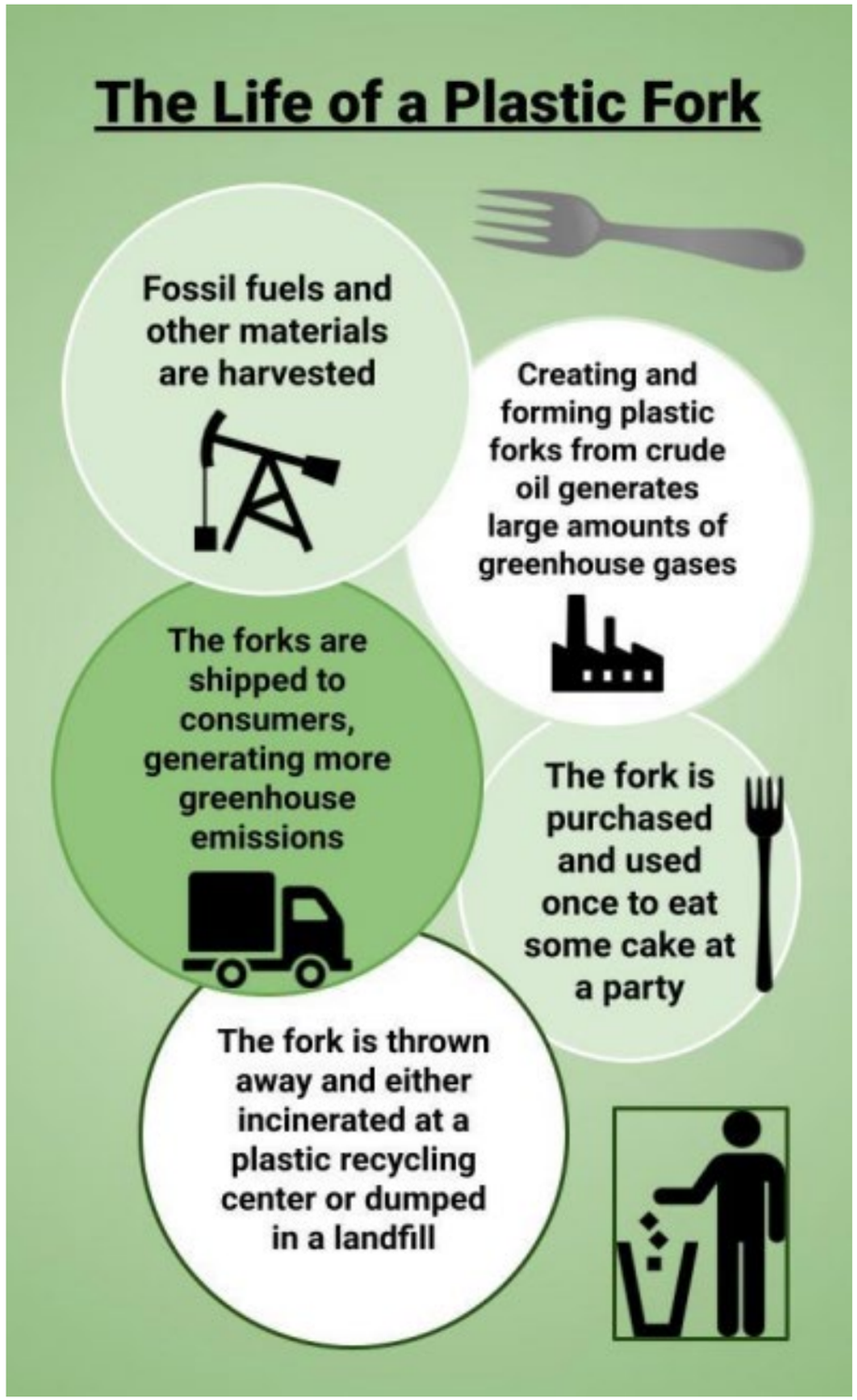
Quantifying the per-capita single-use waste impact from food and beverage in GT campus

What is the daily impact of my disposables?

The idea: put an emission value to



scale it to match the daily consumption specific to a GT student

The idea:

put an emission value to

Graphics: Quantis International

scale it to match the daily consumption specific to a GT student

Climate Change kilograms of carbon dioxide equivalents

Human health potential disappeared fraction of species per square meter per year.

Ecosystem Quality mega joules of primary energy

Resources meters cubes of resource

Water Withdrawal meters of cubes of water

Single-use tableware

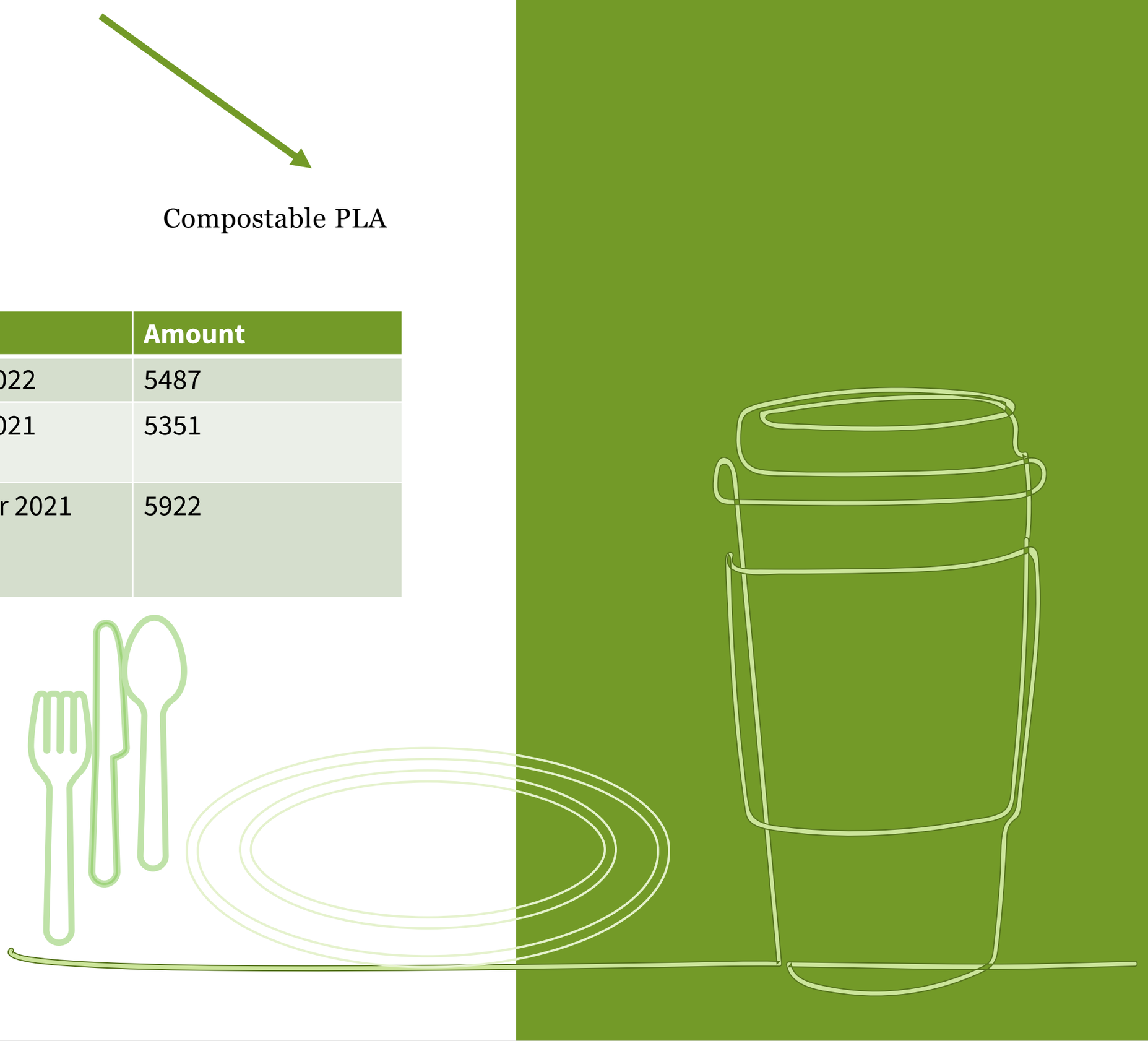
Non-recyclable plastic

Compostable PLA

Metric Type	Schedule	Amount
Meal Plan count	January 2022	5487
Average daily transactions	October 2021	5351
Average daily transactions	September 2021	5922

Source: Tech Dining database

1:1 ratio



Plastic cutlery : manufacturing

Manufacturing 1 lb of material	Energy Used (kWh)	Water Used (gal.)	Solid Waste (lbs.)	CO2 Emissions (lbs.)
Polystyrene	**11.28**	20.54	0.113	**2.51**

Manufacturing (1-lbs of the Final Product)	Energy Used (kWh)	CO2 eq (lbs.)
GPPS injection molding (general purpose polystyrene - plastic)	11.93	7.33

Source: Plastics Europe paper: The Facts 2021
Quantis Intl Client-based LCA

Daily per-capita cutlery weight calculation:

1 utensil weighs ~1.8 g (Prolon Manufacturing LLC)
Total set weighs 1.8*3= 5.4g
=0.012 lb

Impact from manufacturing:

0.012*(11.28+11.93) KWh
=0.279 kWh
0.012*(0.088+2.51)lbs. CO_2
=2.598 lbs. CO2 eq

Plastic cutlery

: Distribution

+

Use

Daily per-capita cutlery weight calculation:

1 utensil weighs ~1.8 g (Prolon Manufacturing LLC)
Total set weighs 1.8*3= 5.4g
=0.012 lb.

Plastic cutlery : end of life (landfill)

Landfill impact (1-lbs of the Final Product)	Energy Used (kWh)	CO2 eq (lbs.)
Prolon Cutlery	0.005	22

Quantis Intl Client-based LCA

Landfill transportation impacts:

- WM Atlanta transfer station
GA 30336

- Dekalb County Landfill
GA 30294

Daily per-capita cutlery weight calculation:

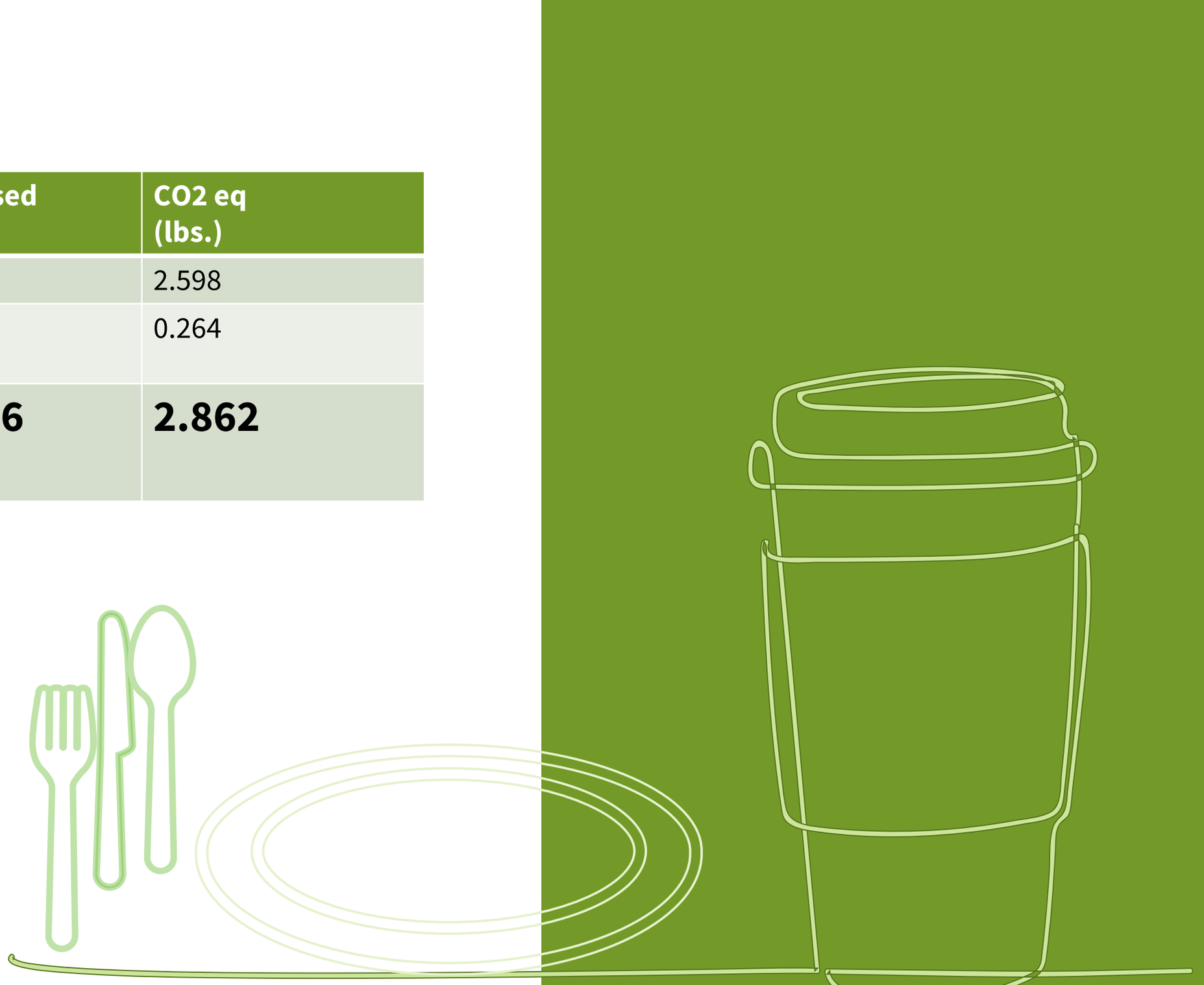
1 utensil weighs ~1.8 g
(Prolon Manufacturing LLC)
Total set weighs 1.8*3= 5.4g
=0.012 lb

Impact from landfill:

0.012*(0.005) KWh
=6E-5 kWh
0.012*22 lbs. $CO_{2\ eq}$
=0.264 lbs. $CO_{2\ eq}$

Per-Person Impact

Process	Energy Used (kWh)	CO2 eq (lbs.)
Manufacturing	0.279	2.598
End-of Life	6E-5	0.264
Total	**0.27906**	**2.862**



Scope for Future Research

Calculation of Water Withdrawal Impact

Comparison with Reusable Options

Stainless steel

Multi-use PLA-PBS

Recalculate with more GT-specific data

Which brands?

Which sources?

Recycling/composting statistics

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