

# Annual Production And Energy Value (As HHV) of Potential Energy Feedstock From U.S. Forests

Source	HHV MJ/kg	Amount available million dry tons/yr	Total energy available/HHV	
			GW <sub>th</sub>	%
Unmerchantable timber	20	129	81.6	40.3%
Harvesting residues	16.3	48	24.8	12.2%
Mill residues	20	48	30.4	15.0%
Paper mill sludge	15	70	33.2	16.4%
Black liquor	14	73	32.3	16.0%
<b>Total</b>		368	202.4	100.0%

# Ash, Extractives, Sugars, and Acid Insoluble Lignin From Pine On Dry Basis.

Sample	Ash	Extractives	Acid-Insoluble Lignin	Soluble Lignin	Carbohydrates
<b>Branches</b>	0.4%	19.1%	27.3%	0.6%	52.7%
<b>Twigs</b>	1.3%	20.6%	32.6%	1.0%	44.4%
<b>Needles</b>	2.5%	26.5%	30.6%	2.1%	39.2%
<b>Bark</b>	0.8%	6.3%	51.0%	0.9%	40.8%

Sample	Arabinan	Galactan	Glucan	Xylan	Mannan	Total Wood Sugars
<b>Branches</b>	2.6%	4.4%	34.1%	8.7%	7.2%	57.0%
<b>Twigs</b>	4.6%	4.5%	27.1%	6.9%	5.0%	48.0%
<b>Needles</b>	3.2%	2.7%	21.7%	2.7%	5.1%	35.3%
<b>Bark</b>	2.3%	5.4%	16.2%	2.8%	2.5%	29.2%