CARBON ASSESSMENT REPORT

Tunley Engineering

"Engineering A Decarbonised Future"

CARBON ASSESSMENT REPORT

for

OPTIMA PRODUCTS LIMITED

Case study 3: Adaptable Meeting Room (AMR)

- Scenarios 1: Customer A purchased an AMR but no longer requires the product which is in good conditions. Optima takes back ownership.
- Scenario 2: Customer B buys this pre-used AMR.
- The AMR is transported directly from site A to site B.

June 2023

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Nomenclature

Nomenclature	Description
GHG	Greenhouse Gases, gases that trap heat in our atmosphere. GHG include Carbon dioxide, methane, nitrous oxides and fluorinated gases.
Embodied Carbon	The total GHG emissions generated to produce a product; It includes those from extraction, manufacture, processing, transportation and assembly in every component.
Carbon Equivalent	The effect on global wAMRing of a greenhouse gas (GHG) relative to that of CO_2.
Zero Carbon	The absence of GHG emissions
Greenhouse Gas Protocol	The GHG Protocol Corporate Accounting and Reporting Standard which provides requirements and guidance to prepare a corporate-level GHG emissions inventory.
Net Zero Carbon (NZC)	The sum effect of combining actions to reduce GHG emissions with actions to off-set them.
Carbon Off-setting	A reduction in emissions of GHG to compensate for unavoidable emissions.
Global WAMRing Potential (GWP)	The heat adsorbed by any GHG as a multiple of the equivalent in carbon dioxide.
IPCC	The Intergovernmental Panel on Climate Change. It provides regular scientific assessment on climate change to policy makers.
AR5	The fifth assessment report of the IPCC. The most recent assessment report is 2014.
tCO_2e	Notation for tonnes of carbon dioxide equivalent emissions.
$kgCO_2e$	Notation for kilograms of carbon dioxide equivalent emissions.
ICE	The Inventory of Carbon and Energy.
Scope 1	Direct GHG emissions are those that occur from sources that are owned or controlled by the company such as emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc., emissions from chemical production in owned or controlled process equipment.
Scope 2	Indirect GHG emissions account for GHG emissions from the generation of imported energy such as purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.
Scope 3	Other indirect GHG emissions. The GHG Protocol Corporate Accounting and Reporting Standard defines Scope 3 as an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services. BS EN ISO 14064 separates out Scope 3 emissions into categories 3 to 6 covering indirect emissions from transportation, products used, use of products from the business and other sources respectively.

Methodology and Quantification Standards

The Business Carbon Assessments was completed using methodology consistent with the international standards BS EN ISO 14064-1, BS EN ISO 14067:2018 and The GHG Protocol. Quantification of carbon dioxide equivalent emissions arising from business activities were completed in accordance with the emission factors of Greenhouse gas reporting: conversion factors published by DEFRA, the UK government Department for Business, Energy and Industrial Strategy for 2022. Additionally, The Inventory of Carbon and Energy has provided carbon equivalent data conversions for complex materials.

Global Warming Potentials are stated from IPCC Sixth Assessment Report, 2021 (AR6).

Executive Summary

Optima would like to report on the carbon emissions involving a case study where their product, the Adaptable Meeting Room (AMR) was fully reused by Company B. This involved transferring the original product installed for Company A by disassembling and then reassembling for Company B at a new site. Quantifying carbon emissions in this case study puts Optima in a position to demonstrate sustainability and environmental responsibility to their customers and the wider public. It allows Optima to show how a measurable change can be made to climate change emissions and facilitate the achievement of Net-Zero Carbon (NZC). Optima and Tunley Engineering have collaborated to identify emission sources and collect data.

Tunley Engineering has conducted an independent assessment to quantify carbon emissions due to business activities conducted by OPL and their contractors, based on the data provided by the company. The evaluation herein reported includes two components of emission quantifications for:

i) Scenario 1: An AMR (3m x 3m x 2.4m) was installed for Company A,

ii) Scenario 2: The AMR installed for Company A, then was taken back by Optima and resold as a reused product to Company B.

This assessment demonstrates Optima's commitment to showing how carbon emissions can be reduced. It also provides Optima and its customers with a clear evaluation of carbon emissions associated with these business practices and aligns with Optima's ambition for achieving carbon neutrality.

Total carbon emissions in tonnes of carbon dioxide equivalents (tCO_2e) for the two scenarios are 4.2 and 0.1 (Figure 1).

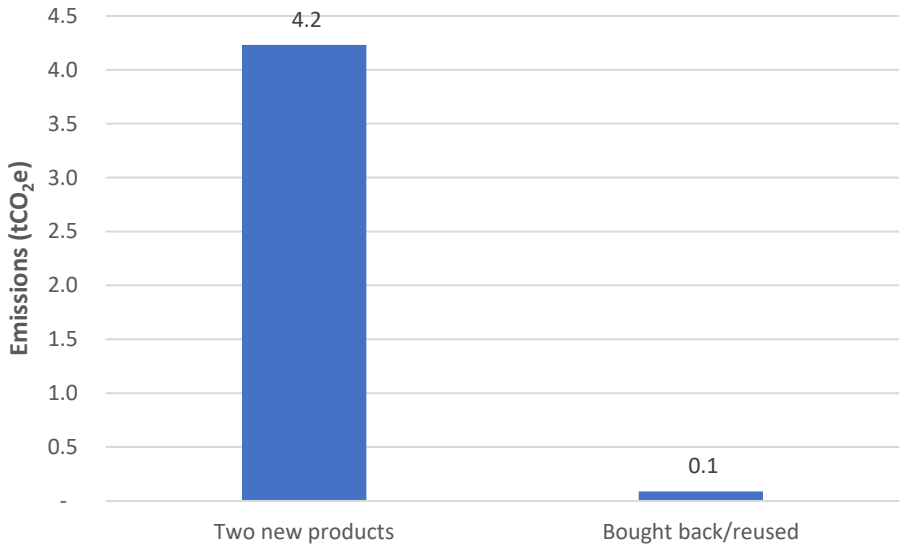

Figure 1: Greenhouse gas emissions from two scenarios.

By reusing their product, OPL saved approximately 98% of GHG emissions (4.1 tCO_2e) compared to the install of a new product.

This emission saving figure is equivalent to one of the following:

i) Emissions from driving 15,073 miles using an average diesel car,
ii) Emissions from burning approximately 1.4 tonnes of charcoal,
iii) Emissions from consuming 1,620 litres of diesel,
iv) Sequestration from 68 tree seedlings grown for 10 years.

Introduction

Tunley Engineering conducted this assessment using the standard protocols stated above and data provided by OPL for their business activities for the two scenarios: installation of a new products and reuse of AMR (3m x 3m x 2.4m).

For each scenario, where appropriate the assessment provides detailed quantification of GHG emissions due to:

i) Embodied carbon emissions from material usage for the AMR,
ii) Emissions from transportation of the products,
iii) Emissions from assembly/dismantling/reinstallation of the new/reused products.

Emission sources considered for two scenarios include:

i) Scenario 1: Embodied carbon emissions, emissions from transportation and assembly of an AMR product (for Company A),
ii) Scenario 2: Emissions from transportation of the product from Company A to Company B, dismantling at Company A/installation at Company B.

Information on embodied carbon emissions and emissions from assembling processes were taken from the EPD document of the AMR product. In this assessments, Tunley Engineering assume that:

i) Emissions from assembling and dismantling the products are identical,
ii) Transportation distance between site A and B is 4.5 km,
iii) The AMR is in good conditions and thus can be fully reused,
iv) Transportation distance for a journey in Scenario 1 was assumed as 203 km, by average HGVs at 50% loading.

Appreciating the importance of determining major contributors to the emissions, Tunley Engineering provides detailed analysis and discussion on different components in each scenario; this will support Optima's customers with their decision-making processes to reduce their carbon emissions. Where information and data were limited, we made reasonable assumptions based on our expertise and external sources of data. This report is completed to internationally recognised standards mentioned previously.

Emission data

Table 1: Emission data for two scenarios.

Item	New installation of one AMR			Taking back and Reusing the product		
	Embodied carbon emissions	**Transport**	**Assembly**	**Embodied carbon emissions**	**Transport**	**Dismantling and reinstallation**
Emissions (tCO_2e)	4.04	0.15	0.04	-	0.0033	0.08
Total (tCO_2e)	**4.2**			**0.1**		
Carbon savings (tCO_2e)	0			4.1		
Percentage of carbon savings	0%			98%		

Table 1 shows emission data for the two scenarios. For the first scenario in which one new product was implemented, carbon emissions are 4.2 tCO_2e; embodied carbon (material usage) emissions of the products contribute 95% to the total carbon emissions (Figure 2).

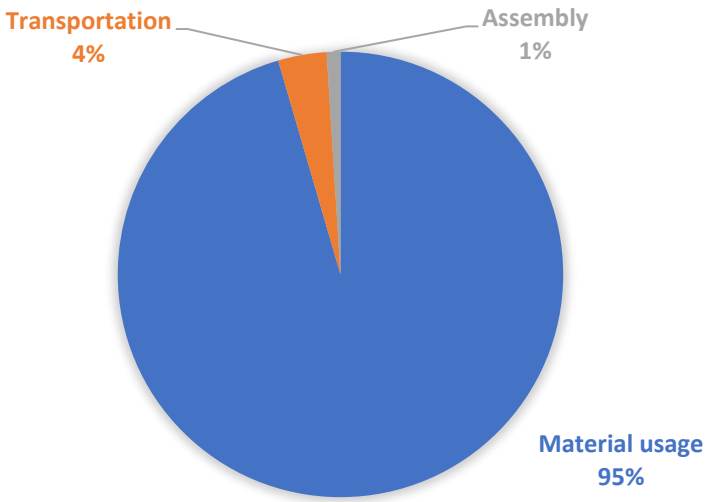

Figure 2: Percentage contributions of emission sources for Scenario 1.

For the second scenario, the majority of the emissions are from the dismantling/reinstalling processes, which accounts for approximately 96% (Figure 3). There is a significant carbon saving of 4.1 tCO_2e by reusing the products, this is equivalent to a 98% reduction in the emissions compared to the installation of one new product.

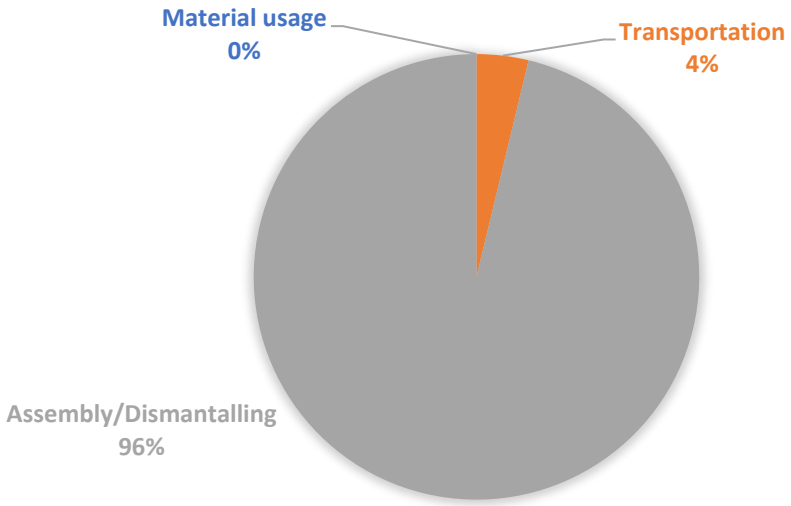

Figure 3: Percentage contributions of emission sources for Scenario 2.

Conclusion

Total GHG emissions for two scenarios (new installation of products and taking back/dismantling/reconfiguring/reusing the products) are 4.2 and 0.1 tCO_2e, respectively. The carbon footprint quantification presented in this report was conducted using data provided to Tunley Engineering by Optima.

Tunley Engineering has provided Optima with detailed analysis and discussion of the emission data. By taking back and reusing their products, Optima's customers saves 98% of carbon emissions in this analysis.

Tunley Engineering's Report Emission Statement

Tunley Engineering's GHG emissions from completing this assessment were 0.01 $kgCO_2e$.

Approval

Author:	Dr Luan Ho PhD MIEnvSc BEng
Position:	Carbon Reduction Scientist
Written Date:	22nd May 2023
Approved by:	Nathan Wood MChem MRSC
Position:	Carbon Reduction Scientist
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Revision:	B

Revision History:	Change Description:	Changed by:	Date:	Approved by:	Date:
B	Updated the analysis using new data	LH	07th Jun. 2023	TB	7th June 2023
C					
D					
E					
F					

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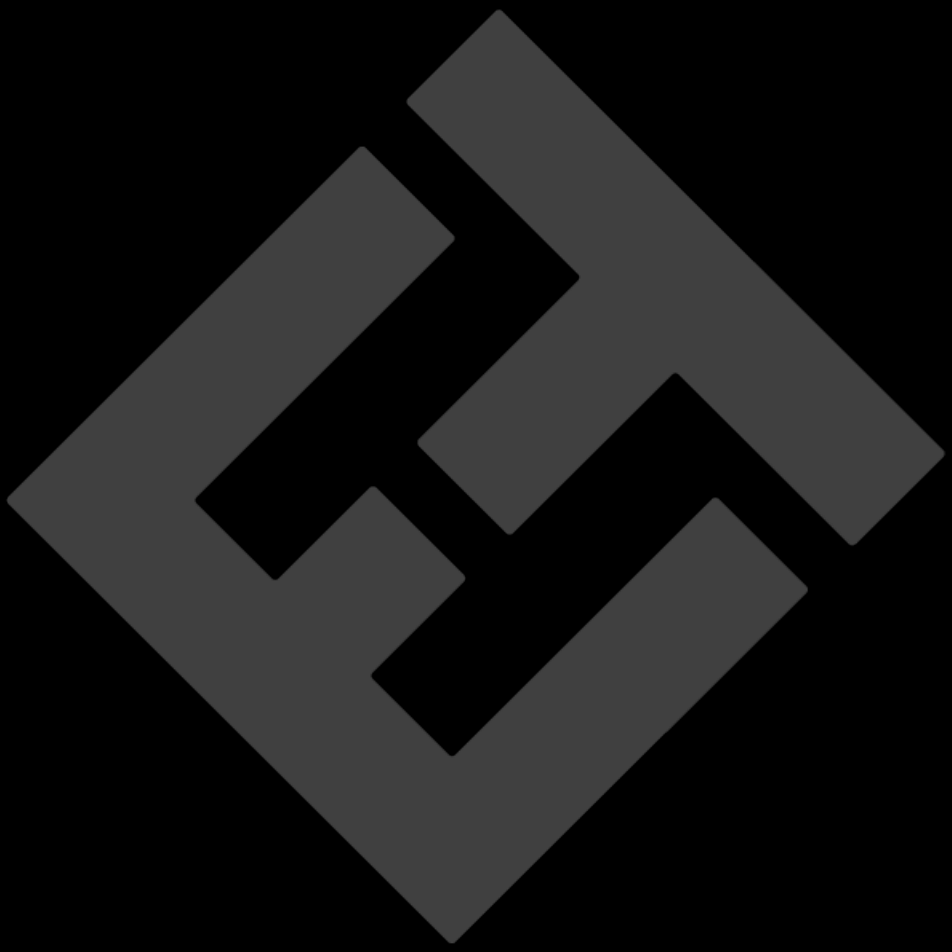

Tunley Engineering Ltd
Leeds, LS17 8RP

Info@tunley-engineering.com
www.tunley-engineering.com