

# Measuring Sustainability

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## Life Cycle Assessment: Example 1

by Sarah Dehlinger, Jake Hvistendahl, Joel Kohn, Jessica Papa (2013)

Note: This is a company-anonymized version of the file.

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### Comments:

Input assumptions were clearly described and listed in a system bill of materials (SBOM) table, the assumptions seemed reasonable, functional units were clear and well-chosen, presentation of important LCA results was clear, and they had a clear written interpretation of results. Nothing to criticize!



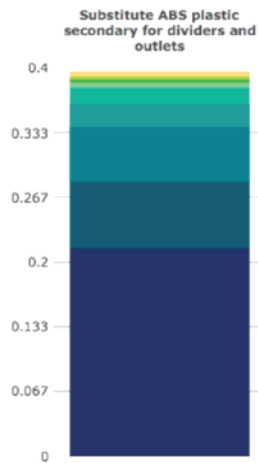
## Simple LCA - Charging Cart

### - Substitute Recycled ABS Plastics For Dividers and Outlet Pieces

**SCOPE** - Materials Extraction, Materials Processing, Manufacturing, Transportation, Use, End of Life.

**Functional Unit** – Ecological impacts per charging space per year.

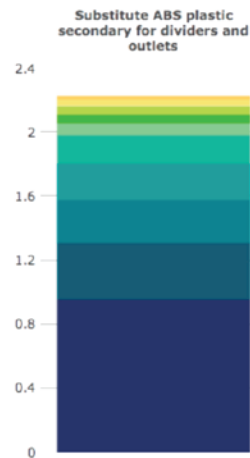
Total Impacts by SBOM Inputs



Total = 0.41 mPts/func unit

Input	mPts/func unit
Steel, converter, low-alloyed	0.214
Cable, three-conductor cable	0.0689
Sheet rolling, steel	0.0564
Powder coating, steel	0.0236
Truck and trailer	0.0169
Cable, three-conductor cable	0.00536
Acrylonitrile-butadiene-styrene copolymer, ABS	0.00332
Aluminum, cast, semi-permanent mold (SPM)/kg NREL /US	0.00317
Turning, steel	0.00243
Incineration, plastics, mixture	0.00207

Carbon Footprint by SBOM Inputs



Total = 2.4 CO<sub>2</sub> eq. kg/func unit

Input	CO <sub>2</sub> eq. kg/func unit
Steel, converter, low-alloyed	0.957
Powder coating, steel	0.352
Cable, three-conductor cable	0.266
Truck and trailer	0.229
Sheet rolling, steel	0.177
Aluminum, cast, semi-permanent mold (SPM)/kg NREL /US	0.0738
Incineration, plastics, mixture	0.0552
Acrylonitrile-butadiene-styrene copolymer, ABS	0.0530
Injection molding, plastics	0.0401
Injection molding, plastics	0.0235

Name	Qty	Material/process	Amount	Units	Total (mpts)	CO2 Eq. (kg)
<b>Substitute ABS plastic secondary for dividers and outlets</b>						
<b>Wheels</b>						
Wheel rubber	4					
Process	1	Injection molding, plastics	0.389	lbs	0.000476	0.0101
Wheel rubber		Styrene Butadiene Rubber	0.389	lbs	0.00121	0.02
Wheel plastic	1					
Process	1	Injection molding, plastics	0.908	lbs	0.00111	0.0235
Wheel plastic		Acrylonitrile-butadiene-styrene copolymer, ABS	0.908	lbs	0.00332	0.053
<b>Top</b>						
Top	1	Medium density fibreboard	5	lbs		
			5	lbs	0.00138	0.0204
<b>Dividers</b>						
Dividers	44					
Process	44	Injection molding, plastics	2.25	oz	0.00189	0.0401
Dividers		Acrylonitrile-butadiene-styrene copolymer, ABS, secondary	2.25	oz	0.000744	0.013
<b>Handle</b>						
Handle	1					
Process	1	Heat treatment, aluminum	20.3	oz	2.38E-05	0.000671
Handle		Aluminum, cast, semi-permanent mold (SPM)/kg NREL /US	20.3	oz	0.00317	0.0738
<b>Handle Rod</b>						
Handle Rod	1					
Process	1	Powder coating, steel	0.75	ft2	0.000201	0.003
Process	1	Cold impact extrusion, steel, 1 stroke	8	oz	0.000126	0.00187
Handle Rod		Steel, converter, low-alloyed	8	oz	0.000965	0.00431
<b>Bumpers</b>						
Bumpers	1					
Process	1	Injection molding, plastics	5	oz	9.57E-05	0.00203
Bumpers		Polyvinylchloride, PVC	5	oz	0.000184	0.00233
<b>Structural Steel bits</b>						
Structural Steel bits	1					
Process	1	Powder coating, steel	88	ft2	0.0236	0.352
Process	1	Sheet rolling, steel	111.137	lbs	0.0564	0.177
Structural Steel bits		Steel, converter, low-alloyed	111.137	lbs	0.214	0.957
<b>Wires</b>						
Wires	1					
Process	1	Cable, three-conductor cable	18.25	lbs	0.0689	0.266
Wires			18.25	lbs		
<b>Outlet plastic</b>						
Outlet plastic	43					
Process	43	Injection molding, plastics	0.25	oz	0.000206	0.00436
Outlet plastic		Acrylonitrile-butadiene-styrene copolymer, ABS, secondary	0.25	oz	8.08E-05	0.00141
<b>Outlet copper</b>						
Outlet copper	11					
Process	11	Sheet rolling, copper	0.25	oz	8.84E-05	0.00108
Outlet copper		Copper, primary	0.25	oz	0.000585	0.00147
<b>Extension cord</b>						
Extension cord	1					
Process	1	Cable, three-conductor cable	1.42	lbs	0.00536	0.0207
Extension cord			1.42	lbs		
<b>Connectors</b>						
Connectors	1					
Process	1	Zinc coating, pieces	10	in2	0.000275	0.000359
Process	1	Turning, steel	9	oz	0.00243	0.00786
Process	1	Wire drawing, steel	9	oz	0.000412	0.000816
Connectors		Steel, converter, low-alloyed	9	oz	0.00109	0.00485
<b>Large washers</b>						
Large washers	1					
Process	1	Milling, steel	2.25	oz	0.000619	0.00214
Process	1	Sheet rolling, steel	2.25	oz	7.14E-05	0.000224
Large washers		Steel, converter, low-alloyed	2.25	oz	0.000271	0.00121
<b>Misc plastic connec</b>						
Misc plastic connec	1					
Process	1	Injection molding, plastics	0.5	oz	9.57E-06	0.000203
Misc plastic connectors		Polyethylene terephthalate, granulate, amorphous, PET	0.5	oz	3.24E-05	0.000361
<b>Plastic Cord Clips</b>						
Plastic Cord Clips	1					
Process	1	Injection molding, plastics	1.25	oz	2.39E-05	0.000507
Plastic Cord Clips		Polyethylene, HDPE, granulate	1.25	oz	4.03E-05	0.000566
<b>End of Life</b>						
Landfill, manufacture	1	Medium density fibreboard	5	lbs	2.16E-05	0.000587
Incineration, plastics	44	Acrylonitrile-butadiene-styrene copolymer, ABS, secondary	2.25	oz	0.00207	0.0552
Landfill, aluminum	1	Aluminum, cast, semi-permanent mold (SPM)/kg NREL /US	20.3	oz	1.13E-05	0.000148
Landfill, steel	1	Steel, converter, low-alloyed	8	oz	1.12E-06	1.44E-05
Landfill, polyvinylchlc	1	Polyvinylchloride, PVC	5	oz	2.61E-06	8.01E-05
Landfill, steel	1	Steel, converter, low-alloyed	111.137	lbs	0.000248	0.00319
Recycling	1	Cable, three-conductor cable	18.25	lbs	0	0
Incineration, plastics	43	Acrylonitrile-butadiene-styrene copolymer, ABS, secondary	0.25	oz	0.000225	0.00599
Incineration, copper	11	Copper, primary	0.25	oz	2.43E-06	2.00E-05
Recycling	1	Cable, three-conductor cable	1.42	lbs	0	0
Landfill, steel	1	Steel, converter, low-alloyed	9	oz	1.25E-06	1.62E-05
Landfill, steel	1	Steel, converter, low-alloyed	2.25	oz	3.14E-07	4.04E-06
Landfill, polyethylene	1	Polyethylene terephthalate, granulate, amorphous, PET	0.5	oz	3.32E-07	9.74E-06
Landfill, polyethylene	1	Polyethylene, HDPE, granulate	1.25	oz	8.19E-07	3.38E-05
Transportation	1	Truck and trailer	2000	miles	0.0169	0.229