

Bonfire assumes dry wood, rotation age loblolly is 30 years, absorption changes per species, Pinus taeda used in both equations.

Volume ft3	Volume m3	Wood density Pinus taeda in kg m3	Percent Carbon	C to CO2	Bonfire in kg CO2	Bonfire in tCO2
216	6.117336	470	0.531	3.67	5603.002012	5.603002012
Dixon et al (1991)			Koch (1989)			

- 1) Total stock of carbon at the end of the rotation in biomass and products (Mg C ha)
- 2) Total stock of carbon at the end of the rotation in soil organic matter (Mg C ha)
- 3) Total stock at the end of rotation in biomass, forest products, and in dead organic material on or in the soil (Mg C ha)

	1	2	3	bonfire absorption in ha	bonfire in acres
good site	122	91	211	0.026554512	0.065617527
moderate site	93	77	170	0.032958835	0.08144293
limited site	61	61	122	0.045926246	0.11348605

The above example is really based on a plantation model & I don't know the situation of the trees you are planning. Another way to do it is to ignore the soil-carbon aspect, and go for the tree itself.

pine carbon factor in lbs ft3	pine carbon factor in kg m3	C to CO2	kgCO2/m3	you need m3 tree
16.9	270.6762573	3.67	993.3818642	5.640330485

circum. Pinus taeda in cm	height Pinus taeda in cm	height in ft	volume m3	# of trees needed
Large	60	1500	49.21	1.312734695 large
Medium	50	1200	39.37	2.362922451 medium
Small	40	800	26.25	5.538099495 small

In reality, you need more volume in tree on the stump than volume burned, since 'green wood' shrinks and becomes about 13% lighter when dried. I suppose this is the limitation of knowledge at this moment.

Anyway, if you plant 6 loblollies, and they grow beyond 26 feet, you are home safe!

If you think they'll grow bigger, plant less. (ps, notice one m3 is about 1tCO2)

Tree survival rate really depends on a lot of factors. The lowest numbers seem to indicate that at least 60% of an original plantation makes it to maturity. Depending on the type of care trees receive when young, this can be much higher, with ratios of 'tended' plots ranging around 85%. I suppose if you were to plant 10 trees, or simply double the amount in the example above, you'd be taking care

of most of these issues.

Gallon fuel	tCO2	Bonfire + Fuel tCO2	you need m3 tree	tree attrition	plant m3 tree	# trees needed
10	0.0874979	5.690499862	5.728411266	0.6	9.547352109	
					Large	2.222057802
					Medium	3.999704044
					Small	9.374306352