Is it Time for **Biochar**—to Reduce Fuel and Criteria Pollutants, Control GHGs and Play a Role in Cap and Trade

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Biochar

- Biochar is loosely packed hexagonally arranged carbon rings that differ from ash , which ha s a much higher concentrations of Ca and Mg.
- Production of Biochar requires;
  - Organic Material
  - Reduced O2

    and low heat (<700 C)

Biochar

- Thermal decomposition produces highly charged and highly stable biochar
- Soil application increases water and nutrient holding capacity,
- Increased biomass production, and carbon sequestration
- Effects Energy production (biofuel) and climate change

Plant producing syngas and biochar through pyrolysis

From ; Sonoma Biochar

Biochar

From Sonoma Biochar

Biochar

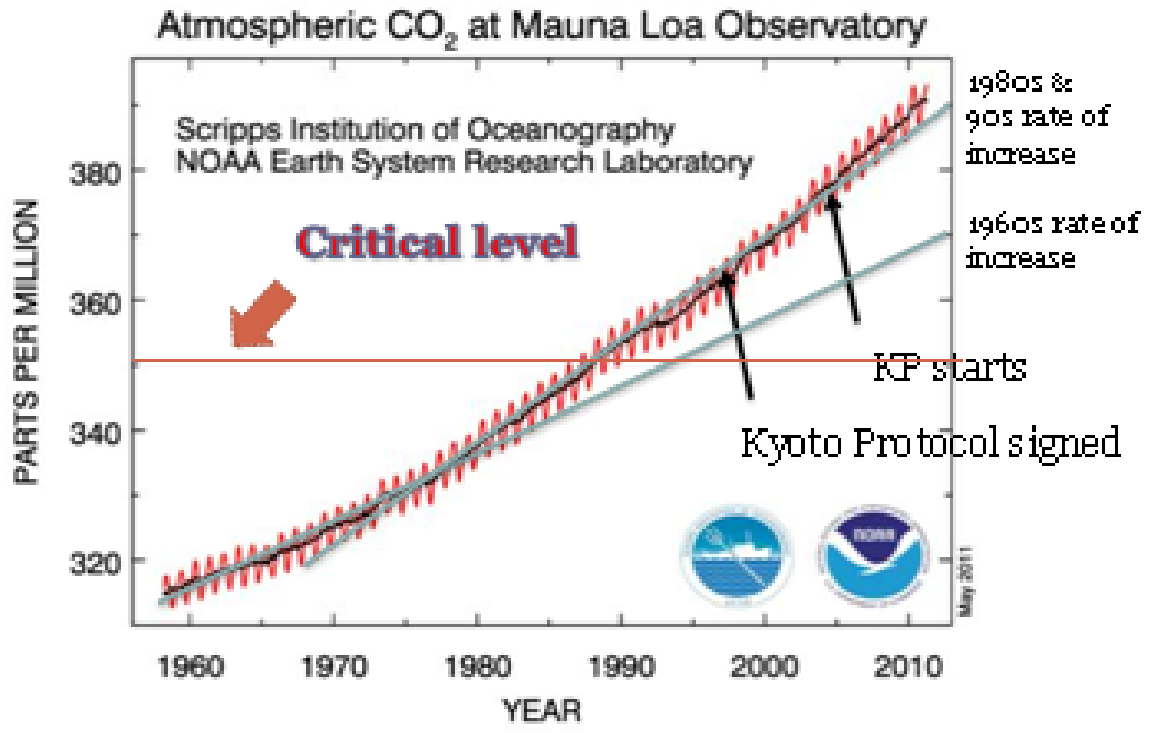
Biochar may be added to soils with the intention to improve soil functions and to reduce emissions from biomass that would otherwise naturally degrade to greenhouse gases. Biochar also has appreciable carbon sequestration value. These properties are measurable and verifiable in a characterisation scheme, or in a carbon emission offset protocol.

Biochar

- No emissions to atmosphere for the material converted to Biochar
- Decomposes over hundreds to thousands of years
- burns can occur on complex terrain and for ecosystem maintenance

Atmospheric CO2

The Big Picture



CO2 levels at Mauna Loa are increasing faster then ever at 2ppm/yr

As of May 2011, CO2 level is at 391.

http://www.esrl.noaa.gov/gmd/ccgg/trends

AB32

- AB32 commits the state to reduce its global warming emissions to 1990 level by 2020
- The AB 32 identified a CAP-and Trade program as one of the main strategies to be employed to reduce the GHG emissions.

Cap-n-Trade

The cap-and-trade program includes a compliance offset program. ARB offset credits are greenhouse gas (GHG) emission reductions or sequestered carbon that meet regulatory criteria and can only be generated through implementation of an offset project for which ARB has adopted a compliance offset protocol.

Cap-n-Trade

- Included in the regulation are four protocols, or systems of rules for quantifying offset credits:

1. In forestry management;
2. Urban forestry;
3. Dairy methane digesters; and,
4. Destruction of existing stores of ozone-depleting substances .

Forests and GHGs

- Forests have the capacity to both emit and sequester carbon dioxide (CO2), a leading greenhouse gas that contributes to climate change.
- Depending on how forests are managed or impacted by natural events, they can be a net source of emissions, resulting in a decrease to the reservoir, or a net sink, resulting in an increase of CO2 to the reservoir
- Public forests can not acquire Off-Sets

Biochar Benfits

- decrease Atmospheric CO_2 nd sequester CO_2.
- Biochar Production meets both criteria.
- Biochar is an ideal candidate for exploration as a mitigation strategy .
- Biochar production and soil application at the site.
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Biochar

- Allows to evaluate Benefits and costs of biochar production vs fire by calculating the emissions trade-off between biochar production compre d to wildfires , slash burning or prescribed fire emissions

Future Work

- Need Portable and Economical equipment
- Require CARB's Acceptance of Off-sets for Biochar Production.
- Achieve FLMs, AQMs and Industrial Managers coordination to reduce GHGs, sequester more CO2 and restore fire resilient forests through production of Biochar