NETL Life Cycle Inventory Data
Process Documentation File

Process Name: SRWC Harvesting Assembly, Construction

Reference Flow: 1 pcs of Equipment Assembly per kg Biomass

Brief Description: Assembly process that apportions the construction requirements of equipment used for SRWC biomass harvesting. Equipment includes a harvest chipper and a pushoff trailer.

Section I: Meta Data

Geographical Coverage: US **Region:** Midwest

Year Data Best Represents: 2009

Process Type: Basic Process (BP)

Process Scope: Gate-to-Gate Process (GG)

Allocation Applied: No

Completeness: All Relevant Flows Recorded

Flows Aggregated in Data Set:

☒ Process ☐ Energy Use ☐ Energy P&D ☐ Material P&D

Relevant Output Flows Included in Data Set:

Releases to Air:	☐ Greenhouse Gases	☐ Criteria Air Pollutants	☐ Other
Releases to Water:	☐ Inorganic Emissions	☐ Organic Emissions	☐ Other
Water Usage:	☐ Water Consumption	☐ Water Demand (throughput)	
Releases to Soil:	☐ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

Harvest Chipper Lifetime	*The assumed lifetime of the harvest chipper, in years*
Trailer Lifetime	*The assumed lifetime of the trailer, in years*
SRWC Yield	*The production rate of SRWC biomass, in kg per year*
Farm Size	*The assumed size of the farm, in acres*

Tracked Input Flows:

Tree Harvester Chipper, 440 Horsepower Propelled, Construction [Installation]	*Total number of harvester chippers needed over the lifetime of the energy conversion facility (plant), normalized to the reference flow*
Pushoff Trailer, 60m^3, Tractor Propelled, Construction [Installation]	*Total number of trailers needed over the lifetime of the energy conversion facility (plant), normalized to the reference flow*

Tracked Output Flows:

Equipment Assembly per kg Biomass [Installation]	*Amount of SRWC biomass produced (reference flow)*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage1_C_Assembly_SRWC_Harvesting_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 in the harvesting of short rotation woody crops (SRWC) under Life Cycle (LC) Stage #1, as described below and in **Figure 1**. Harvest chippers and pushoff trailers are needed during the harvest to cut, chip, and transport the SRWC on the farm before it is transported during LC Stage #2 to the energy conversion facility (LC Stage #3). This unit process determines the fraction of each machine that should be allocated to each kilogram of SRWC biomass produced.

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_Tree_Harvester_Chipper_440_HP_2010.01.doc and DF_Stage1_C_Pushoff_Trailer_60m3_Tractor_Propelled_2010.01.doc. For a discussion of environmental emissions associated with the manufacture of raw materials used in the construction of SRWC harvesting 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 harvest chipper and trailer are constructed in separate, embedded unit processes. All emissions and environmental effects are accounted for upstream from this unit process, as discussed in greater detail in the documentation for each embedded unit process.

This unit process has three adjustable parameters, which can be adjusted to match the scenarios being examined. Both the harvest chipper and pushoff trailer 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 study assumptions and recent or more relevant biomass production data.

Relevant properties of SRWC harvesting 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

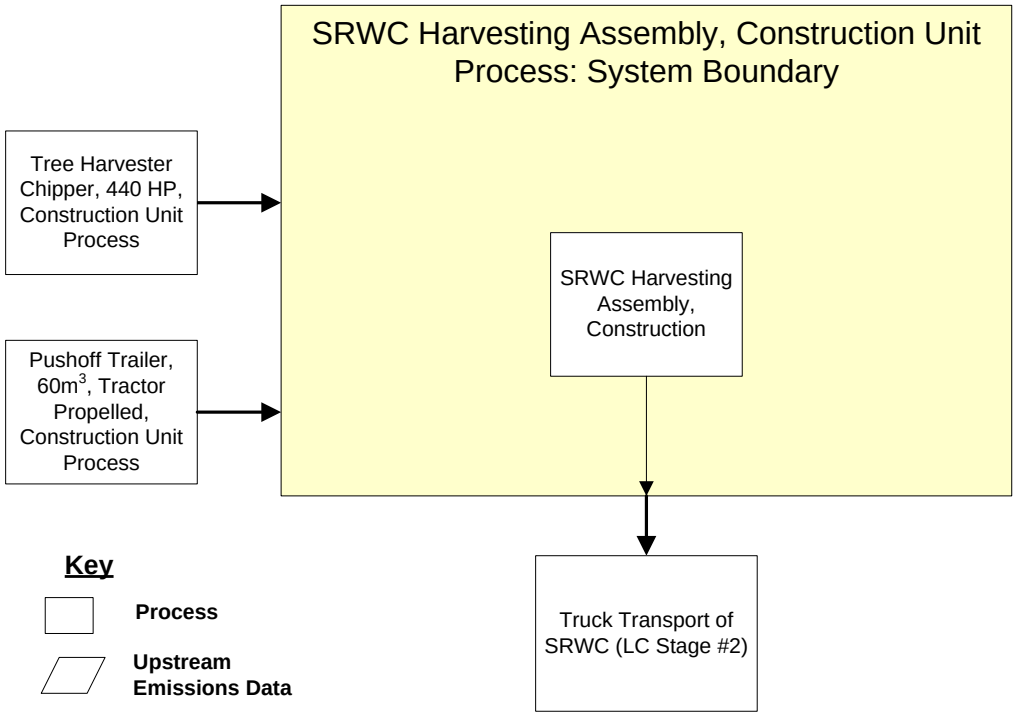

Table 1: Properties for Assembly of SRWC Harvesting Equipment

Machine	Value	Unit	Source
Lifetime of Tree Harvester Chipper, 440 HP	15	years	NETL Engineering Judgment
Lifetime of Pushoff Trailer, 60m^3, 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		
Tree Harvester Chipper, 440 HP, Construction	**2.14569E-08**	**pcs**
Pushoff Trailer, 60m^3, Tractor Propelled, Construction	**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_Tree_Harvester_Chipper_440_HP_2010.01.doc

DF_Stage1_C_Pushoff_Trailer_60m3_Tractor_Propelled_2010.01.doc

References

None.

Section III: Document Control Information

Date Created: January 18, 2010

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13JUNE2012 Updated to revised parameter values.

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