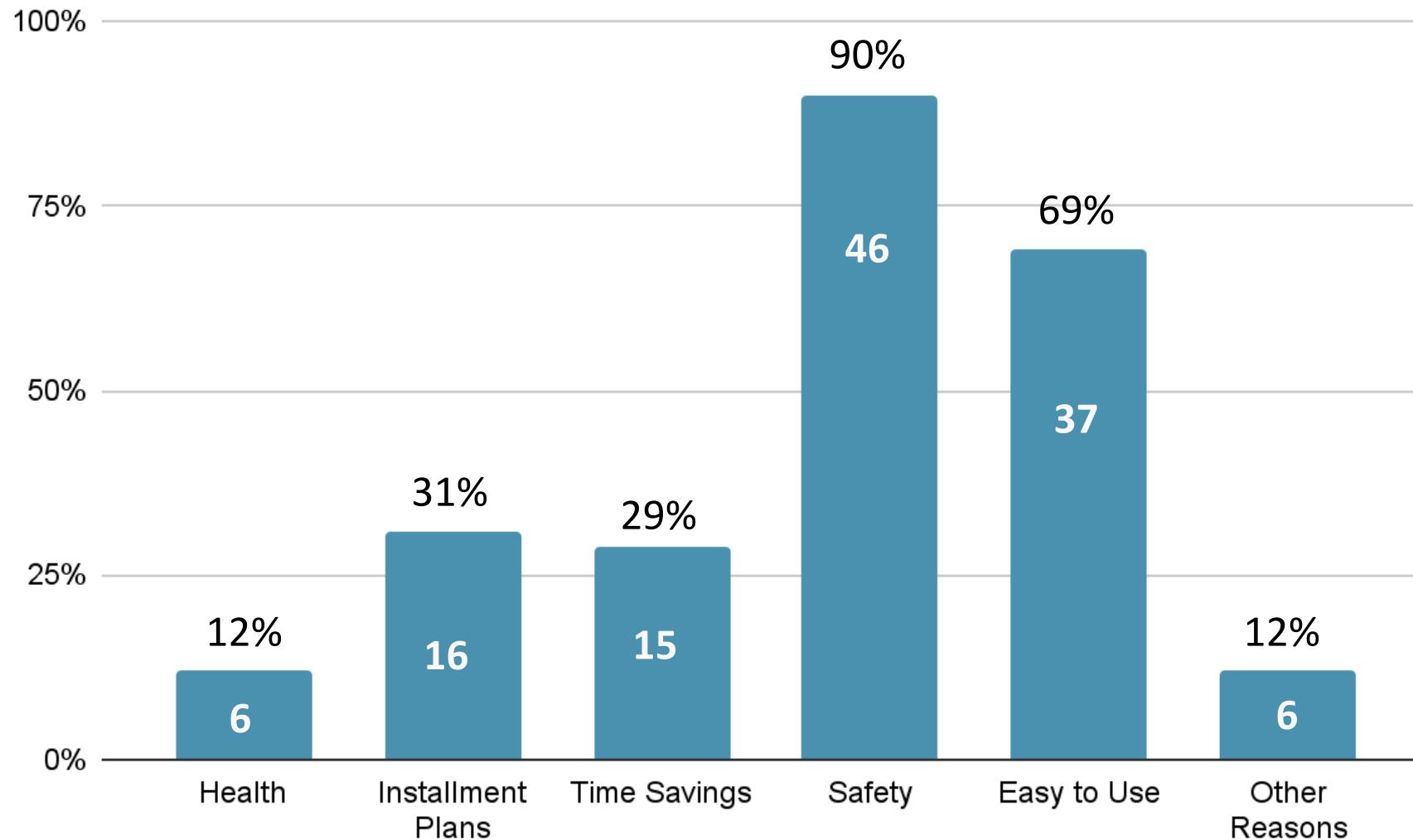
# What role can you play in making Vision 2030 real?

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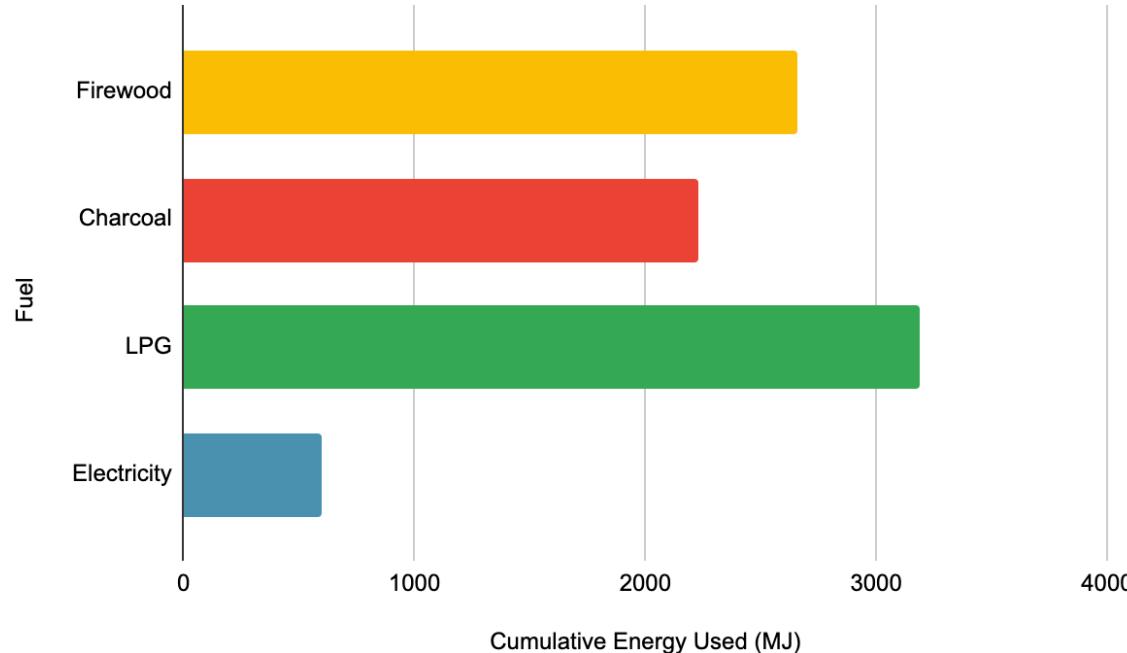


# Q&A

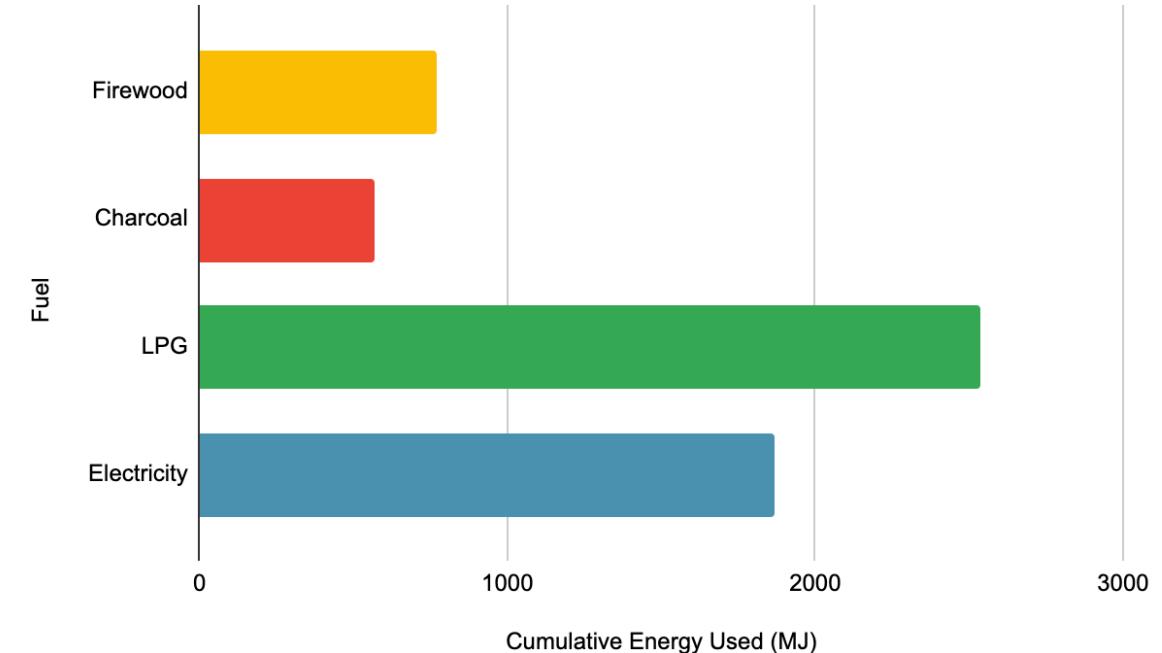




# Substituting biomass use



Graph: Total cooking fuel consumption Phase 1  
(before introducing e-cooking)

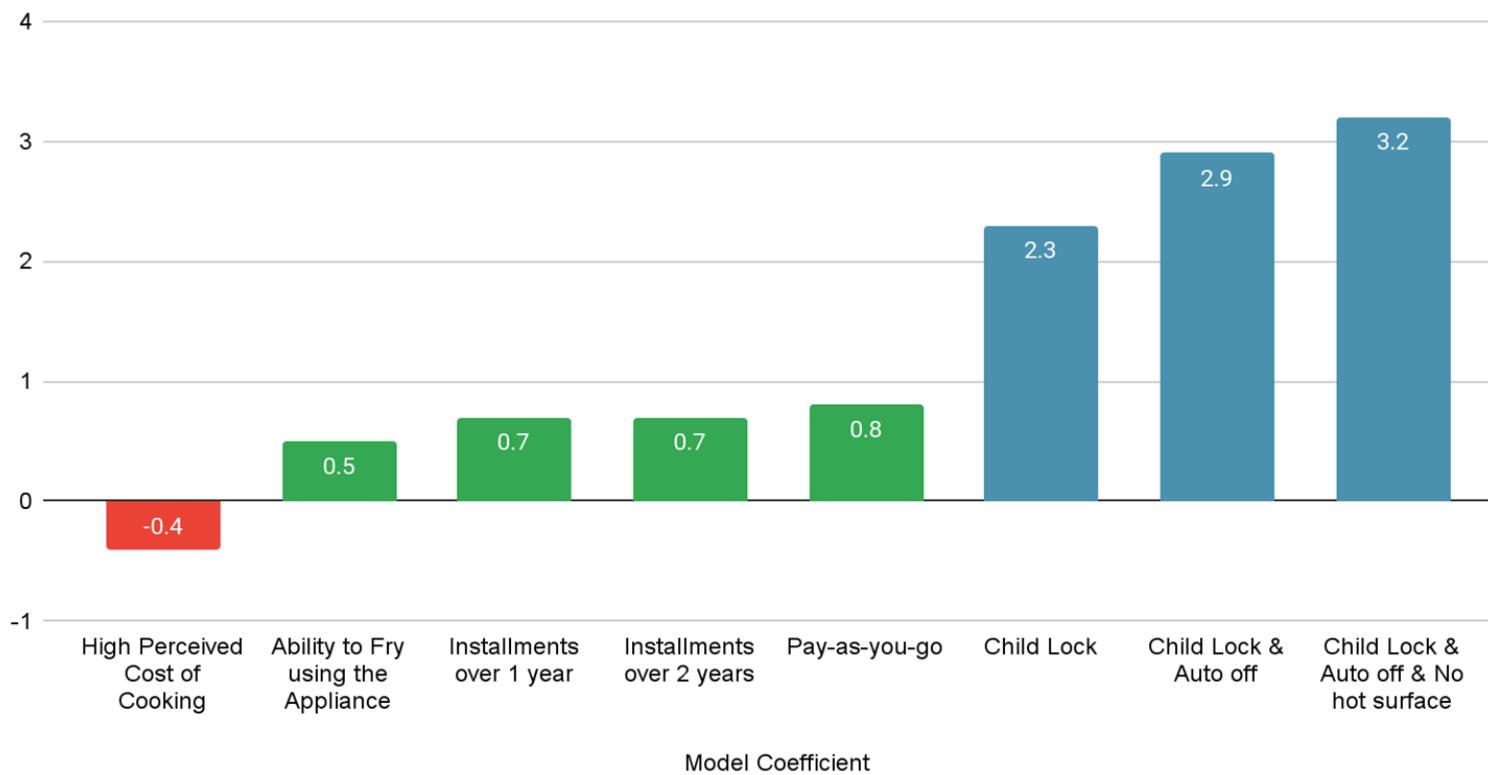


Graph: Total cooking fuel consumption Phase 2  
(after introducing e-cooking)

# Willingness to cook with 'Modern Fuels'

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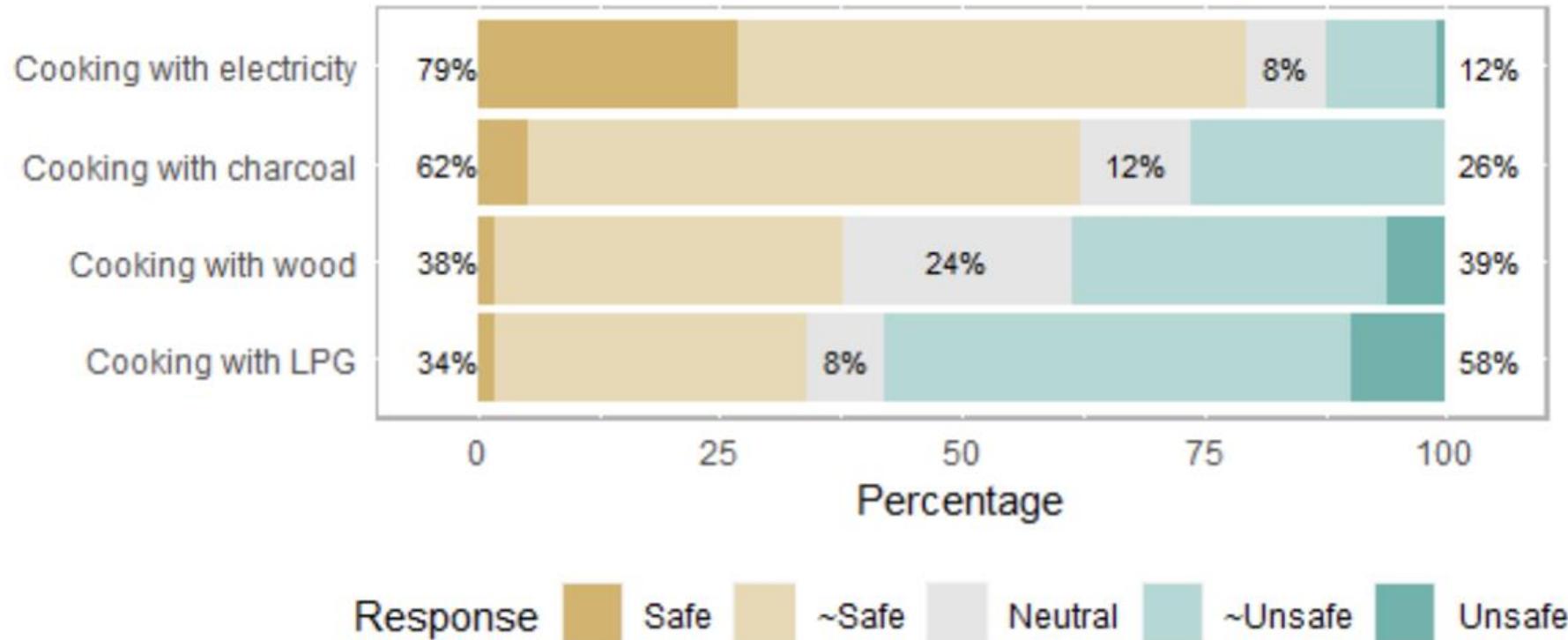
Factors Influencing Households to Adopt Electric Cooking



Graph: Reasons for considering adoption to electric cooking

# Safety Perception

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**Figure 14: Perceived safety of different heat sources used for cooking, arranged from safest to least safe.**