

# What are the drivers of dry toilets? an entrepreneurs perspective

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# 1.6 billion is the problem

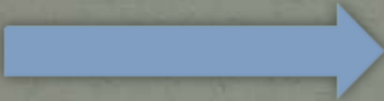
- 4,000 children a day
- 2<sup>nd</sup> leading cause of death for children under 5
- Dying from pathogens in our own shit
- Issue is exacerbated in urban and peri urban areas
  - Children in the slums of Nairobi, Kenya, have mortality rates much higher than rural Kenyan children (150.6 per 1000 live births vs 113.0, respectively)
- Urban population in developing countries will double from 2.5 billion in 2009 to 5.2 billion in 2050
  - 165,000 people every day!

Am I asking the right question?

What are the drivers of dry toilets?

What are the drivers to reduce disease transmission via sanitation interventions?

# How to prevent disease transmission

- Prevent interaction with pathogens
  - Minimize interaction and inactivate pathogens
    - Containment
    - Collection
    - Treatment
- 
- BEHAVIOR  
CHANGE



# How do we change behavior ? in peri-urban and urban communities..

- Value chain approach
- CLTS
  - What happens when pit is full?
  - What happens when there is no space to dig a new pit?
- Waste can be fertilizer?
  - We don't have small farms for people to use, but we can collect, process, redistribute and sell

# How much is our shit worth?

- Urea fertilizer price locally in Mali is \$0.80/kg
  - FOB price \$0.30/kg
- =1kg N is worth \$1.74
- Jerry can of urine = \$0.13
  - One person 13 days
- Truck of 11,000 liters is worth only \$70

# Get back to the basics

- No one likes eating their own shit
- People like toilets
- Value chain approach
  - Target reasons why people like toilets
    - Comfort, privacy, safety, dignity,
- So, it's simple lets just offer people toilets they like and a system that is sustainable and effective at preventing disease transmission



# What type of toilets do people like?

- Ones that are affordable, meet peoples needs and don't require interacting with shit

Products (\$350 to \$400)



Low cost VIP (\$150 to \$200)

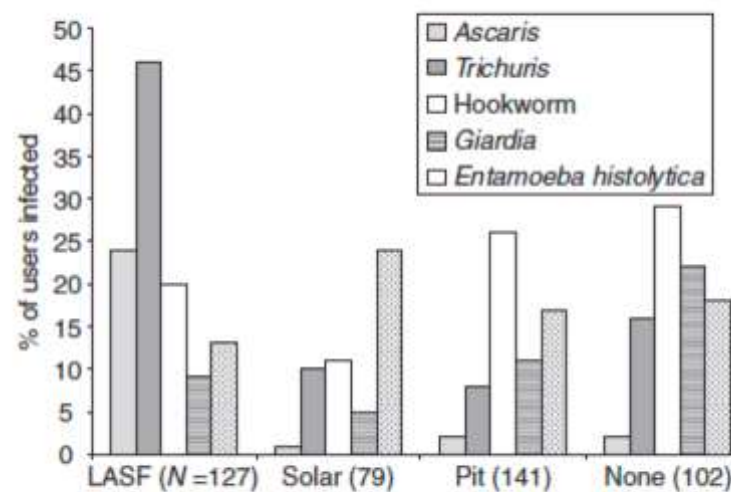


Figure 2 Prevalence of parasitic infection by latrine type.

Latrina Abono Seco Familiar(LASF)=Ecosan=higher disease prevalence

Corrales, L.F., Izurieta, R. and Moe, C.L. (2006) Association between intestinal parasitic infections and type of sanitation system in rural El Salvador. *Tropical Medicine and International Health*. 11 (2):1821-1831.



# What types of toilets do people like? (continued)

- Low investment costs are important

Sanergy community toilet  
<\$0.05 per use

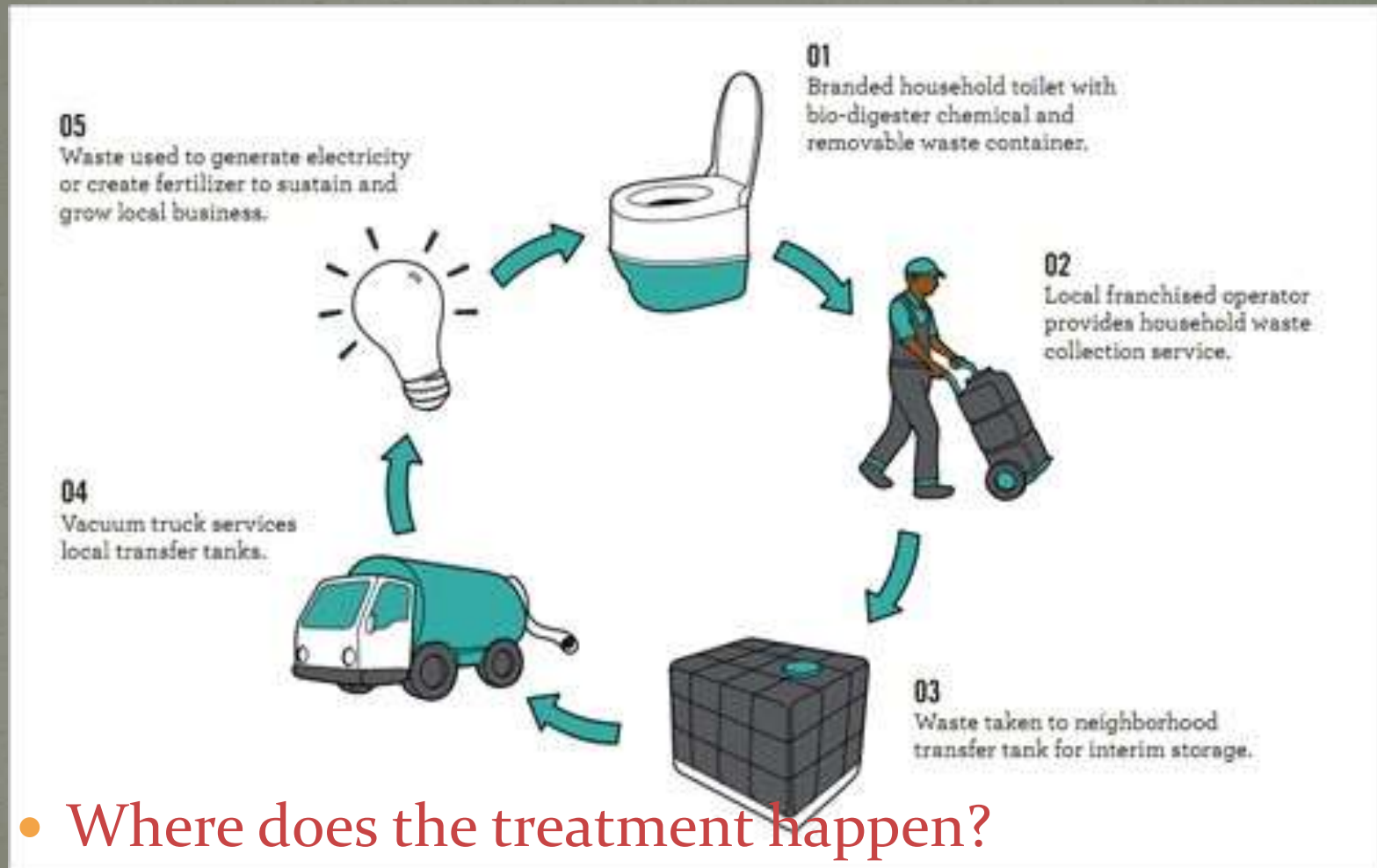


Ghanasan in-home toilet  
<\$0.05 per use



Both come with a service so they are maintained and models are financially independent = SCALING

# Is it preventing disease transmission



Ahah! We've found a huge need

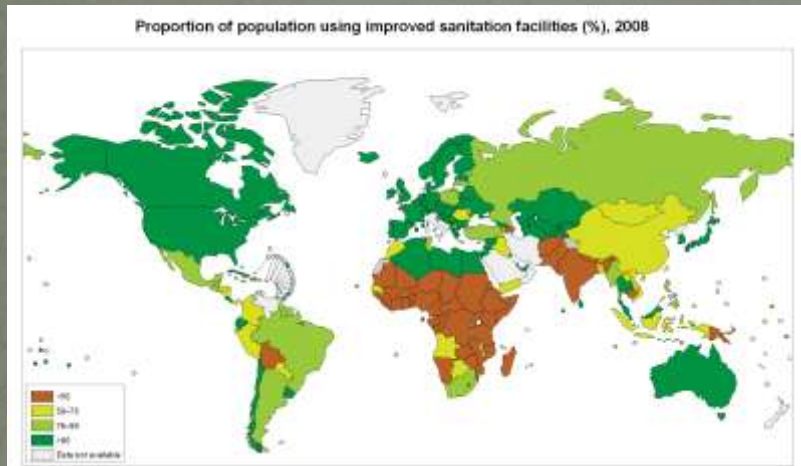
- Waste treatment system that can integrate into affordable sanitation system where users are buying or renting the toilets because well they like toilets



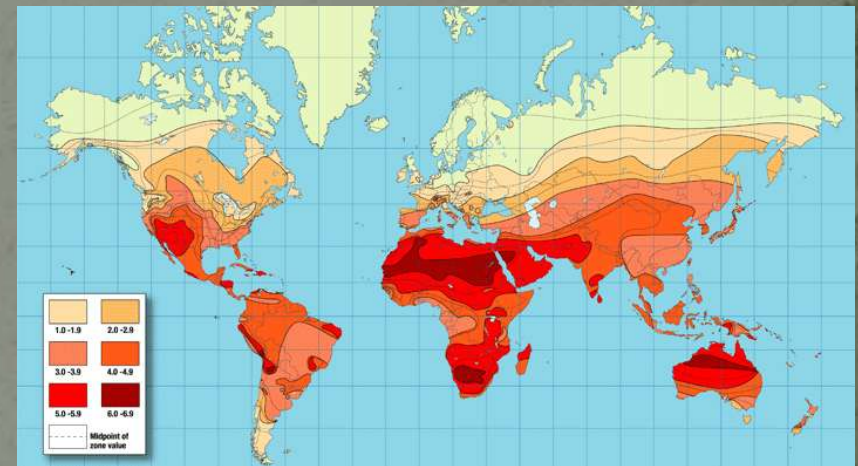
# Challenge: Develop low cost waste treatment device that fits into service model

- Sunlight is free!
  - And kills pathogens!

Diarrhea due to lack of sanitation



Solar Radiation Levels



Places where  
sanitation is most  
rare



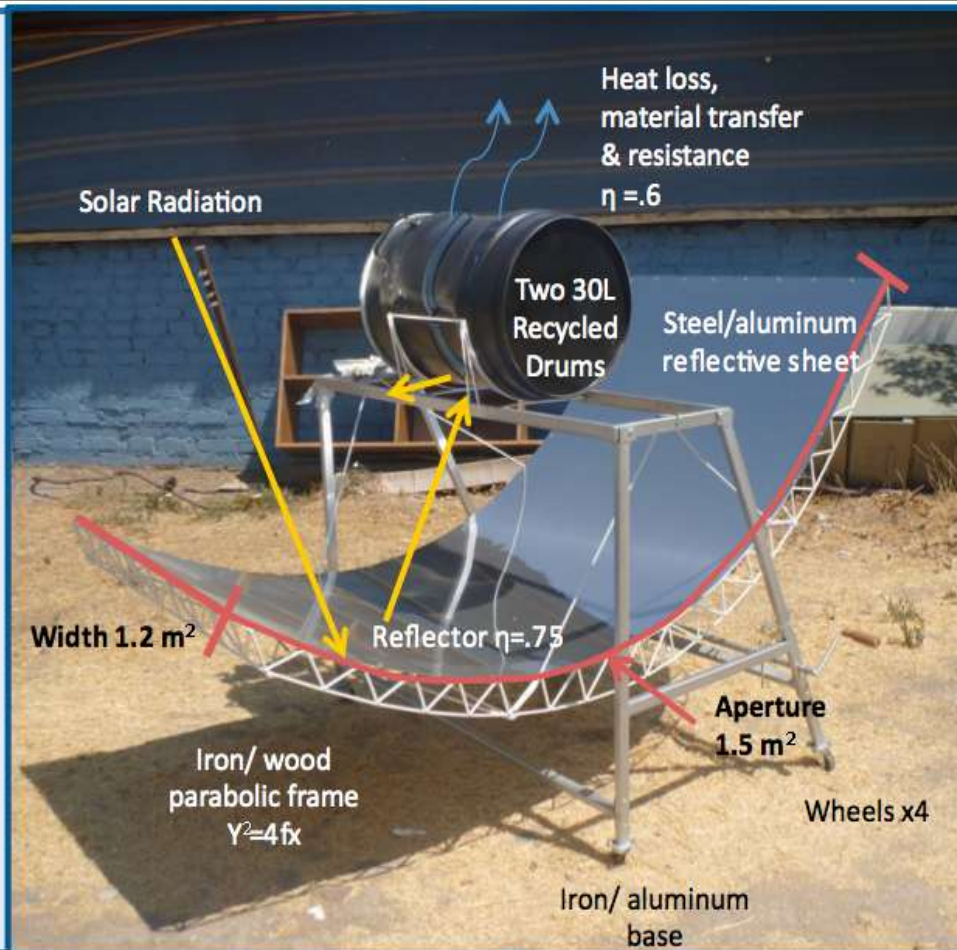
Places where solar  
radiation is most  
abundant

$Q = \text{mass} \cdot c_p \cdot \Delta T$   
 $\Delta T = 65C - 30C$   
 Mass = .6kg per person  
 $Q = 860 \text{ J/person/day}$

Solar Radiation in Nakuru, Kenya  
 Min 3.8 kWh/m<sup>2</sup>  
 Avg 6.0 kWh/m<sup>2</sup>

Efficiency of system = 45%

Size required for Nakuru, Kenya  
 Worse Case: 2.6m<sup>2</sup>  
 Average: 1.7m<sup>2</sup>

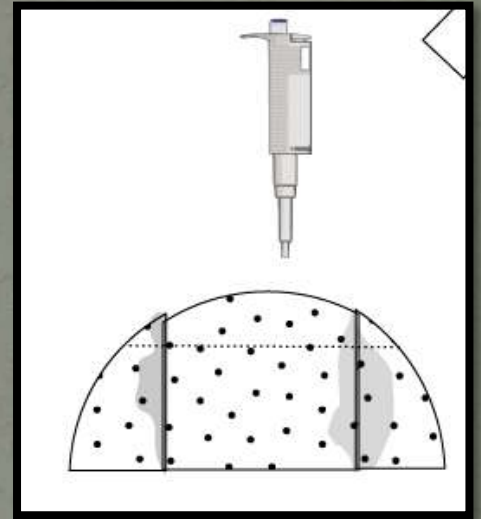


**Costs:** [usd] Kenya fabrication costs

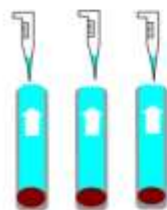
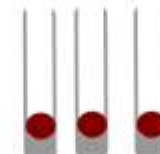
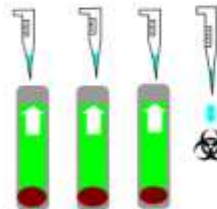
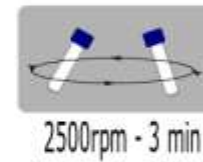
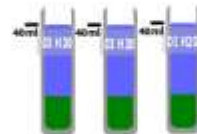
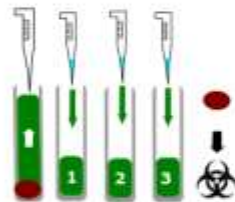
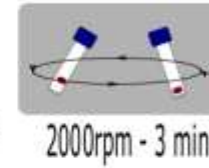
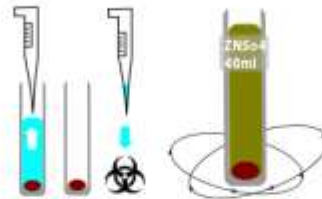
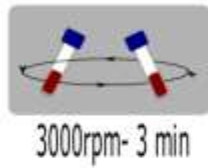
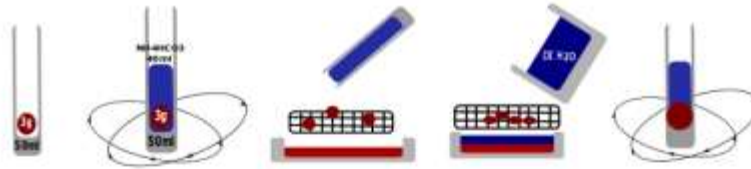
Base: \$90  
 Wheels: \$50  
 Parabolic Frame: \$90  
 Reflector: \$60  
 Hardware: \$20

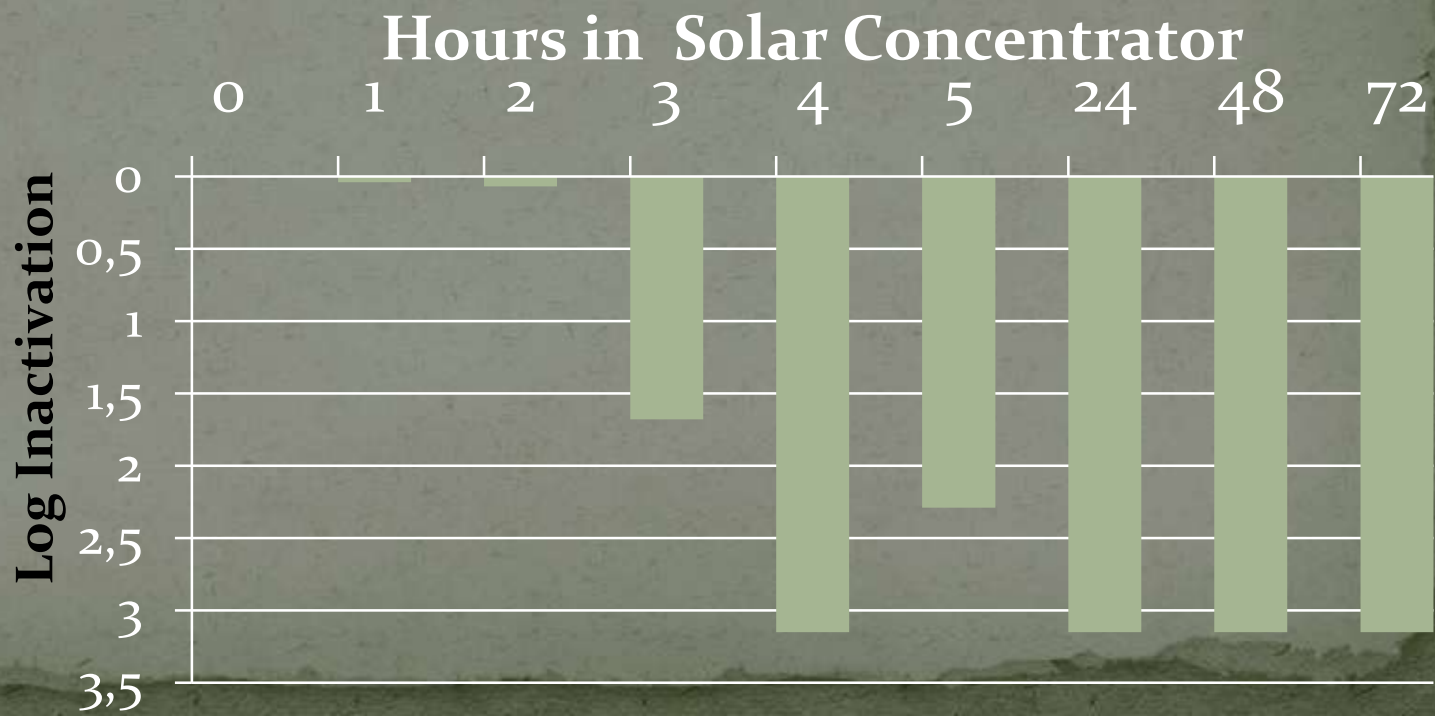
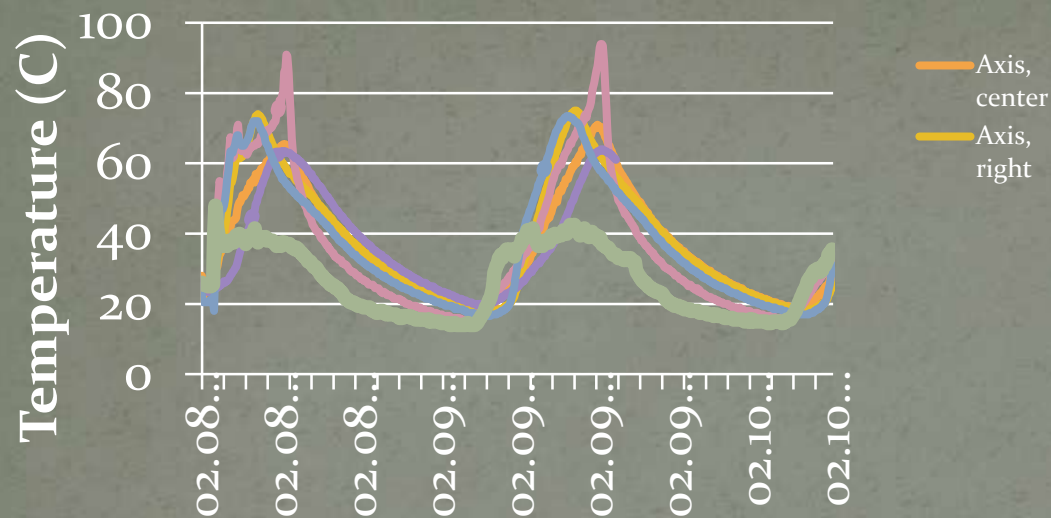
**Total: \$300**





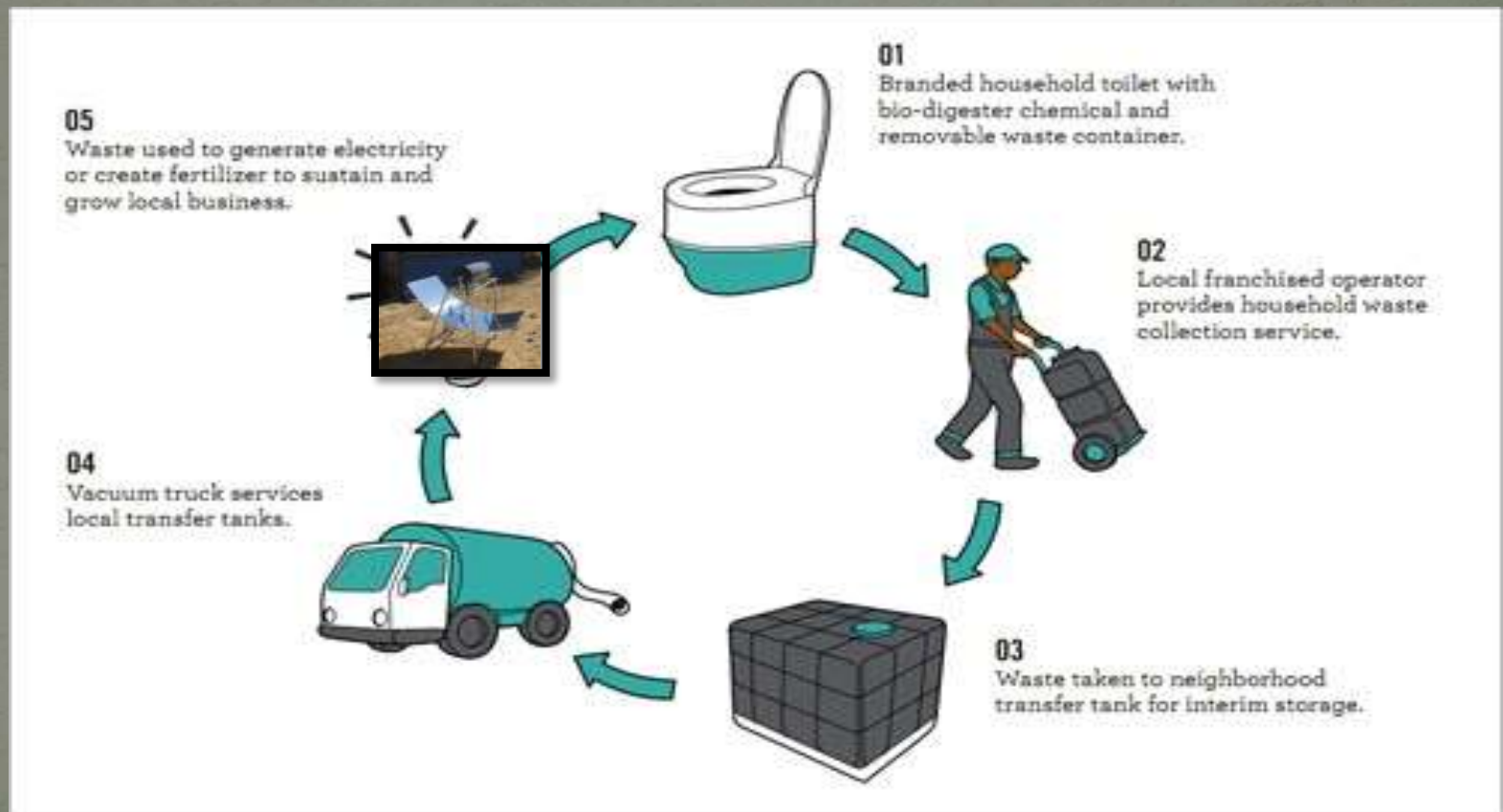






# It's effective. Is it affordable and scalable?

Capital costs are \$0.0008 per use





# Scalable

- Looking for funding and partners to do large scale pilot in a peri-urban community
- Once we reach 1,500 households will be financially sustainable based on toilet rental fee

# What are the drivers to reduce disease transmission via sanitation interventions?

in peri-urban and urban communities

- Not so much
  - Value from reuse
  - CLTS approach
- Main drivers
  - Market
  - Affordable solution that treats BOP as costumers and delivers a service that meets needs (privacy, dignity, hygienic, etc)
    - No one likes eating their own shit
  - Low-cost fecal sludge management

Thank you!