



NETL Life Cycle Inventory Data

Process Documentation File

Tracked Input Flows:

Diesel Tractor, 165 Horsepower [Installation]	<i>Total number of tractors needed over the lifetime of the energy conversion facility (plant), normalized to the reference flow</i>
Tiller, 5,015 lbs, Tractor Propelled [Installation]	<i>Total number of tillers needed over the lifetime of the energy conversion facility (plant), normalized to the reference flow</i>
Treeplanter, 4500 lbs, Tractor Propelled [Installation]	<i>Total number of treeplanters needed over the lifetime of the energy conversion facility (plant), normalized to the reference flow</i>

Tracked Output Flows:

Equipment Assembly per kg Biomass [Installation]	<i>Reference Flow</i>
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Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage1_C_Assembly_SRWC_Cultivation_2010.02.xls*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

The scope of this unit process covers the elements required for the components used for the land preparation and cultivation of short rotation woody crops (SRWC) biomass under (Life Cycle) LC Stage #1, as described below and in **Figure 1**. Tractors, tillers, and treeplanters are needed during the land preparation and cultivation of SRWC. This unit process determines the fraction of each machine that should be allocated to each kilogram of SRWC biomass produced, based on the parameters shown above and in the DS.

Construction data, including the mass of raw materials required to construct each piece of equipment, are calculated in separate unit processes. Therefore, the following unit processes are considered to be embedded in this assembly unit process: *DF_Stage1_C_Diesel_Tractor_165_HP_2009.01.doc*, *DF_Stage1_C_Tiller_5015_lbs_TractorPropelled_2009.01.doc*, and *DF_Stage1_C_Treeplanter_4500_lbs_TractorPropelled_2009.01.doc*. For discussion of environmental emissions associated with the manufacture of raw materials used in the construction of the SRWC land preparation and cultivation

components, as well as other pertinent information, please refer to these separate unit processes.

Boundary and Description

Figure 1 provides an overview of the boundary of this unit process. As it shows, the tractor, tiller, and treeplanter are constructed in separate, embedded unit processes. All emissions and environmental effects are accounted for upstream of this process, as discussed in greater detail in the documentation for each embedded unit process.

This unit process has four variable parameters, which can be adjusted to match the scenarios being examined. The tractor, tiller, and treeplanter all have an assumed lifetime of 15 years based on the assumptions presented in the DS. Depending upon the intensity of usage for these items, or based on additional data, the assumed lifetime may be increased or decreased. NETL currently suggests a yield of 6,214 kg/acre-year of SRWC for this LCA. This value may be adjusted based on more recent study assumptions or relevant biomass production data.

Relevant properties of SRWC cultivation equipment used for the calculation of input and output flows for this unit process are shown in **Table 1**. **Table 2** provides a summary of the modeled input and output flows. Additional details showing calculation methods for input and output flows, and other relevant information, are contained in the associated DS.

Figure 1: Unit Process Scope and Boundary

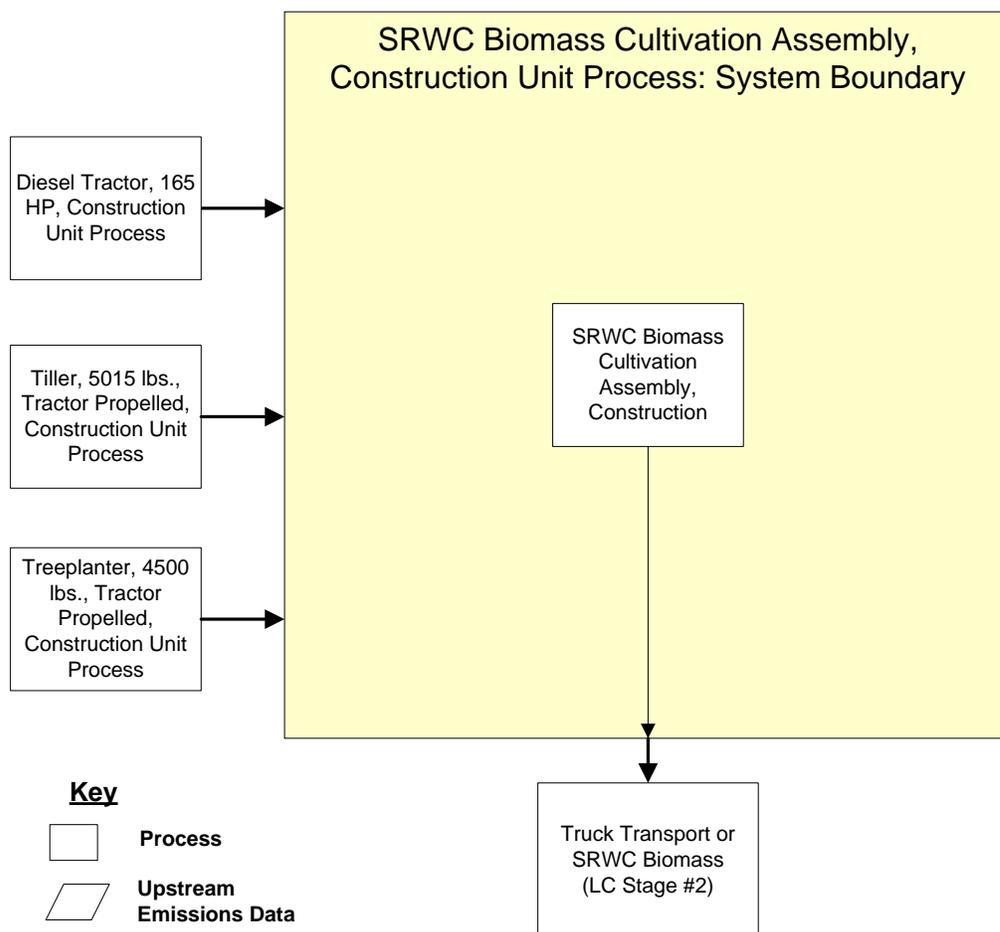


Table 1: Properties for Assembly of SRWC Cultivation Equipment

Machine	Value	Unit	Source
Lifetime of Diesel Tractor, 165 Horsepower	15	years	NETL Engineering Judgment
Lifetime of Tiller, 5,015 lbs, Tractor Propelled	15	years	NETL Engineering Judgment
Lifetime of Treeplanter, 4,500 lbs, Tractor Propelled	15	years	NETL Engineering Judgment
Farm Size	500	acres	NETL Engineering Judgment
SRWC Yield	6,214 (13,700)	kg/acre-yr (lb/acre-yr)	NETL Engineering Calculation

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
Inputs		
Diesel Tractor, 165 Horsepower [Installation]	2.14569E-08	pcs
Tiller, 5,015 lbs, Tractor-Propelled [Installation]	2.14569E-08	pcs
Treeplanter, 4,500 lbs, Tractor Propelled [Installation]	2.14569E-08	pcs
Outputs		
Equipment Assembly per kg Biomass [Installation]	1	pcs

* **Bold face** clarifies that the value shown *does not* include upstream environmental flows. See also the documentation for embedded unit processes, as shown below.

Embedded Unit Processes

DF_Stage1_C_Diesel_Tractor_165_HP_2009.01.doc

DF_Stage1_C_Tiller_5015_lbs_TractorPropelled_2009.01.doc

DF_Stage1_C_Treeplanter_4500_lbs_TractorPropelled_2009.01.doc

References

None.

Section III: Document Control Information

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