



**HAVE BOILER,
WILL TRAVEL**



University of Idaho

TEAM MISSION STATEMENT

Our team's mission is to develop and prototype model of a scalable, practical retrofit for modern, industrial boilers that will produce biochar for sale and steam for energy production. This design must account for variable factors, and allow control of input and output flow rates amongst other factors.



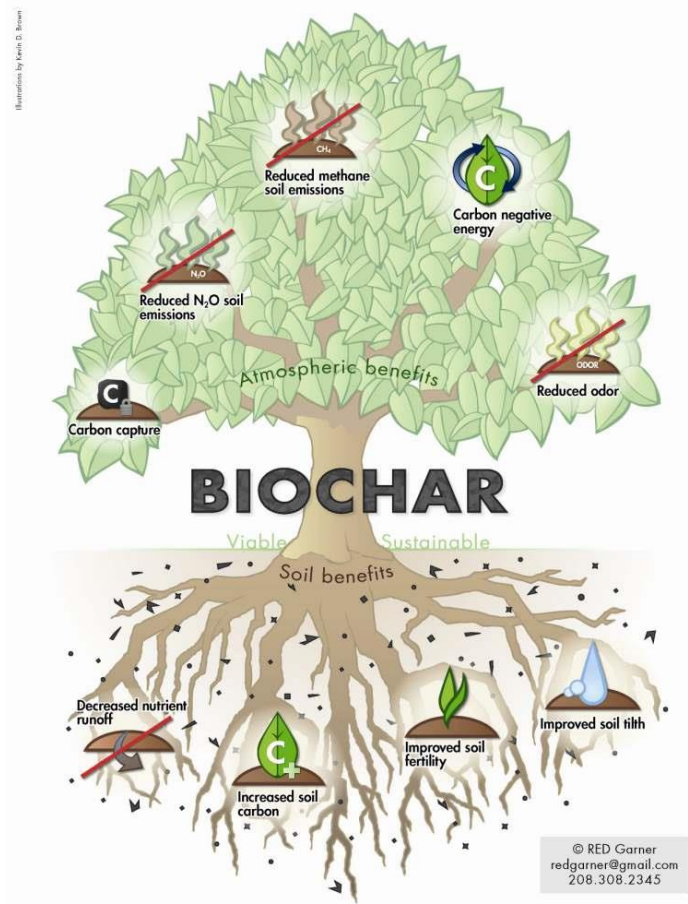
PROBLEM STATEMENT

An abundance of biomaterial exists in the region as a byproduct of industrial lumber production, this material has little value and is currently being used for steam generation.



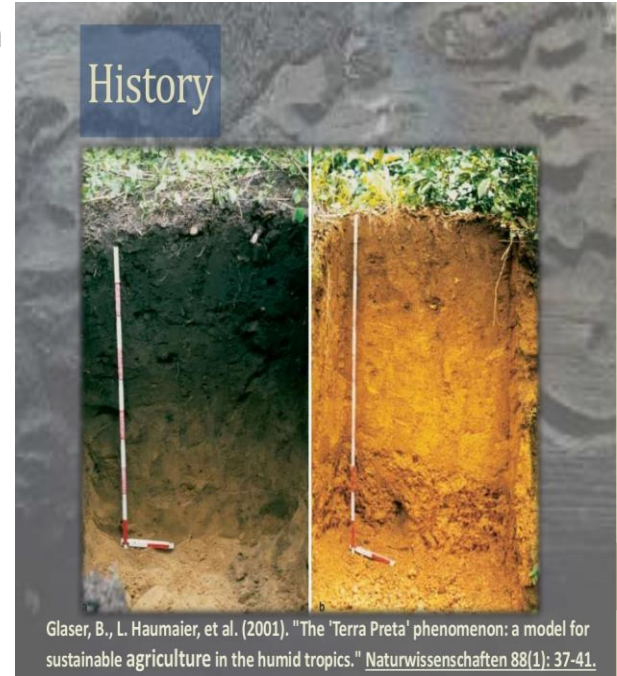
BENEFITS OF BIOCHAR

- Biochar is rich in fixed carbon and has an enhanced surface area caused by micro and macro pores that easily absorb and maintain moisture and nutrients.
- Can be used as a filtering media to absorb contaminants in rainwater and storm water runoff.
- As a soil enhancer, biochar makes soil more fertile, boosts food security, and reduces the need for some chemical and fertilizer inputs.



HISTORY OF BIOCHAR

- Biochar dates back 2,000 years to a civilization in a remote region of the Amazon Basin where regions of dark, highly fertile soil has been discovered.
- It is theorized that the ancient Amazonians used a process known as “slash and char”, where the biomass (plant material) were cut, ignited and buried to smolder.
- This process allowed the Amazonians to support a diverse agriculture and explains how their population grew to immense numbers.



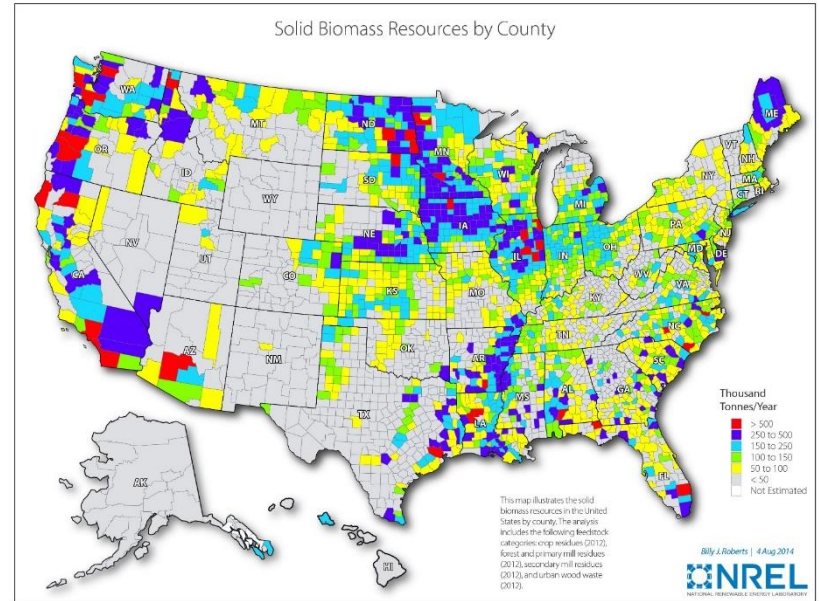
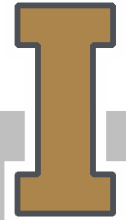
Glaser, B., L. Haumaier, et al. (2001). "The 'Terra Preta' phenomenon: a model for sustainable agriculture in the humid tropics." *Naturwissenschaften* 88(1): 37-41.

BIOMASS RESOURCES IN THE NORTHWEST

The National Renewable Energy Laboratory estimates that in 2012 over 6,000,000 tons of waste biomass were produced in area surrounding Moscow (150 mi. radius).

Of that waste biomass, about 1,750,000 tons were from primary mill residues.

Another 2,250,000 tons were from crop residues.



https://www.nrel.gov/gis/images/biomass_2014/national_biomass_solid_total_2014-01.jpg