

HARVESTING SURPLUS SOLAR ENERGY TO IMPROVE IMMUNIZATION EFFICIENCY, SERVICE AND SAFETY

TECHNET
October 18, 2017



Solar Electric Light Fund



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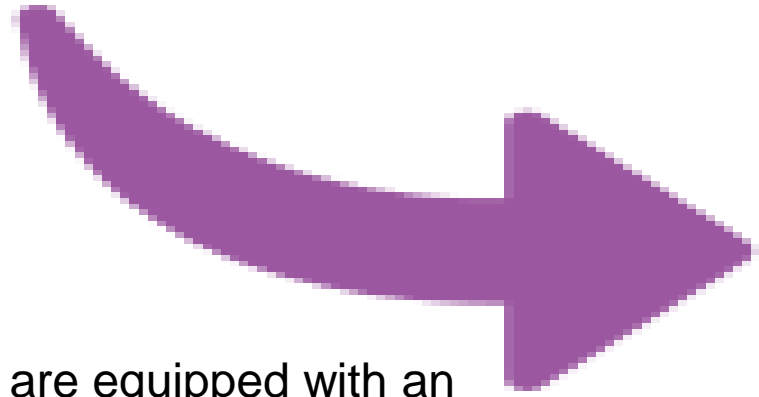
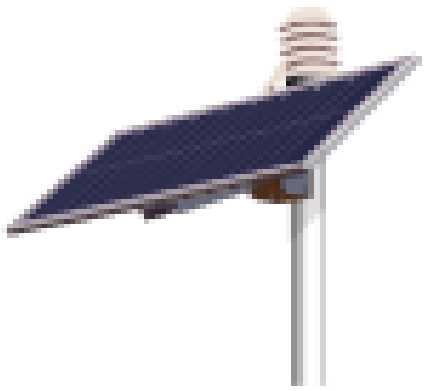


Non-Profit with a Mission
to use renewable energies
to help eradicate energy
poverty by powering:

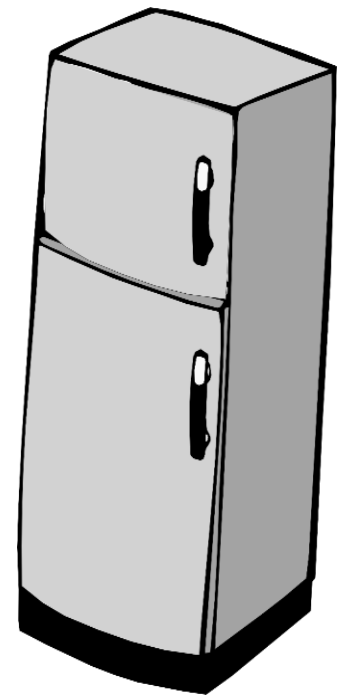
- Food & Water Security
- Health & Education
- Whole Village Development
- Innovation



Typical Solar Direct Drive (SDD) Appliance



#1



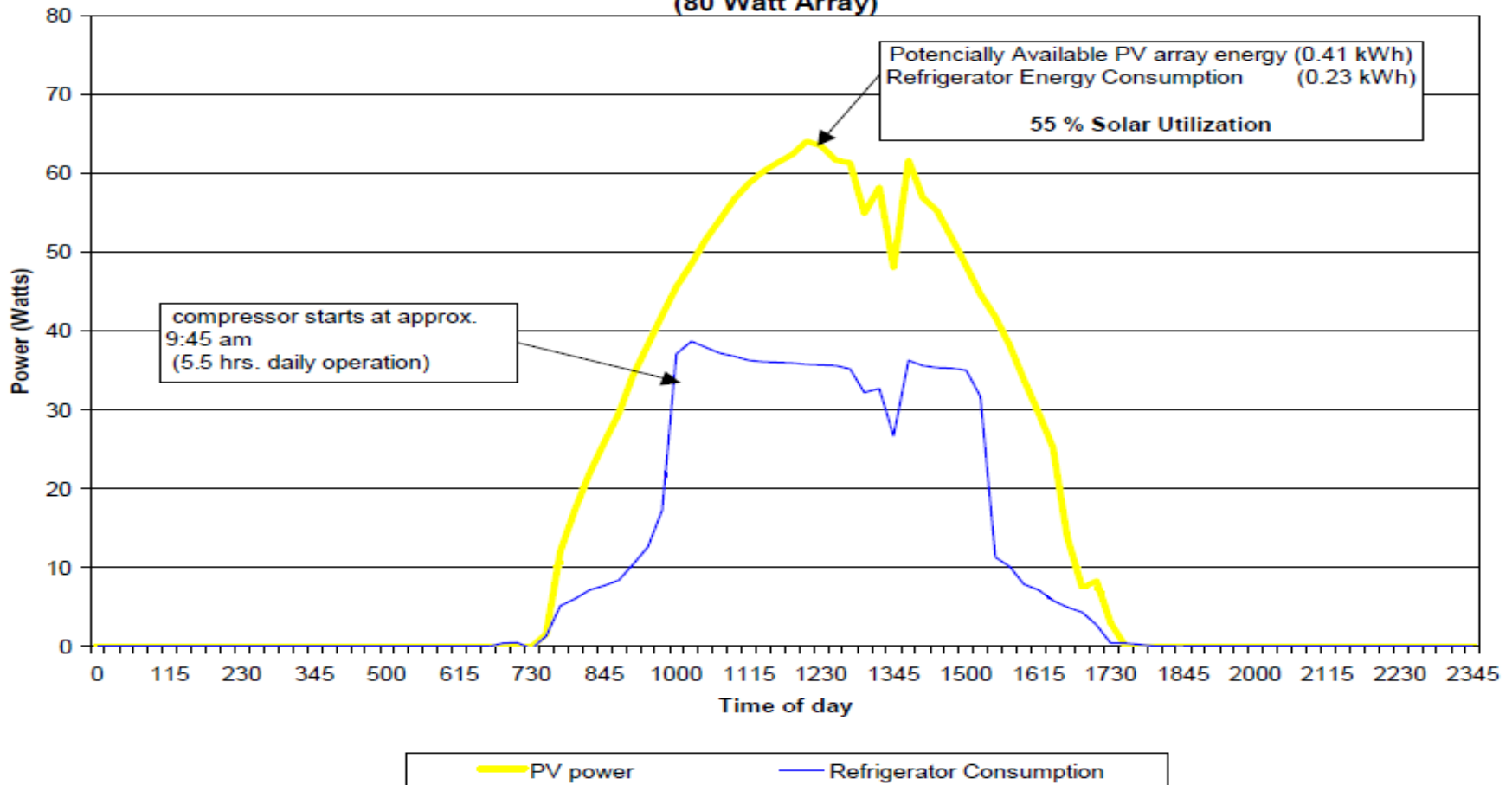
SDD compressors are equipped with an Electronic Control Unit to match motor to solar power but does not provide load prioritization for excess energy harvest.



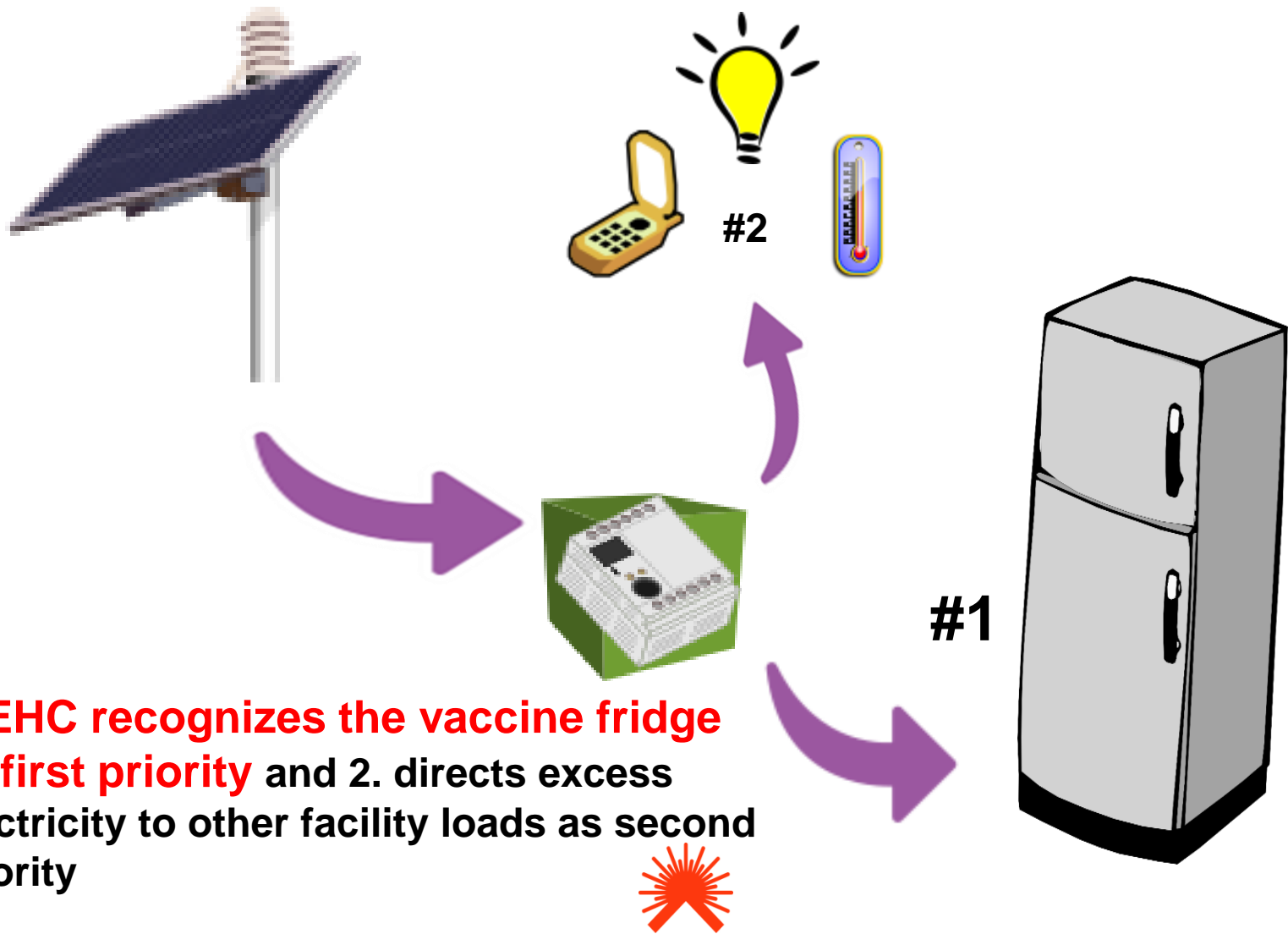
Typical operation leaves unused power

NASA (2000) reported that 45% was not used

PV Energy Utilization-Winter Day (January)
Las Cruces, New Mexico
(80 Watt Array)



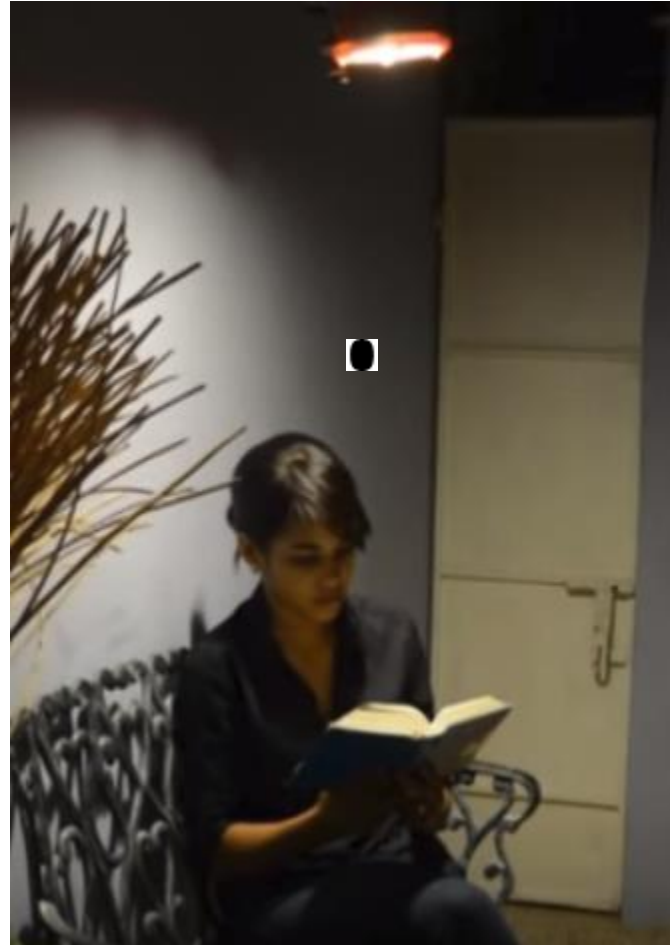
SDD + Energy Harvest Control (EHC)



1. **EHC recognizes the vaccine fridge as first priority** and 2. directs excess electricity to other facility loads as second priority



Secondary Loads with Built in Battery



... or a Secondary Load Battery
for undefined “plug in” loads



SELF and PATH Collaboration

- **Explore SDD + Energy Harvesting**
 - Gather stakeholder input
 - Prove principal(s)
 - Create and test prototype(s)
 - Provide evidence to WHO PQS
 - Inventions to be open source

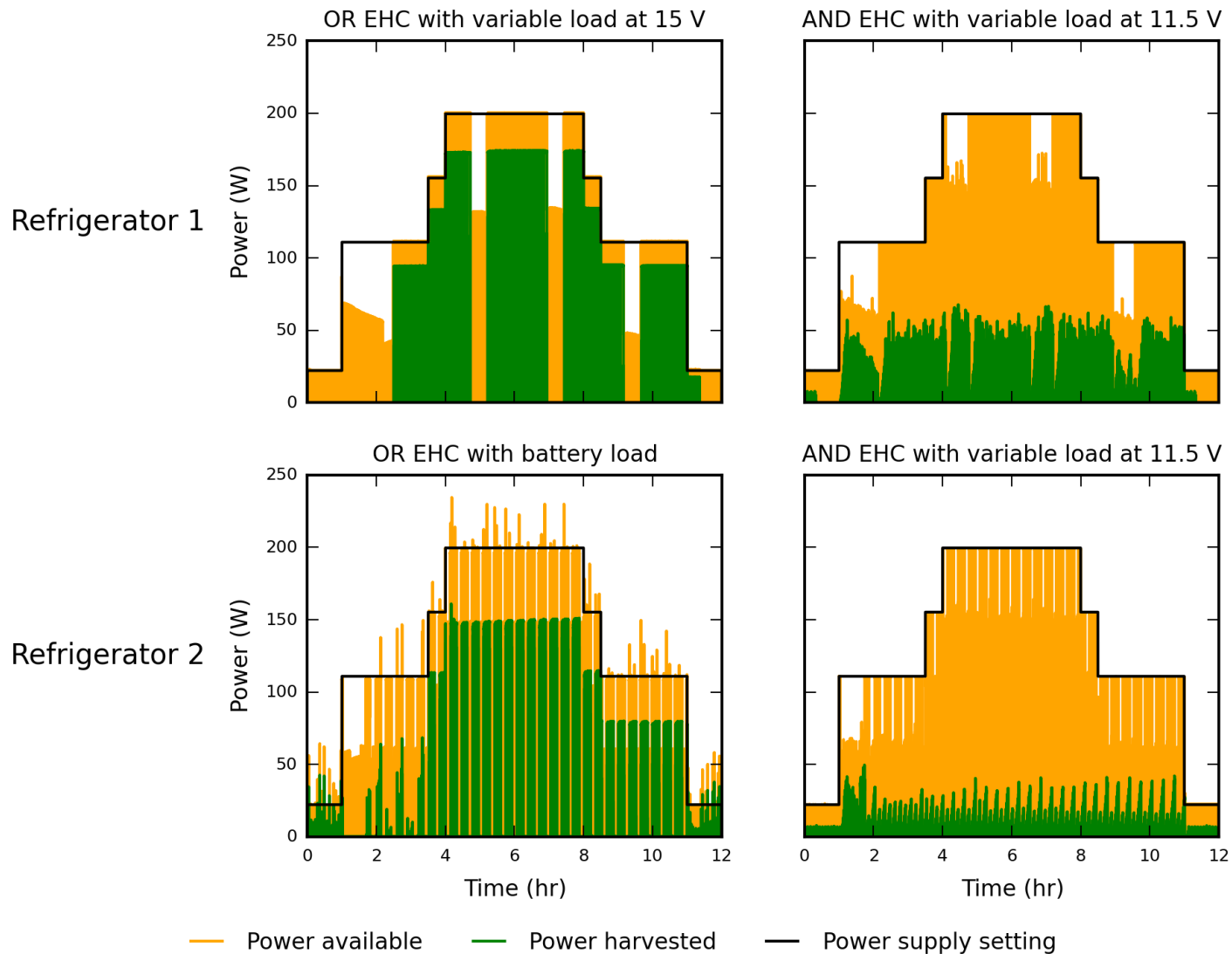


Functional Requirements Defined

- **Be safe**
 - **Always prioritize vaccine refrigeration** ahead of all other ancillary uses
 - **Failsafe design** to prevent any adverse impact on vaccine refrigeration
 - **Compatibility and compliance** with all related **WHO PQS** standards including SDD appliance and solar power systems
- **Provide some amount of excess power** to other, undefined facility loads



Indoor lab testing – energy harvesting



Lab and Mock Field Tests Completed



Field Evaluation-Colombia x 3 Facilities



PQS Equipment Spec, Tests & Report



PQS performance specification

WHO/PQS/E007/EHC01.1

Original: English

Distribution: General

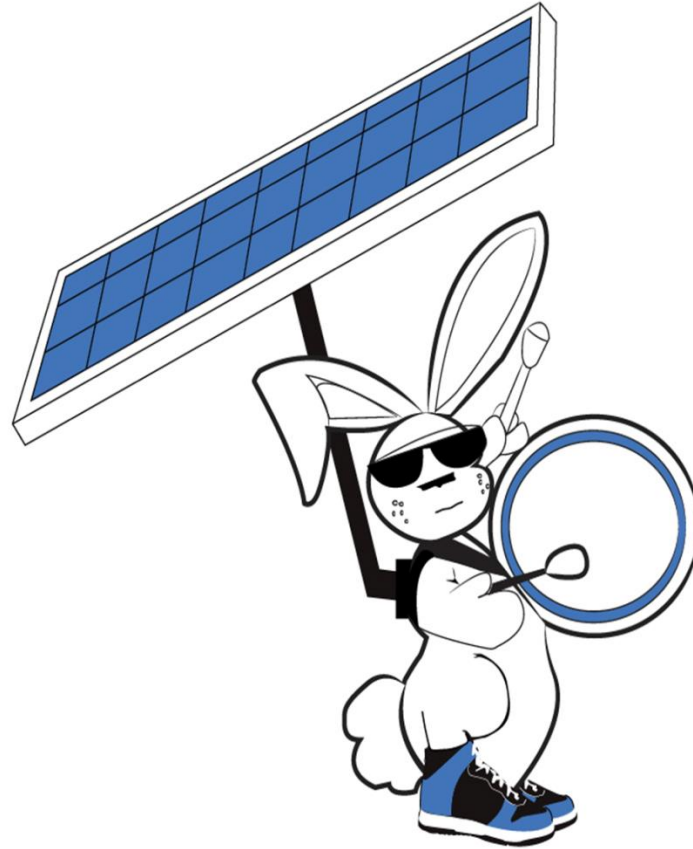
TITLE: Solar direct drive surplus energy harvest control

<i>Specification reference:</i>	E007/EHC01.1
<i>Issue date:</i>	November 1, 2016
<i>Date of last revision:</i>	May 2, 2017

http://www.path.org/publications/files/DT_ehc_full_doc_rpt.pdf



Ready to move Energy Harvest to the field!



What do you want to power?

- Remote temperature monitoring
- Supply chain data
- Lighting
- Communications
- Medical devices
- Staff housing
- Other

