

West Virginia Bioenergy Markets

West Virginia BioEnergy Forum

**Aug. 3, 2007
Morgantown**

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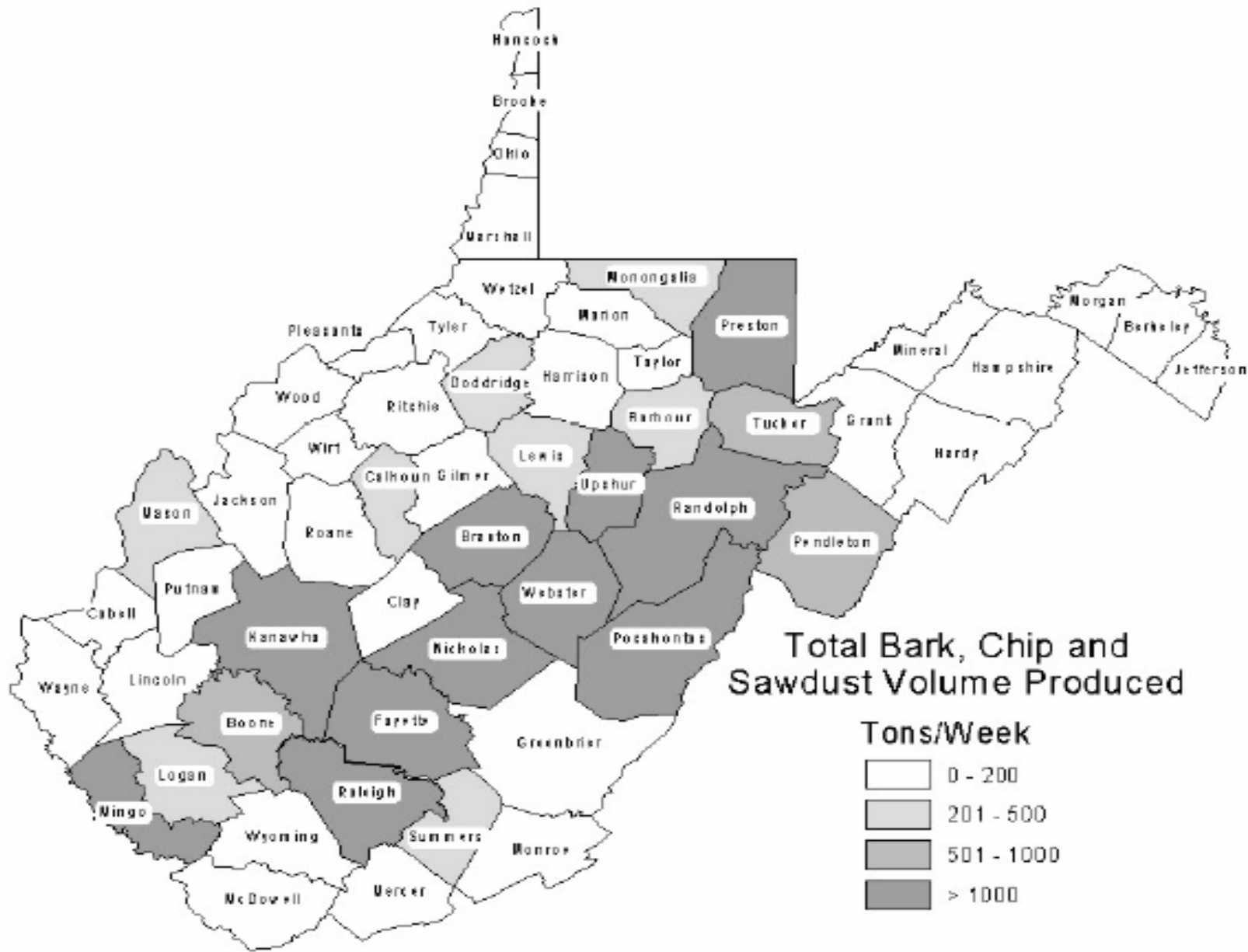
Biomass resources available in W.Va.

(From Innovative Energy Opportunities in West Virginia, October 2004, CBER)

	Thousand tonnes/year
Crop residue	32
Switchgrass on CRP lands	9
Forest residues	1,347
Primary mill waste	1,555
Secondary mill waste	344
Urban wood	184
Methane from manure management	16
Methane emissions from landfills	47

(From Appalachian Hardwood Center)

- ❖ West Virginia is the third most forested state**
- ❖ Forests cover 12 million acres (78% of land area)**
- ❖ 88% of the forest resource is privately owned**
- ❖ Growth to removal (harvest) averages 1.7:1**
- ❖ Oak species account for 48% of removals**



Logging residues are increasing

(From Appalachian Hardwood Center)

- ❖ In a 1995 study, on average, 8.4 tons of unwanted limb wood, logs and tops remained after harvest**
- ❖ By 2002, a study showed 10.4 tons of logging residue remained after harvest**

Current markets

❖ Process steam

Dry kilns

Other

❖ Charcoal

❖ Wood pellets

From Appalachian Hardwood Center survey of wood waste producers:

- ❖ 18% produced heat with their byproducts**
- ❖ 16% produced steam with their byproducts**
- ❖ 1% produced electricity**

Current markets

❖ Biodiesel

AC&S

- Nitro
- New plant nearing completion; laboratory expanded

Emerald Biofuels

- Institute
- Engineering for the plant under way
- Construction firm selected
- Production scheduled for first quarter 2008

Current markets

❖ Chicken litter gasification

USDA/Frye Poultry/Coaltec Energy

Change agents

- ❖ **Declining world oil resources**
- ❖ **Uncertain domestic natural gas availability**
- ❖ **Green focus**
- ❖ **Reduced traditional demands for hardwood**
- ❖ **Biomass technology innovations**

Cellulosic ethanol unlocked
CBTL

Future markets

- ❖ **Cellulosic ethanol**
- ❖ **Coal/biomass to liquids**
- ❖ **Chemicals from wood**
- ❖ **Ethanol crops**
- ❖ **Biodiesel crops**

Cellulosic ethanol

- ❖ **Utilizes wood residues as the feedstock**
 - **4.78 million tons of wood residues estimated to be available annually in West Virginia.**
- ❖ **Essential part of the national and state energy strategies as a transportation fuel.**
 - **A key component in the Bush Administration 20/20 Energy Plan.**
 - **Would be a substitute for food crops as an ethanol feedstock**

Coal/Biomass to Liquids

- ❖ A 10,000-barrel-per-day plant would require roughly 2 million tons of coal a year.
- ❖ A 10,000 barrel a day plant would annually produce roughly 150 million gallons of diesel product.
- ❖ Ten plants could be the West Virginia energy reduction goal of 1.5 billion gallons by 2030.

Chemicals from Wood

- ❖ **4.78 million tons of annual wood residues and 41,000 tons of crop residue in West Virginia could provide a feedstock to support a new chemical industry focus in West Virginia.**
- ❖ **The Division of Energy is working with the WVU Division of Forestry to establish a biomass-to-chemical Center of Excellence**

Biodiesel and Ethanol Crops

❖ In addition to residues, a fuel crop industry would provide new markets for small farm operators

Crops could include

- Switchgrass, miscanthus**
- Corn**
- Soybeans, canola, mustard seed, sunflowers**
- Wheat**
- Barley**

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