Insulated Solar Electric Cooking

Orion Barar with Dr. Peter Schwartz

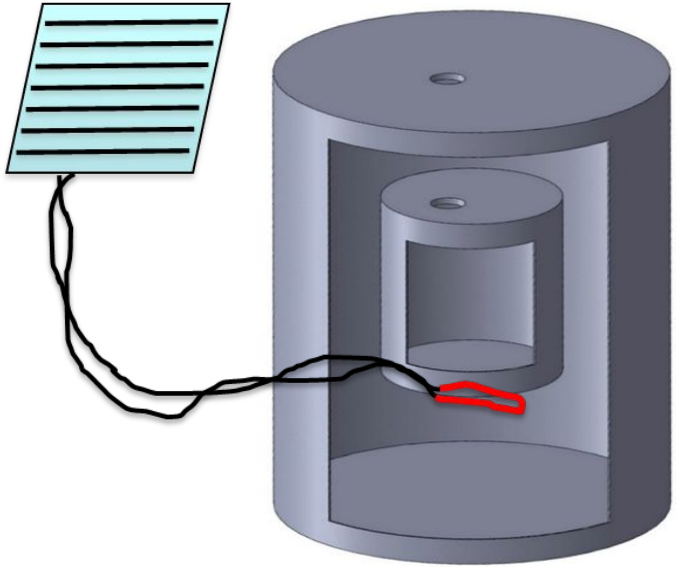
ISECooker:
Solar electric heater inside of a retained heat cooker

The Sun as an alternative to coal, biomass, kerosene…

Flash Cooking in Togo

What is an ISECooker?

- Cookpot
- Insulation Chamber
- Heating Element
- Solar Panel



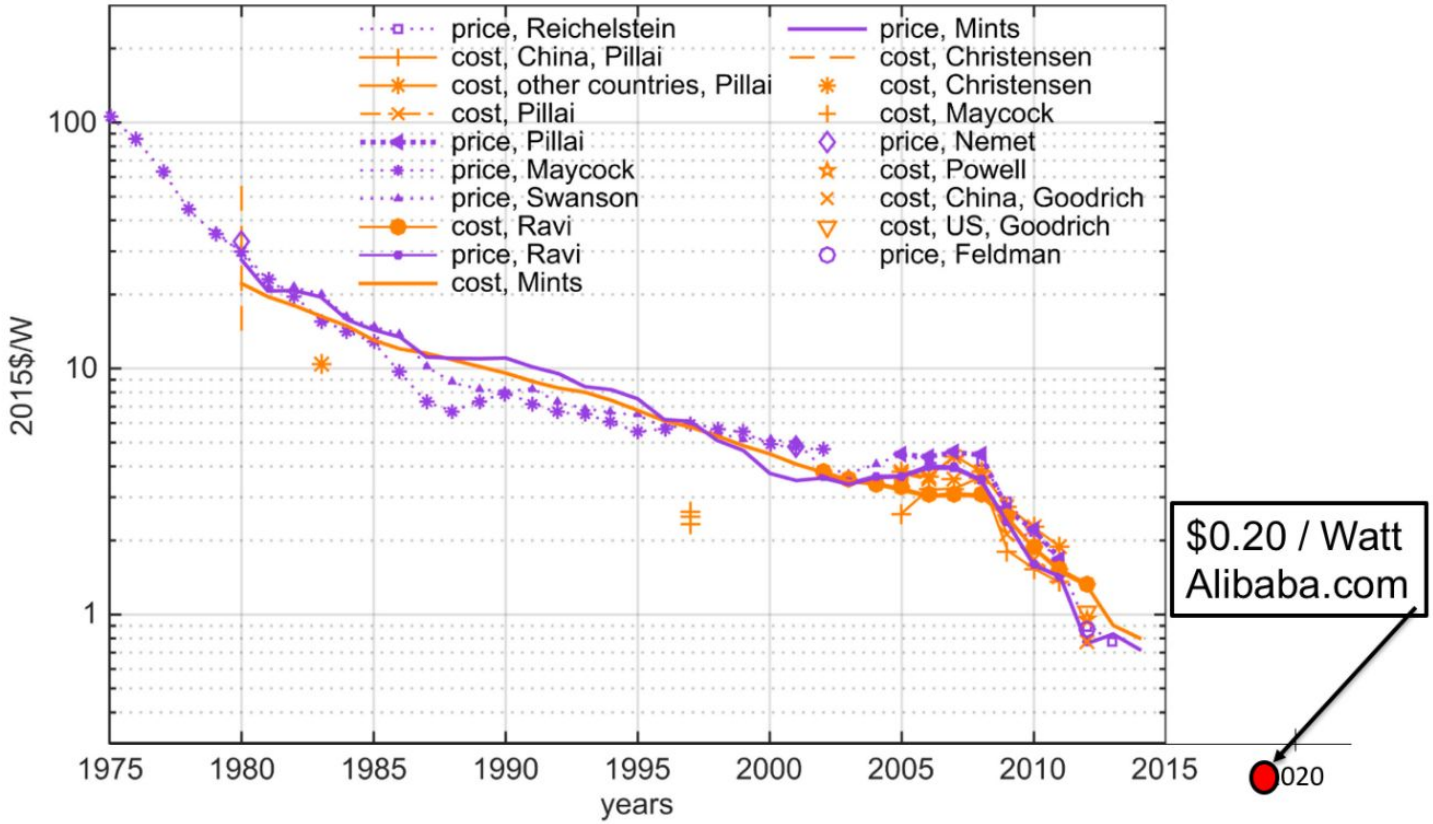
- New ISECookers with thermal storage
  - Aluminum or Molten Salts

Local Manufacturing / Dissemination

- Inexpensive
- Diverse Ideas, Resources, Preferences
- Support Local Economy
- Build Local Technology
  - ---Service
  - ---Education

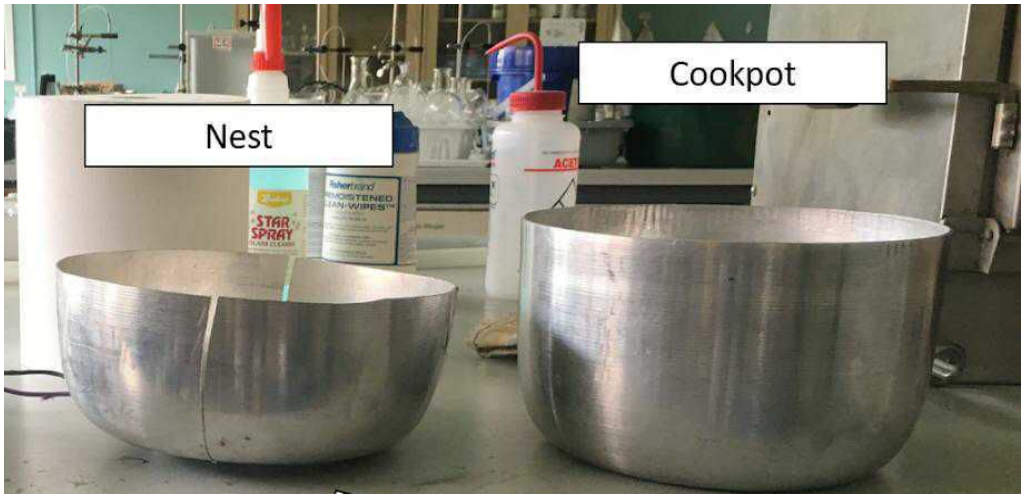
Global Supergroup

Why Solar?


price, Reichelstein
cost, China, Pillai
cost, other countries, Pillai
cost, Pillai
price, Pillai
price, Maycock
price, Swanson
cost, Ravi
price, Ravi
cost, Mints
price, Mints
cost, Christensen
cost, Christensen
cost, Maycock
price, Nemet
cost, Powell
cost, China, Goodrich
cost, US, Goodrich
price, Feldman
2015$/W
100
10
1
1975
1980
1985
1990
1995
2000
2005
2010
2015
020
years
$0.20 / Watt
Alibaba.com

Direct Connect ISECooker

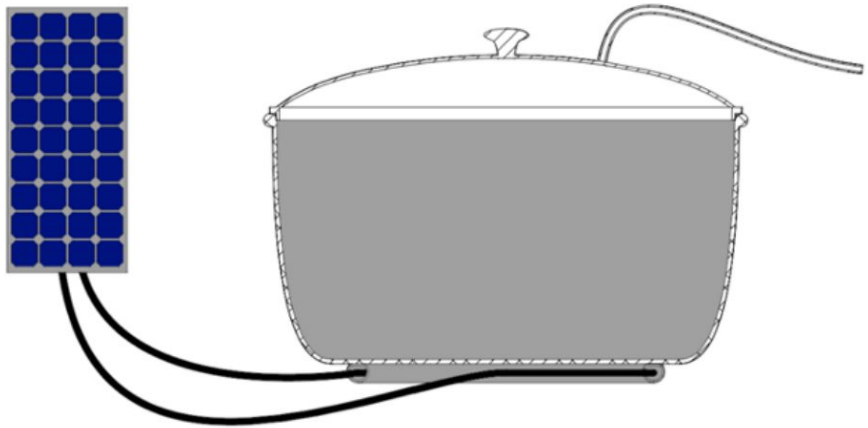
- Cheapest, most basic variety
- Heating element connects directly to pot or nest



Section of eletric stove heating element

Feedback from ISECooker Users

- Want more power
- Cook when sun is down

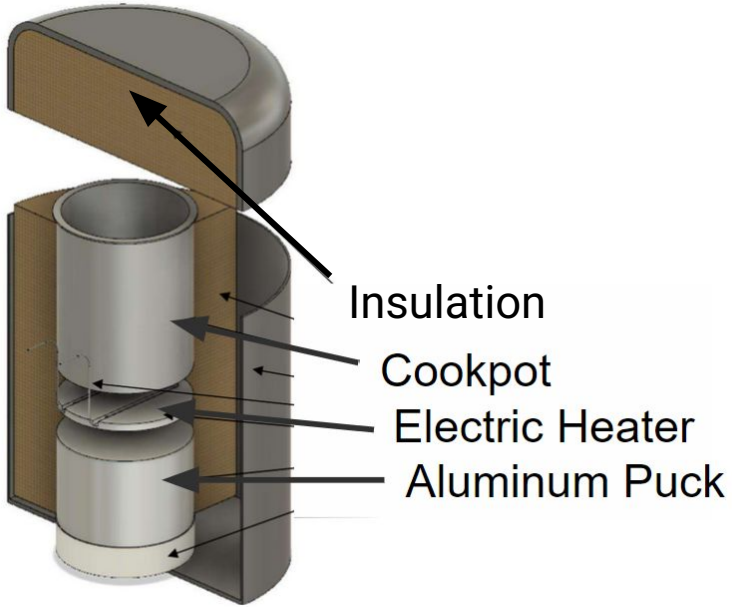


Solution

Thermal storage creates versatility in solar cooking

Solid Thermal Storage ISECooker: Aluminum

- Stored thermal energy in aluminum



ISECooker in Togo

- Thick 5 cm base for thermal storage
- Concrete insulation

ISECooker in Uganda

ISECooker in Uganda

New Heating System

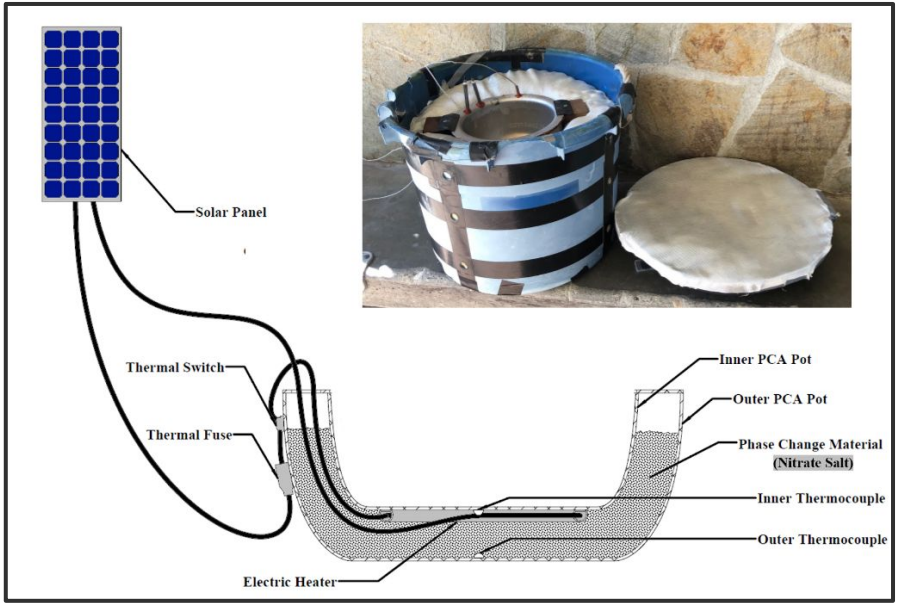
Plaster to cover electronics

Electrodes taken from a plug

All finished!

Solar Salt ISEC

- Stored thermal energy in Solar Salts
- 60% $NaNO_3$, 40% KNO_3
- Melting Point: ~220-270 ºC
- Needs immersive heater



Solar farm with energy stored in molten salt tower

Conclusion

- ISECooking technology is an inexpensive, convenient alternative to combustion cooking
- Direct Connect is cheap and easy. Adding heat storage capacity increases versatility
- Local Manufacturing serves many purposes: financial, academic, product support
- Want to make an ISECooker? See Pete's blog. Send me an email at obarar@calpoly.edu for more details.

Local Dissemination is Funded by:

Acknowledgements

- Dr. Peter Schwartz
- California Polytechnic University at San Luis Obispo
- William and Linda Frost Foundation
- Stefan Avramov
- MECS
- ASEI (African STEM Education Initiative)