DEVELOPMENT STATUS AND CHALLENGES OF THERMOSYPHON SYSTEMS IN AFRICA: CASE STUDIES

KICK-OFF MEETING, KASSEL, GERMANY.
TASK 69 SOLAR HEATING & COOLING PROGRAMME, INTERNATIONAL ENERGY AGENCY

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Presentation Layout

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- Development Status and Challenges - Case Studies
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- Conclusion

Introduction

- Among the various types of SWHS, thermosyphon SWHS are the most economical and dominant in Africa (66%).
- Thermosyphon systems are used for harnessing solar energy for hot water production, all over the world, especially for low temperature thermal systems [Samanci and Berber, 2011; Liu et al., 2012; Sarma et al., 2014; Ko, 2015; Kolhe et al., 2015].
- Thermosyphon (passive) systems make up more than 70% of solar water heating installations in Africa.
- However, above 70% of hot water preparation at the household/domestic level is still undertaken primarily using electric geysers (despite energy scarcity in most African countries).
- In the last five (5) years, solar water heating installations in Africa has witnessed tremendous increases.
- In Southern Africa, the Southern African Solar Thermal Training & Demonstration Initiative (SOLTRAIN) has worked in improving awareness and uptake of solar water heating systems.

Development Status - Nigeria

- There are various installations and applications ranging from household use to SMEs
- Most of the installations are locally fabricated or imported.
- The manufacturing sector for solar water heating is still evolving
- Some of the challenges is the economy of scale, standardization/quality issues, and regulatory framework.
- Appropriate technology in terms of operating temperatures and water quality is still an issue.

Development Status – South Africa

- Many households/SMEs use thermosyphon systems.
- There are manufacturing companies in scale operations (e.g. Kwikot – manufactures evacuated tube and flat plate collectors)
- Regulatory framework is still evolving.
- Electric geysers are very dominant, in spite of load shedding issues
- There is an appreciable mix of pumped systems.
- There are renowned installers in the country. The activities of SOLTRAIN has led to attention to issues of standards and quality.

Development Status - Zimbabwe

- Zimbabwe
  - Many households/SMEs use thermosyphon systems
  - There is still a very large percentage of households depending on electric geysers
  - Manufacturing activities are picking up (e.g. Monarch Steel manufactures storage tanks and frames)
  - There are also assembling plants in the country, particularly for evacuated tube collectors
  - There are renowned distributors of imported units and a pool of trained installers.

Development Status - Botswana

- Many households/SMEs use thermosyphon systems for hot water preparation.
- Incidentally, there is still a very high percentage of dependence on electric geysers.
- Some of the challenges include end user confidence due to installation and maintenance issues in a previous mass rollout of thermosyphon systems.
- There are renowned distributors and installation company, including an organised solar thermal trade association
- Attempts at manufacturing is faced with challenges of accreditation of plants (e.g. Keymark certification)
- Preference for solar PV.
- Installations have improved very significantly due to SOLTRAIN activities.

Way Forward

- Addressing cost of systems and installations
- Manufacturing within Africa
- Certification/Quality Assurance
- Appropriate Technology
- Trained Installers
- Government Policy

Conclusion

- Thermosyphon system is still widely accepted in Africa.
- Appropriate technology selection and quality assurance issues still need attention
- Certification of collectors need to be addressed; quality assurance issues to be prioritized.
- Manufacturing plants are evolving and will greatly impact uptake of the technology
- Training of installers need to be prioritized.
- Regulatory framework that can amend building codes will greatly improve adoption.

Gratitude

- Mr Samsom Mhlanga – NUST, Zimbabwe
- Mr Kuda Ndhlukula - SACREEE

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THANK YOU!

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Solar Hot Water For 2030

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