Coffin choice and the effect on cremation emissions

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What effect do coffins have on cremation emissions?

- No data existed which could readily answer this question as previous research has been conducted using only empty coffins (i.e. without a body present).
- JC Atkinson partnered with environmental consultants Giraffe Innovation Limited to determine how the coffin assisted as a secondary fuel contributing to the cremation process.
- Utilising research and testing data from multiple real cremations (i.e. with the deceased present) Giraffe produced a Life Cycle Analysis report for all types of coffin construction.

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Giraffe Innovations Limited

- Giraffe's world leading team has a wide range of skills covering life cycle assessment (LCA), environmental management, and environmentally sensitive design.

- Giraffe currently works with UK Government and companies of all sizes – from small farms to corporations, undertaking complex Life Cycle Assessments and carbon footprinting projects for clients in Hong Kong, Sweden, France, USA, Korea and the UK.

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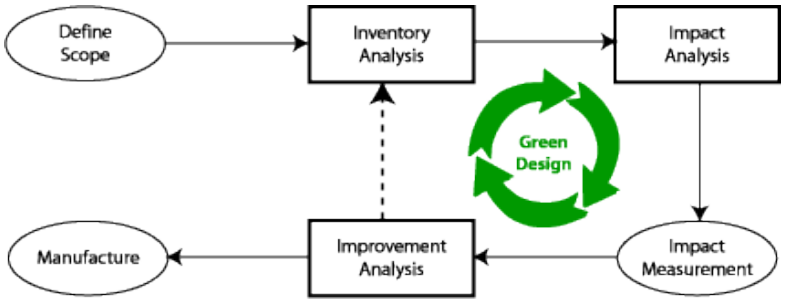
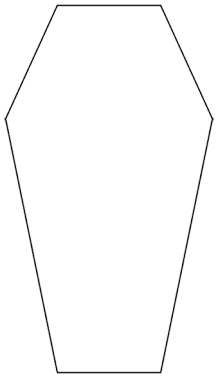
What is a Life Cycle Analysis (LCA)?

- The Protocol is developed by the European Environment Agency (EEA) as a standard means of measuring and comparing products, helping drive eco efficiency and assist in decision making.
- A LCA will identify the total environmental impact of a product.
- A LCA study will account for all the inputs and outputs throughout the products life cycle i.e. from its birth, including design, raw material extraction, material production, part production, and assembly, along with its use, reuse, to its final disposal.
- First Stage – Inventory Analysis – What the product is composed of, where those materials came from, where they go and the inputs and outputs related to those component materials during their lifetime. This analysis is to quantify what comes in and what goes out, including energy, materials and environmental emissions.
- Second Stage – Impact Analysis - The environmental impacts of generating energy for the processes and the hazardous wastes emitted in the manufacturing process. These are enumerated, representing how much the environment is affected.



Partial data released into sector - LifeArt

LifeArt published MRA consulting report 4/12/18 “Coffin Emissions Analysis” highlighting the total cremation emissions on a selection a coffins.



	LifeArt Earthcare	LifeArt Enviroboard	MDF with printed wrap	Particleboard with foil wrap	Triple lid dark particleboard
GWP (kg-CO2e) per coffin from forestry to conversion	6.75	5.87	23.34	14.86	17.07

Following this incomplete report, JCA tasked Giraffe Limited to measure the Carbon Footprint and cremation emissions of a coffin from multiple real cremations (i.e with the deceased present). The following results were established from 5 different coffin types tested…..

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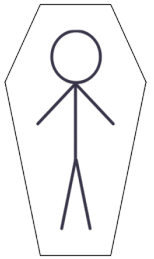
Impact of coffins – JC Atkinson

Carbon footprint of JC Atkinson coffins



Coffin type	Coffin Furnished and Lined ($kgCO_2e$)
Chipboard/MDF veneered with Oak with routered Panel sides	50.3
Chipboard veneered with Oak (Newcastle)	40.3
"Oasis" Willow Coffin (Fitted with Plywood base)	65.6
Cardboard / Paper board	24.8
Solid Pine Coffin (Brighton)	25.2

Coffin measurements include all furnishings, lining, all wood / board materials, coatings, nails, glue, production energy and transport

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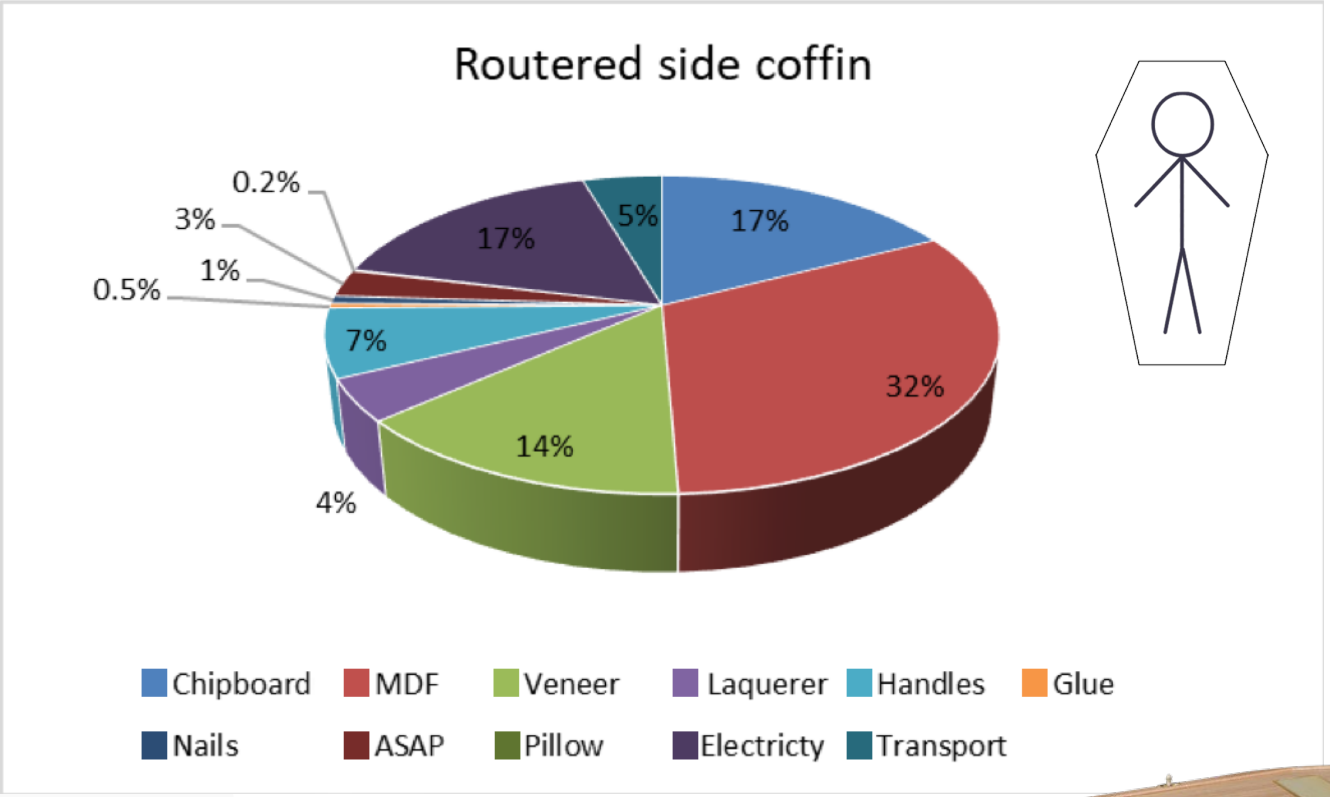
Carbon footprint of routered side coffin (Chipboard and MDF)



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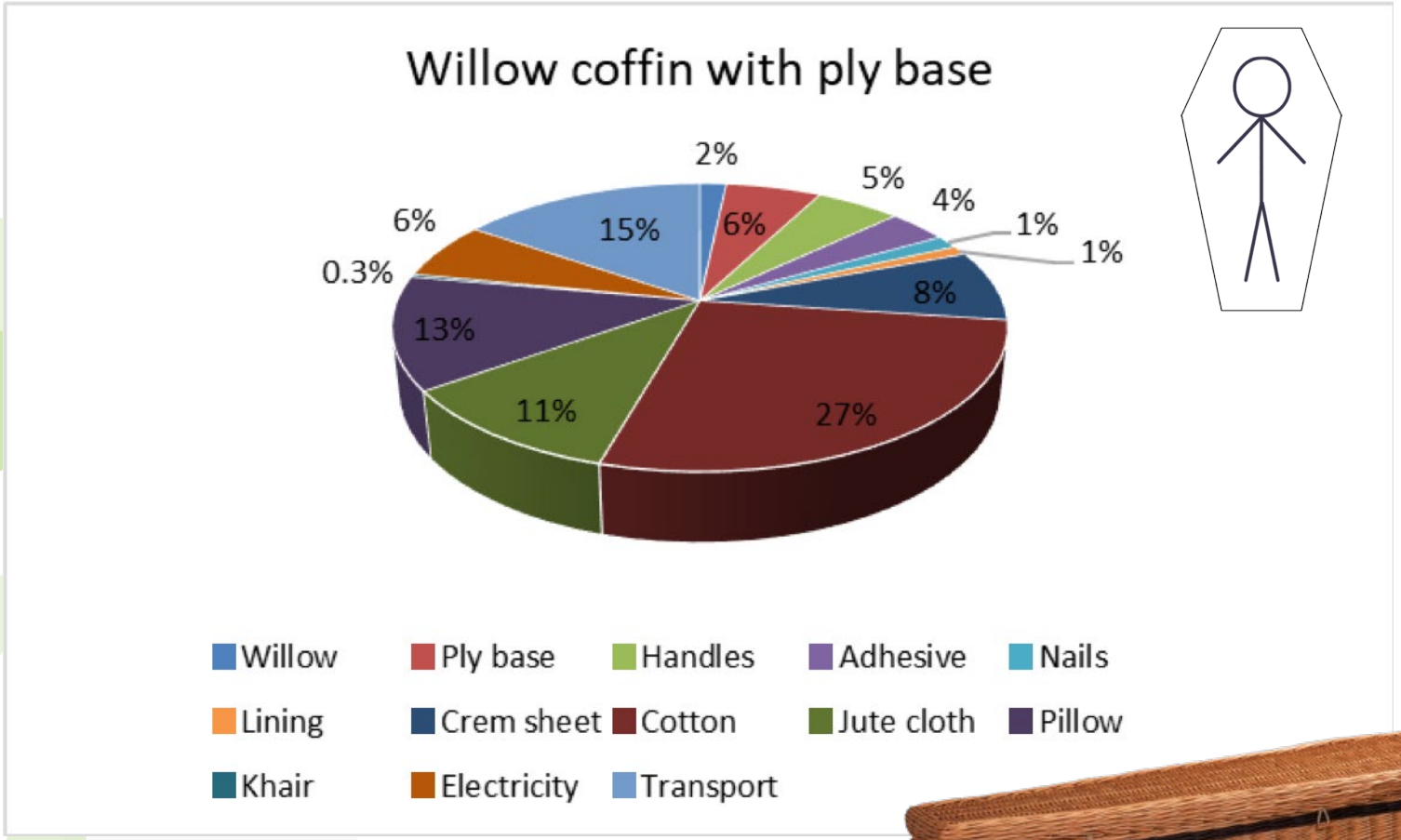
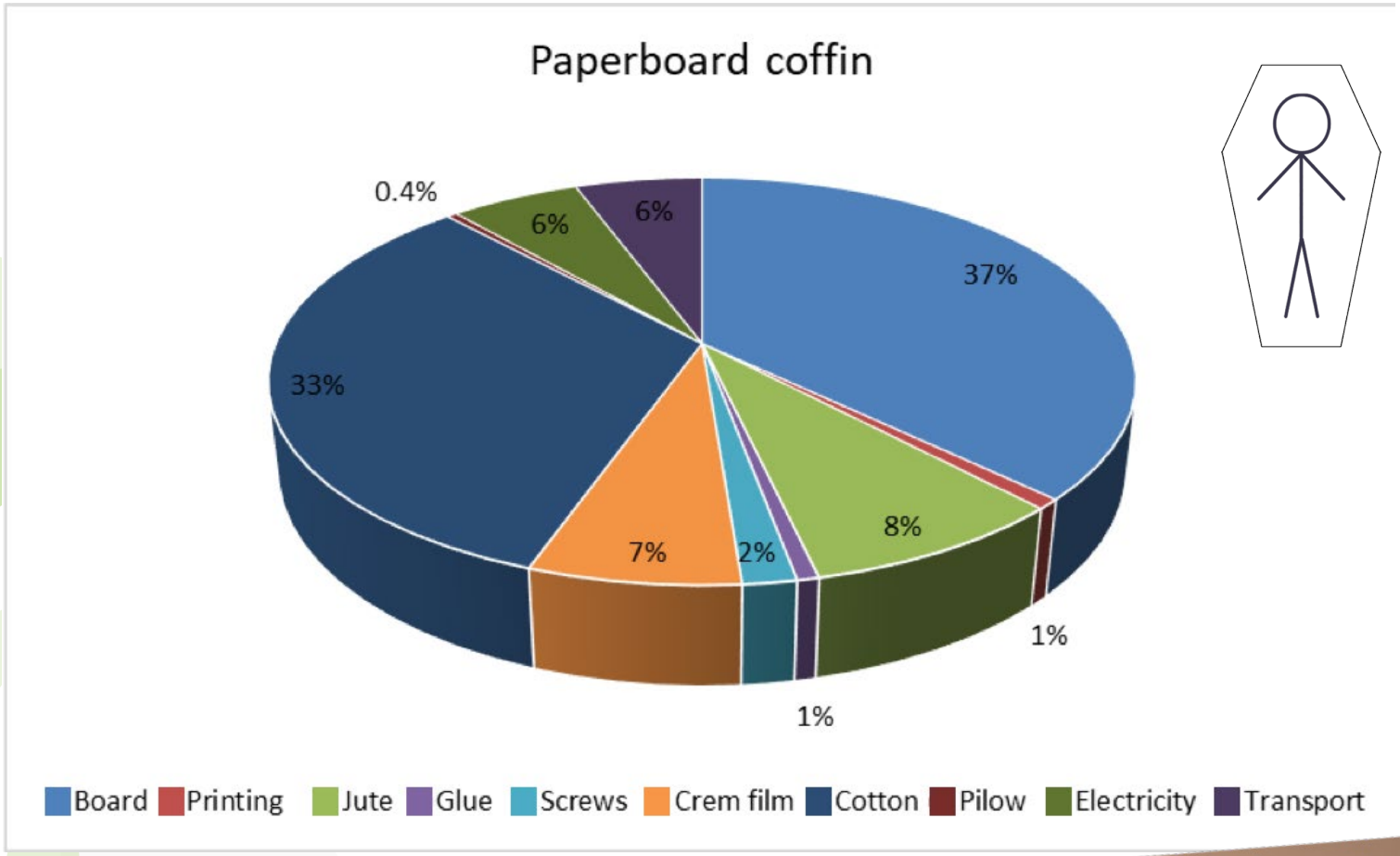
Carbon footprint of Willow coffin with ply base



Carbon footprint of Paper board coffin



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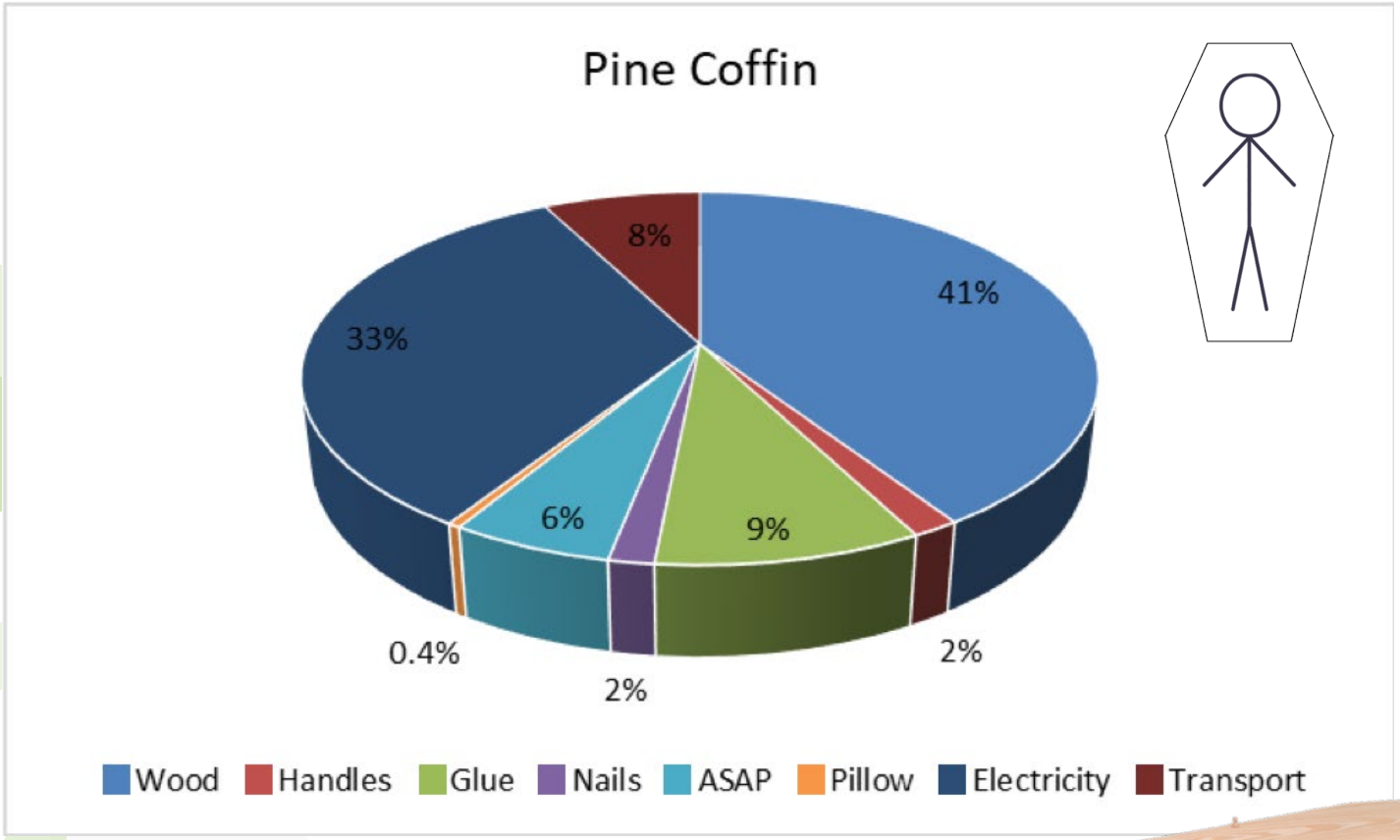
Carbon footprint of Pine coffin



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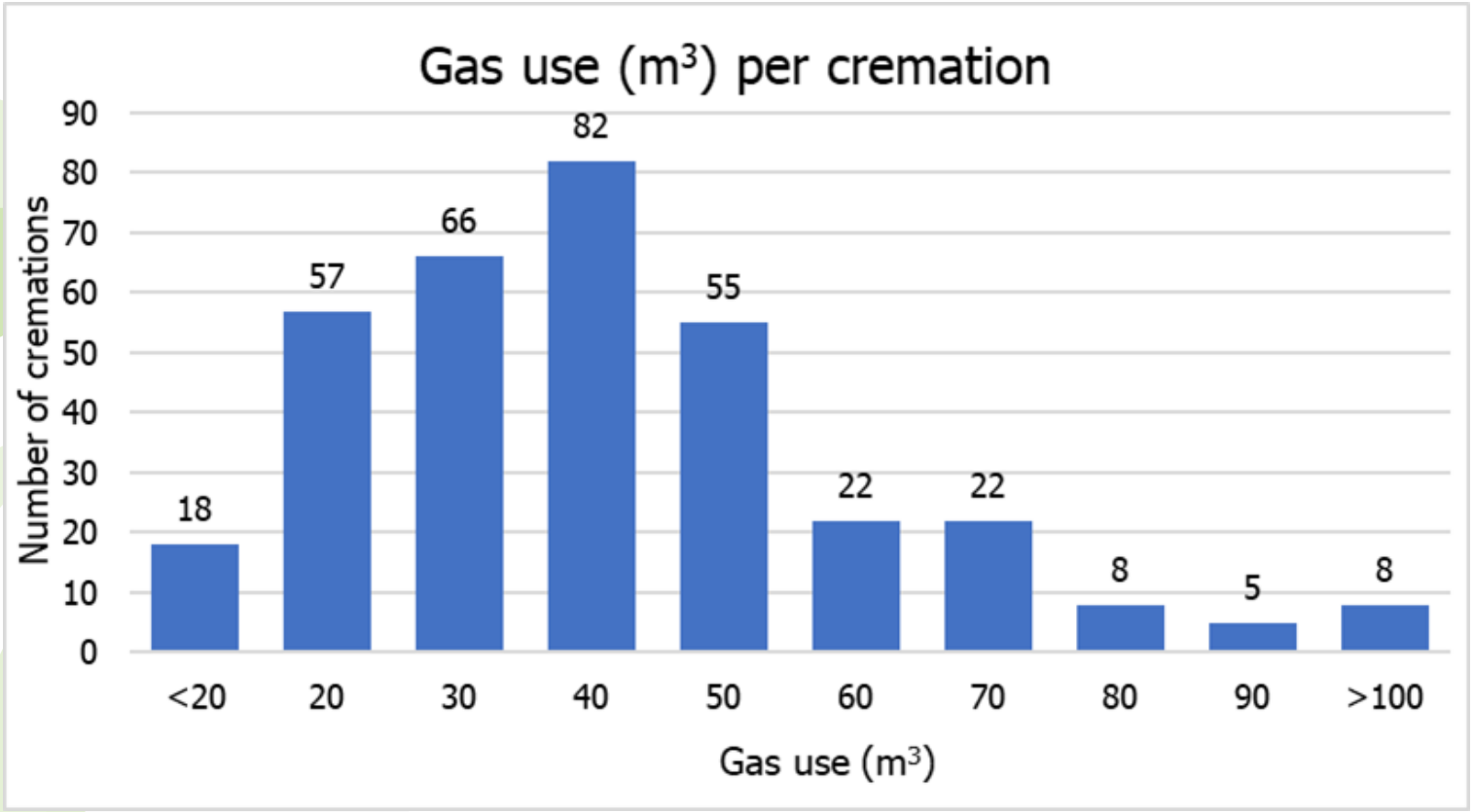
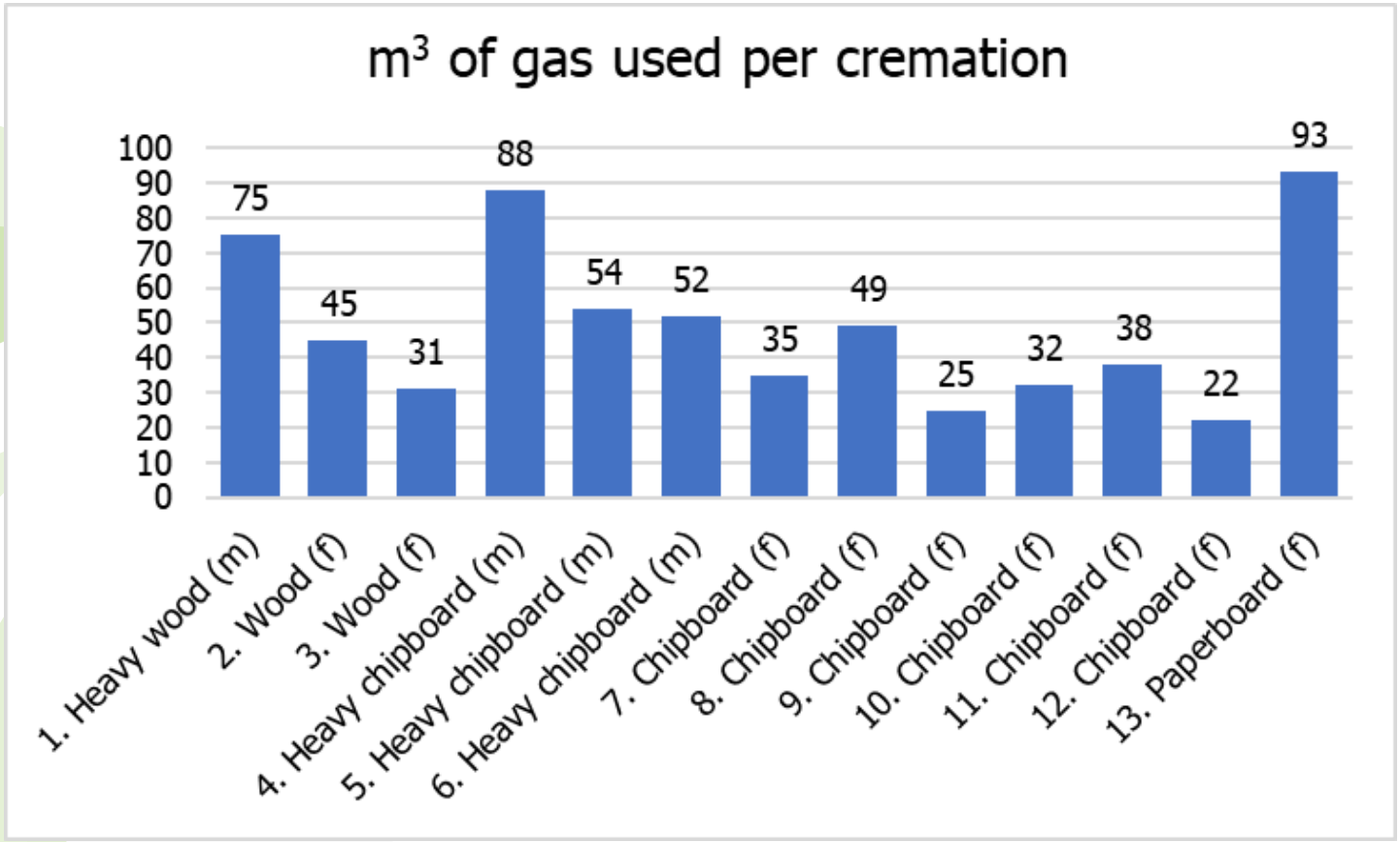
Gas used for cremation, range of coffin types, sizes and body weights

Results of 343 cremations in 2015



Annual emissions - testing of six cremations plus the addition of the card / paper board coffin, overall known coffin types, body weights, and body (m) male / (f) female – 2018/2019



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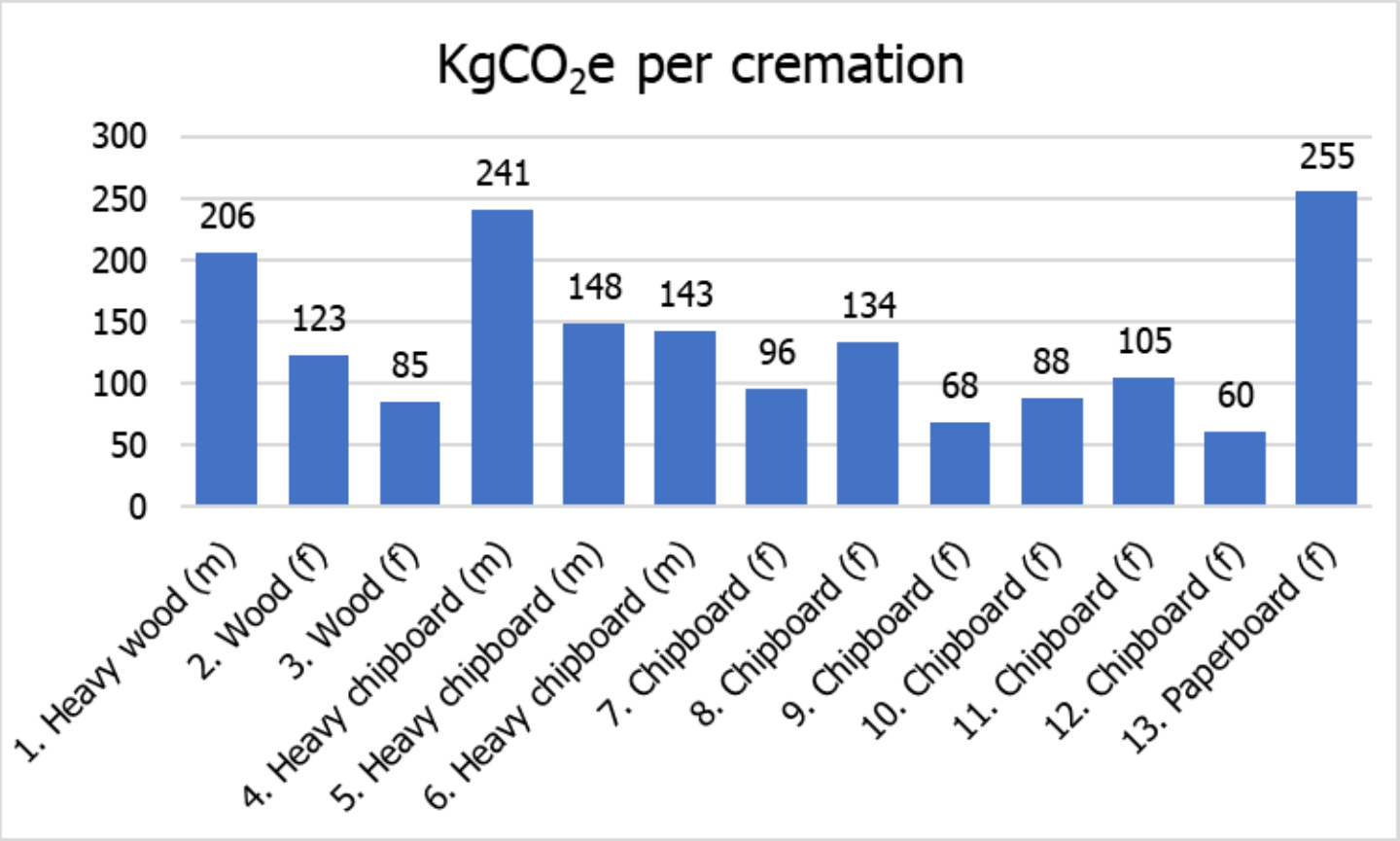
Carbon Footprint of emissions - testing of six cremations plus the addition of the card / paper board coffin, overall known coffin types, body weights, and body (m) male / (f) female – 2018/2019



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Cremation electricity consumption

Based upon our own analysis of 1720 cremations, the average electricity consumption per cremation is 15.4kWh.

This will add **8.27**kgCO_2e to each cremation.

Carbon footprint of cremation emissions

Based upon our own analysis a furnished and lined UK chipboard/ MDF coffin would have an impact of 50.3kgCO_2e.

The average body weight in our tests was 71kg and the cremation of the coffin used on average 45m^3 (126kgCO_2e).

This gives a total maximum impact of; 50.3+126+8.27 (electricity consumption) = 184.57kgCO_2e, which is 84.57kgCO_2e less than the 269.14kgCO_2e

(5.87+255+8.27) of the stated figure from Lifeart / MRA analysis cremated LifeArt paperboard coffin.

	LifeArt Earthcare	LifeArt Enviroboard
GWP (kg-CO2e) per coffin from forestry to conversion	6.75	5.87

To conclude, when comparing a cardboard coffin to a wood coffin, using the life cycle principles, Giraffe Innovation demonstrated that a wood coffin had a much lower carbon footprint when compared to a card/paperboard coffin.

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