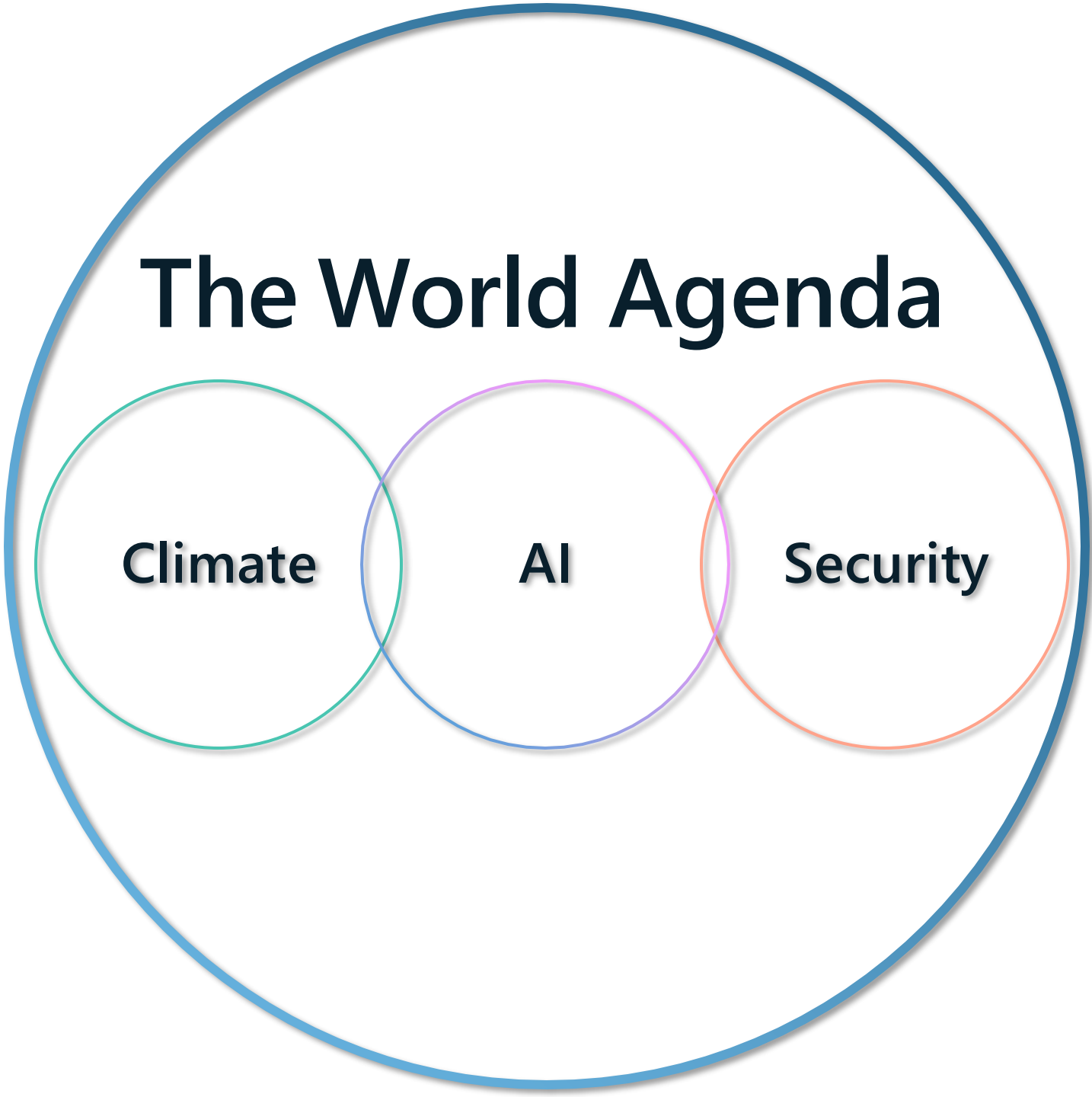


Surface Sustainability

Ola Fagerström



The World Agenda



Climate

AI

Security

Microsoft Investing to build the leading platform for technology solutions to environmental challenges



Microsoft core environmental sustainability commitments



Carbon

**Carbon
negative
by 2030**



Water

**Water
positive
by 2030**



Waste

**Zero
waste
by 2030**



Ecosystems

Protect more
land than we
use and Build the
**Planetary
Computer**

Decades of action



Windows and Surface Focus



Carbon

**Carbon
negative**
by 2030



Water

**Water
positive**
by 2030



Waste

**Zero
waste**
by 2030



Ecosystems

Protect more
land than we
use and Build the
**Planetary
Computer**

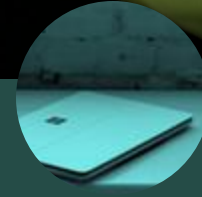
Windows and Surface Commitments



Reducing carbon impact



Circular by design



Integrity built-in

Reducing carbon impact



Designing Out Carbon Emissions

1 Material efficiency
increasing recycled content,
selecting recyclable materials
and designing out waste



2 Reducing
hazardous materials
substituting materials to improve
recyclability

3 Built to last
designing for and promoting
repair, refurbishment and reuse
of devices

Reducing carbon impact



Material efficiency

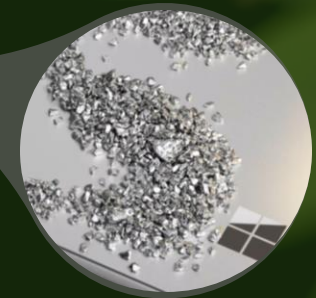
Enclosure is made with a minimum of 72% recycled content, including 100% recycled aluminum alloy and 100% recycled rare earth metals

Designing Out Carbon Emissions



Eco Design

material interventions drive a 38 kgCO₂eq. carbon footprint reduction from baseline



Reducing carbon impact



1 Partnership



2 Hotspots

3 Financing

Renewable

Energy in Supply Chain

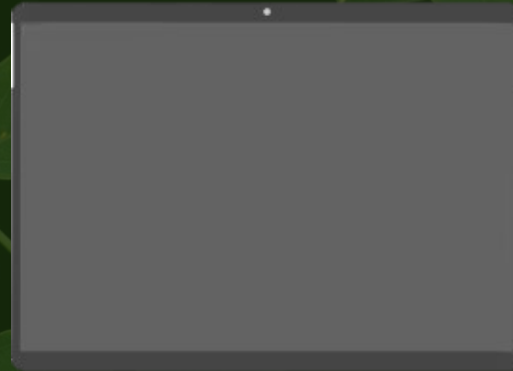


Renewable

Energy in Supply Chain

Example

Touch display module, our supply chain engagement extends to tier 4 suppliers.



Impact

Pro 10

The carbon free electricity transition implemented so far drives 21 kgCO₂eq. carbon footprint reduction from baseline.

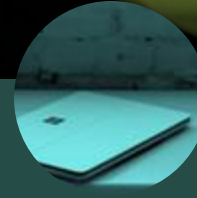
Windows and Surface Commitments



Reducing carbon impact

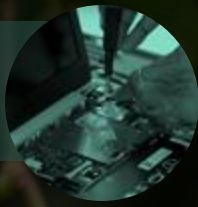


Circular by design



Integrity built-in

Circular by design



Replaceable Components

Surface Go 4



- Display
- Bucket
- Battery
- Motherboard
- SD Slot
- Blade Connector
- Front Camera
- Rear Camera
- IR Camera
- Speakers
- Hinge (R+L)
- Kickstand

Surface Laptop Studio2



- Motherboard
- Chassis and Battery
- Keyboard
- rSSD (Storage)
- Display
- Surflink Port
- Audio Jack
- USB A+ C
- USB C
- MicroSD
- Cosmetic Plate
- Non-skid Feet

Surface Laptop 6



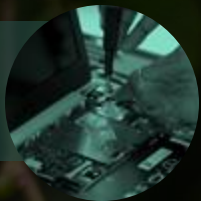
- rSSD
- Display/Screen (A/B-Cover)
- Screen (TDM)
- Keyboard C Cover
- Feet & Screws
- USB-C & Audio Jacks
- Surflink
- Bucket
- Speaker/Wi-fi Modules
- Battery
- Thermal Module
- Motherboard

Surface Pro 10

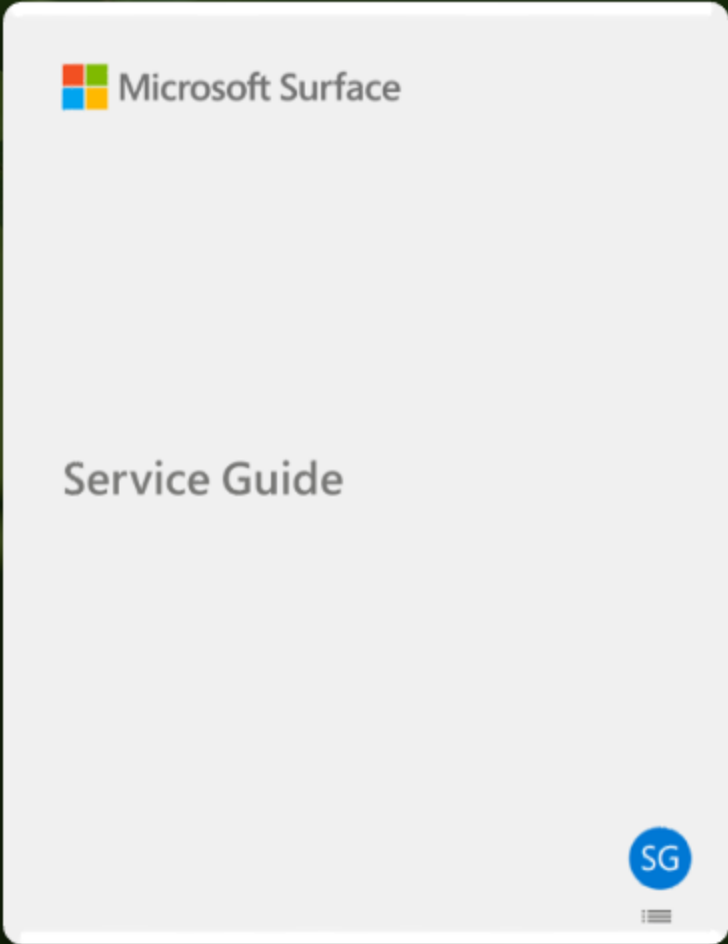


- rSSD
- SSD Door
- Kickstand
- Screen (TDM)
- USB-C
- Surflink
- Bucket
- Speaker/WiFi
- Modules
- Fingerprint Reader
- Battery
- Thermal Module
- Camera Front & Rear
- Camera Deck
- Power/Volume
- Button
- Motherboard

Circular by design



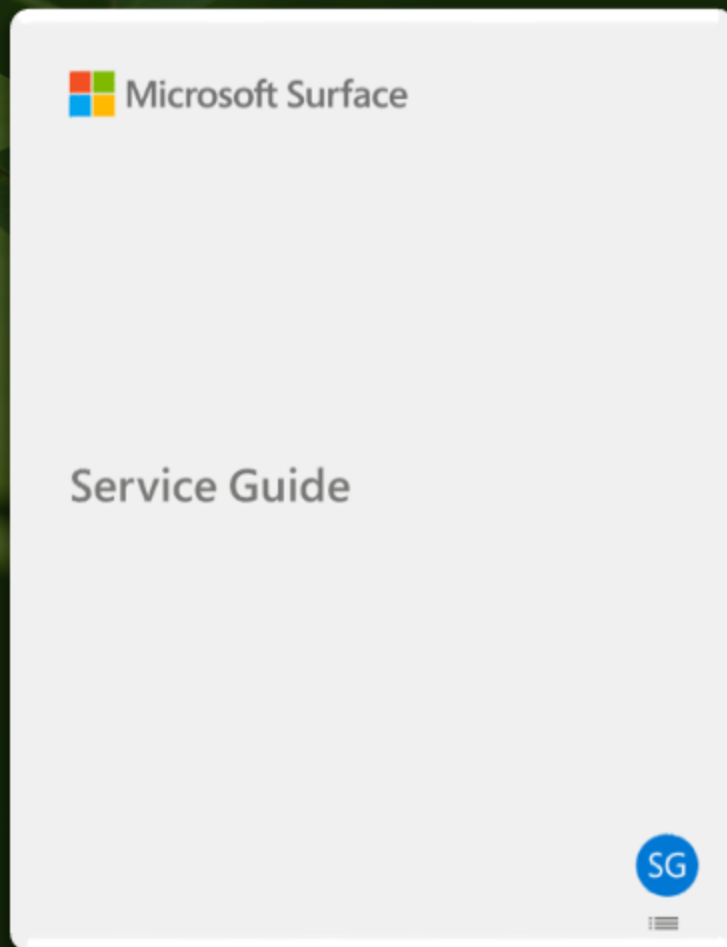
Surface Service Guides



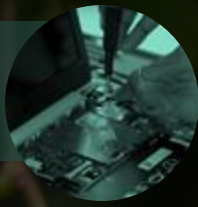
Circular by design



Surface Service Guides



Circular by design



Driver
firmware
support

6 years

Surface Pro 7+
Surface Laptop 4
Surface Pro 8
Surface Laptop Studio

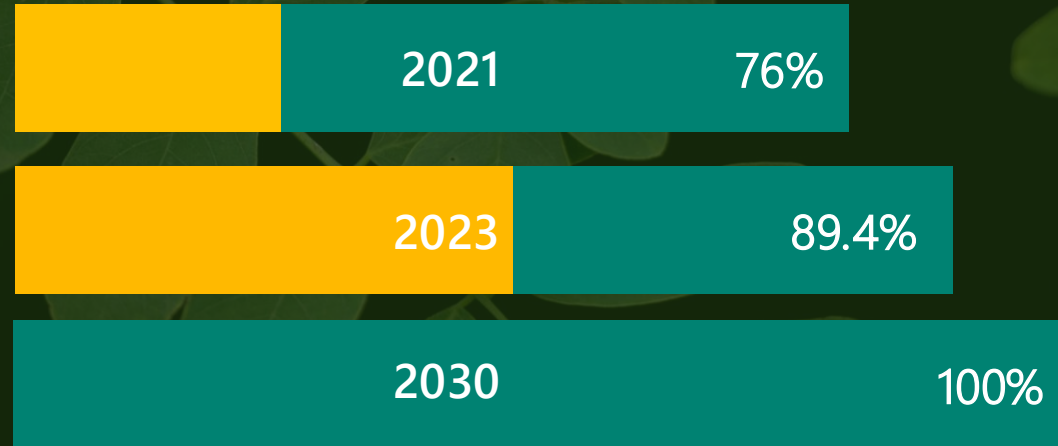
Surface Go 3
Surface Pro X Wi-Fi
Surface Laptop SE
Surface Laptop Go 2
Surface Laptop 5
Surface Pro 9
Surface Studio 2+
Surface Go 4
Surface Laptop Go 3
Surface Laptop Studio 2





Zero waste

Increasing reuse and recycling of servers and components



● Reused
● Recycled

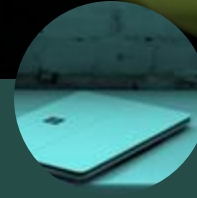
Windows and Surface Commitments



Reducing carbon impact



Circular by design



Integrity built-in

Integrity built-in



Transparency on Impact



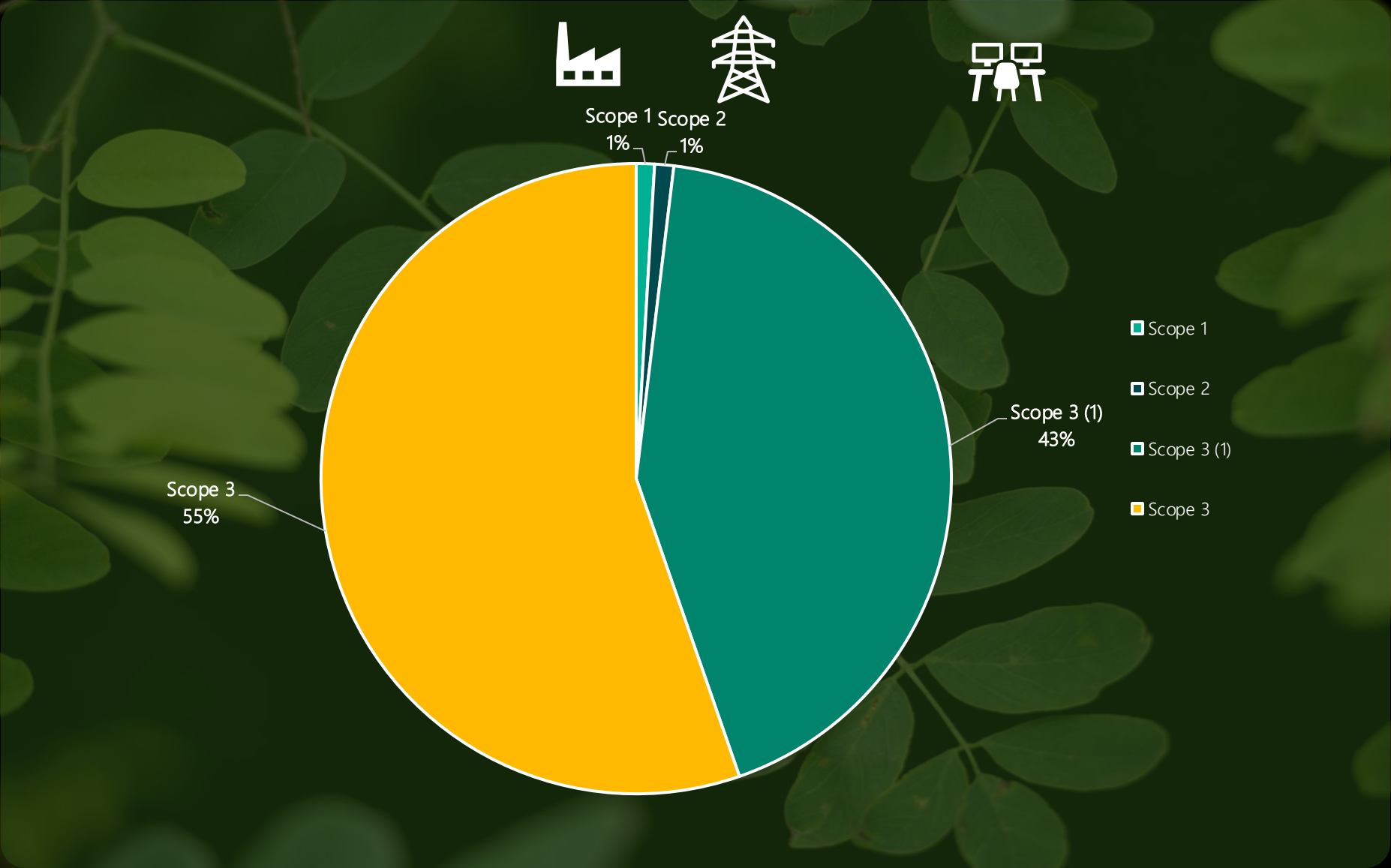
Scope 1: direct emissions



Scope 2: indirect emissions
consumption of purchased electricity,
steam, heat and cooling

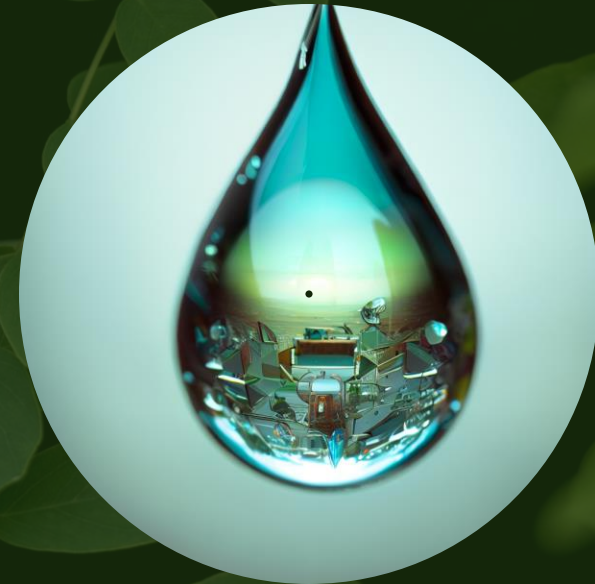


Scope 3: indirect emissions
– not owned
Example: Purchased goods and services





VS



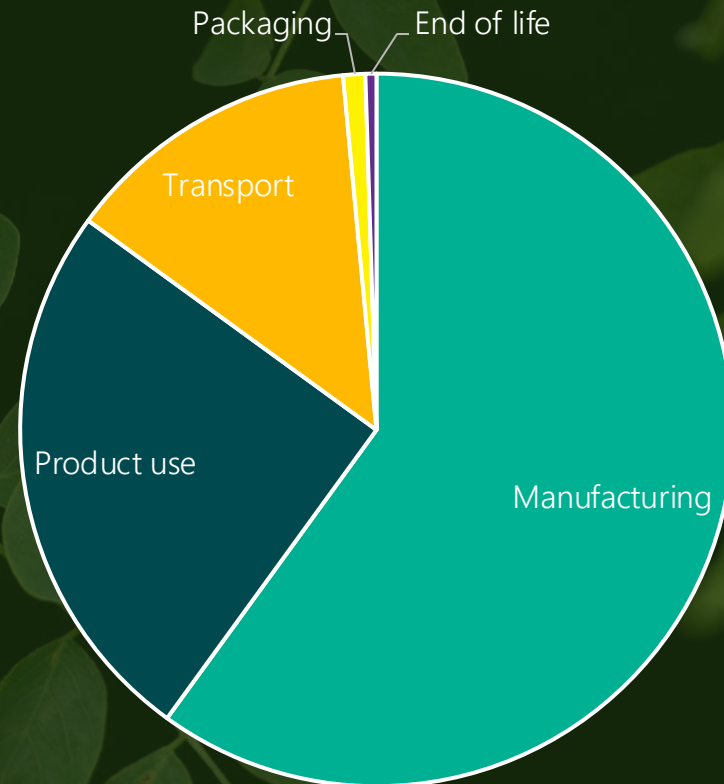
How many dollar was spent

"Hey the I got a nice 20% discount so now our Co2 went down..."

**What was the impact based
in LCA and primary data**



Manufacturing
Transport
Packaging
Product use
End of life



Integrity built-in



LCA

Life Cycle Assessment



Integrity built-in



LCA

Life Cycle Assessment



Process

Liquid Cristal Module (LCM)

- LCM assembly
- LCM testing

Touch Sensor Panel (TSP)

- TSP assembly
- TSP testing
- Film lamination

Cover Glass (CG)

- CG assembly
- CG testing

Final assembly

- TDM assembly

Integrity built-in



DATA Collection



Primary data (+70%)



Secondary data (Eco invent)

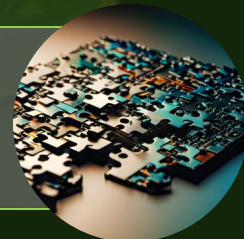
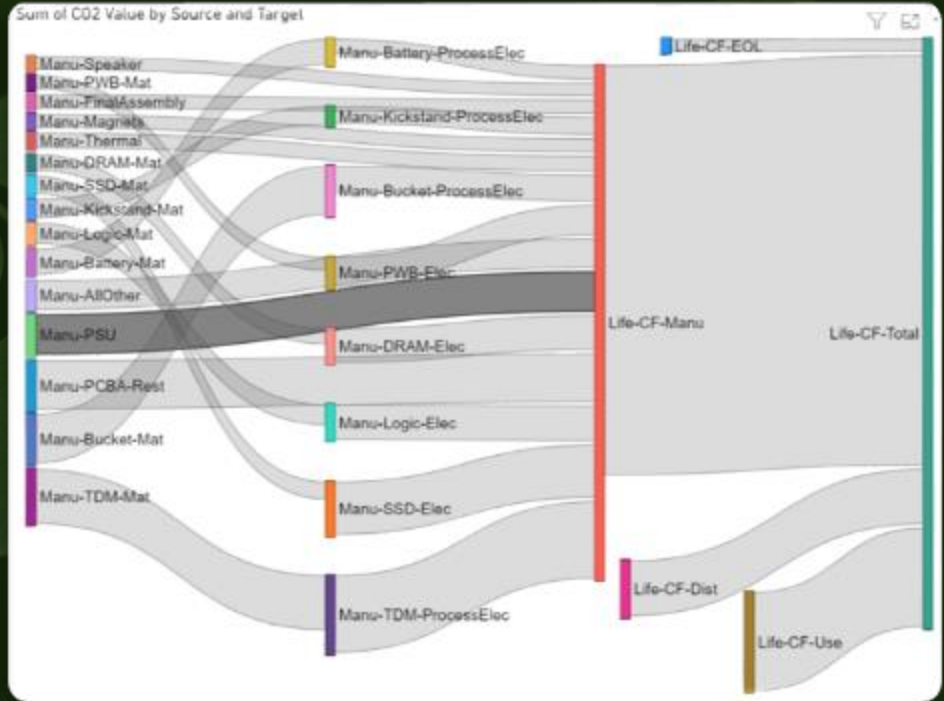


28k* rows of data



LCA tool (Software)

Integrity built-in



Integrity built-in



Microsoft Devices LCA Methodology Version 2.1



Microsoft Consumer Devices Life Cycle Assessment Methodology Overview

Updated in April 2024

Executive Summary

At Microsoft, we achieve reductions in the carbon footprint¹ of Surface, Xbox, and other hardware products by implementing a structured ecodesign approach that considers a balance of technical, economic, and environmental factors.

The process we use to quantify the environmental impacts of our hardware devices and measure environmental improvements is called "Life Cycle Assessment." Life Cycle Assessment, or LCA, is the systematic assessment of environmental impacts associated with all life cycle stages of the product, process, or service that is being assessed. We follow recognized procedures for conducting LCAs, which are established by ISO 14040 and ISO 14044 standards, along with additional guidance available through various initiatives, including the Product Environmental Footprint (PEF)² initiative driven by the European Commission.



Integrity built-in




ECOPROFILE
Surface Pro 10 for Business





Transparency to impact

We have made significant investments to improve our life cycle assessment (LCA) approach. That's because quantifying the environmental impacts of our products is critical to make and track progress toward our carbon reduction goal. We use LCA to identify and prioritize opportunities to minimize the carbon footprint across the full life cycle of our devices.

The life cycle assessment² of Surface Pro 10 for Business includes production of one device, distribution to customer, 4.5 years of product use³, and end-of-life management. The estimated annual electricity consumption⁴ in use is 13.1 kWh per year.

The carbon footprint⁵ of one year of computing using Surface Pro 10 for Business is 33 kg CO₂e, assuming a 4.5-year total use period¹.

The production life cycle stage includes extraction of raw materials, upstream material preparation, electronic component manufacturing, subassembly manufacturing and assembly, and final assembly.
Calculations are based on the US configuration of Surface Pro 10 for Business: Intel® Core™ Ultra 5 Processor 135U, 8GB LPDDR5x, 256GB SSD. Included in the assessment are the device, power supply unit, and packaging. Other accessories are not included.
LCA methodology details are included in the Resources and notes page of this document.



Surface Pro 10 for Business full life cycle carbon footprint¹

148 kg CO₂e

equivalent¹ to 379 miles driven by an average gasoline-powered passenger vehicle

- Production: 112 kg CO₂e
- Transport: 13 kg CO₂e
- Product use: 24 kg CO₂e
- End of life: 11 kg CO₂e

Circular by design

The linear 'take, make, and waste' approach is no longer viable. That's why we design products with circularity in mind, meaning we follow a 'reduce, reuse, and recover' model to minimize waste and maximize the reuse of resources.

Surface Pro 9 is our most repairable Surface Pro device to date.

Clockwise from the top of the circle, images are aluminum and plastic.



- 12** replaceable components
- 99%** recyclable⁶ packaging
- 20%** post-consumer recycled plastic content in power supply unit

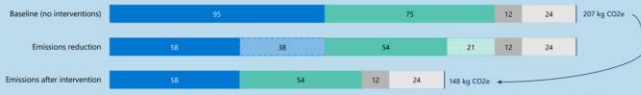
Surface Pro 10 for Business. © Microsoft Corporation. All rights reserved. Introduced October 2024.

Reducing manufacturing carbon emissions

The lifecycle carbon footprint of the Surface Pro 10 for Business was reduced by 28% compared to a baseline (no interventions)* scenario through a series of ecodesign (material & design) and supply chain interventions.

The enclosures of Surface Pro 10 for Business are made with a minimum of 72% recycled⁶ content, including 100% post-industrial⁷ recycled aluminum in the Bucket and Kickstand. The rare earth magnets in the enclosure assemblies are made with 100% recycled⁶ rare earth metals. These material interventions drive a 38 kgCO₂e, carbon footprint reduction from baseline. We are working with our suppliers to transition key manufacturing processes to 100% carbon free electricity⁸. The carbon free electricity transition implemented so far drives another 21 kgCO₂e, carbon footprint reduction from baseline.

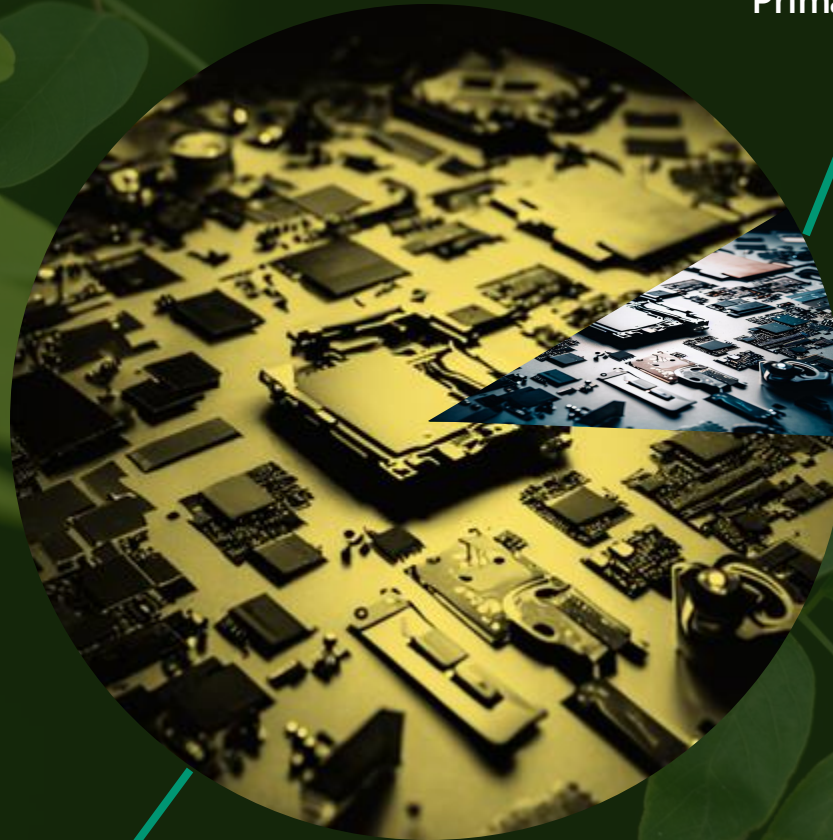
Calculations are based on the US configuration of Surface Pro 10 for Business: Intel® Core™ Ultra 5 Processor 135U, 8GB LPDDR5x, 256GB SSD. Chart includes Production, Distribution, Use, and End of Life of the device, power supply unit, and packaging.
*The baseline (no interventions) scenario models the same product without any sustainability interventions in the production phase of the device. (a) no additional renewable energy in the supply chain beyond what is already modeled in the regional grid and from Ecoinvent v3.9.1; (b) the carbon footprint of materials and manufacturing processes assuming no recycled content or additional ecodesign interventions as of the date of Ecoprofile, and (c) the default US distribution, use, and end of life modeling assumptions of Surface Pro 10 for Business.



Category	Material production	Ecodesign reductions achieved	Supply chain manufacturing processes	Supply chain reductions achieved	Transport	Product Use	End Of Life	Total
Baseline (no interventions)	95		75		12	24		207 kg CO ₂ e
Emissions reduction	58	38	54	21	12	24		
Emissions after intervention	58		54		12	24		148 kg CO ₂ e

Surface Pro 10 for Business. © Microsoft Corporation. All rights reserved. Last updated April 2024.

Primary
data
0-20%



Primary data

Secondary data

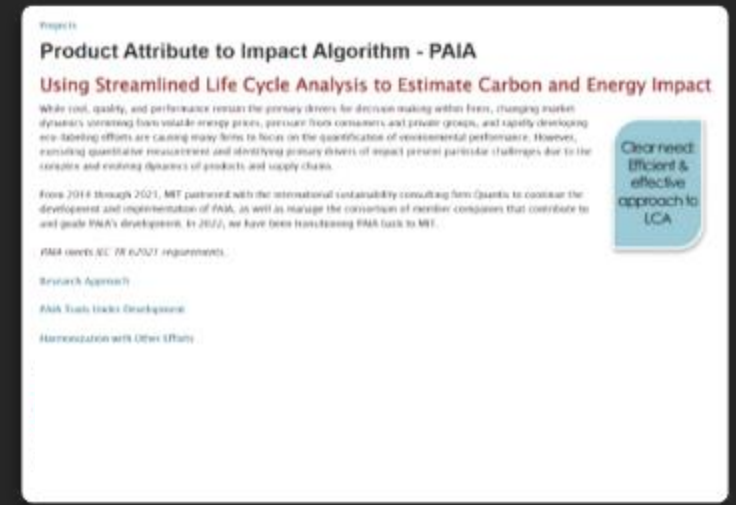


LCA tool (Software)
PAIA

LCA In 20 min



“At this time, the results of the PAIA tools should **not be used for a regulated carbon footprint disclosure program**”



“the results of the PAIA tools are not designed to differentiate between products at the SKU level. The tools can offer a high level estimate of impact along with the associated uncertainty of the results **for product classes**, but **not for specific products**”

“PAIA may **not be compliant** with the primary data requirements”



Transparency to impact

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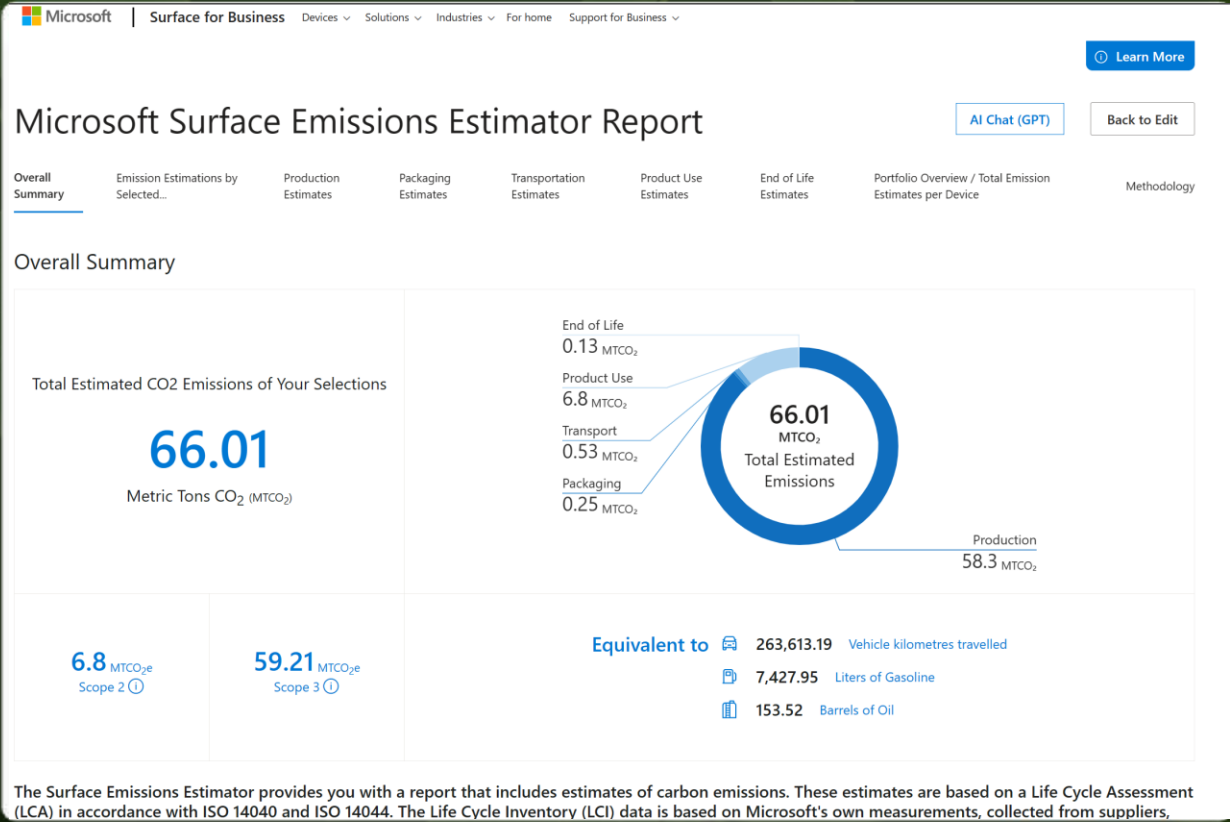
LCA methodology details are included in the Resources and notes page of this document.



Integrity built-in



Surface Emissions Estimator



Integrity built-in



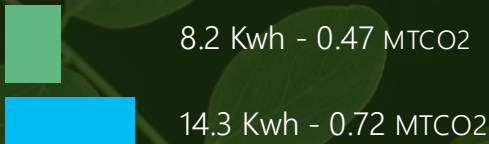
Tracking real- world energy



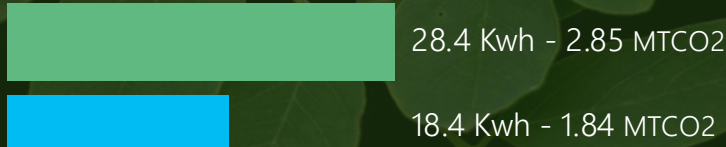


ENERGY-STAR vs real-world usage

Surfa Pro 9 SQ3



Surfa Laptop Studio i7

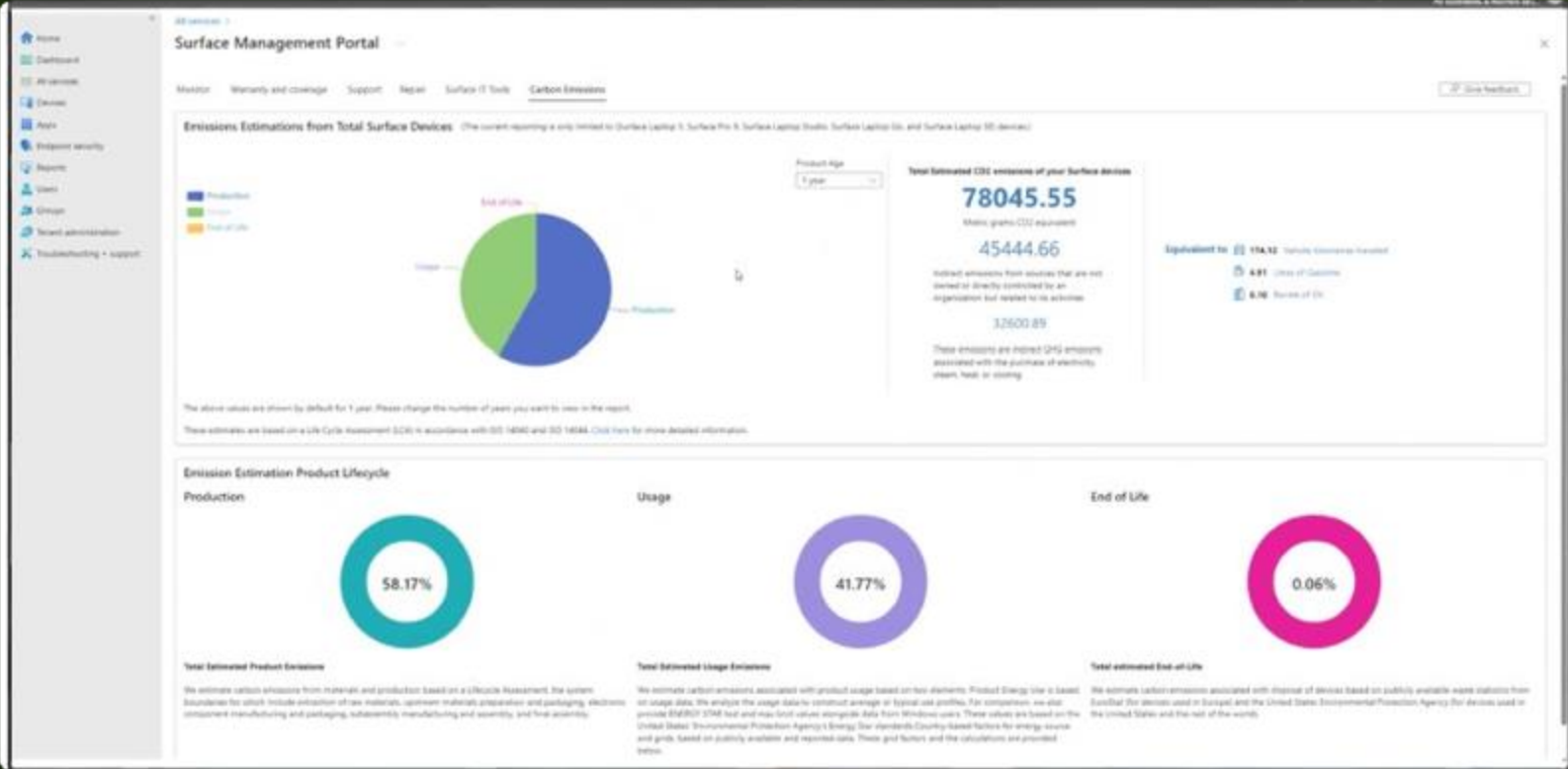


Total energy consumption (Co2/year)

Integrity built-in



Surface Management Portal



Whats Next



SKU level Impact

In the works



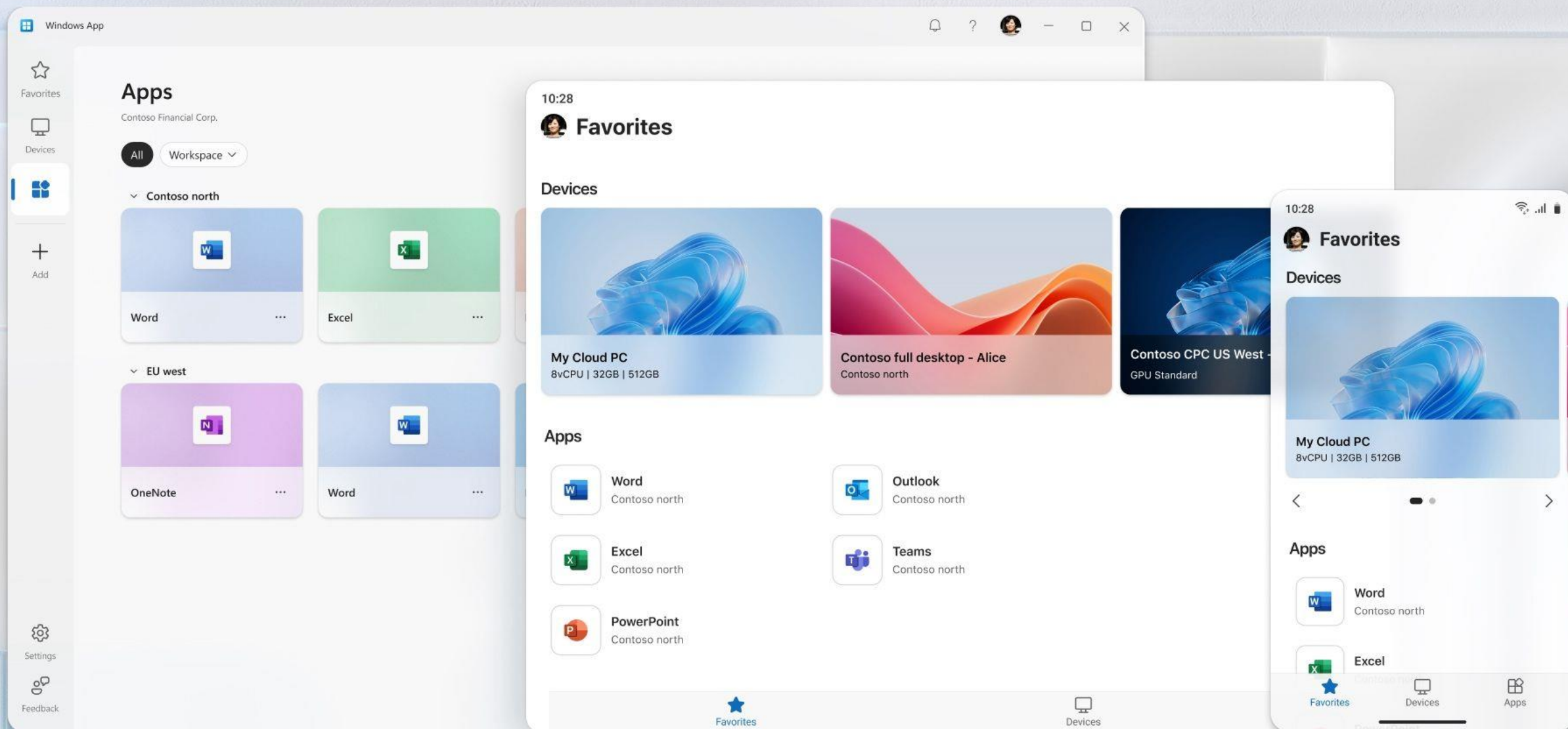


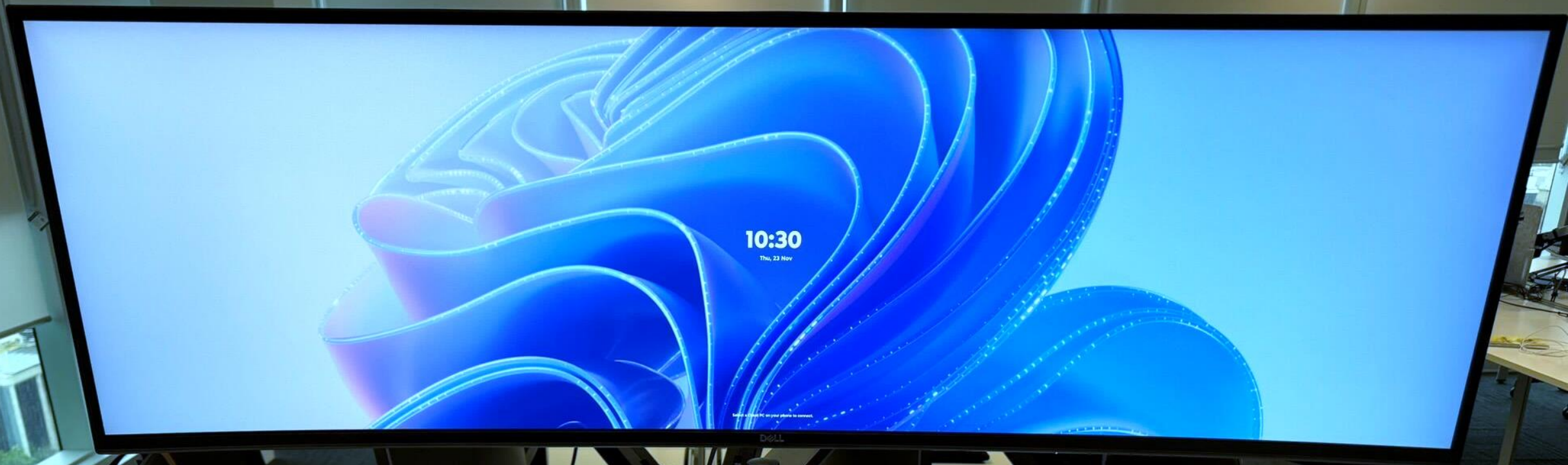
Surface
+
W365

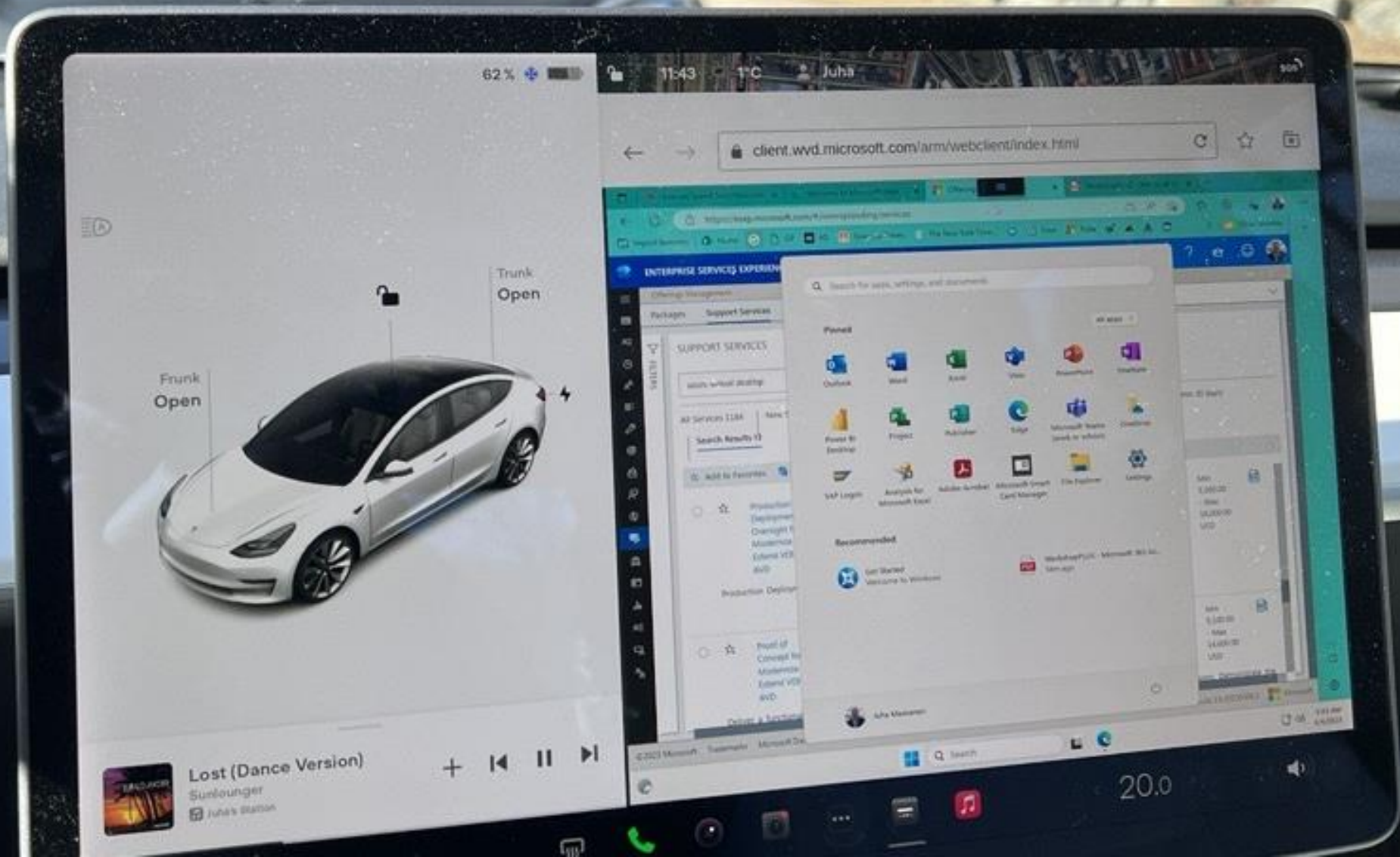




Access your Windows on any device, anywhere.







Windows



From the cloud to any device

Cloud PC



Windows 365
optimized for **simplicity** and **experience**

On a local device

Client PC



Local on a PC or tablet
across price points and form factors

Windows



From the cloud to any device

Cloud PC



Windows 365
optimized for **simplicity** and **experience**

On a local device

Client PC



Local on a PC or tablet
across price points and form factors

Integrity built-in

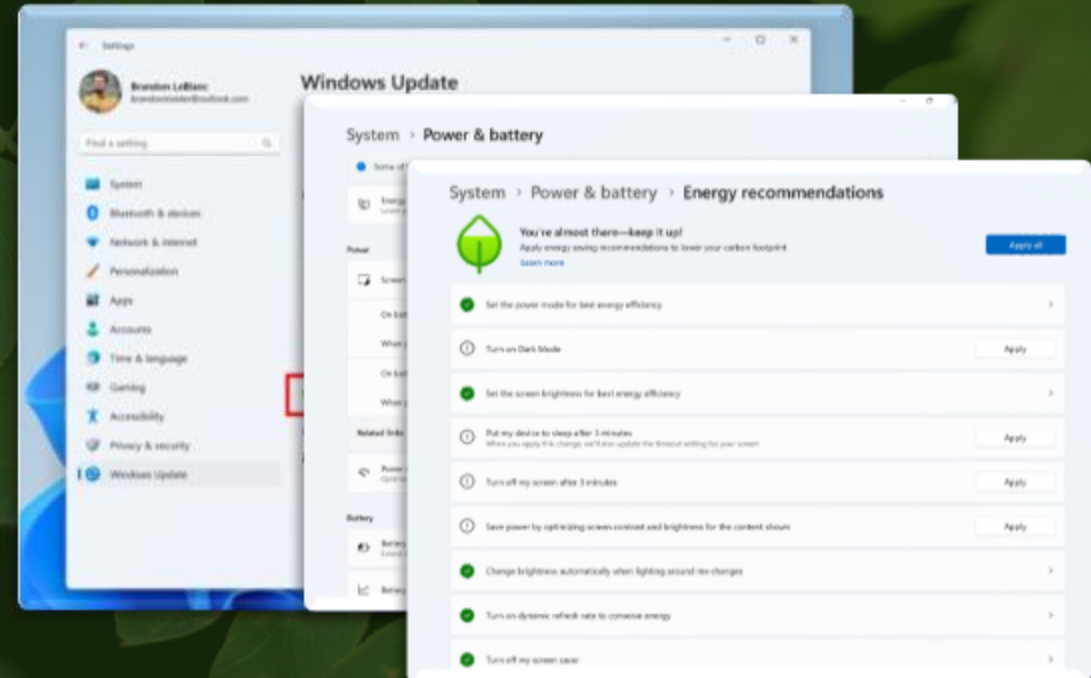


Carbon Aware Operating System

Windows Update leverages more renewable energy

Windows Update will try to schedule update installations at specific times of day when doing so results in lower carbon emissions. Most electricity grids are powered by multiple sources, including renewables and fossil fuels. Whenever possible, Windows 11 will now prioritize installing updates in the background at times when greater amounts of clean energy sources (like wind, solar, and hydro) are available. Users can always choose to install updates immediately by navigating to Settings > Windows Update and choosing 'Check for updates'.

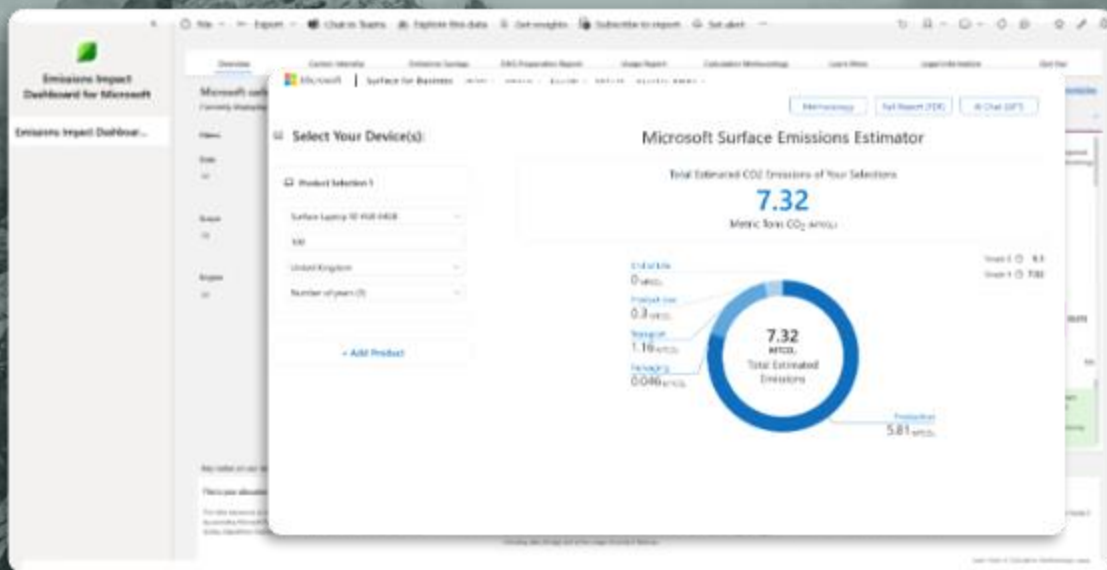
This feature will only be enabled when your PC is supported and regional carbon intensity data is available from our partner [Microsoft](#) or [Carbon Aware](#). If enabled, users will see the text shown below on the Windows Update settings page. We're still working on the content that the text links to - stay tuned for future updates.



Reducing carbon impact across the lifecycle









You will get 1000+ miles

“Industry average - Product class”



Would you buy it?

The background is a dark green color with a subtle, repeating pattern of leaves. The leaves are a slightly lighter shade of green and are arranged in a way that creates a sense of depth and texture. The text is centered horizontally and vertically on the page.

What get's measured Gets Done!

How can I compare Surface to.....

How can I compare

to

Surface



Surface