

CUMMINS

UPDRAFT BIOMASS GASIFIER

SENIOR DESIGN TEAM E:

RAZAK ADENIJI, TARO VUE, WILL KIDD,
DANNY MAHOTA, AND BRIANNA PINT

TEAM ADVISOR:

TOM SHEPPARD

INDUSTRY REPRESENTATIVE:

JOHN PENDRAY

PROJECT SUMMARY:

Biomass gasification is a known method of producing gas such as carbon monoxide from a process of slow burning renewable products such as sawdust or straw. Updraft gasifiers however are rarely seen on a commercial scale due to a built-up by-product of the gasification process called tar. This project will focus on simulating the effects of tar buildup in an engine bay and possible methods of tar mitigation.



DESIGN GOAL:

The goal of this project is to test the theory that an engine will be able to continually run off the gas produced by an updraft gasifier without tar build up if tar is kept in vapor phase throughout the gasification process.



DESIGN CONSTRAINTS:

- Designed reactor system must be able to be mobile.
- Design must have sensors indicating thermal readings in the reactor, test beds, and along piping.
- Design must have sensors to read pressure differentials at air inlet.
- System should be able to cool down to below 200°C within 10 minutes of an emergency shut down.
- System shall be cool to touch within 24 hours of operation cycle.