

BIOCHAR PRODUCTION AND APPLICATION IN THE INTERMOUNTAIN WEST

Darren McAvoy
Utah State University
USA
Darren.mcavoy@usu.edu

Key Words: pyrolysis, biochar, juniper, production, application

Introduction

The Utah Biomass Resources Group (UBRG) has focused on biochar production and application since 2011. We partner with Amaron Energy of Salt Lake City and have developed mobile pyrolysis technology for in-situ biochar production. We have also initiated field trials of biochar application in mining and agricultural settings.

Ecological Basis

Scrubby woodlands cover more than 20 million hectares in the Intermountain West of the United States. The dominant species include pinyon and juniper trees, commonly referred to as PJ woodlands. The biomass density of PJ woodlands in Utah tends to be 14 metric tons per hectare. The Bureau of Land Management is cutting 16,000 acres of PJ annually in Utah for wildlife habitat and wildfire hazard reduction. There is currently very little value derived from the massive amount of material produced each year. Additionally, bark beetles have killed millions of hectares of pine, spruce, and fir forests across the West over the past decade.

Meanwhile, there are 30,000 square kilometers of rangeland and cropland have been developed for oil and gas drilling operations in the western United States, with more than 2 million wells drilled since the land was originally settled. Industry has more recently been sinking 50,000 wells annually and each well pad occupies a hectare. These are lands that are in need of remediation and replanting, but they also are tend to be in arid climates with significant invasive species threats.

Bridging the Gap

A significant portion of the western United States landscape has excess carbon in the form of expanding PJ woodlands and beetle killed conifer forests. An equally significant portion of this landscape has a deficit of carbon where the vegetation has been removed and the site flattened to accommodate drilling equipment. We see mobile biochar production and application as a bridge that can gap these challenges.

Mobile Pyrolysis

Amaron Energy has developed a mobile pyrolysis machine capable of handling 18 metric tons of dried biomass input daily which yields 25% biochar, 25% syngas, and 50% bio-oil. This technology was awarded first place for its biochar production and quality in a competition among mobile pyrolysis units, hosted by the Washington Department of Natural Resources in 2014, garnering \$30,000 in support. We have demonstrated this technology in Utah, Nevada, Washington, and Colorado in cooperation with local, state, and federal partners and have successfully pyrolyzed 18 different feedstocks to date.

Biochar Application

We are also amending Utah soils with biochar in applications to oil and gas drilling pads as well as commercial vegetable farms in a series of field trials. Results of these studies will be presented and discussed in this presentation.