COMMSCOPE®

Green Agenda

for outdoor wireless networks

2023

Mobile network operators are working hard to reduce their environmental impact. CommScope's Outdoor Wireless Networks segment is working just as hard to help them do it.

CommScope's Outdoor Wireless Networks segment (OWN) is trusted by mobile network operators (MNOs) all over the world because we build solutions that answer their RF path challenges—*all* their challenges. It's not always about building bigger and stronger. Sometimes it's about building smaller and smarter.

We have a special responsibility to fulfill

Mobile networks are a top consumer of electricity and a major user of finite materials like steel, copper and other mined resources that also require energy to refine, resulting in significant CO_2 release. Our MNO partners are committed to reducing these impacts, and OWN is committed to building solutions that help them reach those environmental responsibility goals.

We measure results with sound science, not sound bites

OWN doesn't deal in platitudes and vague declarations of intent. We take conscious steps in our design, materials selection, manufacturing and logistics that yield real, quantifiable results because we share our partners' belief that a greener business model is not just possible, not just desirable, but in fact a critical goal to achieve. Our partners have targets to hit—OWN provides the hard scientific data they need to know how they're doing.

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OWN provides the hard scientific data they need to know how they're doing.

Combined, our four pillars cover the entire planning, production and lifecycle of our products

Four pillars supporting our one planet

We have a special responsibility to fulfill

OWN knows there is no single solution to improving sustainability and promoting the circular economy. That's why we help our MNO partners reduce their environmental impact at every stage. Our efforts cover the entire planning, production and lifecycle of our products.

Our four pillars:

- Eco-friendly design for more efficient networks through a smart use of resources
- Sustainable operations and supply chain
- Rethinking packaging and logistics to reduce distribution impact
- Extending product lifecycles to extend the lifespan of wireless networks

Our OWN ambition

We have defined the key steps of our roadmap

2022

OWN sustainability assessment and strategy validation

Complete full assessment of all key measurables

Green house gas (GHG) emissions for scopes 1 and 2

26% reduction from 2019 baseline
(the objective was a 4% reduction)

2023

Science-based target initiatives (SBTi) implementation

Implement strategy across all initiatives in 2023

Green house gas (GHG) emissions for scopes 1 and 2

Reduce total emissions by 5% *compared to 2022*

2024

Lifecycle Assessment (LCA)

Achieve LCA and EPD of all product families

Green house gas (GHG) emissions for scopes 1 and 2

Reduce total emissions by 5% *compared to 2023*

2030

Green house gas (GHG) emissions for scopes 1 and 2

Achieve total emission reduction of 50% from 2019 baseline

As of May 2nd, 2023

Eco-friendly design

Thoughtful resource management from design to disposal

Embracing a more sustainable future means finding better ways to build solutions that connect more people while consuming less

—less metals mined, less electricity consumed, less weight transported and less material going into landfills at the end of a much longer lifecycle.

CommScope OWN fulfills our commitment to environmental sustainability in countless ways—but we're always able to count the actual, tangible benefits they yield.

CommScope OWN embraces the circular economy

The idea of the circular economy—doing more with less, increasing efficiency, extending product lifespans and increasing recyclability both in production and disposal of our products—is central to our design philosophy.

CommScope has the capability to quickly customize products to meet application requirements; tailoring the product to the specific needs means a reduced amount of material and consequently a reduction of weight and wind load.

Tangible benefits

We reduce the amount of raw material used in our products.

>1,000 tons less aluminum used

- Our newest base station antenna (BSA) reflector requires less aluminum, reducing aluminum used by an estimated 1,000 tons by 2025
- Our advanced BSA internal mounting brackets require 37% less aluminum, cutting another 17 tons of aluminum used by the end of 2023

Up to 286.4 metric tons CO_2 release prevented

These improved antenna brackets also reduce CO_2 in two ways:

- Reduced aluminum content translates to 276 tons of prevented CO_2 release by the end of 2023, and
- 5.9 metric tons less steel used per 1,000 installations, yielding an additional 10.4 metric tons of CO_2 release prevented

We build smaller and smarter.

- **Our reduced-weight hub mounting ring** for microwave antennas has saved 2.6 tons of aluminum in manufacturing, representing 41 tons of CO_2 release prevented. 13 more tons of released CO_2 are prevented for every 1,000 antenna we build.

- **PowerShift® Macro** dynamically boosts DC voltage to remote radios, mitigating voltage losses from line resistance. It enables MNOs to avoid upgrading power trunks to larger cable sizes, avoiding the need for performing costly and material-rich upgrade projects. PowerShift Macro supports circular economy objectives in several important ways:

  - Supports high-power RRUs with minimal cable diameters
  - Enables the continued use and reuse of existing cell site cables
  - Minimizes the need for additional backup battery strings
  - Ensures the maximum utility and service life of older battery strings

We support the deployment of shared infrastructure.

- OWN BSAs include solutions that are designed to be shared across multiple operators, reducing the need for redundant infrastructure and promoting a lighter environmental footprint for mobile networks.
- HELIAX® SkyBlox™ and modular connectivity solutions are designed to accommodate multiple MNOs on a single infrastructure platform, reducing the amount of hardware that must be produced, transported, installed and maintained.
- Our HELIAX SkyBlox solution is constructed from a single polymer which is 100% recyclable.

We design each new solution with recyclability in mind.

Recyclability
100%

Weight reduction
-20% thanks to lower density

Better RF transparency
-65% insertion loss
-30% dielectric constant

Our next-gen glass fiber reinforced polypropylene (GFRPP) antenna radome is made of 100% recyclable thermoplastic instead of heavier resin and fiberglass designs.

It contributes to circular economy while improving RF performance.

By the end of 2023, from 44-54% of our antennas will use these radomes.

Comparable mechanical properties

1,344 hours
UV resistance

>150◦C
Heat resistance

8T8R base station antennas

The right-size alternative that balances radio access network (RAN) performance and energy efficiency

CommScope offers a comprehensive portfolio of more than 80 varieties of 8T8R BSAs that provide a flexible, superefficient alternative to 32T32R and 64T64R architectures in medium- and low-density areas, yielding:

30% **less power use and CO_2 release than 32T32R**

- Up to 2,339 kWh energy savings per year
- As much as 535 kg less CO_2 released

50% **less power use and CO_2 release than 64T64R**

- Up to 5,000 kWh energy savings per year
- As much as 1,600 kg less CO_2 released

Very high traffic	64T64R	32T32R	32T32R 16T16R	(FWA) 32T32R 16T16R
Moderate/low traffic	Not suitable	8T8R	8T8R	8T8R
				
	Dense urban high-rise ISD 200-500 m	**Urban low-rise ISD 500-1,000 m**	**Suburban ISD>1 km**	**Rural ISD ~5 km**
	Complemented with dynamic spectrum sharing (DSS) in some scenarios. In very low traffic sites 3.5 GHz probably not deployed and FDD bands may be enough.			

8T8R BSAs are suitable in 70% to 80% of all deployments

Energy efficiency base station antennas help reduce RAN power consumption

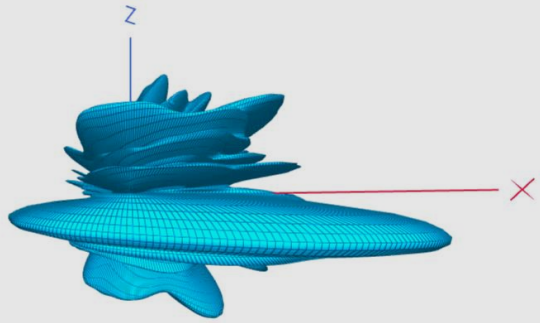
Well-designed BSAs can reduce overall RAN power consumption by improving *radiation* and *pattern efficiencies*: Savings that can be achieved depend on the configuration of the site, the expected traffic load, and the generation of the product being replaced.

CommScope offers a wide range of energy-efficient solutions, so **operators can right-size their infrastructure investments and maximize energy savings from day one**—without locking themselves into limited options later on.

Our latest antenna designs require less power to cover a given area, reducing energy use corresponding to **preventing the release of 480 kg of CO_2 per site per year.**

CommScope designs antennas with efficient radiation and pattern characteristics. These designs can reduce power consumption by **16 percent, preventing 420 kg of carbon release** per antenna at -1.25 db.

You can learn more in our Journey to Net Zero white paper.



Insights into pattern efficiency and CommScope designs focus on the discoveries provided by these metrics.

Today's metrics used for a BSA characterization are based on 2D patterns (azimuth and elevation cuts). New 3D metrics can better reflect the overall antenna *pattern efficiency* and enhance our understanding of how antennas shape the performance of the network (coverage and capacity).

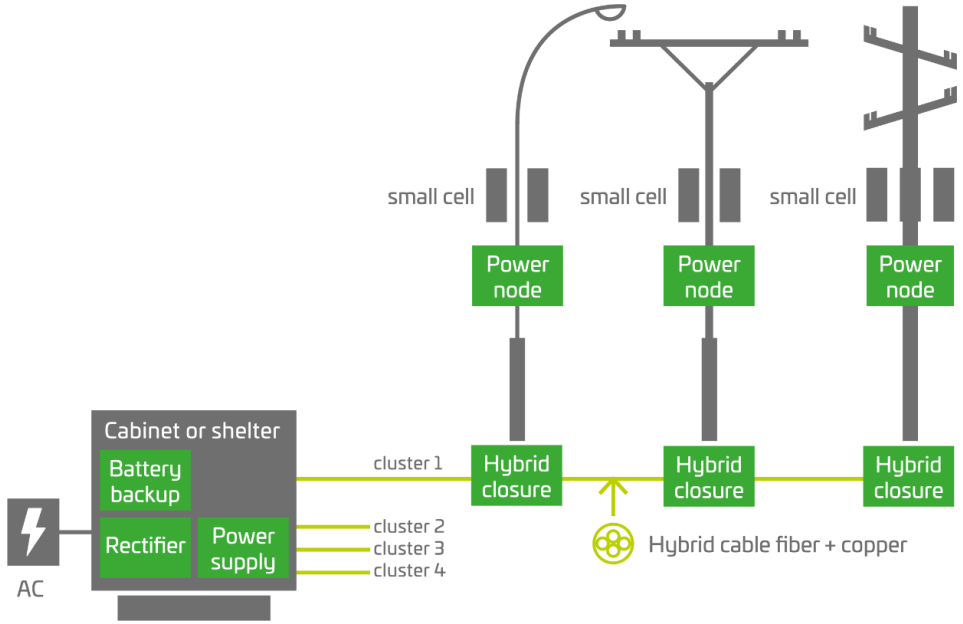
Examples of 3D metrics:

- *Sector efficiency (%)*
- *A1 10 dB (%)*

Future CommScope BSA platforms will focus on optimizing these metrics.

Manage intelligent power delivery

CommScope OWN embraces the evolution of cellular infrastructure power management to deliver smarter, more efficient electrical service to ensure networks can perform as needed, without wasting watts.



PowerShift Metro is designed to **support outdoor small cells.** It uses a modular power shelf with centralized battery backup to employ peak shaving, which enables MNOs to maximize power plant efficiency by pulling battery plant energy during peak traffic times, resulting in more **appropriately sizing the power plant.** Additionally, load shaping is a function that allows MNOs to simultaneously run network elements using both power plant and battery plant power to reduce energy consumption during peak delivery cost periods, recharging the battery plant during lower cost periods.

Our PowerShift Macro solutions deliver dynamically regulated voltage to tower-top RRUs. As RRU power consumption or feed cable length increases, PowerShift improved efficiency compared to fixed boost (up to ~5% better) or no boost architectures (up to ~10%).

You can read more about the role of power management and CommScope's solutions—including PowerShift Metro and PowerShift Macro—in the Powering wireless networks eBook.

Sustainable manufacturing processes

We embrace every angle of the circular economy

The circular economy is the philosophy of bringing products into the market more thoughtfully—making them operate more efficiently, ensuring they are useful for a longer time, and at end of life, that they are recycled as much as possible. For a global company like CommScope, that puts us in a place of special responsibility.

For CommScope OWN, the circular economy is our roadmap for manufacturing

From responsible supply chains, to reducing the carbon footprint of our manufacturing processes, to—soon—a customer take-back program to ensure maximum reuse and recycling of our products, CommScope OWN is walking the greener, more sustainable path with our partners.

Tangible benefits

We reduce CO_2 emissions by design.

CO_2 emissions decreased 31%

F4C jumper connectors are designed to use less raw materials and simplify the assembly process to reduce CO_2 emission in the manufacturing operations over our standard jumpers. Since first implementation in 2021, CO_2 emissions per 1,000 jumpers manufactured have decreased by 31%.

CO_2 emissions reduced 55%

HELIAX cable manufacturing uses software-controlled processes that automate starting and stopping of equipment (power, water cooling, fans and more) to improve efficiency. Since implementation in 2020, average CO_2 emissions per EH have been reduced by 55%.

Rethinking packaging and logistics

Optimizing the way we build, box and ship our solutions

CommScope does business with partners all over the world

With tons of product shipping every day to six continents, OWN has a precious opportunity to reduce the environmental impact of this important phase of business.

We are constantly working to use less material and preserve our natural resources—without diminishing the quality our partners expect from CommScope OWN solutions. These measures are making an impact now, and that will increase as we expand these practices further across our global production chain. We will also soon offer product end-of-life guidance to our partners to help them build a greener network—so, while these efforts are doing good now, they'll be even greater soon.

With 90 percent of world trade moving aboard 90,000 cargo ships—which themselves are responsible for 2 percent of CO_2 emissions worldwide—we have focused on using less space, less material and less weight to reduce this impact.

"…while these efforts are doing good now, they'll be even greater soon."

Our compact antenna form factors and redesigned packaging reduce shipping container volume.

The redesign of our BSA packaging reduced the material needed for carton, cushion and pallets, yielding a loading rate increase of 55%. By the end of 2023, this change will prevent the release of 2,000 tons of CO_2E.

We reduced pallet sizes used for our PowerShift shelf by 67%, reducing the amount of wood and space needed for shipment. This will save 70% of CO_2E starting in early 2023 (savings of 3.2 tons of CO_2E per 1,000 units).

We reduced HELIAX pallet sizes in mid-2022 for the transportation of our jumpers. The CO_2 emissions per 1,000 units shipped have since decreased by 45%.

Microwave systems freight optimization: Optimizing loading layout and mixing antenna types enables an increase in the loading rate between 5 and 17%; for 2023 alone, we estimate a reduction of 54 tons of CO_2.

We've embraced digital documentation—less paper, less weight and less waste.

Paper free for HELIAX FDH cables: QR codes printed directly on our coaxial jumper products have eliminated 276 kg of paper used for hard-copy documentation since implementation in February 2022.

We're reducing cardboard and eliminating single-use plastic in our packaging.

Our dual pigtail solution packaging has been updated to double box capacity—and **halving the number of boxes we need to create.**

We're designing solutions that have cascading conservation effects on other site components.

Compact form factors like those in the new **Mosaic™ antenna solution** not only reduce the environmental impact of shipment but also require less material to reinforce installation sites—and have less material to dispose of at the end of the lifecycle.

Extending product lifecycles

Building for the future starts with building for the long term

A key element of the circular economy is to ensure that, for any investment of energy and materials, we realize the maximum benefit possible, for the longest time possible.

CommScope OWN has always made long lifespans a core value of our solutions, but it's not just about saving costs—it's also about saving the planet.

OWN strives to build antennas, cables, connectors, enclosures and other components that will serve our partners' networks for years to come—through the seasons and through the inevitable evolution of technologies.

We build for modular adaptability and the capacity to flex and grow. And, of course, we build for maximum possible durability and reliability because that's always been part of who we are.

"…it's not just about saving costs—it's also about saving the planet."

Our modular approach

CommScope OWN helps operators deploy exactly what's needed and expand when ready.

- Our new **Mosaic solution** combines active and passive antennas in a single slim form factor, enabling operators to **exchange RAN solutions without replacing passive components.**
- Our **modular CMC equipment enclosures** offer multiple options for thermal management and flexibility to incorporate batteries for power back-up.
- Our **stackable HELIAX SkyBlox breakout solution**, made from recyclable polycarbonate, can be deployed up to four units high to facilitate power and fiber connectivity to FTTA sites. It's designed to help operators **deploy what they need, when they need it, and grow over time without ripping and replacing existing components.**
- Expandable and stackable solutions offer **the most low-impact way to grow network coverage and capacity**.

Lasting longer, adapting better

Our solutions are engineered to last longer and adapt better, even under harsh conditions.

- Our trusted **HELIAX solutions come with 10-year warranties** and are commonly in service for twice that long—or even longer.
- Our solutions offer superior reliability, **reducing the resources needed** to configure, maintain and repair them.
- **SkyBlox is a stackable, scalable solution** that can handle various diameter power cords, extending its usefulness even as site components evolve and are changed out.

Designed to be rebuilt

- In the United Kingdom, CommScope's Professional Service team has already **refurbished more than 200 old site cabins**, restoring them to like-new operational condition for just a fraction of the materials and energy required to replace them—**extending lifecycle and keeping materials out of landfills.**

We pave the path to new standards and network technologies.

CommScope OWN solutions support LTE and 5G networks with 4T4R/4T8R and FDD 8T8R, respectively—and we also provide clear and reliable migration paths to let them evolve as technology standards and market needs dictate.

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