LONG TRAIL SUSTAINABILITY
Experts in Product Stewardship

# Long Trail Sustainability Training
# Product Stages Exercise in SimaPro
# Coffee Machine Example

Used in the *Modeling in Product Stages* Course

May 2023

Version 1.12

**This is a fictitious class example that should not be used to derive any judgment**


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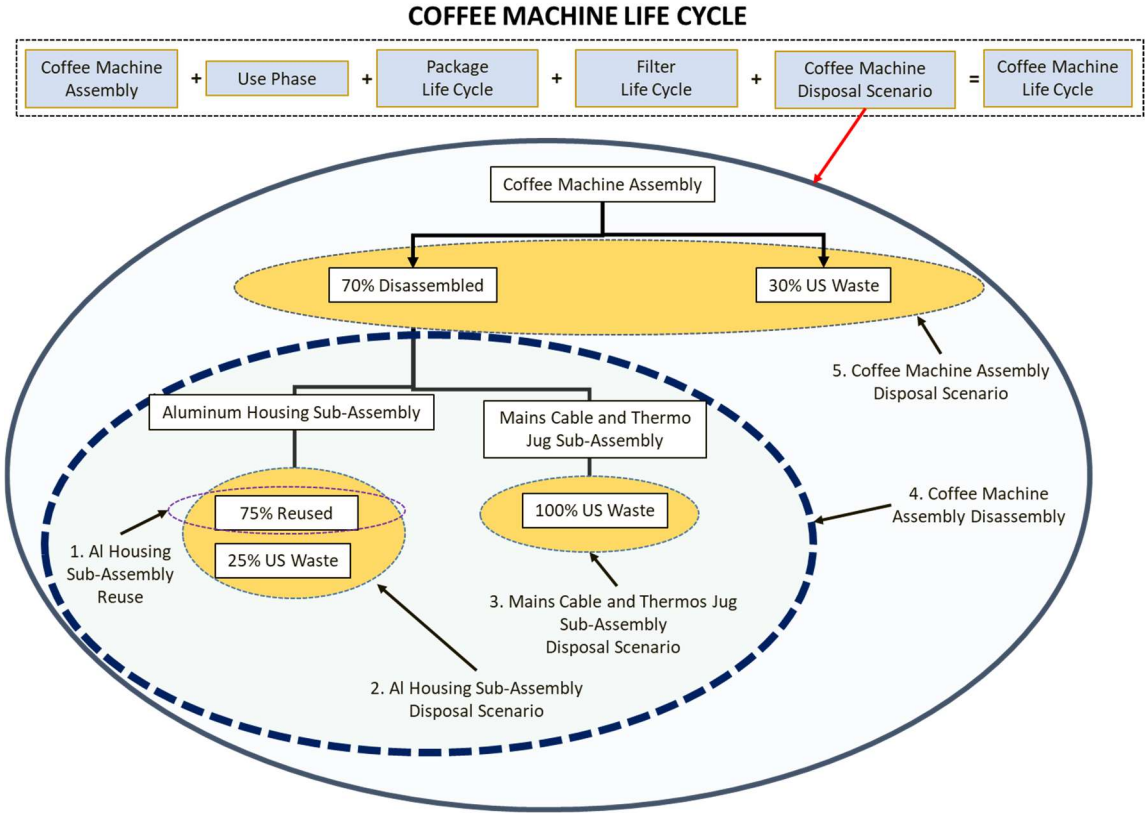
In the end of life beginning course, a coffee machine is modeled in product stages. It is assumed that 70% of the coffee machines are reclaimed for disassembly and the remaining 30% is sent into the US waste stream. The disassembly separates the mains cable and thermos jug from the aluminum housing. The mains cable and thermos jug are sent into the US waste stream. Of the 70% aluminum housings that are reclaimed, 75% are reused and 25% are sent into the US waste stream.




**Create a new project in SimaPro. Under Goal & Scope > Libraries, select the Ecoinvent 3 - allocation, cut-off by classification – unit and Methods libraries.**

Here are the steps to modeling the coffee machine in product stages.

1. Click on “Product Stages” under the “Inventory” heading and create subassemblies and assemblies:
    a. Aluminum Housing Sub-Assembly
        i. Materials/Assemblies
            1. Aluminum:
                a. Aluminium, primary, ingot {RoW}| market for aluminium, primary, ingot | Cut-off, U (SimaPro 8.3: GLO); Amount: 1.5; Unit: kg
                    i. Found in the Materials – Metals – Non ferro – Market folder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ii. Processes
1. Aluminum Processing:
a. Metal working, average for aluminium product manufacturing {GLO}| market for metal working, average for aluminium product manufacturing | Cut-off, U; Amount: 1.5; Unit: kg
i. Found in the Processing – Metals – Metal Working – Market folder (SimaPro 8.4: Processing – Metals – Market – Infrastructure)

b. Mains Cable Sub-Assembly
i. Materials/Assemblies
1. Copper Material:
a. Copper-rich materials {GLO}| market for copper-rich materials | Cut-off, U; Amount: 60; Unit: g
i. Found in the Materials – Metals – Non ferro – Market folder

2. PVC Material:
a. Polyvinylchloride, suspension polymerised {GLO}| market for polyvinylchloride, suspension polymerised | Cut-off, U; Amount: 105; Unit: g
i. Found in the Materials – Plastics – Thermoplasts – Market folder

c. Thermos Jug Sub-Assembly
i. Materials/Assemblies
1. Glass Material:
a. Packaging glass, white {GLO}| market for packaging glass, white | Cut-off, U; Amount: 0.2; Unit: kg
i. NOTE: Already has processing built in
ii. Found in the Materials – Glass – Packaging Glass – Market folder

2. Polypropylene Material:
a. Polypropylene, granulate {GLO}| market for polypropylene, granulate | Cut-off, U; Amount: 0.2; Unit: kg
i. Found in the Materials – Plastics – Thermoplasts – Market folder

ii. Processes
1. Thermos Jug Processing:
a. Injection moulding {GLO}| market for injection moulding | Cut-off, U; Amount: 0.2; Unit: kg


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i. Found in the Processing – Plastics – Market folder

d. Coffee Machine Assembly
    i. Materials/Assemblies
        1. Name: Aluminum Housing Sub-Assembly; Amount: 1; Unit: p
        2. Name: Mains Cable Sub-Assembly; Amount: 1; Unit: p
        3. Name: Thermos Jug Sub-Assembly; Amount: 1; Unit: p
e. Packaging Assembly
    i. Materials/Assemblies
        1. Packaging Material:
            a. Corrugated board box {RoW}| market for corrugated board box | Cut-off, U; Amount: 0.350; Unit: kg
                i. Found in the Materials – Paper + Board – Corrugated Board – Market folder
f. Filter Assembly
    i. Materials/Assemblies
        1. Filter Material:
            a. Paper, woodfree, uncoated {RoW}| market for paper, woodfree, uncoated | Cut-off, U; Amount: 2; Unit: g; Comment: Proxy. Includes processing
                i. Found in the Material – Paper + Board – Graphic Paper – Market folder

2. Create Reuse for Aluminum Housing
    a. Refer to "Aluminum Housing Subassembly" (1 p) *[REMEMBER to write 1 in the 'Amount' field]*
    b. Add 0.02 kWh electricity as an estimate for refurbishing
        i. Electricity, medium voltage {US}| market group for electricity, medium voltage | Cut-off, U
            1. Found in the Energy – Electricity Country Mix – Medium Voltage – Market folder

3. Create Disposal Scenario for Aluminum Housing (75% reuse, 25% US waste)
    a. Refer to "Aluminum Housing Subassembly" (1 p) *[REMEMBER to write 1 in the 'Amount' field]*
    b. Send 75% to "Reuse for Aluminum Housing"
    c. Send 25% to Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U

4. Create Disposal Scenario for Mains Cable
    a. Refer to "Mains Cable Subassembly" (1 p)
    b. Send 100% to Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U


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5. Create Disposal Scenario for Thermos Jug
    a. Refer to “Thermos Jug Subassembly” (1 p)
    b. Send 100% to Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U

6. Create Disassembly for Coffee Machine
    a. Refer to “Coffee Machine Assembly” (1 p)
    b. Separation of sub-assemblies
        i. “Disposal Scenario for Aluminum Housing” (100%)
        ii. “Disposal Scenario for Mains Cable” (100%)
        iii. “Disposal Scenario for Thermos Jug” (100%)
    c. Treatment of remaining waste
        i. Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U (100%)

7. Create Disposal scenario for Coffee Machine
    a. Refer to “Coffee Machine Assembly” (1 p)
    b. Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U (30%)
    c. “Disassembly for Coffee Machine” (70%)

8. Create Life Cycle for Coffee Machine
    a. Refer to “Coffee Machine Assembly” (1 p)
    b. “Disposal Scenario for Coffee Machine”

9. Create Life Cycle for Packaging
    a. Refer to “Packaging Assembly” (1 p)
    b. Municipal solid waste (waste scenario) {US}| Treatment of waste | Cut-off, U

10. Create Life Cycle for Filter
    a. Refer to “Filter Assembly” (1 p)
    Municipal solid waste (waste scenario) {RoW}| Treatment of municipal solid waste, landfill | Cut-off, U
11. Go back to the Life Cycle for Coffee Machine and add
    a. “Packaging Life Cycle” to the “Coffee Machine Life Cycle” (1)
    b. “Filter Life Cycle” to the “Coffee Machine Life Cycle” (3650; Comment: 2 filters per day, during coffee machine’s 5 year life span; includes production and waste disposal of the filters.”


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