AFRICA ELECTRICITY SYMPOSIUM 2025

ADOPTION AND EXPERIENCE OF SOLAR WATER HEATING SYSTEM USERS IN THE COMMERCIAL SECTOR IN KENYA

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Why solar water heating systems?

- Kenya aspires to achieve net-zero emissions by 2050 by supporting and promoting the adoption of sustainable energy technologies and practices in the country.

- Benefits of a solar water heating system include

1

Expanding Energy Access

Solar water heating provides access to sustainable energy and helps households and businesses reduce dependence on the central grid

2

Environmental Impact & Sustainability

Solar water heating systems contribute to reducing GHG emission, promoting Kenya's commitment to climate change mitigation

3

Energy Security and Independence

Solar energy resource is free, and when in operation, not influenced by economic factors

Problem statement

- Solar water heating (SWH) systems are a mature technology with high household adoption rates in developing countries.

- But the rate of adoption of SWH in Kenya remains limited and varies across regions and within commercial businesses.

- User-based studies to understand adopters' experiences of SWHs have not been conducted across different regions of Kenya (different climatic and cultural contexts, sociographic, and community dynamics)

Objectives of the study

- Identify barriers faced by non-adopters of SWH systems
- Understand the motivations and experiences of SWH adopters in Kenya using Eldoret City as a case study.
- Provide insights and data to support the development of evidence-based strategies for increased adoption

Methods

Desk study

To understand the solar energy sector in Kenya and the policies and regulations governing solar water heating (SWH) systems.

Reviewed existing studies on SWH systems and identified potential research gaps

Development of a questionnaire

Using the information gathered during the desk study, a data collection tool is developed.

The questionnaire was developed to capture data from adopters and non-adopters of SWH systems in the commercial sector.

Administer the questionnaire

A research assistant administered the questionnaire.

Eldoret City was selected due to proximity and budget limitations.

Data was collected in November 2024 using the Google Form tool.

Analysis of the collected data

The collected data was analyzed using the Excel tool.

Findings are illustrated using appropriate tables and figures.

Results and Discussion

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Demographic characteristics of the respondents

Variables	Category	Number (Percent)
Categories	Hotel for accommodation	6 (21.4%)
	Food restaurant	5 (17.9%)
	Hotel and restaurant	9 (32.1%)
	Nightclub and bar	1 (3.6%)
	All of the above	7 (25.0%)
Number of employees	Less 10	0 (0.0%)
	10 – 20	8 (28.6%)
	21 – 50	17 (60.7%)
	51 - 100	2 (7.1%)
	Above 100	1 (3.6%)
Average number of customers served per day	Less 50	0 (0%)
	100 - 200	15 (53.6%)
	201 – 300	5 (17.9%)
	301 – 400	5 (17.9%)
	Above 400	3 (10.7%)
Own SWH systems	Yes	18 (64.3%)
	No	10 (35.7%)

Results and Discussion – Non-adopters

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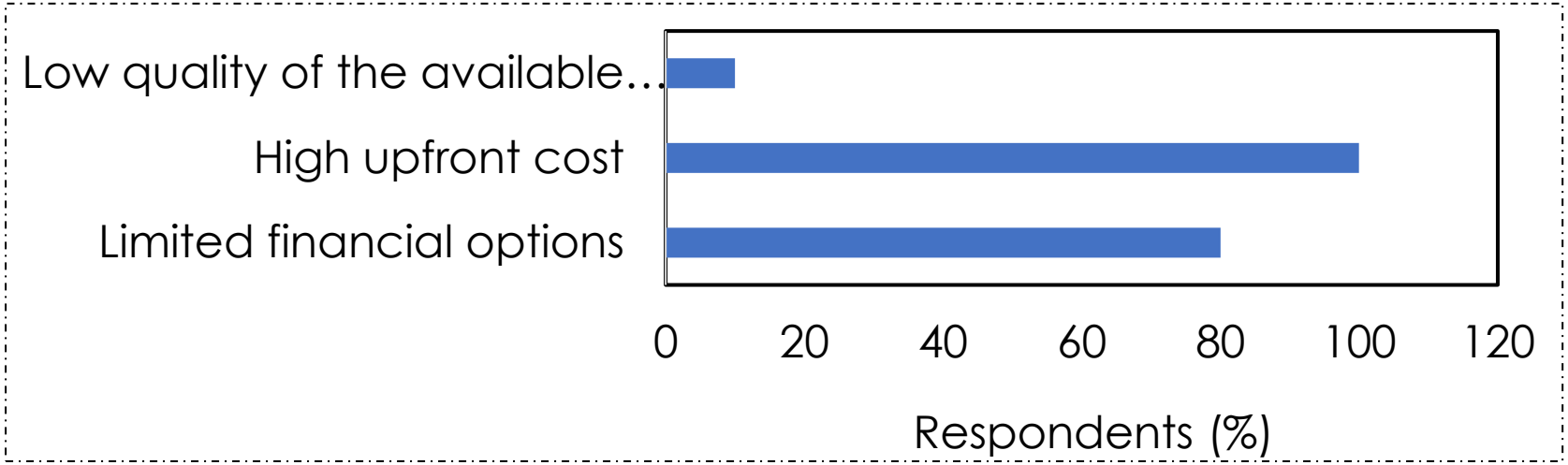
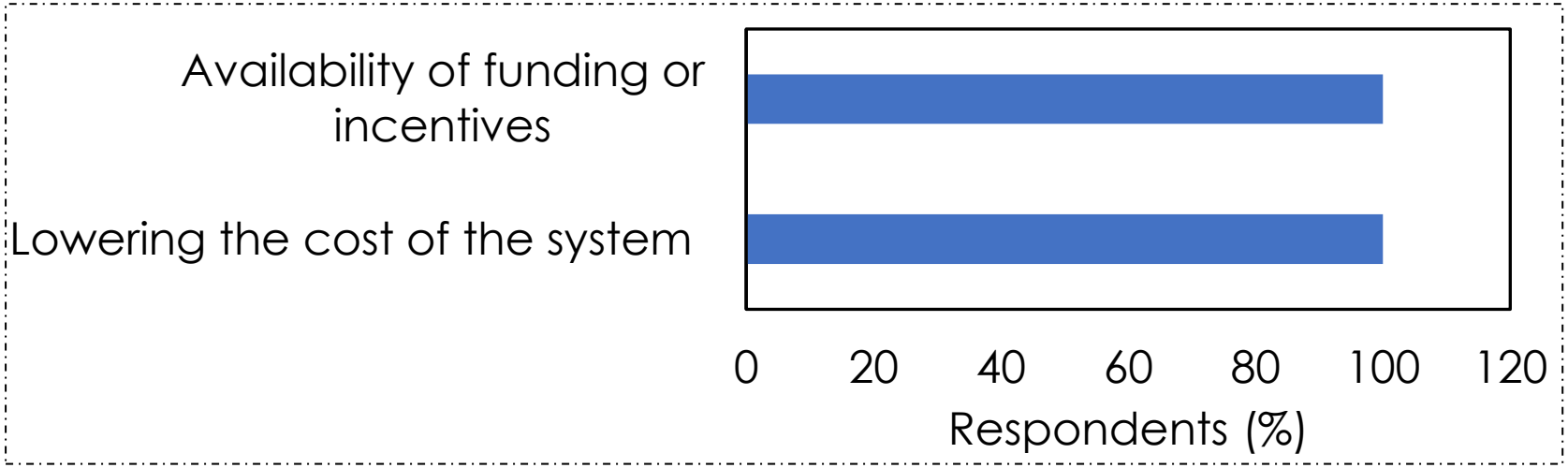
Barriers for non-adopters



Incentives to adopt



Results and Discussion – Adopters

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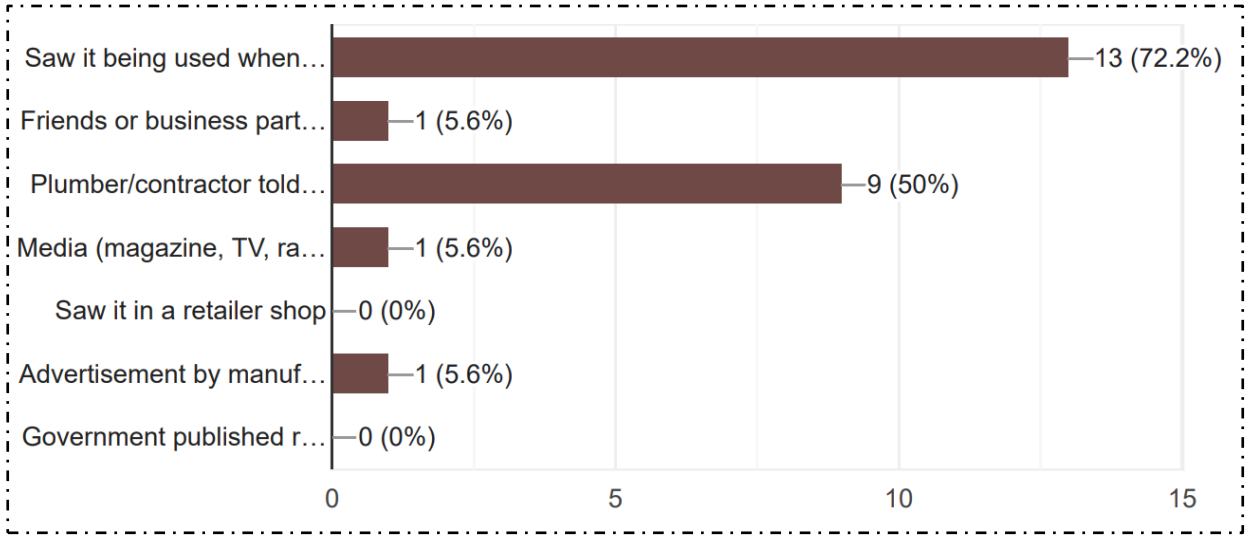
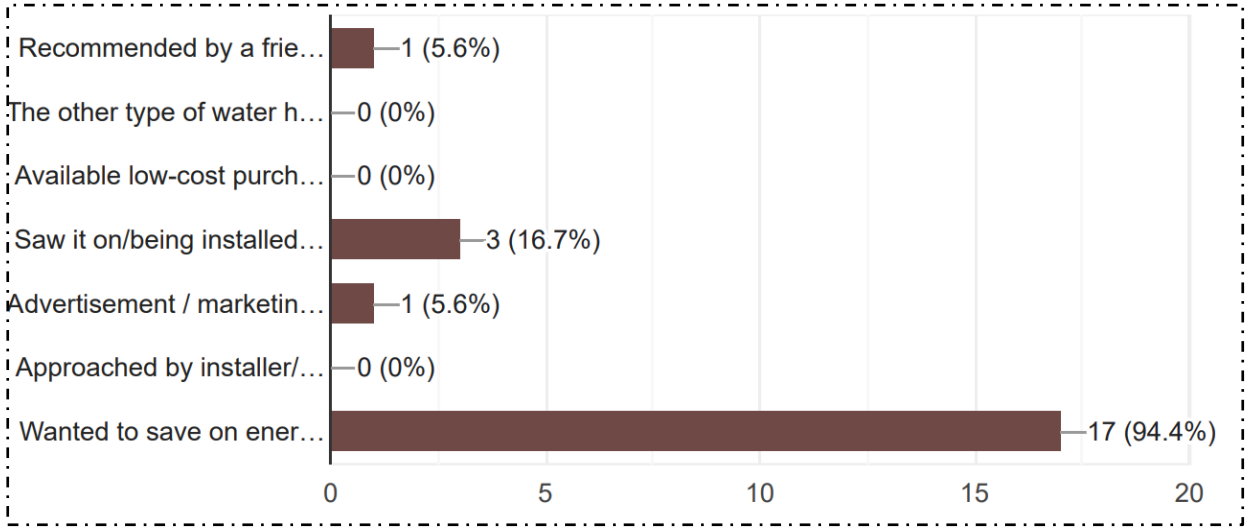
Sources of awareness



Influencing factors to adopt



Results and Discussion – Adopters

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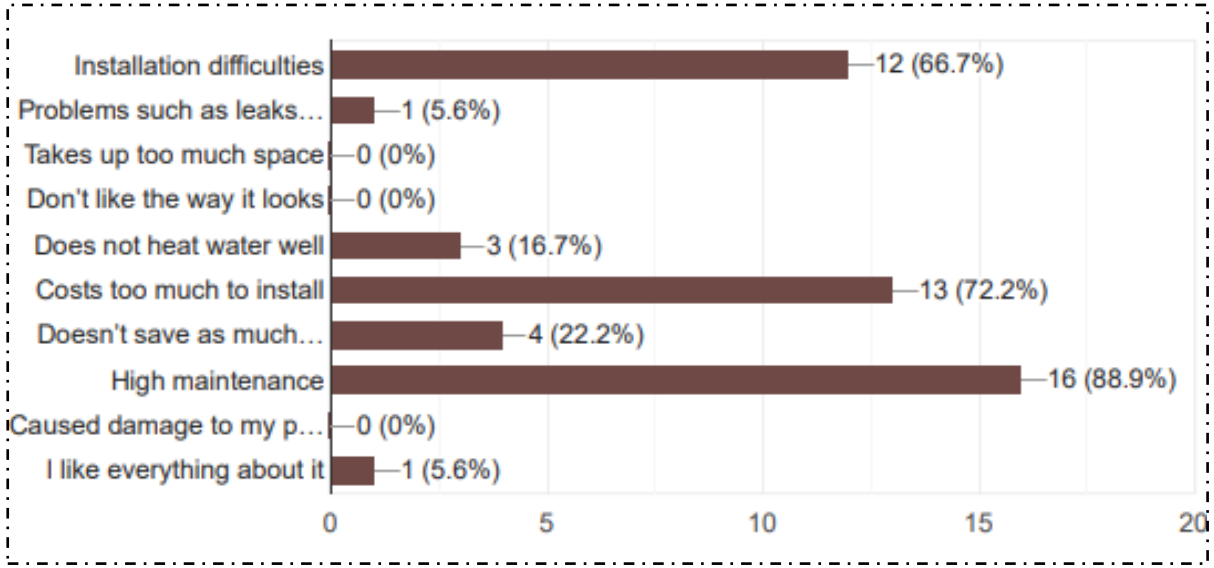
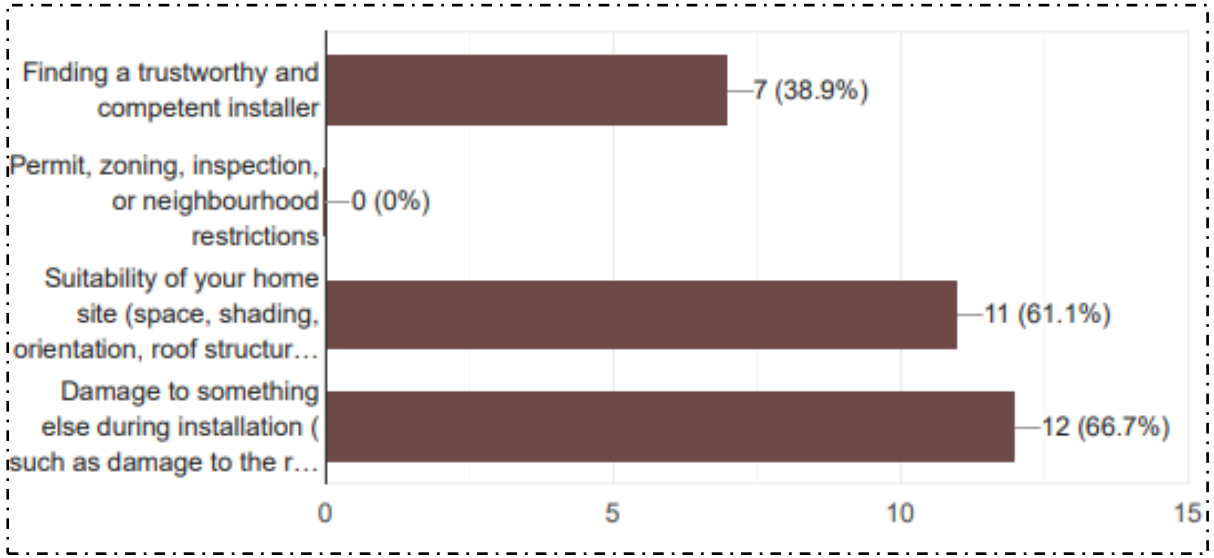
Concerns about SHW systems



Installation difficulties



Conclusions – Key findings and future work

- Adoption of SWH systems by commercial enterprises in the study location is largely driven by technical and economic considerations.
- Main challenges include high initial and maintenance costs, leaks or damage to the house/roof, and the availability of warm water when needed.
- Future research should address
  - Economic viability of this technology and its competitiveness relative to the cost of alternative heating energy resources.
  - Specific level of required financial incentives to make the technology financially acceptable to potential adopters

Conclusions – Policy recommendations

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- Consider offering tailored financial facilities for SWH systems' potential adopters, such as incentives and low-interest loan schemes.
- Improve public awareness and information availability through education and flyers to inform the public on the benefits of SWH systems.
- Solar water heating systems could be provided for primary and secondary schools to serve as teaching facilities for students and expose them to the practical benefits of SWH systems.
- Enforce quality standards and training programs for technicians to ensure proper installation and maintenance.

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