QUARTERLY PROGRESS REPORT

January 1, 2021 to June 30, 2021

PROJECT TITLE: An Integrated Tool for Local Government to Track Materials Management and Progress toward Sustainability Goals

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PROJECT WEB SITE: https://faculty.eng.ufl.edu/timothy-townsend/research/florida-solid-waste-issues/tool-to-track-progress-toward-smm-goals/

Work accomplished during this reporting period:

Development of Source Reduction Measurement Methods

The mass of materials source reduced/generated were calculated by subtracting the WasteCalc results for the future year (e.g., 2019) from the user's inputted individual material collected mass from a past baseline year (e.g., 2013). If the result was negative, then that material was assumed source reduced and if the result was positive that material was assumed source generated. Example hypothetical data are shown in Table 1.

Table 1. Hypothetical calculations used for source reduced/generated for the FDEP 18 material categories.

Material	Collected 2019	Collected 2013	Source reduced mass Tons
Newspaper	13,098	32,718	-19,620
Glass	34,945	51,041	-16,096
Aluminum Cans	7,839	6,544	1,295
Plastic Bottles	21,159	26,175	-5,016
Steel Cans	6,115	5,235	880
Corrugated Boxes	84,656	91,612	-6,956
Office Paper	14,284	26,175	-11,891

Yard Trash	489,520	308,539	180,981
Other Plastics	97,039	91,612	5,427
Ferrous Metals	80,943	48,054	32,889
White Goods	11,167	10,470	697
Non Ferrous Metals	9,660	11,396	-1,736
Other Paper	117,890	100,404	17,486
Textiles	31,577	26,175	5,402
C&D Debris	516,676	383,461	133,215
Food Waste	119,039	37,953	81,086
Miscellaneous	164,363	3,096	161,267
Tires	9,764	3,926	5,838
Process Fuel	-	-	0

Create Actual Worksheet/Spreadsheet Tool

TAB 1 "INTRODUCTION"

The main purpose of this tab is to provide users a simplified background on the motivation and project history associated with this tool. This tab provides resources related to the tool and SMM.

TAB 2 "2019 WASTECALC INPUT"

The version included here is the 2019 version which is compatible with the online version managed on the FDEP website. In this tab, users input their county's name, population, and MSW tonnage data (collected, landfilled, combusted and recycled), along with the new modifications.

TAB 3 "2019 WASTECALC RESULTS"

The results from the inputted data in Tab 2 for the waste composition and their associated masses collected, recycled, combusted, landfilled, and source reduced/generated are provided for users.

TAB 4 "SMM INPUT"

The majority of the data included in Tabs 4-6 derive from the Hinkley Center 2018/2019 Project entitled, *Looking Beyond Florida's 75% Recycling Goal: Development of a Methodology and Tool for Assessing Sustainable Materials Management Recycling Rates in Florida*. The goals of that project were to develop a publicly available LCA tool and LCA factors that will allow users to consider a wider variety of impacts associated with various materials management scenarios. In

Tab 4, it contains clear instructions for users to select one of six model preferences (i.e., MSW-DST (FL), SWOLF (FL), SWOLF (US), WARM (FL), WARM (US), and Literature). The (FL) indicates to the user that the impact factors were developed using the Florida average energy grid and (US) is for the US national average energy grid. The Literature preference must be used if the user desires to estimate jobs produced and landfill use footprints, as well as for furniture waste management footprints and any donation footprints.

TAB 5 "SMM RESULTS"

The data from Tab 2, along with Tab 6 (which are based on the selections in Tab 4) are used to estimate the environmental footprint for corresponding material category and its management method. The results are shown for "produced" and each management method, including source reduced/generated and donated. Note, the environmental footprint for "produced" were estimated by multiplying the mass of collected material categories by the available produced impact factors. The results on a total basis are shown for "produced" and each management and for lifecycle total (all management methods) and waste management total (all management methods except for source reduced/generated, donated, and produced).

TAB 6 "LCI FACTORS"

Users have access to all the impact factors associated with their selected LCA model from Tab 4. Figure A8 shows an example screenshot for the SWOLF (FL) option. The impact factors were developed using both waste LCA models and industry reports or data. The impact factors were created mainly referring to the data reported in the previous Hinkley Center project *Looking Beyond Florida's 75% Recycling Goal: Development of a Methodology and Tool for Assessing Sustainable Materials Management Recycling Rates in Florid*.

Create Missing Categories LCI Factors

The impact factors created as part of *Looking Beyond Florida's 75% Recycling Goal: Development of a Methodology and Tool for Assessing Sustainable Materials Management Recycling Rates in Florida* (University of Florida, 2020) were used. The impact factors created for that project were specifically for the end-of-life management approaches (e.g., recycling, landfilling, combustion, anaerobic digestion, composting). In this project, we created additional impact factors that accounted for the upstream management of materials, which is referred to here as the environmental footprint when producing a material/product. Since source reduction is a major activity that leads to increased environmental benefits and is a critical task of this project, we also created impact factors for when materials are donated for reuse. The material categories books and furniture were not included in the previous project, therefore we created new impact factors for when they are produced, donated, and treated at end-of-life. The impact factors allow for users to estimate the environmental footprint of producing, donating, recycling, and disposal treatment of their county's solid waste stream.

Stakeholder and Training Material Meetings

We conducted several meetings during this time. The presentation and the recording is included on the project website.

- *Technical Awareness Group (TAG) II Meeting* took place on April 4, 2021.
- *Educator 2021 SMM Tool Training* took place on May 5th, 2021.
- *Recycle Florida Today Summer 2021 Conference* took place on June 8th, 2021.
- *FDEP Webinar for Decision Makers 2021 SMM Tool Training* took place on June 24th, 2021.

Metrics:

Name	Rank	Department	Professor	Institution
Malak Anshassi	PhD Student	Environmental Engineering	Dr. Townsend	University of Florida
Eleanor Brown	Undergraduate Student	Environmental Engineering	Dr. Townsend	University of Florida