

Jamebi, the solar water pasteuriser

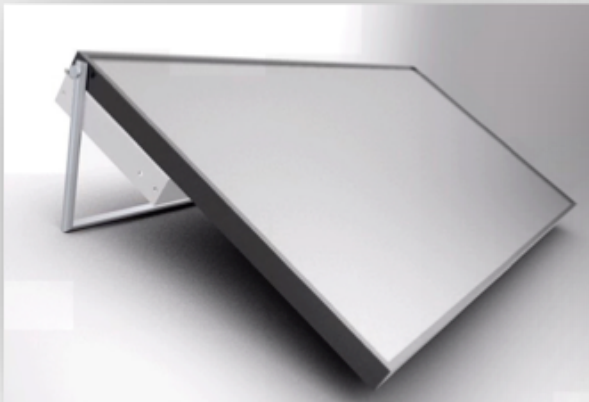
household-scale solar water pasteurisation for the sunny tropics

Presented by Barry Johnston

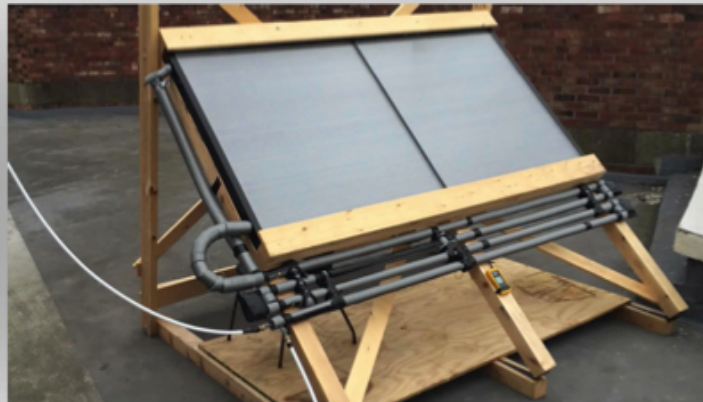
To WEDEC conference 2017

barryjohnstonemail@gmail.com

concept



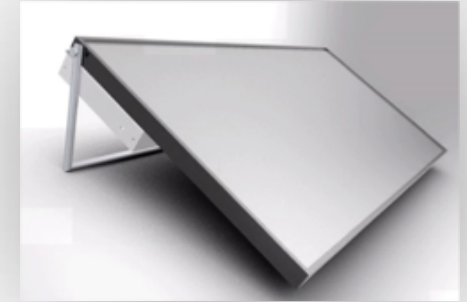
prototype



product



Jamebi: in *concept*

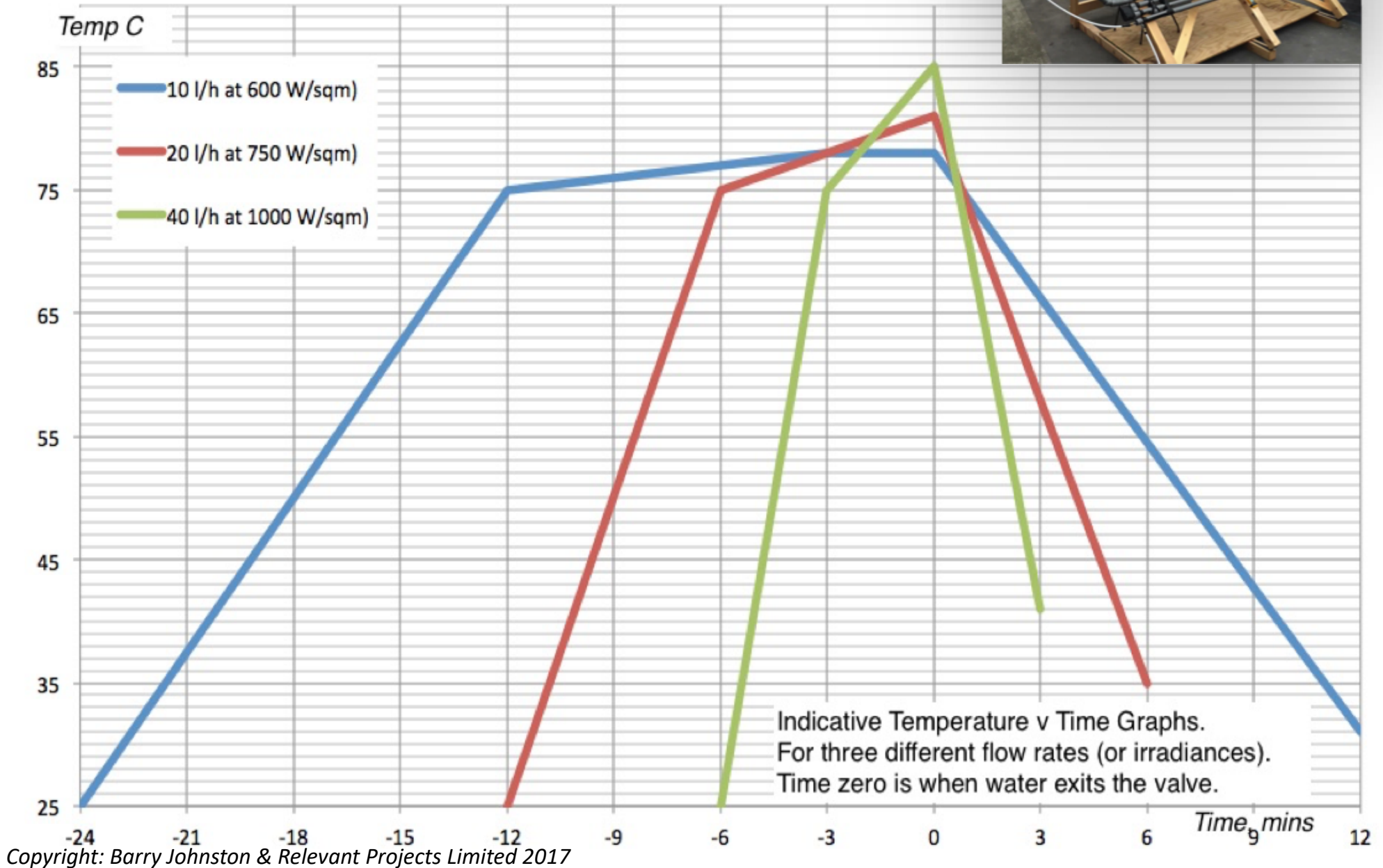
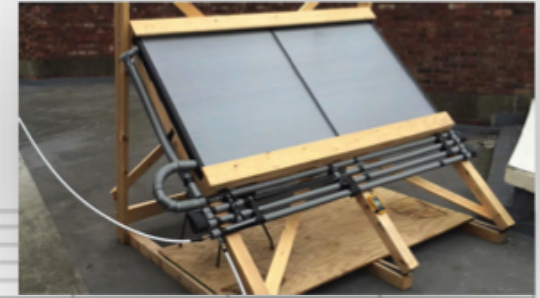


- **Solar water pasteuriser**
 - Makes bio-contaminated water drinkable
 - Thermal pathogen destruction
 - Daytime flow-through (not batch)
 - With heat recovery (greater flow)
 - Off-grid, stand-alone system
 - For sunny tropical locations
- **Applications**
 1. regular - household supply
 2. rapid - emergency relief
- **Target pathogens include**
 - **Multicellular micro-pathogens:** worms & flukes, their eggs & larvae.
 - **Protozoa:** Cryptosp, Entamoeba, Giardia,
 - **Bacteria:** Aeromonas, Yersinia, Listeria, S. aureus, E. coli, C.jejuni, V. cholera,
 - **Viruses,** eg Rotav, Norov, Hep A

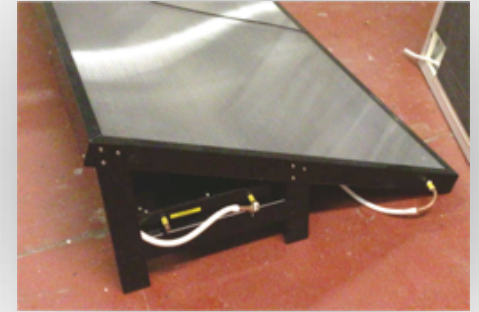
Design principles

1. wide range of target pathogens
 2. at least 99.99% pathogen kill
 3. low lifetime water cost per litre
 4. low environmental impact
 5. long life product
 6. no supplier dependence
 7. no chemical inputs
 8. no power connection
 9. autonomous control
 10. robust flat-pack modular system
 11. simple to set up / operate / maintain
 12. reliably save lives in the tropics
- **Daily water output in sunny tropics**
 - peak: 250 litres
 - typical range: 100-200 litres
 - expected ave: 150 litres
 - output is inherently solar dependent

Jamebi's flow adjusts to solar brightness



Jamebi: the *product*



- **Components**
 1. solar thermal panel
 2. thermostatic control valve
 3. heat exchanger
 4. stand for ground or roof
- **Operation**
 - gravity fed: tank-system-tank
 - heat-pasteurise-cool
 - starts at 30% to 50% peak sunlight
 - 12-36 min to flow right through
- **Constraints**
 - Large (2.5m long) & heavy (50 kg)
 - Requires 2-person lift
 - Requires soft inlet water
 - Only treats bio-contaminated water
 - Not particulates/toxins/odours/tastes
- **Testing & compliance**
 1. Materials meet hot drinking water regs UK
 2. Solar panel has EU Solar Keymark
 3. System on-off & dose-response in UK sun
 4. System pathogen efficacy tests in progress
 5. Manufacture: ISO 9001 Quality Mgt System
- **Safety**
 - Obvious non-operation warning (drips)
 - Low operating pressure
 - Recognised safety valve design
 - 75C minimum water heating
- **Life cycle**
 - 80% recyclable by weight
 - 20 year life (stored / operating)
 - Lifetime water cost below 0.2¢ (US) / litre
- **Patent applied for, initially UK**

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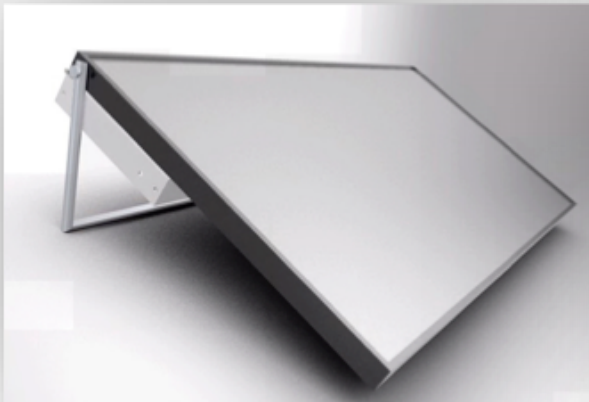
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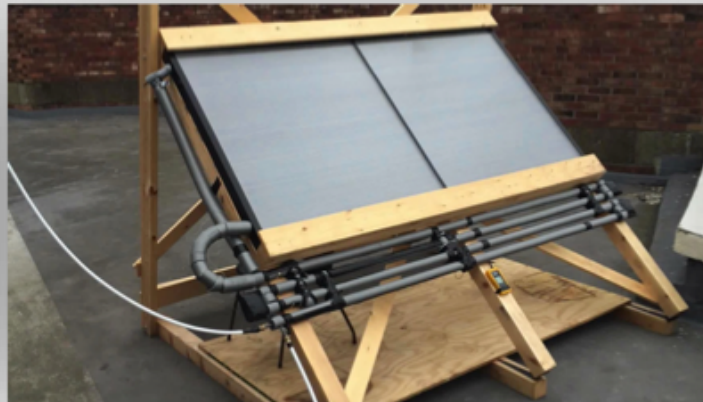
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