THERMOELECTRIC MODULE BASED COOKSTOVE

Stovetastics

## PROJECT OVERVIEW

This project was tasked to design and build a bio-fueled cook stove that incorporates Hi-Z's thermoelectric technology to power a fan and electrical outlet. The cookstove is to be deployed to third world countries to families that use biomass as their main source of fuel. The purpose is to reduce emissions, improve efficiency and create a source of electricity in areas that have limited access to power.

MODELS OF OVERALL SYSTEM

TEG

Inlet Door

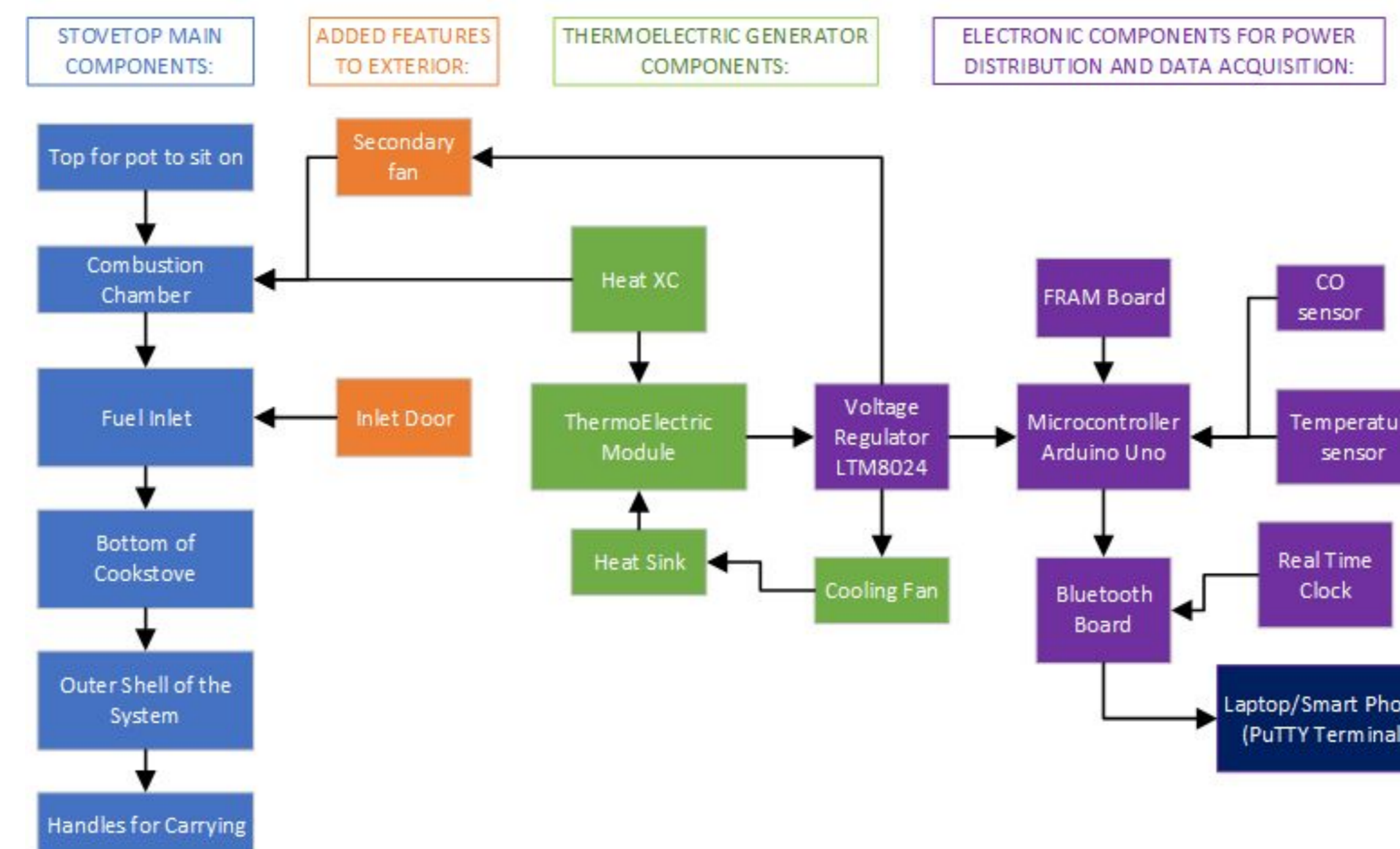Secondary Fan

Exploded View
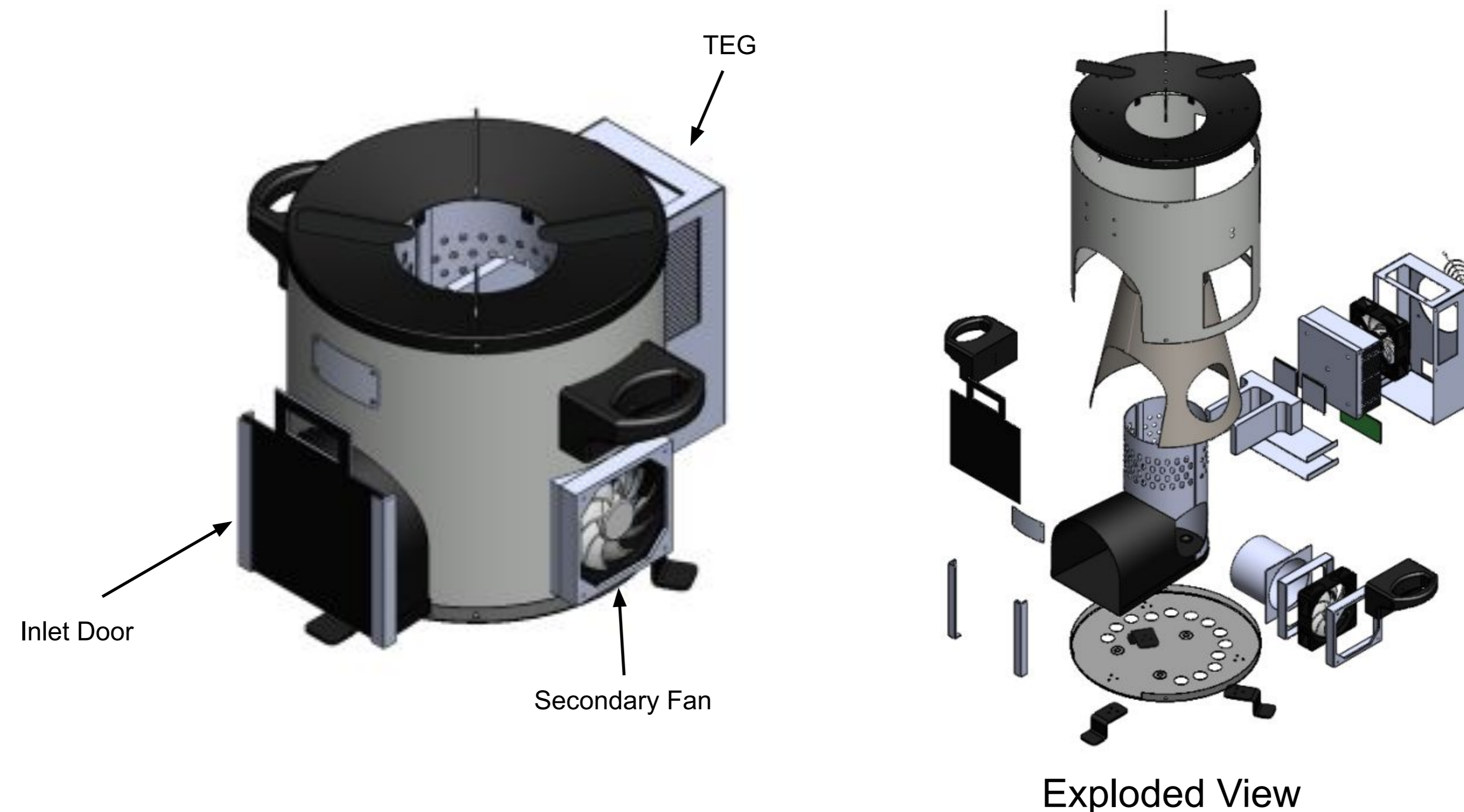
MAIN ELECTRONIC COMPONENTS
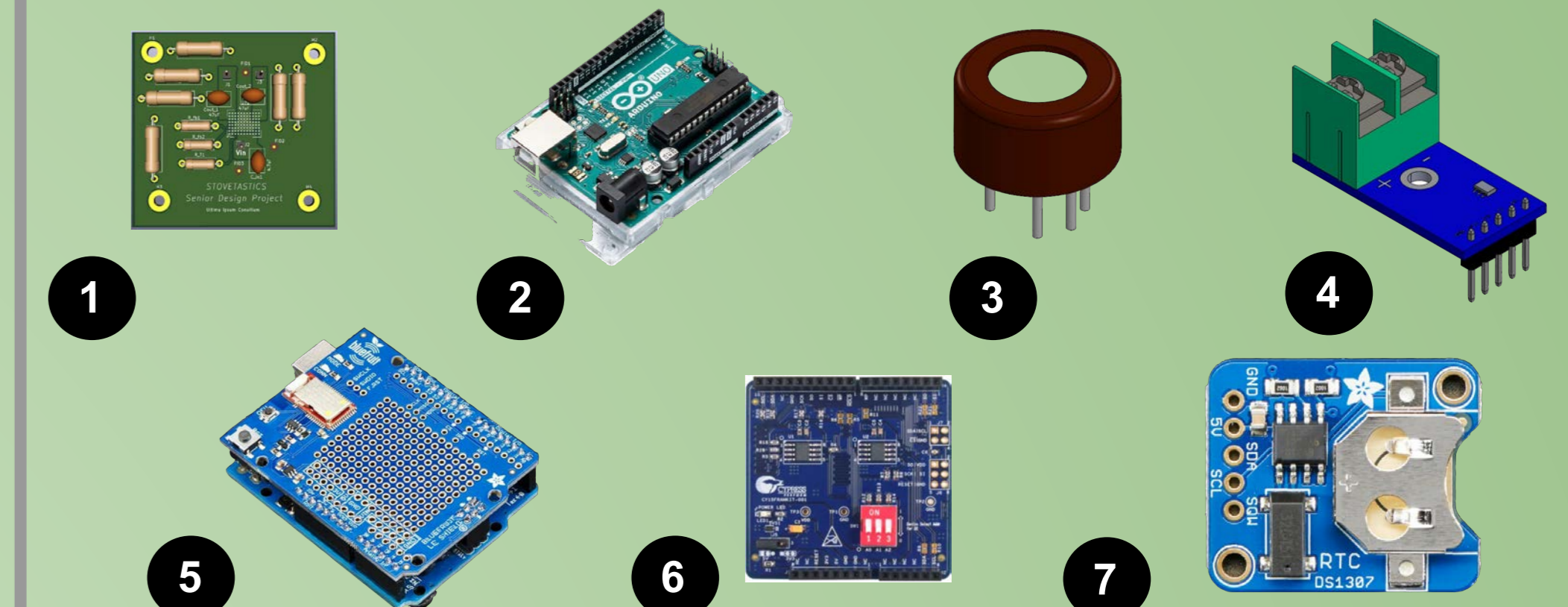
1	LTM8024	Voltage Regulator on our custom PCB board
2	Arduino Uno Rev3	Microcontroller
3	MQ-7	Data acquisition CO sensor
4	MAX6675	Data acquisition temperature sensor
5	Bluefruit LE Shield	Data storage
6	Cypress F-RAM	Data storage
7	DS1307 RTC	Data storage

THE ENGINEERING TEAM

Reve Zumarraga
Lead Design Engineer

Alexander Sprague
Lead Design Engineer

Sophia Nitkey
Lead Quality Engineer

Jason Schwartz
Device Lead

Josh Birkett
RF Systems Lead

Joel Edquiban
Sensor Systems Lead

Agustin Cedeno-Rodriguez
Electrical Power Systems Lead

Alyaa Alkarji
Quality & Reliability Lead

SYSTEM LEVEL DIAGRAM

THERMOELECTRIC GENERATOR MODEL

Shelves for electronics
Teg Casing
LCD Screen
Heat Sink (Cold Side)
Heat Exchanger (Hot Side)
Thermoelectric Modules
Cooling Fan
Fan Guard

Fabrication

Bandsaw
Mill
Water Jet
Tapping/Threading
TEG Casing with Shelves
Finalized TEG Assembly
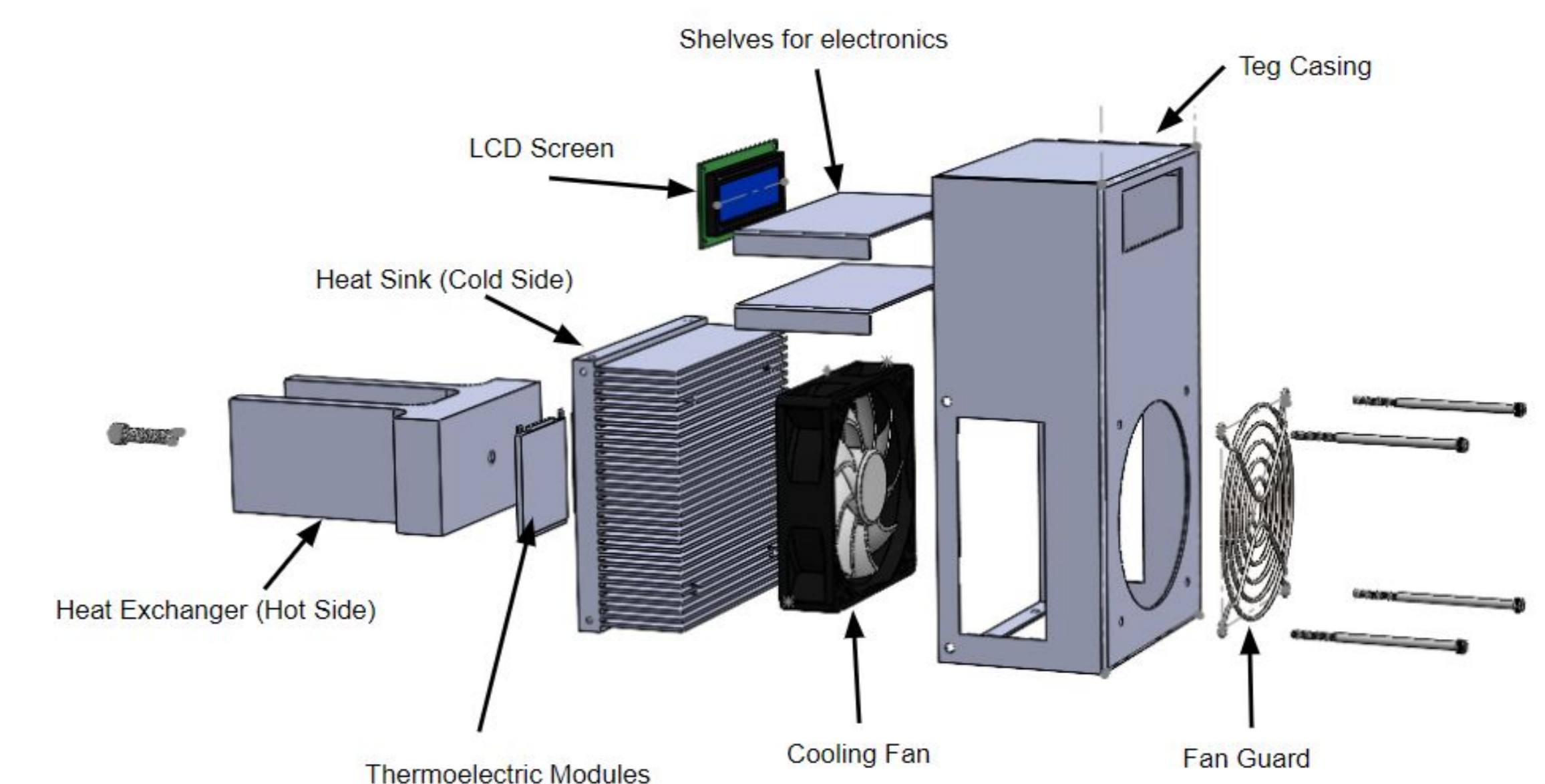
TESTING OVERVIEW

In testing, we find the overall performance of our system by using it to boil a pot of water. There are three main parameters of performance measurement.

Efficiency:
- Determined by measuring how much fuel (wood) is used to boil the 8,500 mL pot of water

CO Emissions:
- Determined by the output of the CO sensor (MQ-7 sensor)

Fine Particulate Matter Emissions:
- Determined by weighing a PM filter before and after each test (gravimetric method)

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