This sheet estimates the time zero CO2 emmission equivalent (tons) associated with one ton wood energy CO2 emission taking into account the difference in land carbon due to use of wood from forest thinnings. The estimat uses the forest carbon curves used by Massachusetts from the Manomet study and assumes a 100 yr time horizon

	CO2 radiative forcing response function parameters				
	Source : IPCC 4th Assessment report - Physical Science Basis p 231 footnote a				
ao	0.217				
a1	0.259	T1	172.9	yrs	
a2	0.338	T2	18.51	yrs	
a3	0.186	T3	1.186	yrs	

For wood biomass from forest thinnings

Tons Time zero CO2 emission equivalent per ton of biomass CO2 emission

0.68

Source: Massachusetts Renewable Portfolio - Biomass Policy Regulations

http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/biomass/renewable-portfolio-standard-biomass-policy

http://www.mass.gov/eea/docs/doer/renewables/biomass/ma-rps-regulation-overall-efficiency-and-ghg-analysis-guideline-doe

Forest and Non-Forest Carbon Deficit Function Parameters

Residues and Thinnings

Biomass from Residues	Decay Rate Half Life, years	
		5.5

	Trendline	
Biomass from Thinnings	Coefficient	Exponent
	1.1239	-0.012

Eligible Biomass Fuel can come from Forest or Non-Forest Residues and Forest Thinnings, each of which has substantially different carbon deficit functions. DOER provides these representative temporal functions for which the carbon impacts of Residues and Thinnings are evaluated. DOER bases these functions on the averaging of results presented in the Manomet study on the Total (Forest) Stand Carbon and on other literature for the decay of non-forest residues (see Tab "Carbon Deficit Analys" in this workbook). DOER recognizes that carbon sequestration recovery and residue decay rates will depend on specific forest conditions, harvest activity, residue sources, but puts forward these representative functions to enable reasonable and practicable implementation of the GHG Analysis required in 225 CMR 14.00 regulation.

This sheet estimates the time zero CO2 emmission equivalent (tons) associated with one ton wood energy CO2 emission taking into account the difference in land carbon due to use of wood from forest thinnings. The estimat uses the forest carbon

	CO2 radiative forcing response function parameters				
	Source : IPCC 4th Assessment report - Physical Science Basis p 231 footnote a				
ao	0.217				
a1	0.259	T1	172.9	yrs	
a2	0.338	T2	18.51	yrs	
a3	0.186	T3	1.186	yrs	

For wood biomass from biomass residue

Tons Time zero CO2 emission equivalent per ton of biomass CO2 emission

0.07

Source: Massachusetts Renewable Portfolio - Biomass Policy Regulations

http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/biomass/renewable-portfolio-standard-biomass-policy.html

http://www.mass.gov/eea/docs/doer/renewables/biomass/ma-rps-regulation-overall-efficiency-and-ghg-analysis-guideline-doer-0817

Forest and Non-Forest Carbon Deficit Function Parameters

and Thinnings

	Decay Rate Half Life, years	k
Biomass from <u>Residues</u>	5.5	0.12602676

	Trendline Coefficient	Exponent
Biomass from <u>Thinnings</u>	1.1239	-0.012

Eligible Biomass Fuel can come from Forest or Non-Forest Residues and Forest Thinnings, each of which has substantially different carbon deficit functions. DOER provides these representative temporal functions for which the carbon impacts of Residues and Thinnings are evaluated. DOER bases these functions on the averaging of results presented in the Manomet study on the Total (Forest) Stand Carbon and on other literature for the decay of non-forest residues (see Tab "Carbon Deficit Analys" in this workbook). DOER recognizes that carbon sequestration recovery and residue decay rates will depend on specific forest conditions, harvest activity, residue sources, but puts forward these representative functions to enable reasonable and practicable implementation of the GHG Analysis required in 225 CMR 14.00 regulation.

This sheet estimates the time zero CO_2 emmission equivalent (tons) associated with one ton wood energy CO_2 emission taking into account the difference in land carbon due to use of wood from forest thinnings. The estimat uses the forest carbon

	CO2 radiative forcing response function parameters				
	Source : IPCC 4th Assessment report - Physical Science Basis p 231 footnote a				
ao	0.217				
a1	0.259	T1	172.9	yrs	
a2	0.338	T2	18.51	yrs	
a3	0.186	T3	1.186	yrs	

For wood biomass from logging slash

Tons Time zero CO2 emission equivalent per ton of biomass CO2 emission

0.30

Source: Massachusetts Renewable Portfolio - Biomass Policy Regulations

http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/biomass/renewable-portfolio-standard-biomass-policy.html

http://www.mass.gov/eea/docs/doer/renewables/biomass/ma-rps-regulation-overall-efficiency-and-ghg-analysis-guideline-doer-0817

Forest and Non-Forest Carbon Deficit Function Parameters

and Thinnings

	Decay Rate Half Life, years	k
Biomass from <u>Logging slash</u>	20	0.034657359

Eligible Biomass Fuel can come from Forest or Non-Forest <u>Residues</u> and Forest <u>Thinnings</u>, each of which has substantially different carbon deficit functions. DOER provides these representative temporal functions for which the carbon impacts of Residues and Thinnings are evaluated. DOER bases these functions on the averaging of results presented in the Manomet study on the Total (Forest) Stand Carbon and on other literature for the decay of non-forest residues (see Tab "Carbon Deficit Analys" in this workbook). DOER recognizes that carbon sequestration recovery and residue decay rates will depend on specific forest conditions, harvest activity, residue sources, but puts forward these representative functions to enable reasonable and practicable implementation of the GHG Analysis required in 225 CMR 14.00 regulation.

	Trendline Coefficient	Exponent
Biomass from <u>Thinnings</u>	1.1239	-0.012