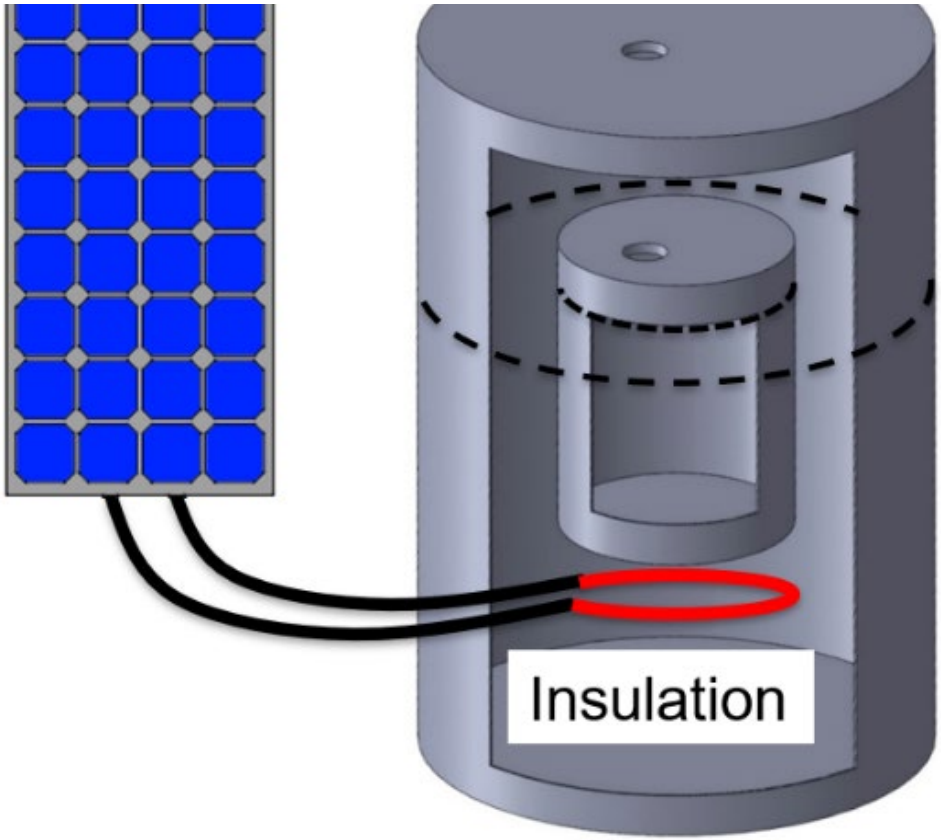
1 Year in Africa and Nepal Creating Solar Electric Cooking with Local Collaborators: Success? Lessons Learned

Pete Schwartz, *Cal Poly Physics*

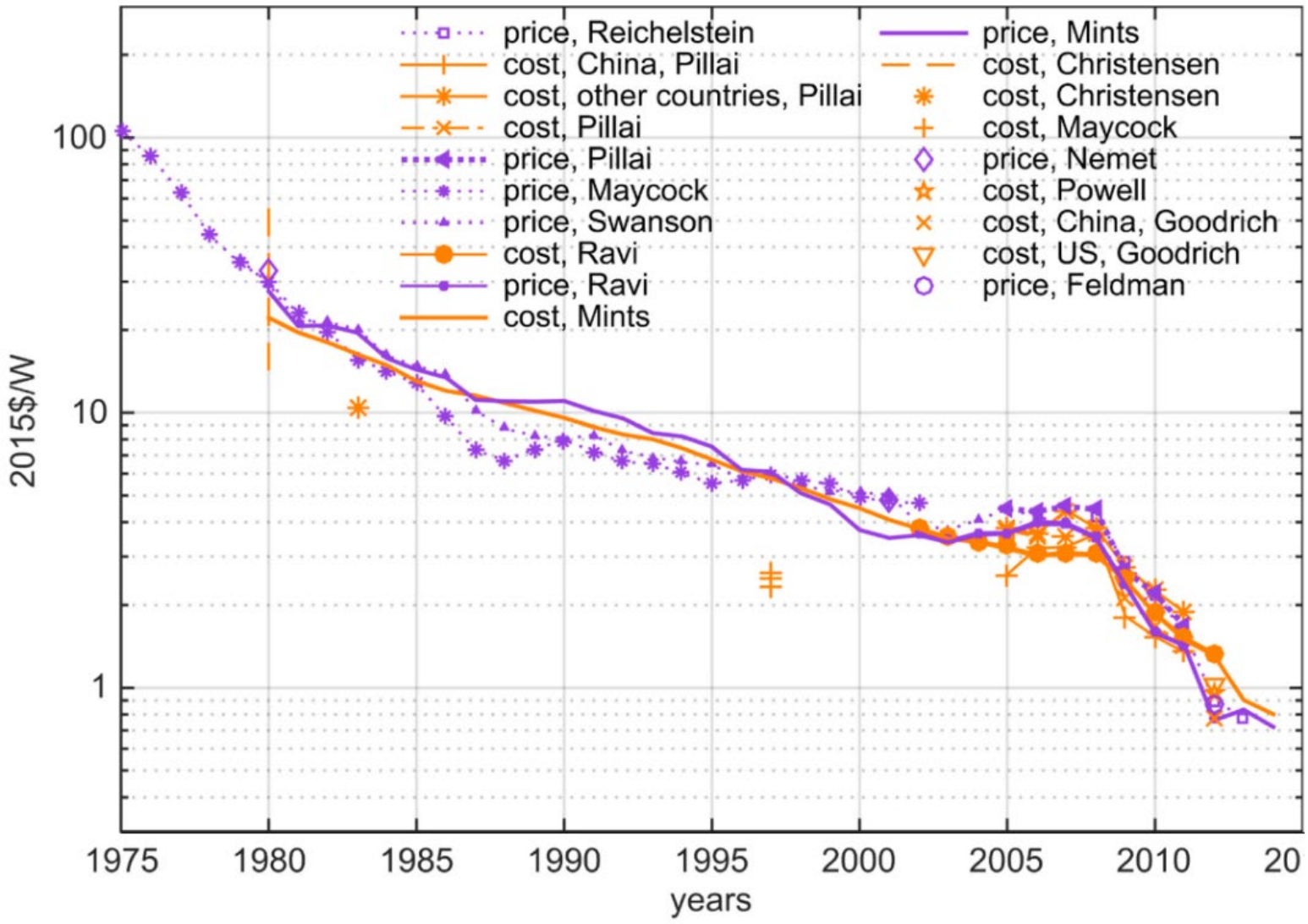


MECS Modern Energy Cooking Services

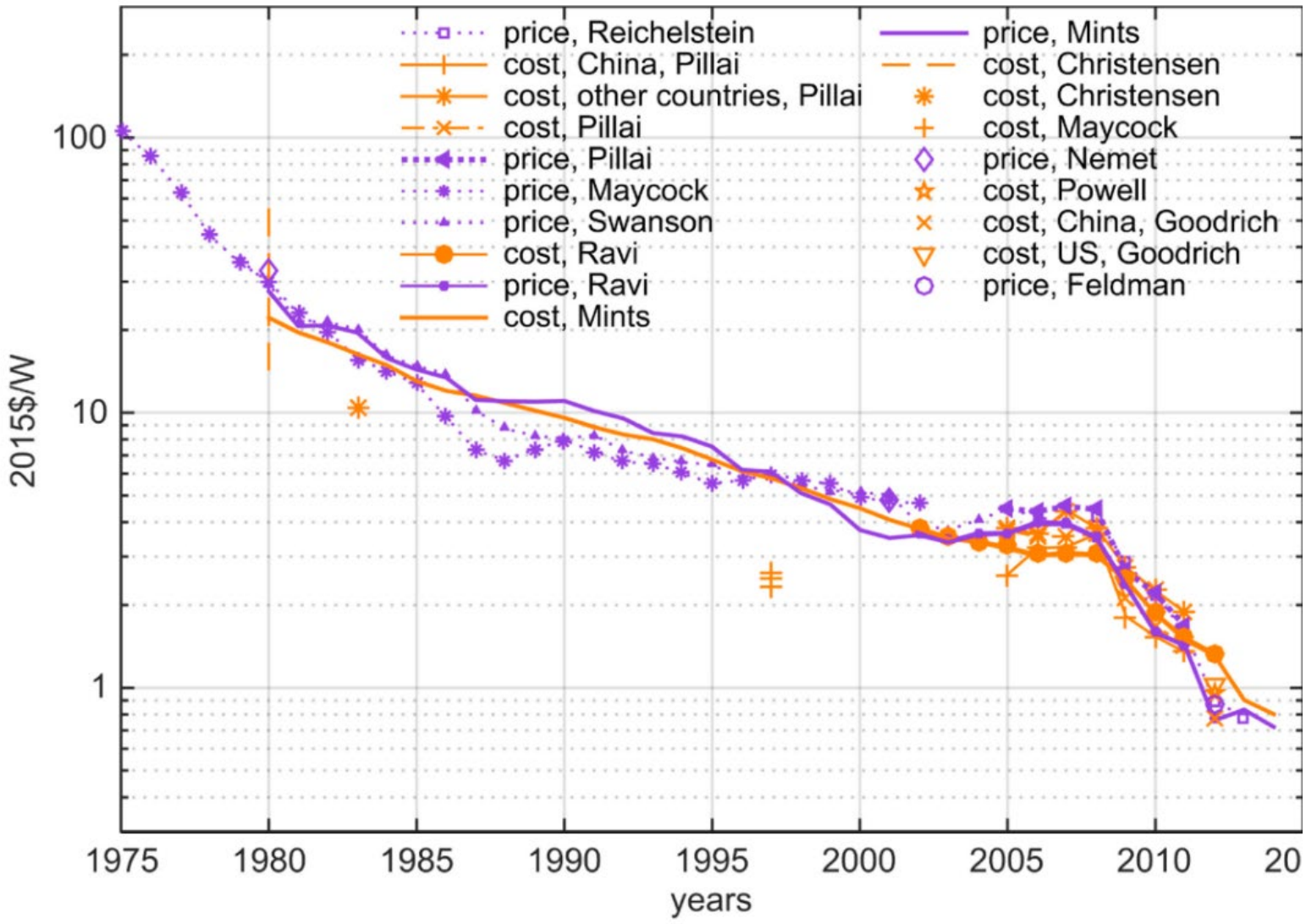
UKaid from the British people

2007-2015: Solar Concentrators

Cost, Complexity, Convenience



Kavlak et al. 2018, https://doi.org/10.1016/j.enpol.2018.08.015



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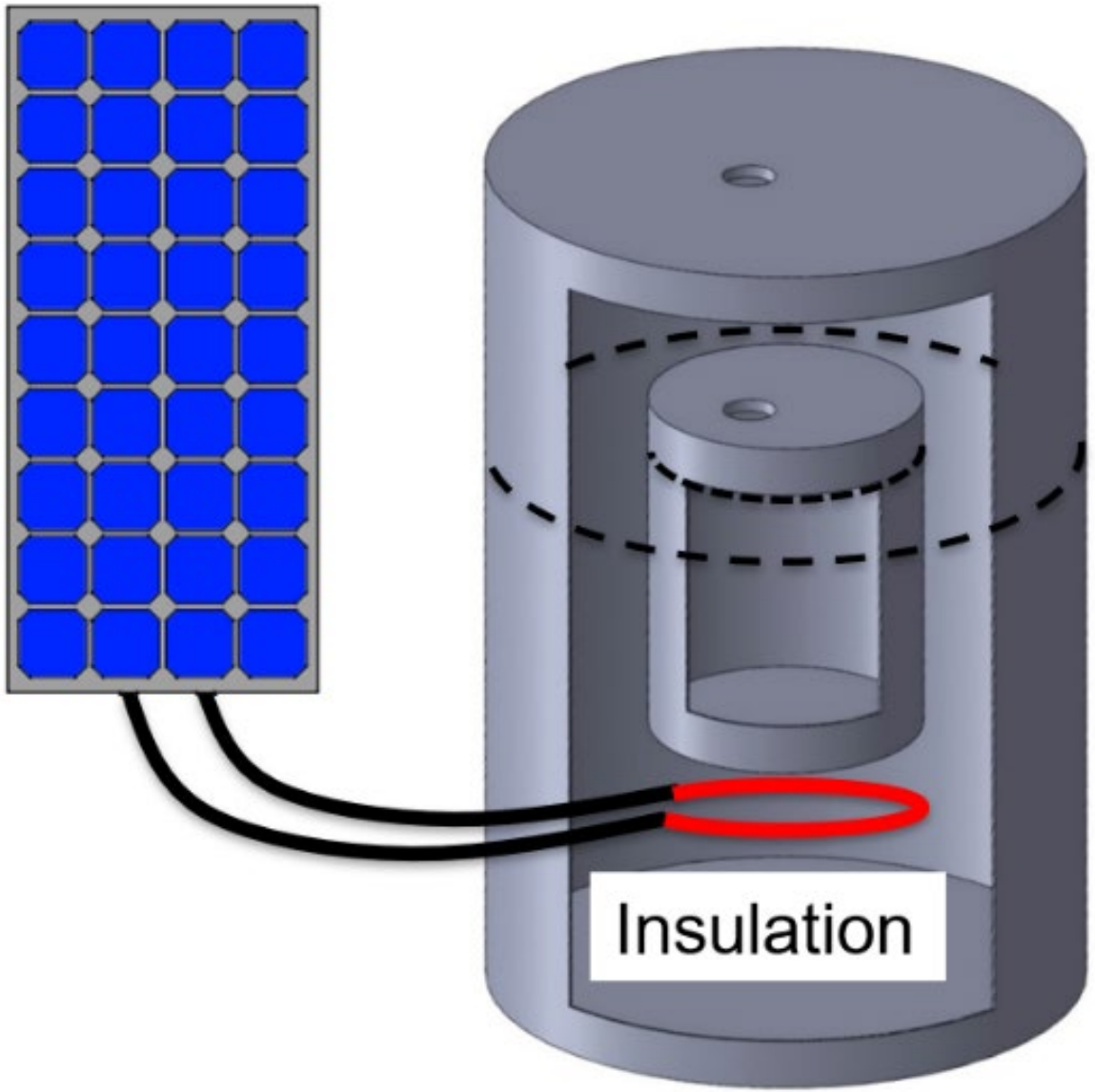
$0.10 / Watt, 2025

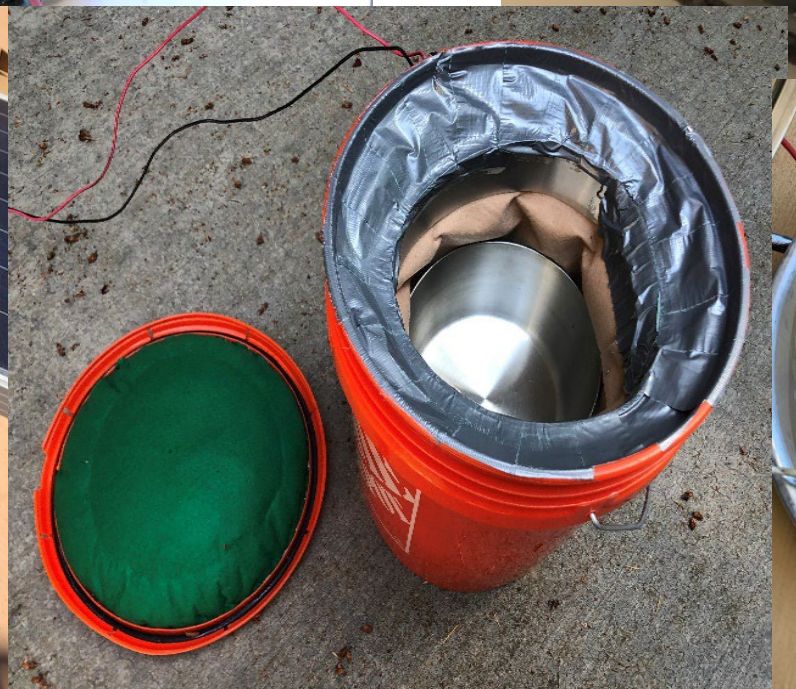
Insulated Solar Electric Cooking (ISEC)



Boil and Simmer

5 kg of food in a day!

How often did I use MINE?



ISEC with Thermal Storage at Home

Location
Convenience
Cost
No moving parts

MECS
Modern Energy Cooking Services

UKaid
from the British people

Local Manufacturing / Dissemination

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

Dissemination Through Global Learning Community (GLC)

- Construction Manual
- Forum for Sharing Knowledge
- Weekly Meetings


TRADITION


Welcome
TRADITION
AVEC
SEMBLE!

What if I…

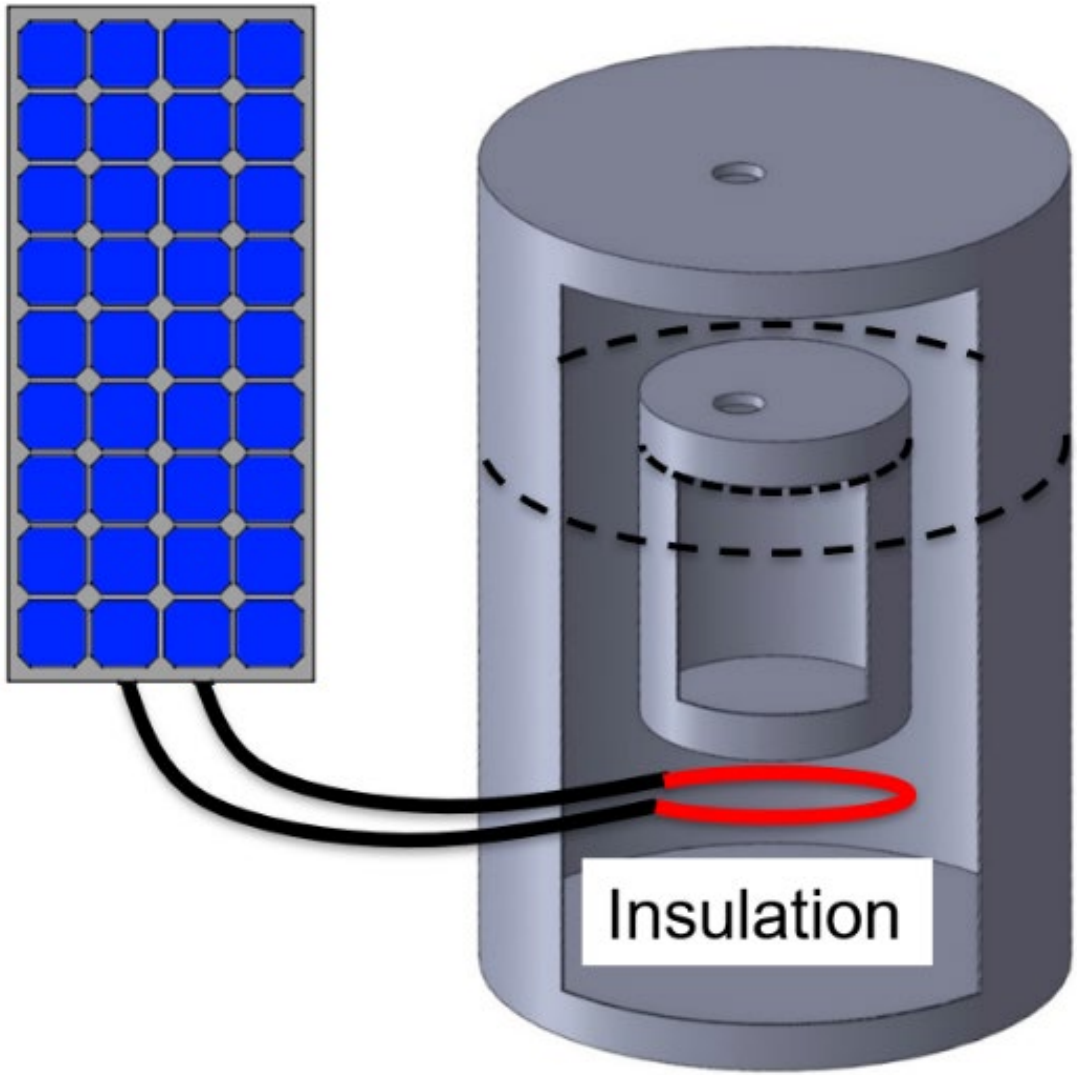
1) Want more than 100 W?
2) Use grid power at night?
3) Don’t want a solar panel at all?
4) Have a battery?
5) Have wind power?

Insulation will save energy, money

We can produce locally

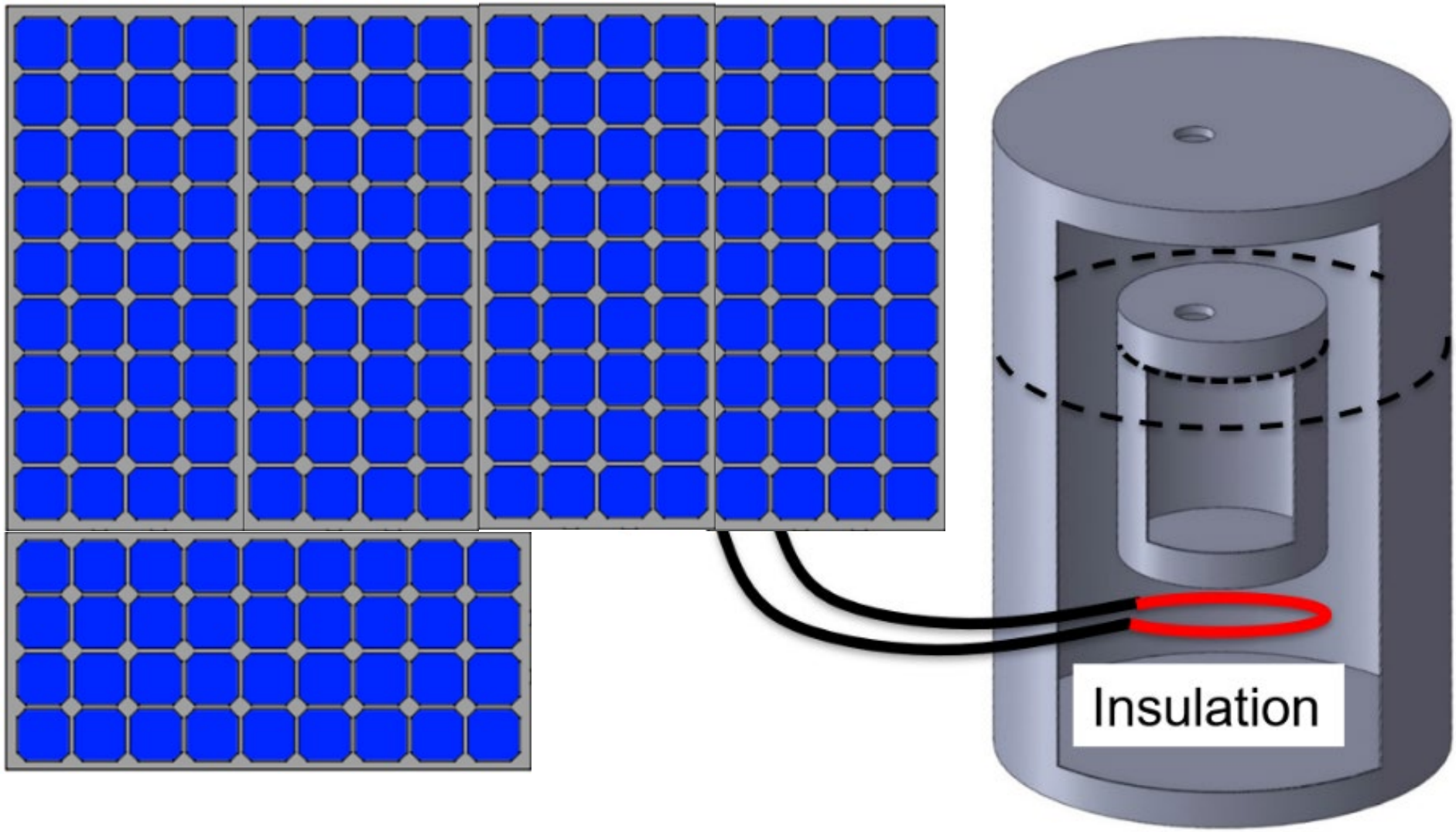
100 W Solar Panel

5 kg / day



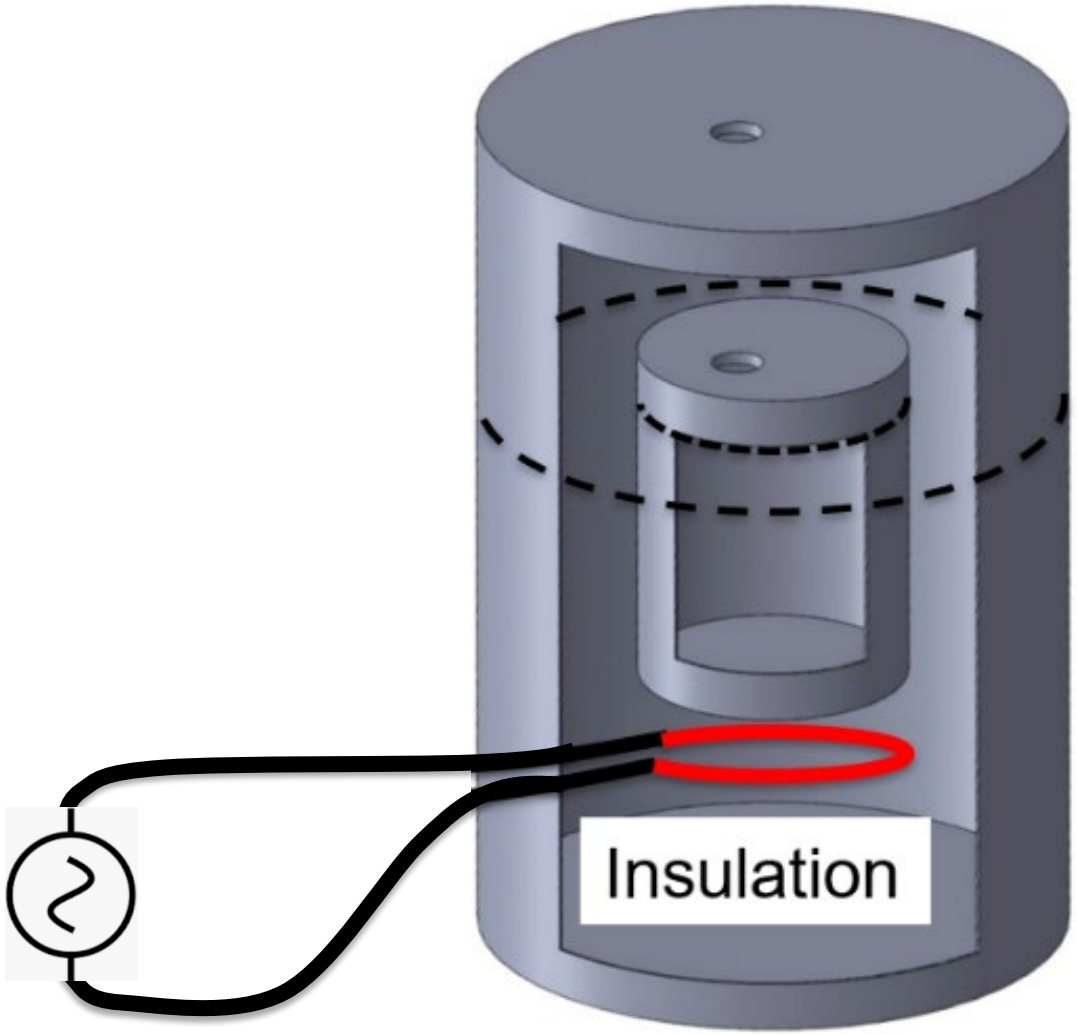
500 W Solar Panel

- 5 kg / hour



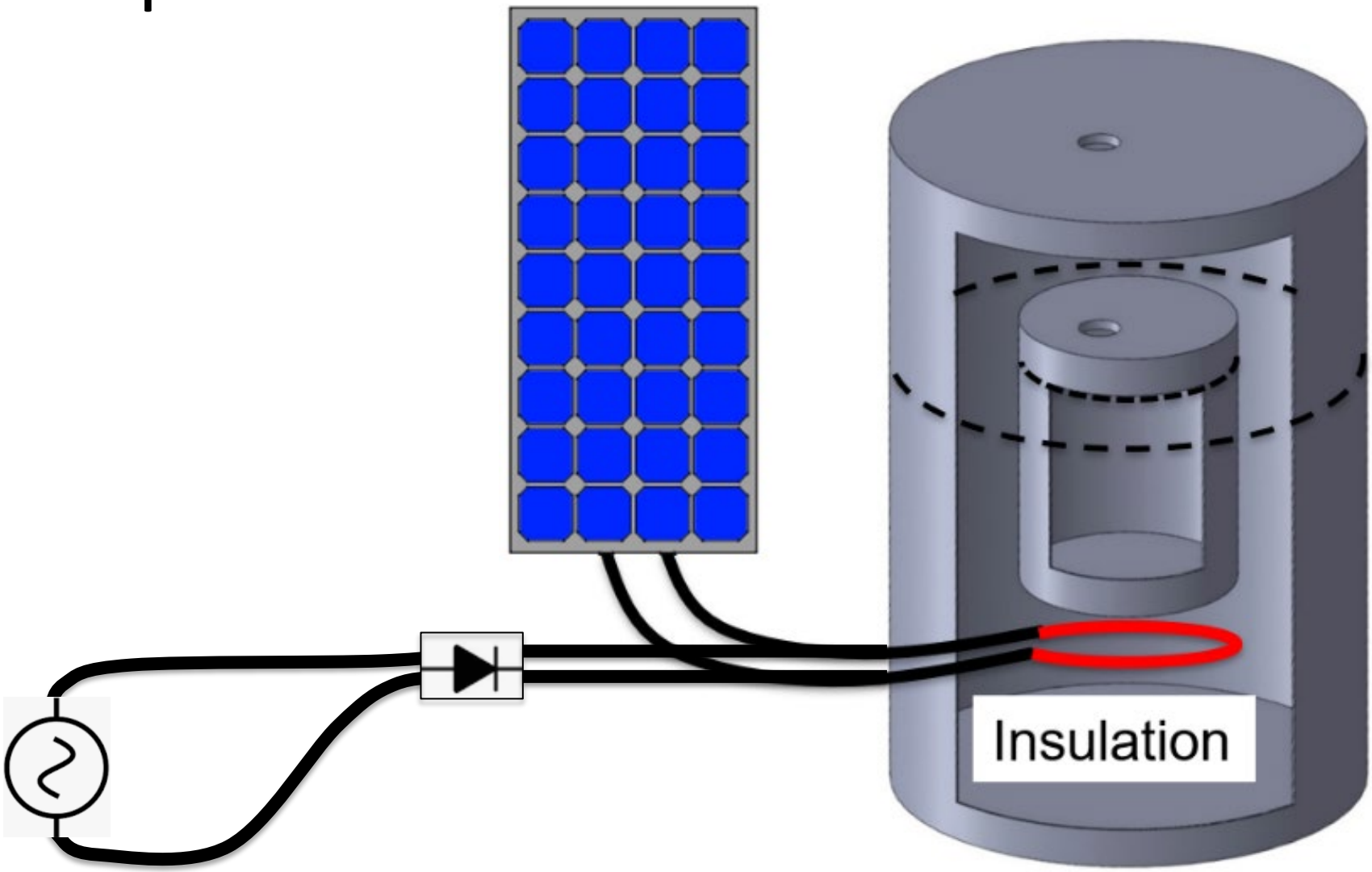
1000 W Grid Connection:

- 10 kg / hour
- 24-7 operation



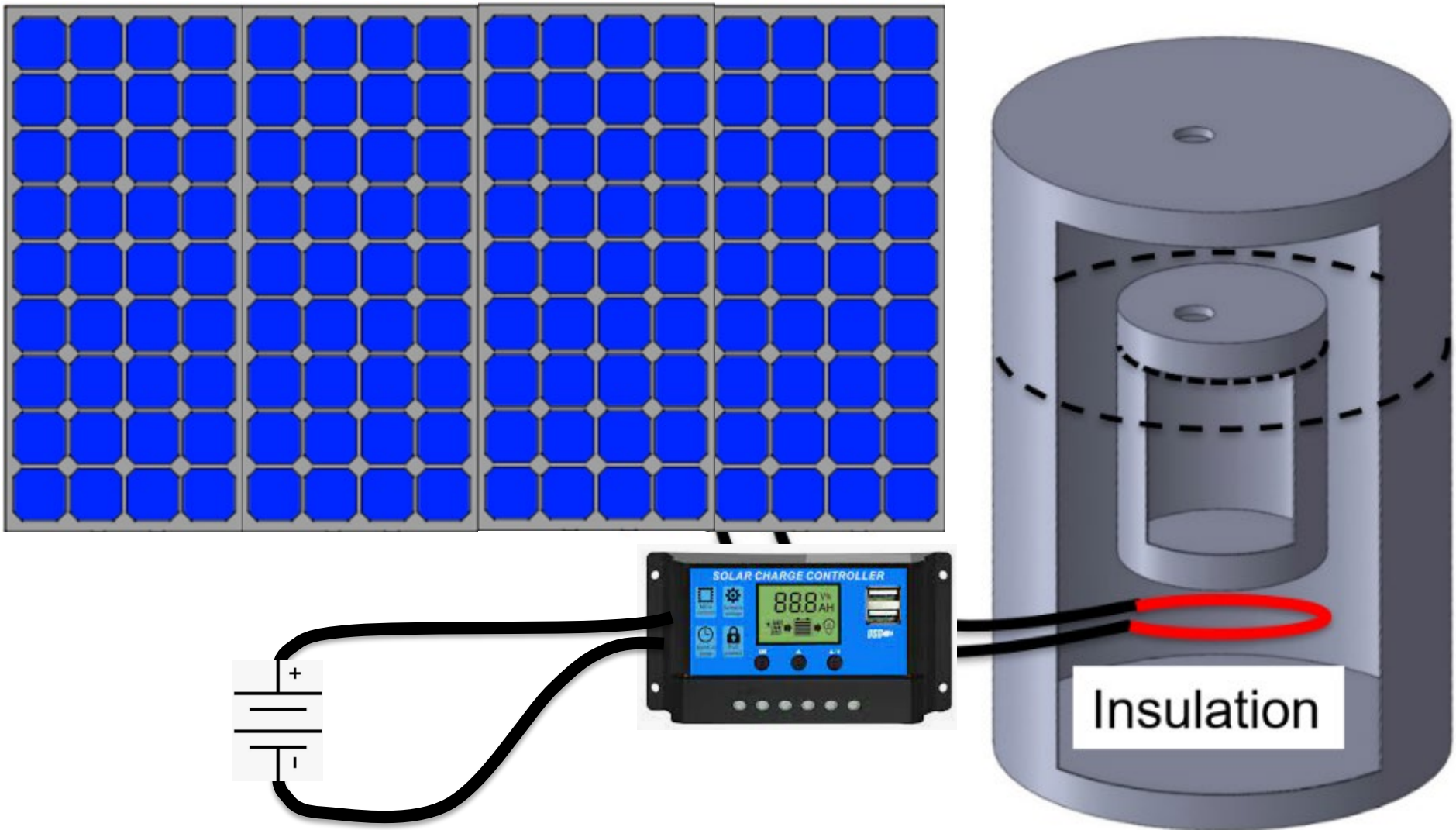
100 W DC Grid Connection:

- 5 kg / Day
- 24-7 Operation



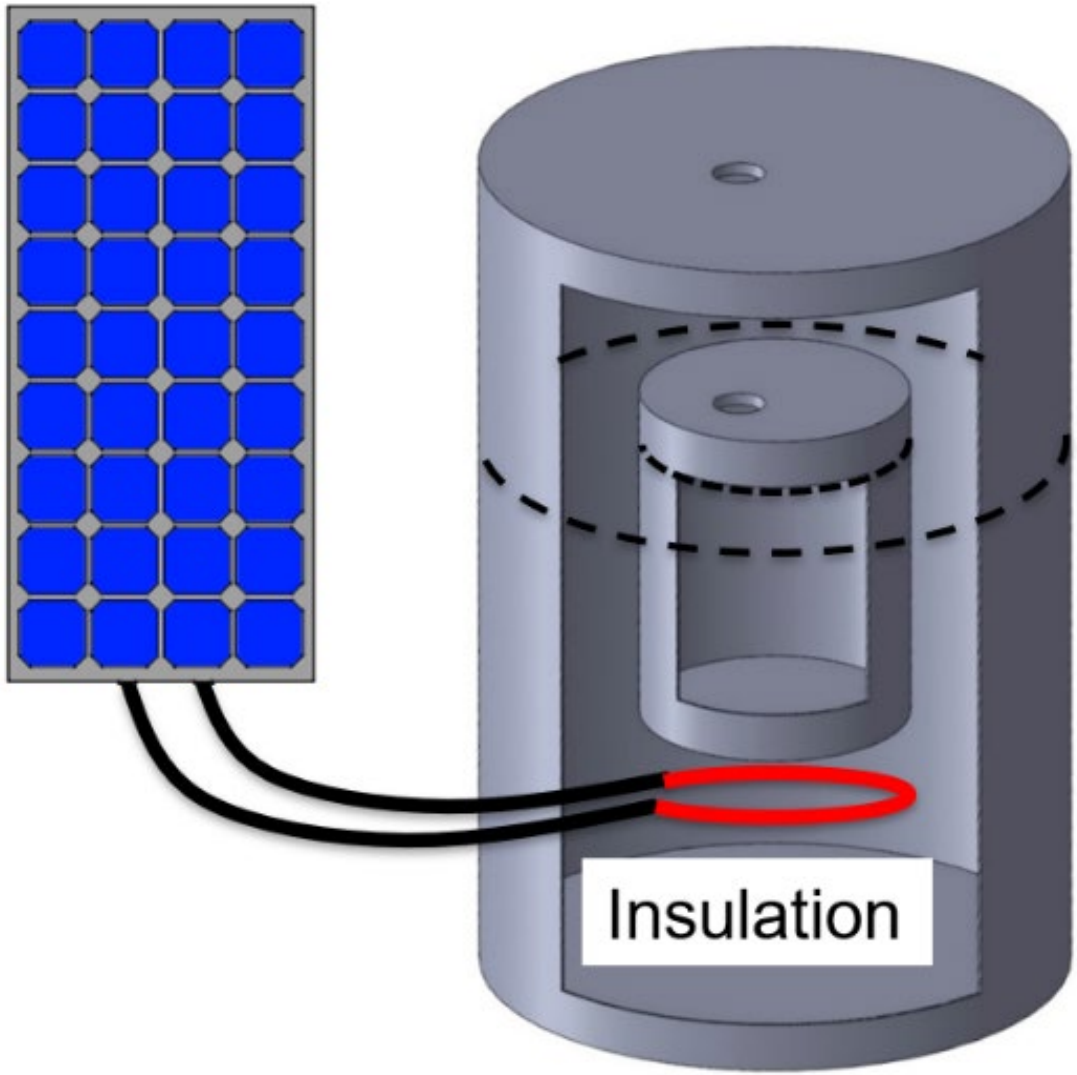
400 W - 1500 W, w/ Battery : $240 - $3000

- 4 kg / hour
- 24-7 (limited) Operation

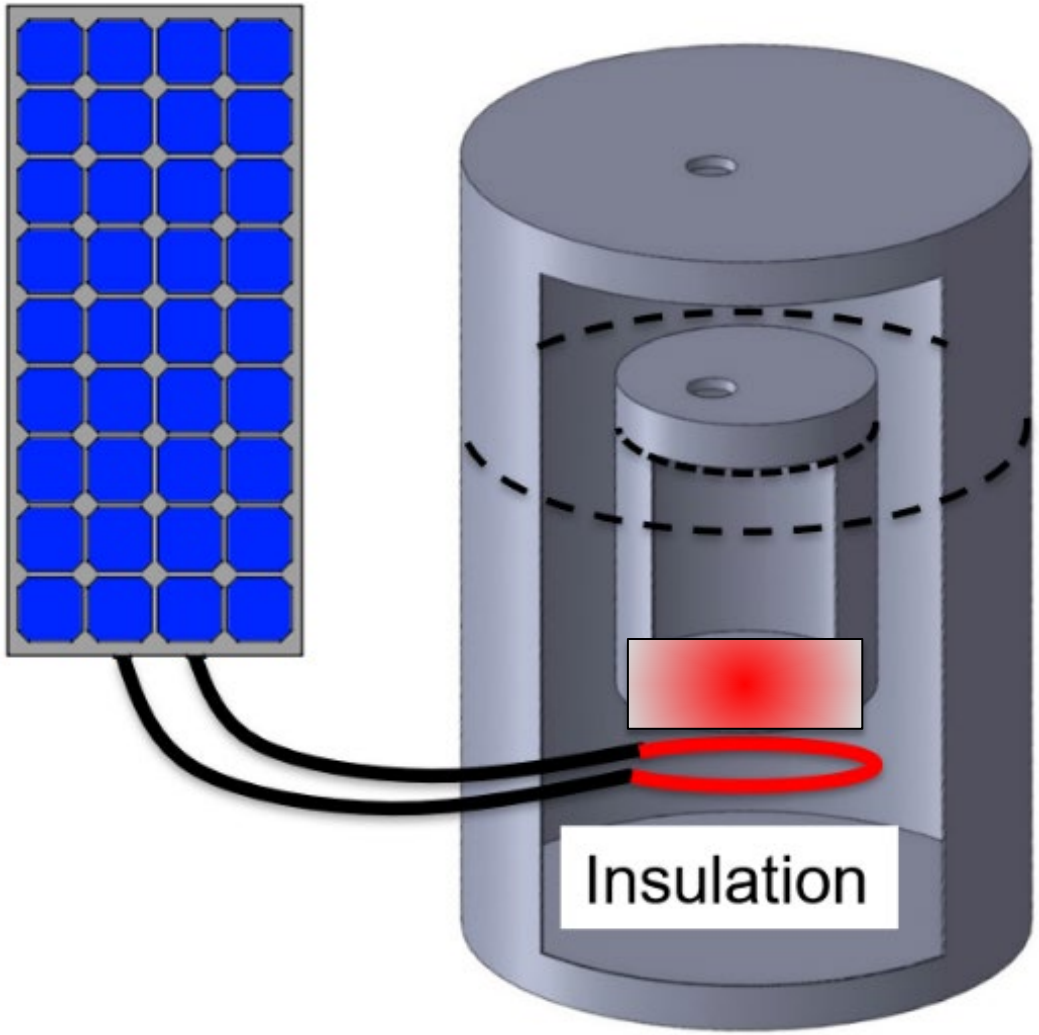


Insulation will save energy, money

We can produce locally



- 100 W and Thermal Storage: $80 + $20
  - 5 kg / day
  - VERY high power



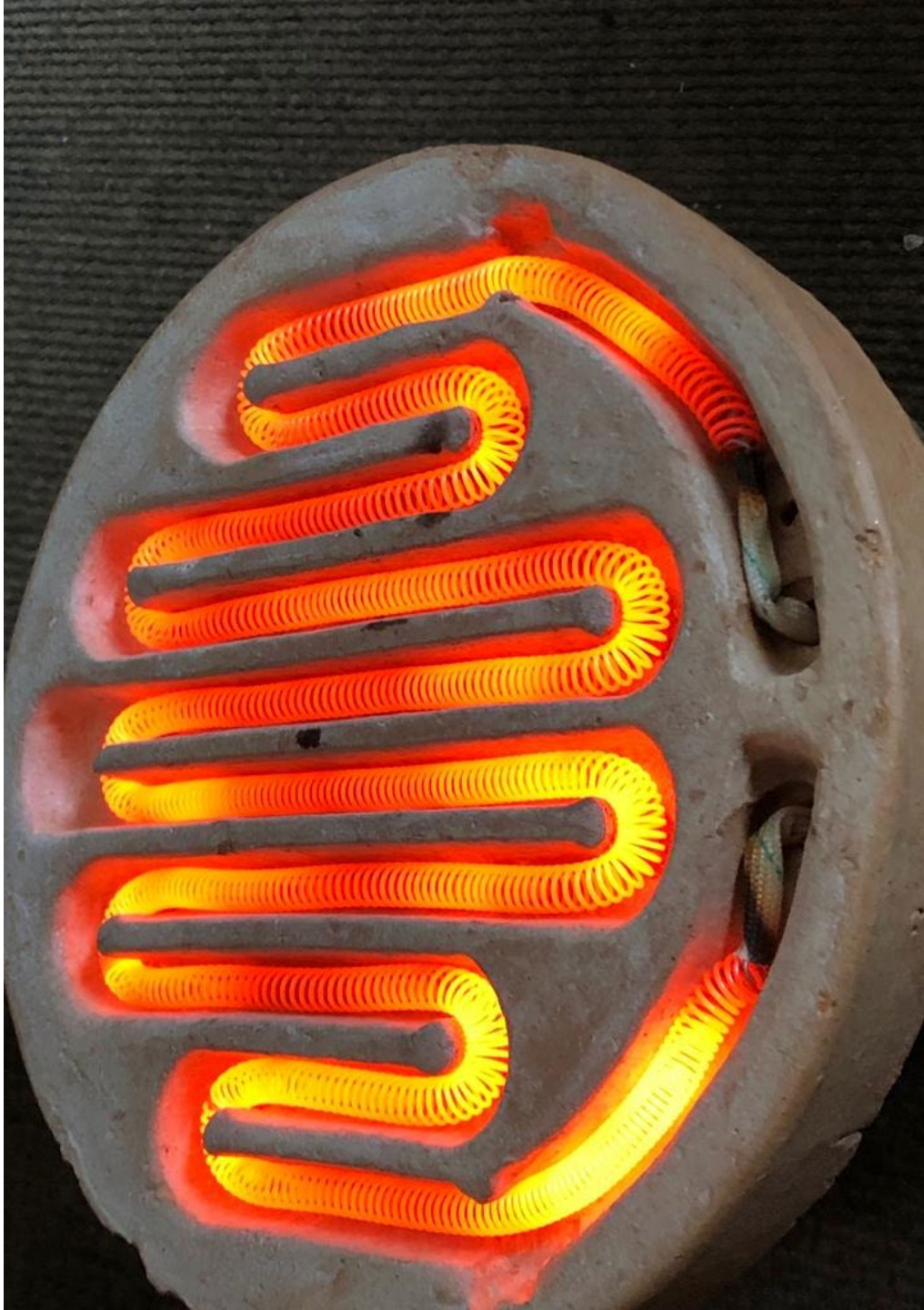


Polyethylene Melting Temperature = 260°C


Kindle Vocational School
Salima
5-month program

Vocational Schools:

- A dedicated instructor that is already paid to teach the students
- Enthusiastic students who want a job after they graduate
- School wants to produce and sell
- Provides a mechanism for production AND adoption, because students are always cooking and innovating both the product and the practice.
- *Still need university partner?*



Bhaktapur Ceramics

Nepal Market:

Off Grid Communities

- Low Power + Thermal Storage + Solar Panels

Morning Electricity Demand Surge

- Low Power + Thermal Storage: Load Shifting


Nepal Yantrashala Energy

300 W heats 20 L water to 90 overnight

Conclusions:

- Why could we better build manufacturing capacity in Nepal than in Africa?

a)Nepal has better manufacturing infrastructure

b)African money is not valued: can't import

"Our Forex is shit"

c) Africans are averse to collaborating

ISEC (Insulated Solar Electric Cookers)

- inexpensive, AND getting cheaper
- convenient, And getting more convenient
- safe, healthy.
- can it be locally produced and adopted?