

# FINAL DESIGN



# CLEAN COOKSTOVE

**Thank You,**

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# PROBLEM

**4 Million** deaths per year from **indoor air pollution**

**Number One** cause of **death** among infants/children

## DESIGN CHALLENGE

Develop an affordable, clean, wood-burning stove for impoverished families which reduces deaths and illnesses caused by indoor air pollution.

## CURRENT METHOD FOR COOKING

### 3 Stone Fire

#### Advantages

- Inexpensive
- Easy to build



#### Disadvantages

- Smoke circulates throughout home causing health problems
- Fuel is wasted because of inefficient burning and valuable heat escapes into open air
  - Requires more labor gathering the fuel
  - Increased deforestation when using wood for fuel
- Only 1 pot can be used at a time
- Open fire creates the risk of burns and accidental spills, especially with the limited space inside the homes

# DESIGN SPECS

- Product Cost
- Health Issues
- Fuel Consumption
- Safety
- And more...

# COMPONENTS

In order to compare existing stoves and create the optimal design, the stove was divided into four main components:

- Fuel Sources
- Combustion Chambers
- Heating Interfaces
- Exhaust Systems

Research was conducted on each component using existing designs. Many different combinations of these components were then created. After comparing, the best combinations were prototyped and tested.

## FUEL SOURCE

The fuel source chosen was **wood**. It is the main source of fuel in Guatemala because of its relatively inexpensive cost and easy availability. It is used by nearly 62% of the population.



TLUD



Rocket

## COMBUSTION CHAMBER

There are many variations of combustion chambers. Each combustion chamber is slightly different in design and performance. Based on the research conducted, the **Rocket Stove** and **Top Lit Up Draft (TLUD)** combustion chambers were chosen to be built and tested.

## HEATING INTERFACE

The process in which heat is transferred from the fire to the food or pot is different for each interface. Guatemalans often use a **plancha** for their stove top. The plancha is a metal plate, similar to a griddle, that is placed on the flame of the fire and foods such as tortillas can be cooked directly on it. Some planchas have removable circles of various diameters so pots can be used to cook as well.



## EXHAUST SYSTEMS

Flue systems are used to direct the smoke produced from the fire up and out of the home, reducing indoor air pollution. Since the combustion was improved, the emissions were reduced; the flue is less necessary for our clean cookstove.