

Ensuring Sustainability in the Development of Wood-based Bioenergy in the US South

August 26-27, 2009

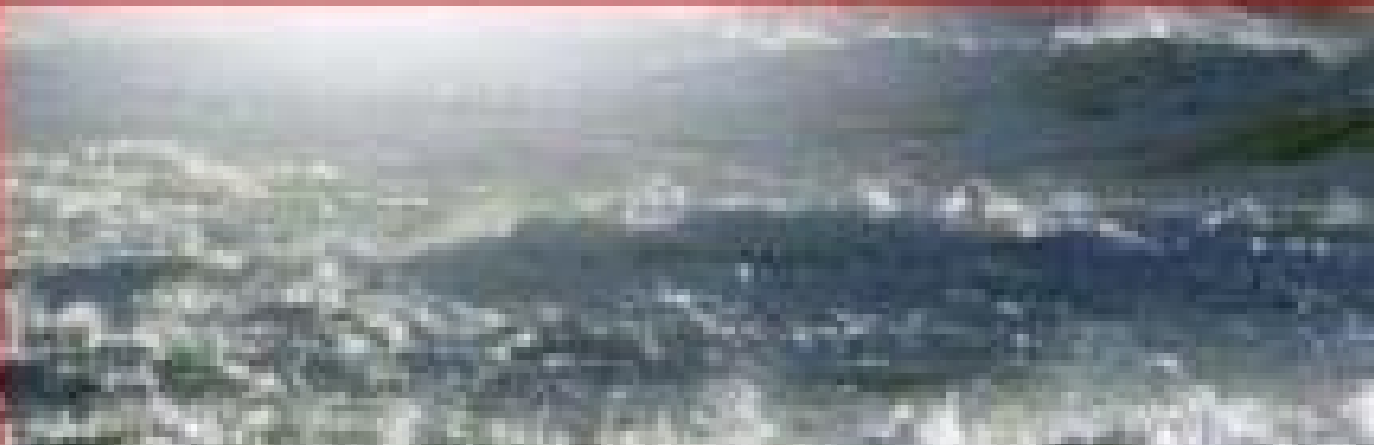
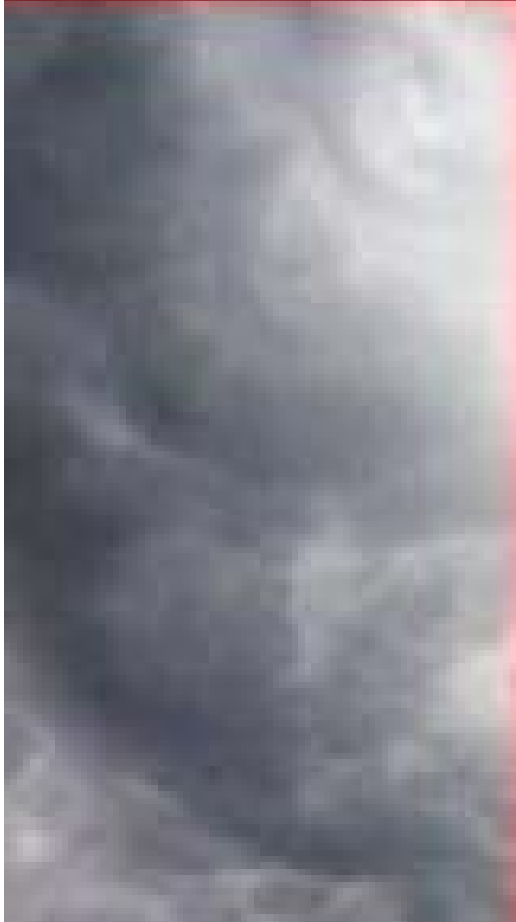
North Carolina State University

V. Alaric Sample
President, Pinchot Institute for Conservation
Washington, DC





CLIMATE CHANGE







Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply

April 2005

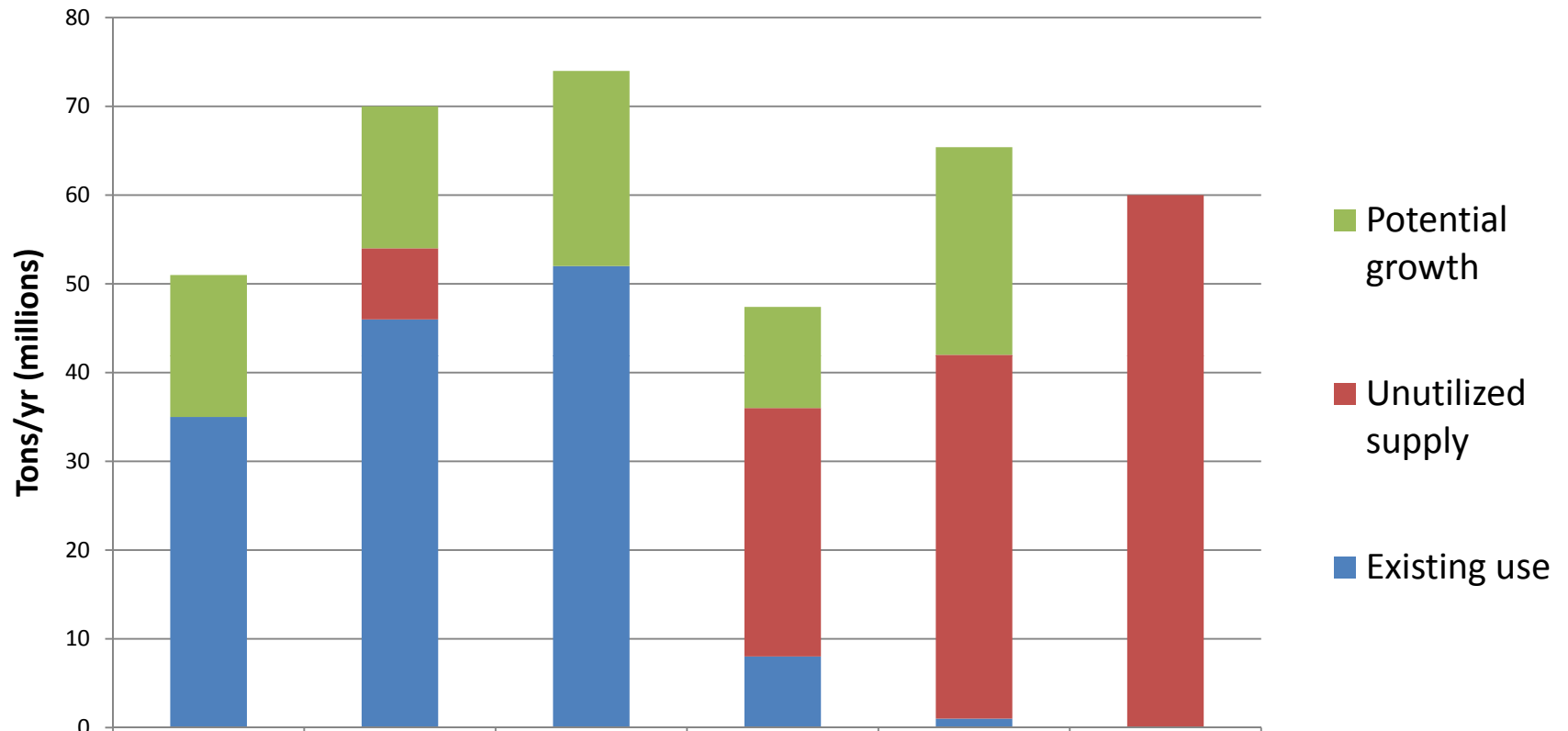


U.S. Department of Energy



U.S. Department of Agriculture

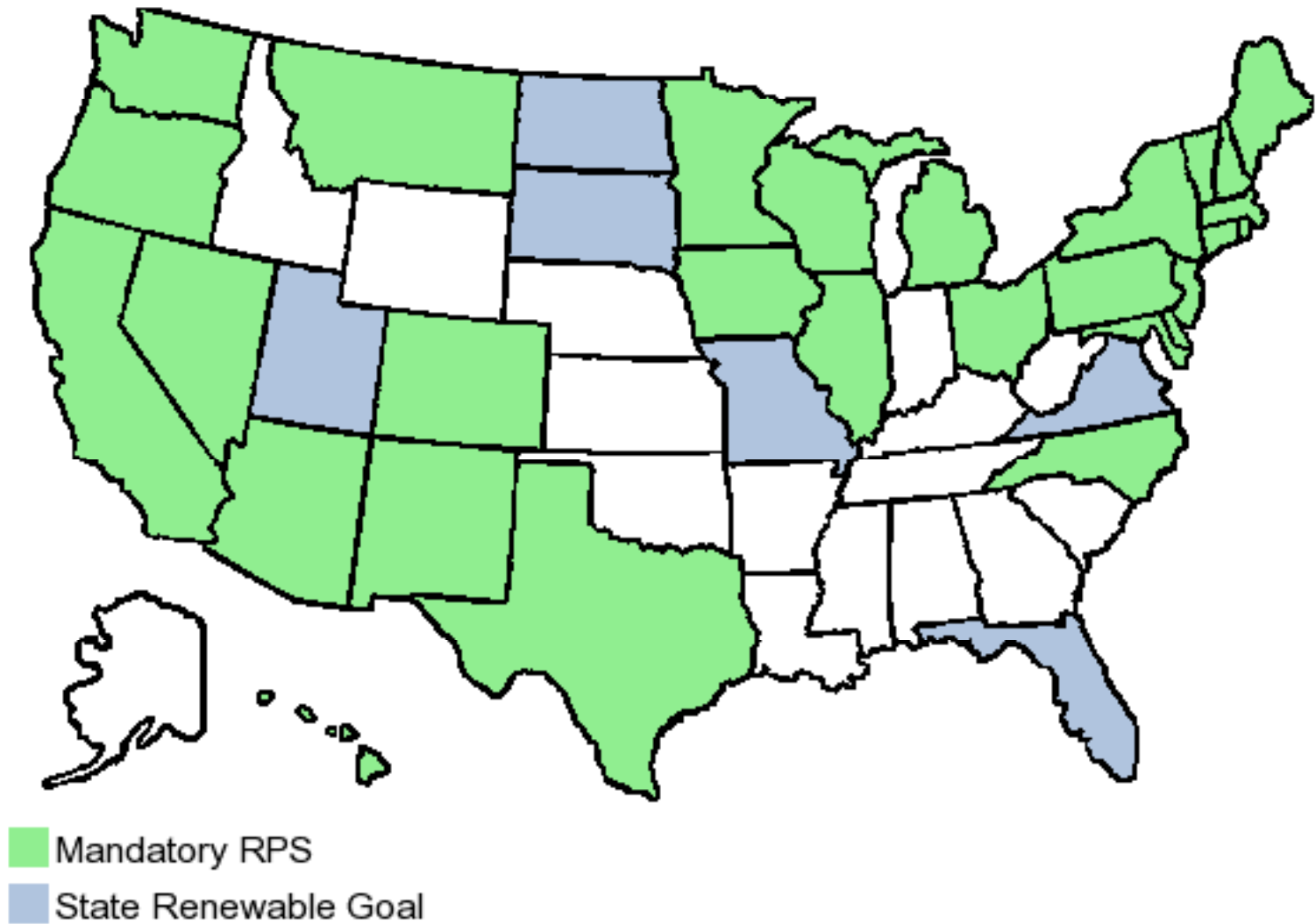
Figure 1. Current and potential wood supply for biomass energy



	Fuelwood (heating and electric utilities)	Secondary wood residues (forest industry)	Pulping liquors (forest industry)	Urban wood waste	Primary wood residues (logging and other)	Hazardous fuels treatments
Potential growth	16	16	22	11	23	
Unutilized supply		8		28	41	60
Existing use	35	46	52	8	1	

Source: Perlack et al. 2005. Biomass as Feedstock for a Bioenergy and Bioproducts Industry.

States with mandatory Renewable Portfolio Standard (RPS) or voluntary goals

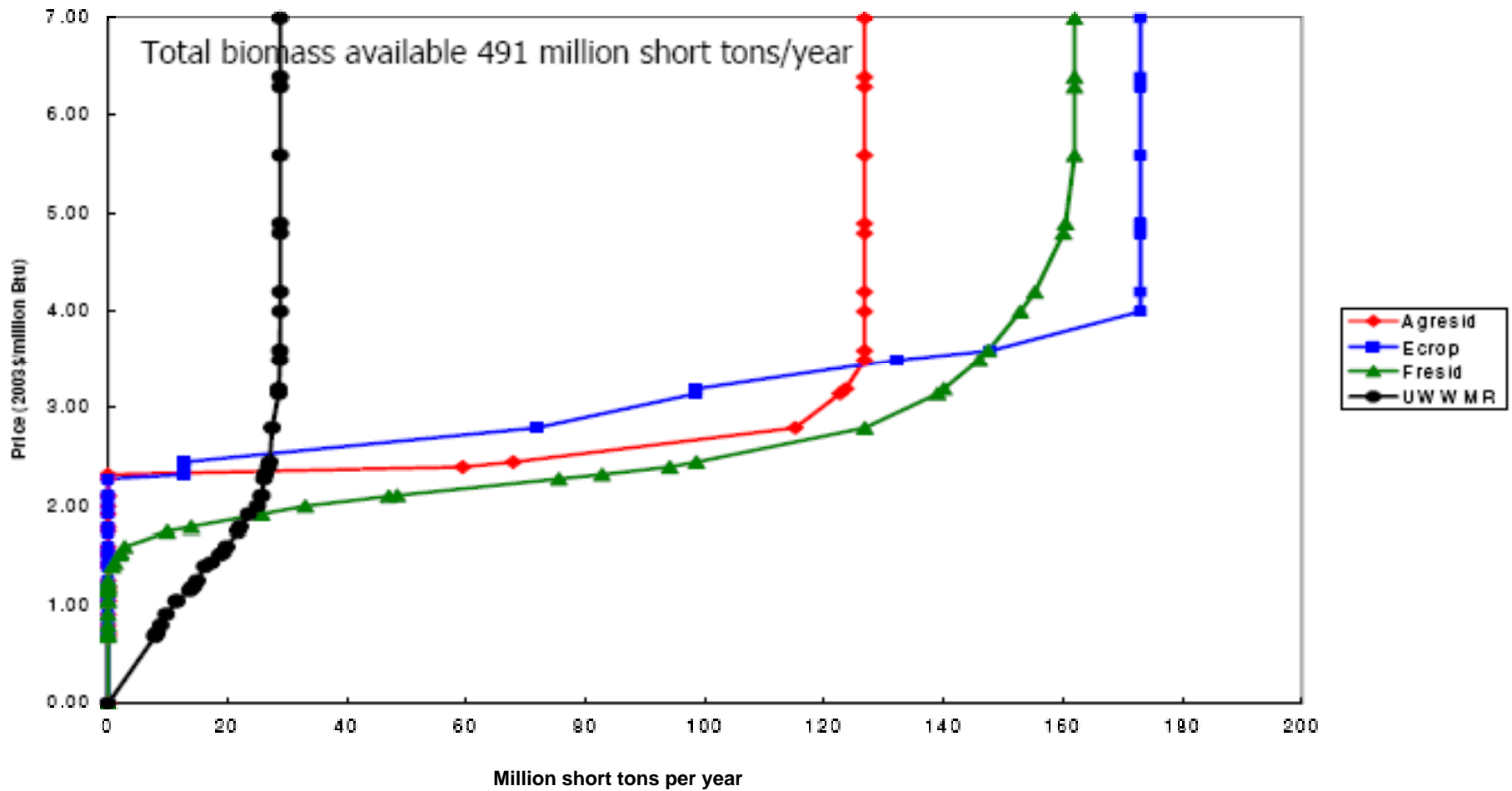


**Energy and Economic Impacts
of Implementing Both a 25-Percent
Renewable Portfolio Standard and a 25-
Percent Renewable Fuel Standard by 2025**

August 2007

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

Figure 2. Availability of Biomass in the U.S.



Source: Energy Information Administration 2006

Biomass utilization in electric power and biofuels production, under both a 25 % RFS and 25 % RES, by 2025

[Millions of dry tons]

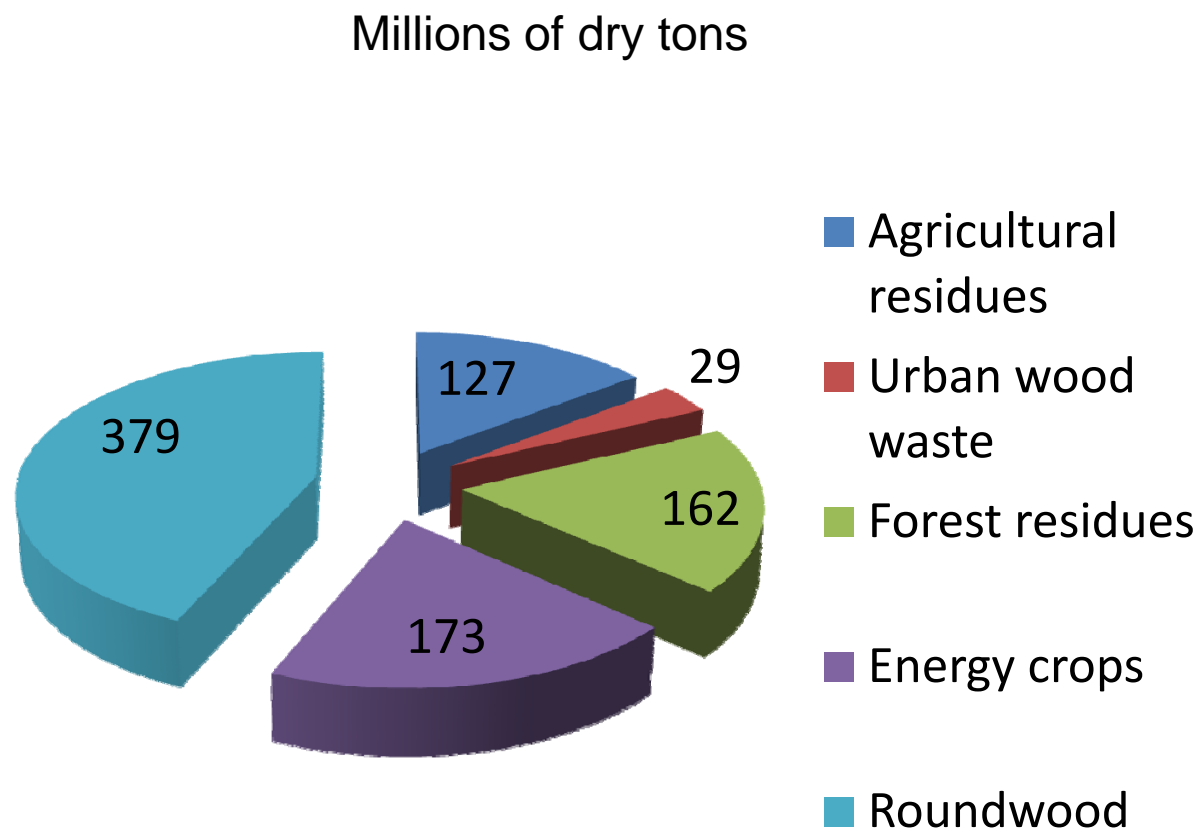
	2007	2025/1		Total
	Actual	25% RES/2	25% RFS/3	
Agricultural residues			127	127
Urban wood waste	8	25	4	29
Forest residues	47	120	42	162
Energy crops		71	102	173
Subtotal:	55	216	275	491
Roundwood	35	329	50	379
Total	90	545	325	870

1/ Energy Information Administration, 2007

2/ 495 billion KWh = 545 million bdT of biomass (assumptions: 2.2 gT=1000 KWh, 1.1 bdT=1000 KWh)

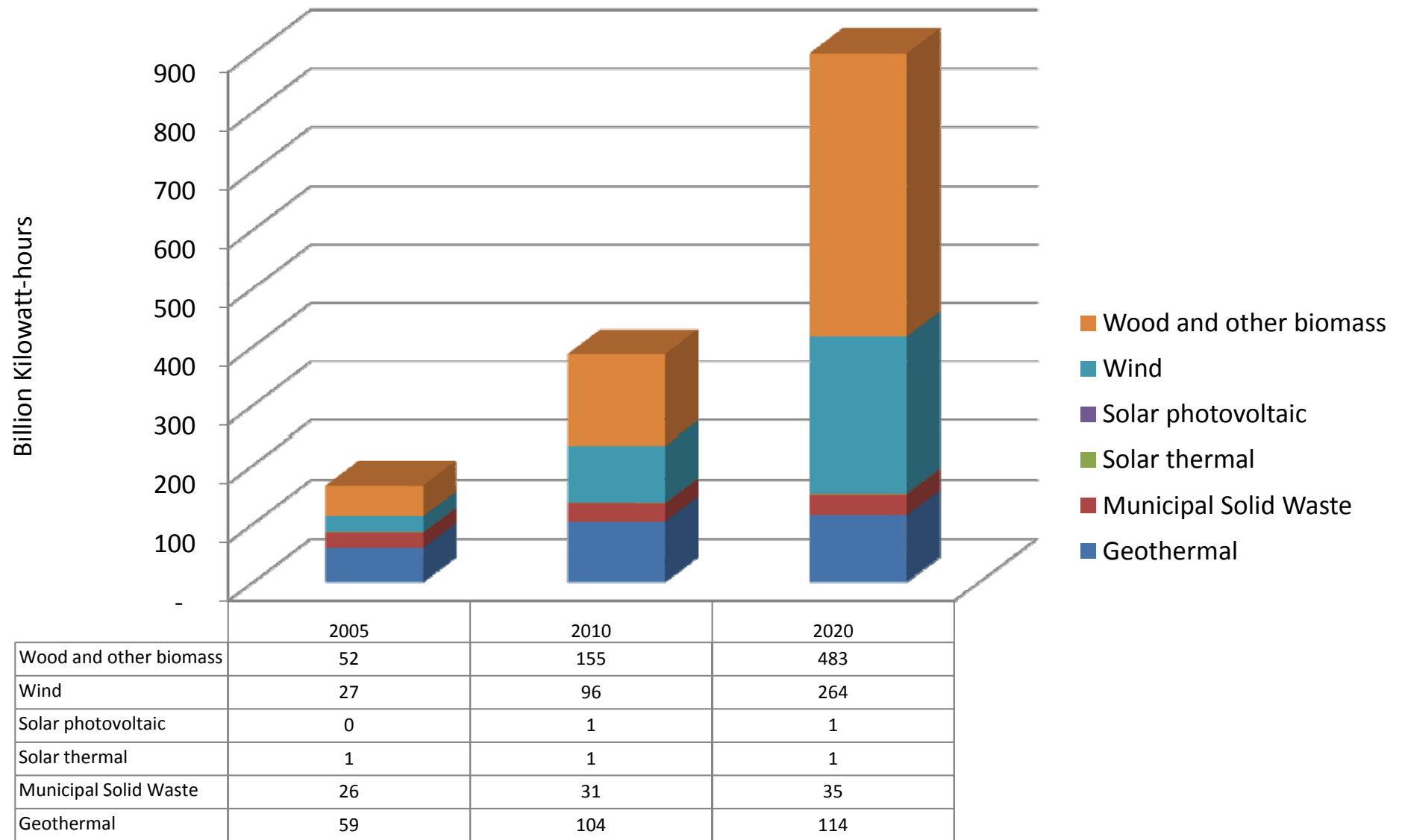
3/ 28 billion gallons ethanol = 325 million bdT of biomass (assumptions: 1 gT=43 gal, 1 bdT=86 gal)

Figure 3. Energy production from biomass and roundwood under a 25 % RFS and RES, 2025



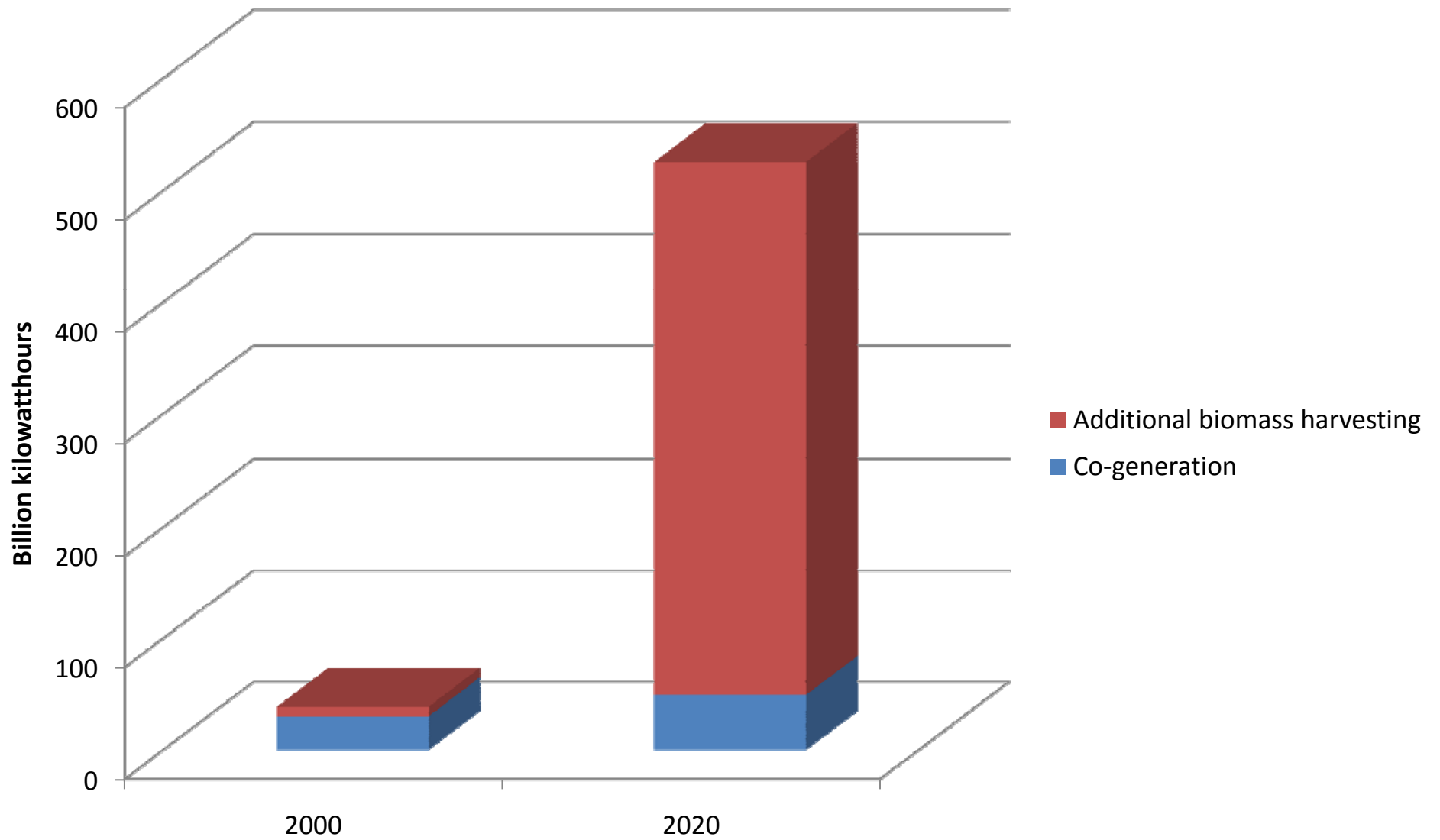
Source: Energy Information Administration, 2007

Figure 4. Projected Renewable Electricity Sources to 2020, with 20% RPS



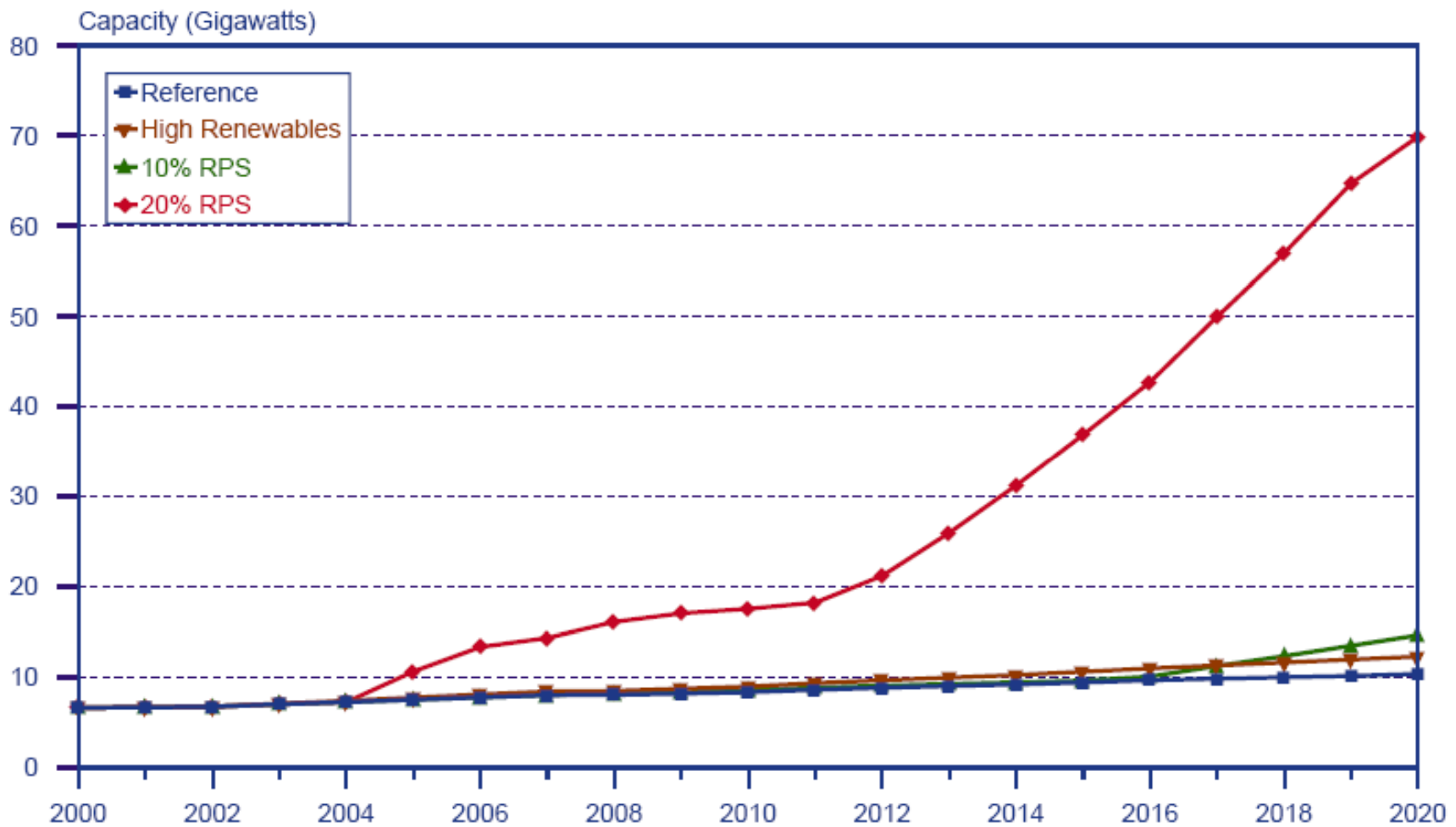
Source: Energy Information Administration 2002

Figure 5. Electricity Generation from Biomass with 20% RES



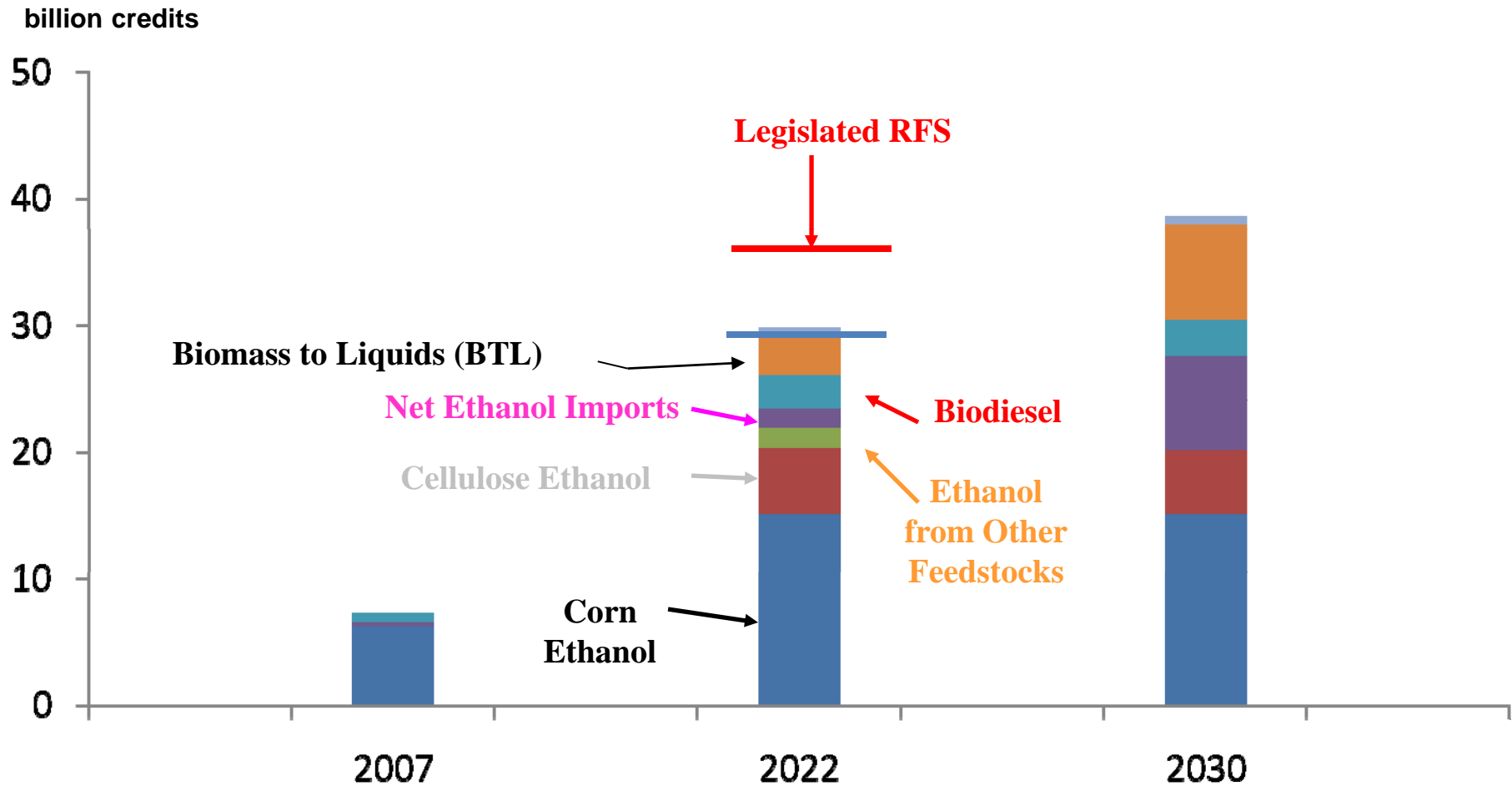
Source: Energy Information Administration 2003

Figure 7. Projections of Biomass-Fired Generating Capacity in Four Cases, 2000-2020



Source: EIA , 2003. Biomass for Electricity Generation

Figure 6. Projected shortfall in achieving biofuels goals, 2022



Source: EIA Annual Energy Outlook 2009

Figure 8. Relative efficiency of electricity, thermal, and cogeneration (CHP) facilities

	Size (MW)	Wood use (Green tons/yr)	Capital cost (US\$millions)	Operations cost (US\$millions)	Efficiency (Percent)
Electricity only					
Utility plant	10-75	100,000-800,000	20-150	2-25	18-24
Industrial plant	2-25	10,000-150,000	4-50	4-50	20-25
School campus	N/A	N/A	N/A	N/A	N/A
Commercial/industrial	N/A	N/A	N/A	N/A	N/A
Thermal only					
Utility plant	14.6-29.3	20,000-40,000	10-20	2-4	50-70
Industrial plant	1.5-22.0	5,000-60,000	1.5-10	1-3	50-70
School campus	1.5-17.6	2,000-20,000	1.5-8	0.15-3	55-75
Commercial/industrial	0.3-5.9	200-20,000	0.25-4	0.02-2	55-75
Combined heat and power/1					
Utility plant	25(73)	275,000	50	5-10	60-80
Industrial plant	0.2-7(2.9-4.4)	10,000-100,000	5-25	0.5-3	60-80
School campus	0.5-1(2.9-4.4)	5,000-10,000	5-7.5	0.5-2	65-75
Commercial/industrial	0.5-2(2.9-7.3)	5,000	5	0.5-2	65-75

1. Sizes for combined-heat-and-power (CHP) facilities are a combination of electrical and thermal capacity; the first figure is electrical and the figure in parentheses is thermal. 1 MW = 3.413 Btu/hour.

Source: USDA Forest Service. 2004. Techline: Wood Biomass for Energy WOE-1. Forest Products Laboratory, Madison, Wisconsin.

Workshop focus

1. Calculating consistent, reliable estimates of woody biomass supply in the context of sustainable forest management
2. Accurately communicating this information to decision makers in industry and local government
3. Exploring the full array of options for efficient, financially viable utilization of wood for bioenergy

Workshop focus

4. Reassuring public that adequate woody biomass harvesting guidelines are in place
5. Informing national-level renewable energy policy processes, and supporting the ongoing development of a regional sustainable wood bioenergy strategy in the US South





www.pinchot.org/bioenergy_paper

Pinchot Institute for Conservation
1616 P Street NW
Washington, DC 20036
202 797-6580
www.pinchot.org

