

Forests: What Role in America's Energy Future?

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Biscuit Fire, southern Oregon (2002)
3.5-4.4 million metric tons carbon released



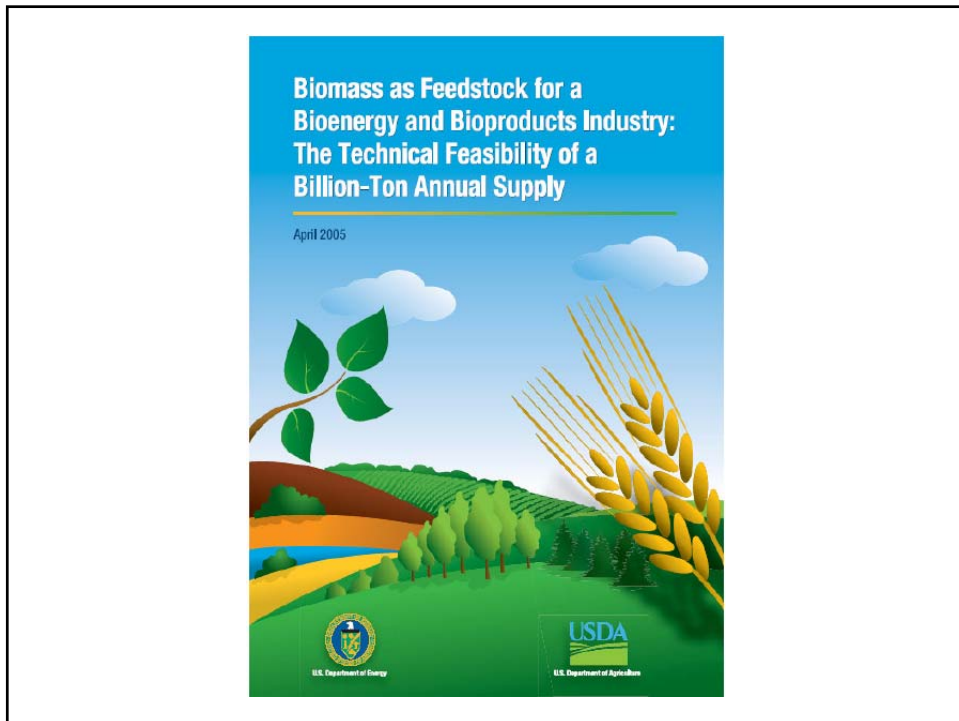
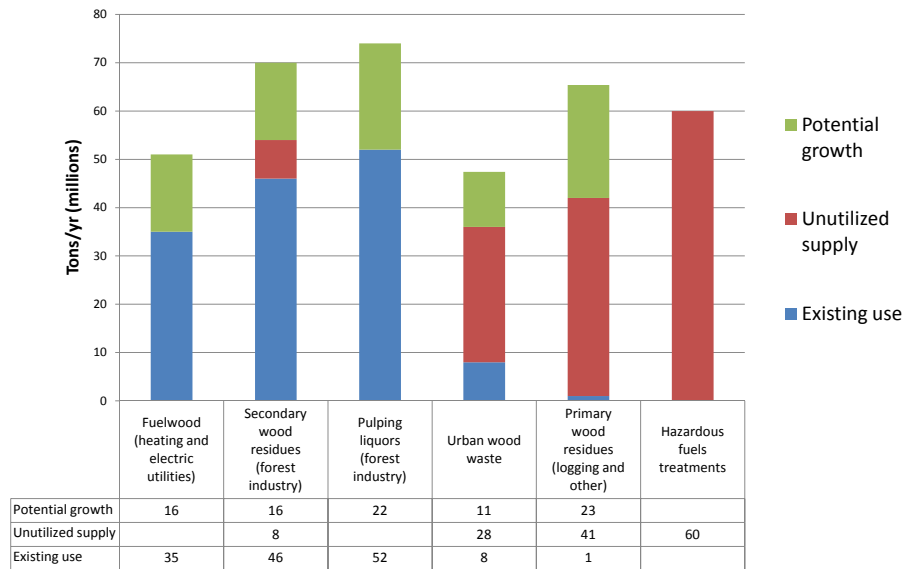


Figure 1. Current and potential wood supply for biomass energy



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

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

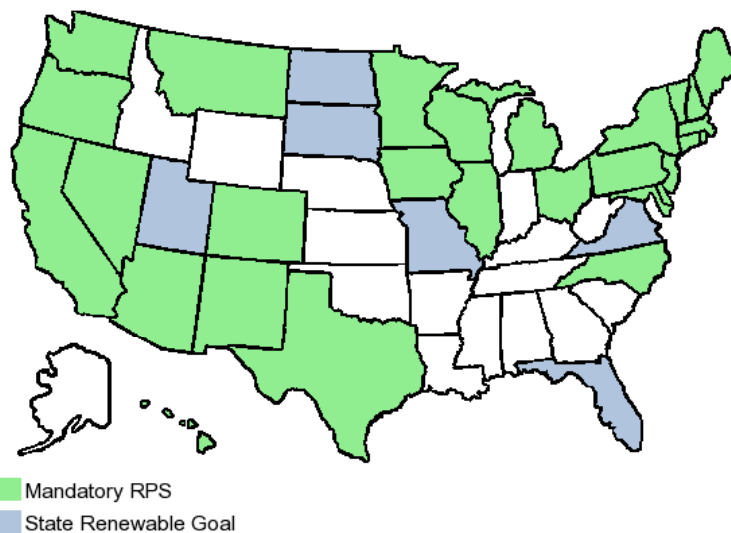


Figure 2. Availability of Biomass in the U.S.

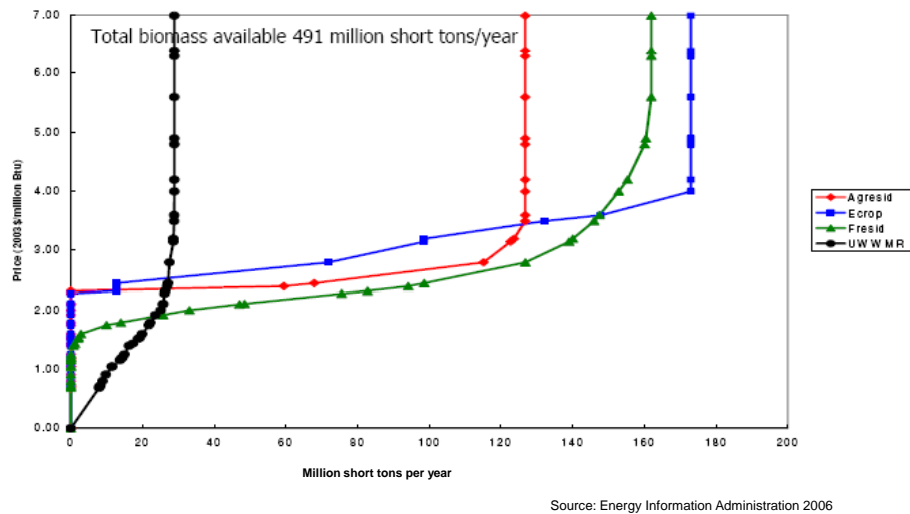


Figure 3. Biomass utilization in electric power and biofuels production, under both a 25 % RFS and 25 % RES, by 2025

[Millions of dry tons]

	2007 Actual	2025/1		Total
		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
Wood	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 4. Electricity Generation from Biomass with 20% RES

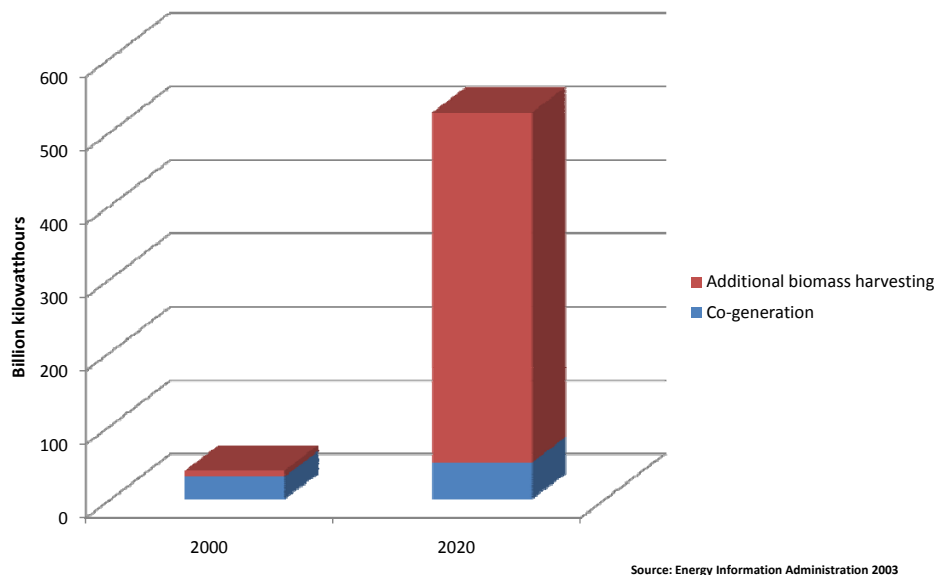
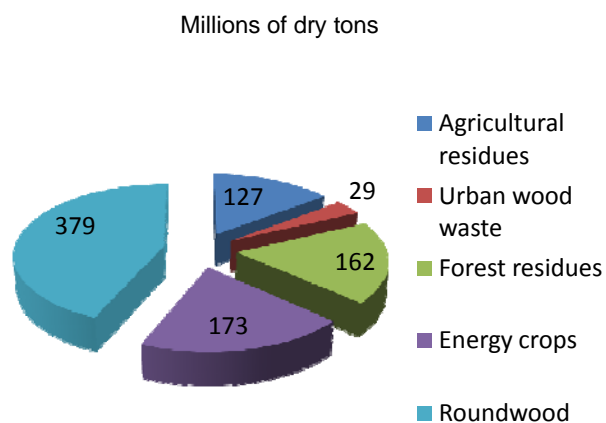


Figure 5. Energy production from biomass and roundwood under a 25 % RFS and RES, 2025



Source: Energy Information Administration, 2007





Figure 6. Projected shortfall in achieving biofuels goals, 2022

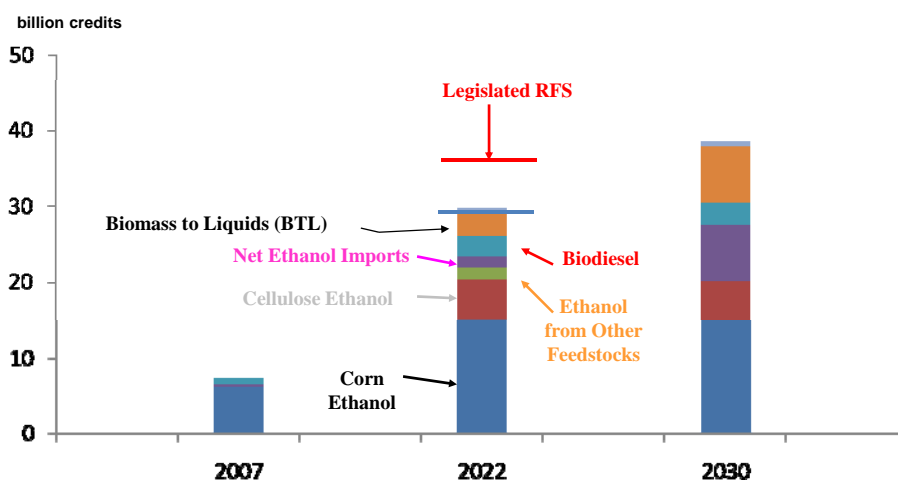
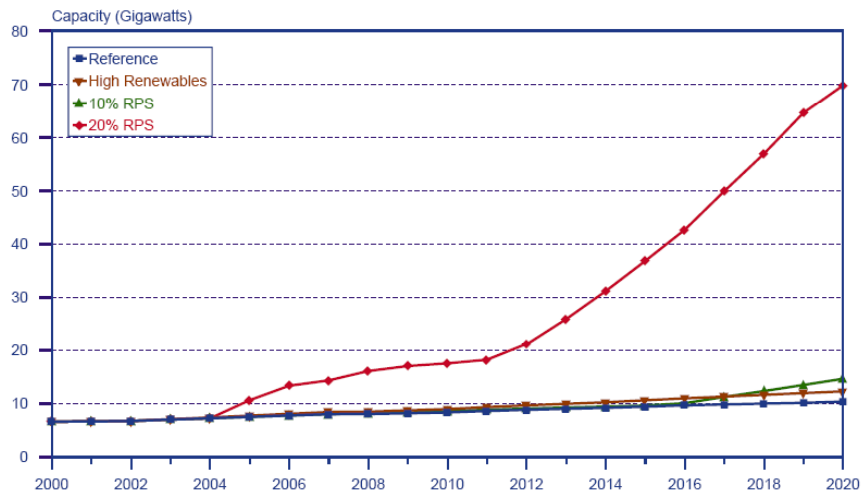


Figure 7. Projections of Biomass-Fired Generating Capacity in Four Cases, 2000-2020



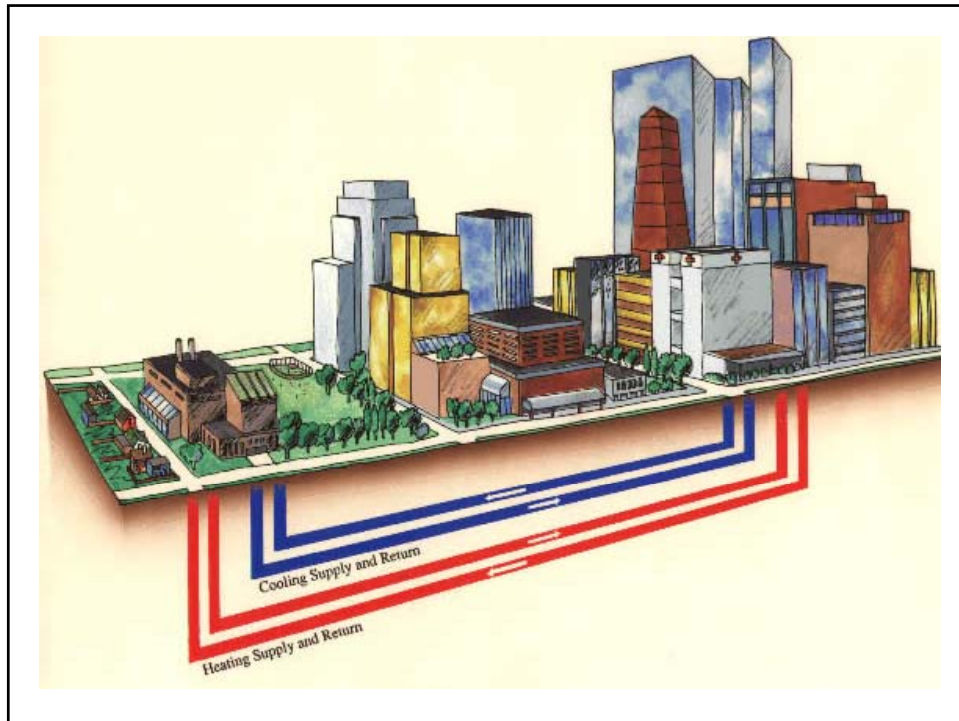
Source: EIA, 2003. Biomass for Electricity Generation

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.





www.pinchot.org/bioenergy_paper.html

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