SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Manufacturing and Design for Reliability and Durability in Solar Thermosyphon Hot Water Systems

Robert A Taylor, UNSW & He Tao, CABR: Joint TMs of Task 69

Aims of this Solar Academy

- Discuss the issues thermosyphon systems can have regarding reliability and durability
- Consider ways to alleviate these issues through design, operation, and best practices

Ulterior Motive: Recruiting for our Task

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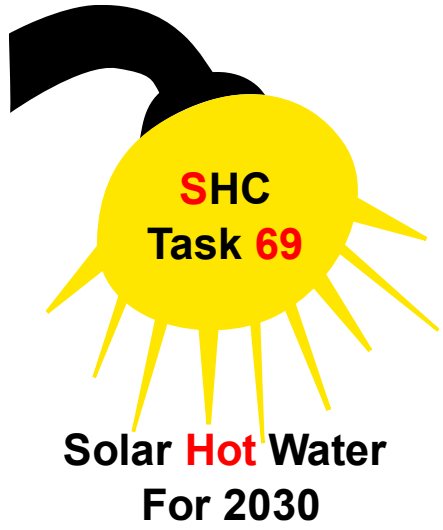
Task 69:
Solar Hot Water for 2030



Prof. Robert A Taylor, UNSW

He Tao, CABR: Joint TMs

An Asia-Pacific + Africa Dominated Task

Timeline: ~2 years completed on 3-year Task.

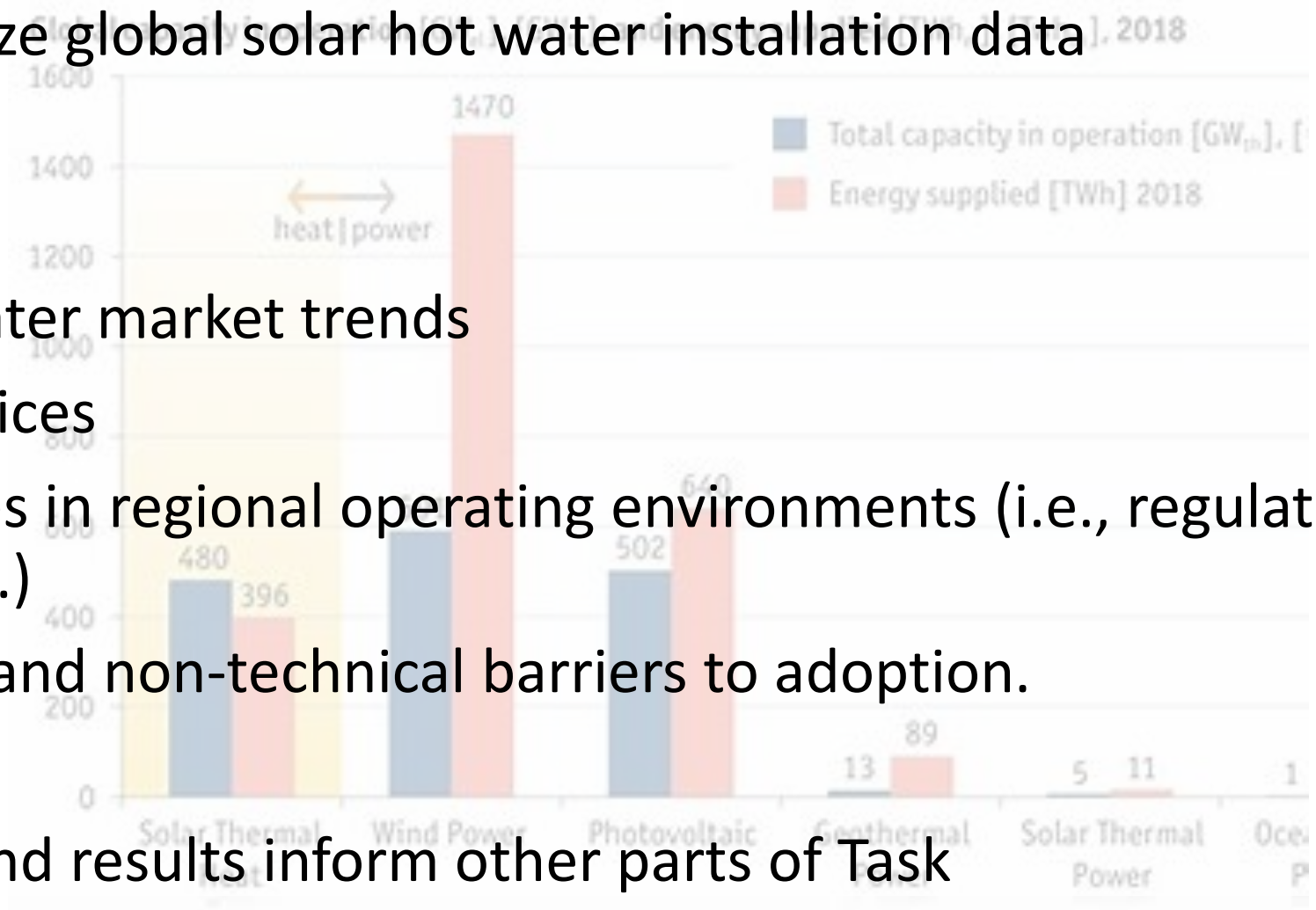
2 technologies:

- **Thermosyphons:** The most used solar heating system (~57% of domestic hot water systems in operation in 2019)
- **PV Hot Water:** Rapid PV growth! Can be simple (i.e., low cost) or advanced (i.e., soak up excess PV and power heat pumps).

Note: Both require very few moving parts, can be affordable and reliable, and provide opportunities for new products/components.

Subtask A: State-of-the-art & operating environments.
Lead: Daniel Tschopp (AEE INTEC), Austria

Goal: Analyze global solar hot water installation data



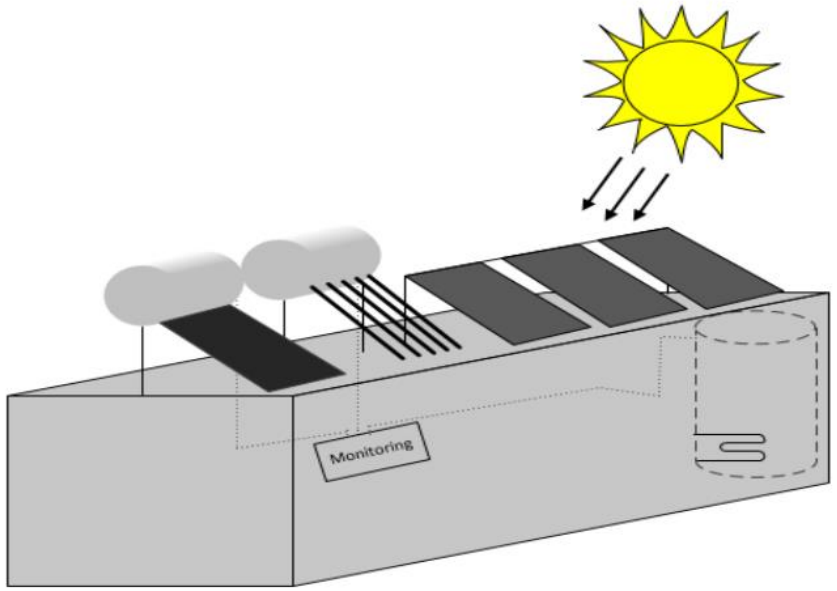
Includes:

- Water heater market trends
- Best practices
- Differences in regional operating environments (i.e., regulations, targets, tariffs, etc.)
- Technical and non-technical barriers to adoption.

*Findings and results inform other parts of Task

The SOLTRAIN+ Comparison Test Bed

- **Side-by-side comparison of solar hot water technologies**
  - Indirect thermosyphon system with a flat plate collector
  - Indirect thermosyphon system with evacuated heat pipe collector
  - PV-to-Heat (PV2Heat) system
- **Monitoring phase**: 1 year
- **Location**: Namibia University of Science and Technology



Subtask B: Thermosyphon hot water systems

Lead: Li Bojia, China

Goal: To ensure thermosyphon systems are fit-for-purpose

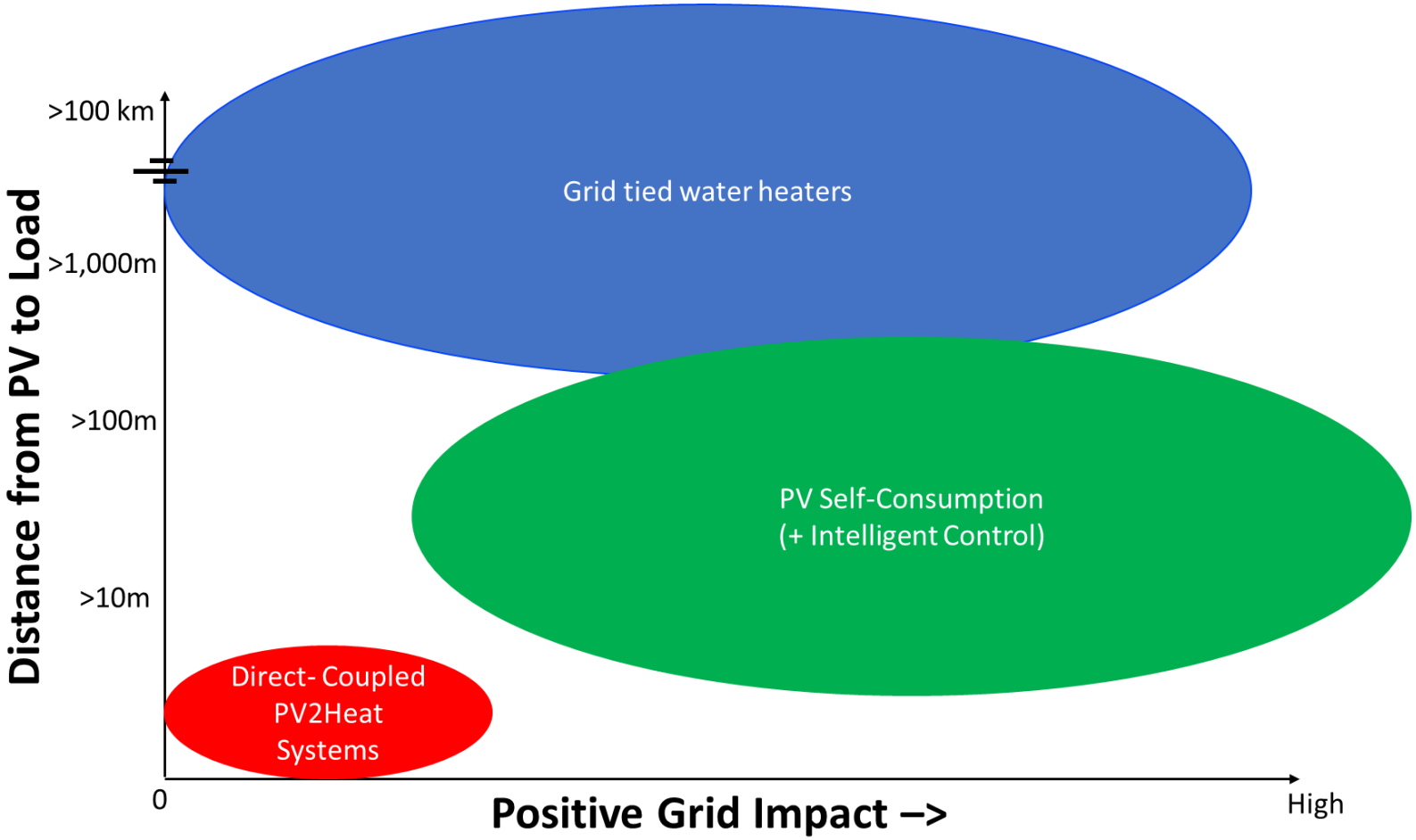
- Investigate their:
- Potential to be installed going forward
- Reliability and durability (today's talk!)
- Potential for energy-savings and GHG reductions (and lifecycle optimization)

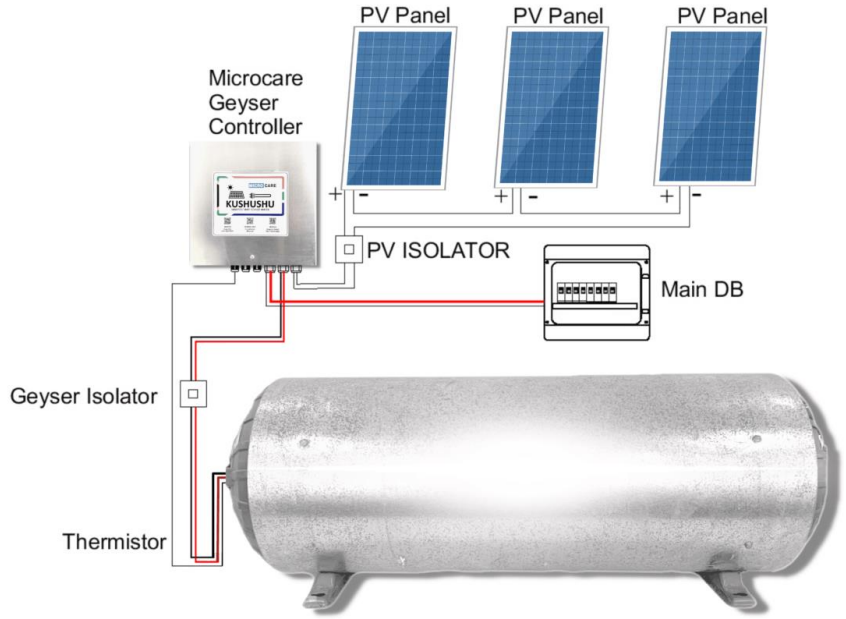
Subtask C: Solar Photovoltaic Hot Water
Joint Leads: Tony Day, United Kingdom

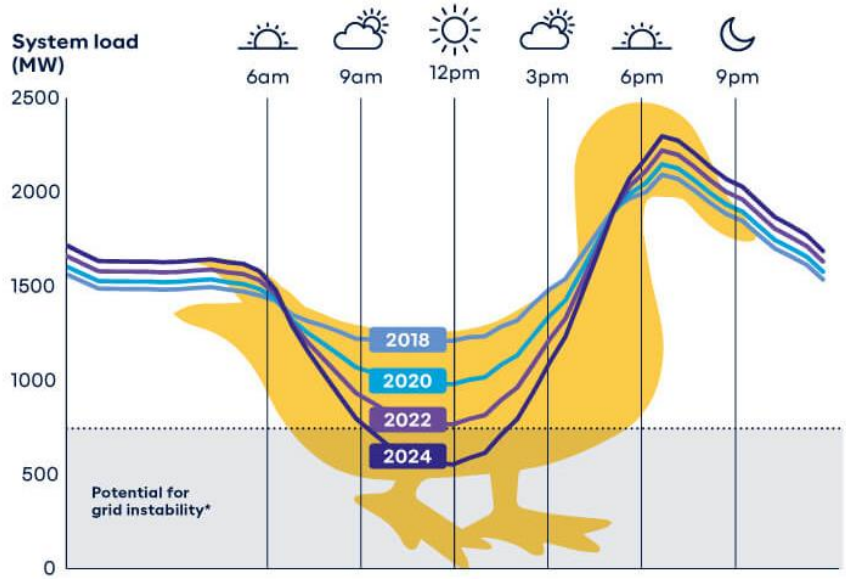
Goal: Track and help guide the emergence of PV hot water

- Survey experts/manufacturers about developments
- Categorize and compare advantages/disadvantages of options
- Research and identify optimal strategies / controls
- Make recommendation on best practices

PV-Derived Hot Water



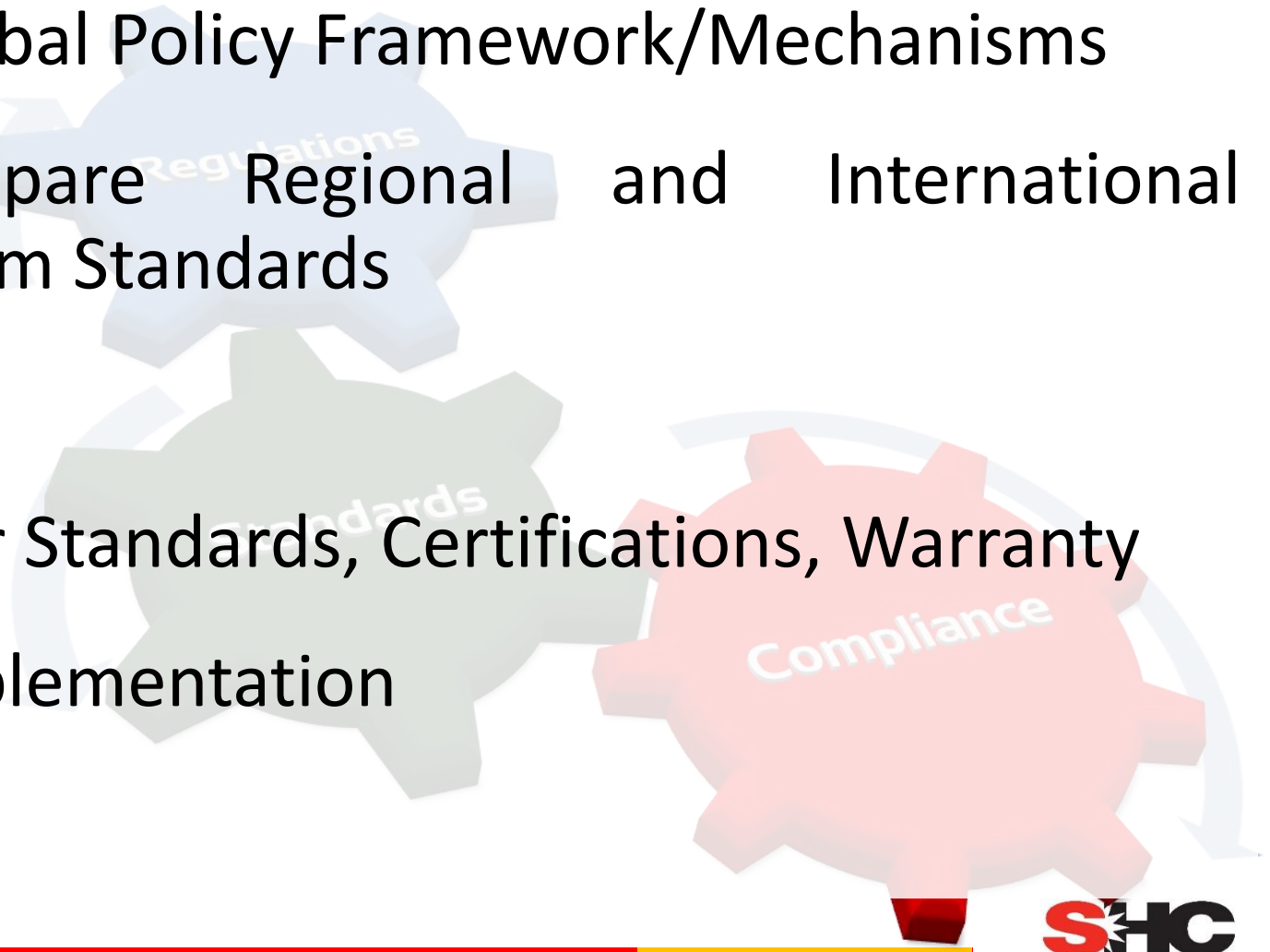




SubTask D: Training and Standards
Lead: FAN Jianhua, Denmark

Goal: Highlight the Global Policy Framework/Mechanisms

- Identify and compare Regional and International component and system Standards
- Facility Training
- Needs assessment for Standards, Certifications, Warranty
- Success stories of implementation



Join Us!

- **Task Meeting #5:** 11-12, Lianyungang, China (online option)
- **Task Meeting #6**: April 2025, African location? (online option)

Sign up to our Expert list:

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