Wood Products Carbon Storage Estimator (WPsCS Estimator) Documentation

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The WPsCS Estimator is developed by Python programming.

The operating systems required for WPsCS Estimator is Windows 7, 10, 11.

The input data of annual wood products is a comma-separated values (CSV) file including the annual production, consumption, or user-defined system boundary of each wood product broken out by bioenergy, non-energy use biochar, building, exterior use, home application, and paper (i.e., newspaper, graphic paper, packing paper, and household paper). Note that the input wood product data includes products made by harvested timber and recyclable waste wood materials when the system boundary includes the products made by recycled waste wood materials.

The unit for the input wood products is **kg C per year**.

The file names of input wood products and output results are provided by the user at the top of the estimator window.

Parameters including the combustion efficiency of biofuel, charcoal decay rate, disposal rate for each end-use wood product, recycling rate for each recyclable wood product, and decay rate for each type of waste wood material in landfills can be manually calibrated by users (Table 1).

A file named ‘WP_Data’ should be created and placed in the same directory as the estimator, which is used to store the input data and output results.

To start a calculation, click the “Run” button and the calculation will be automatically started. The results are output as a CSV file and listed as the size of each carbon pool for every year.

Table 1. Parameters include the combustion efficiency, charcoal decay rates, disposal rates for end-use wood products, recycling rates for recyclable disposed wood materials, and decay rates for waste wood products. (These parameters are used for the United States. See the main article to obtain the details for each parameter.)

Biofuel Biochar	Biofuel and charcoal			
	Combustion efficiency			96%
	Charcoal decay (τ)			0.007
	Charcoal decay (σ)			0.0003
Disposal rate	End-use wood product	α	β	γ
	Building	0.133	0.028	80
	Exterior use	0.326	0.041	25
	Home application	0.265	0.031	30
	Newspaper	3.062	0.0	2
	Graphic paper	1.006	0.0	6
	Packing paper	6.036	0.0	1
	Household paper	12.036	0.0	0.5
Recycle rate	Disposed wood product	λ		μ
	Building	0.085		0.015
	Home application	0.085		0.016
	Newspaper	0.225		0.027
	Graphic paper	0.225		0.027
	Packing paper	0.225		0.027
Landfill decay rate	Waste wood material	ξ		ω
	Building	0.997		30
	Exterior use	1.178		20
	Home application	1.329		15
	Paper	0.821		5