



WHITEPAPER

Bridging the Sustainability Gap:

How Integrated Network Asset Management helps Telecoms Track and Reduce their Carbon Footprints

Published by

**MOBILE
WORLD
LIVE** 

In partnership with

FNT
// simplify complexity

Summary

Today's mobile network and infrastructure providers have a sustainability problem. In order to meet government sustainability mandates, reduce operation expenditures on energy, and lower impact on the environment, telecom companies must first be able to ascertain their current carbon footprint. And few companies have this ability.

This whitepaper will dive into this challenge and explain existing imperatives and regulations that require a telecom to ascertain and maintain the knowledge of their carbon footprint. Additionally, it will explain how specific sustainability goals for mobile and edge data center providers can be met by introducing integrated network asset and infrastructure management software.



Sustainability Challenges: Energy Usage Challenges that Telecoms Face

Mobile networks and edge data centers face sustainability challenges on several fronts: their increasing energy demands, environmental impacts, and operational complexities. For example, 5G networks are constantly growing by adding coverage and capacity, deploying macrocells and small cells, IoT devices and massive MIMO antennas.

In a 2020 research paper¹ concerning the world's mobile technology power needs, InterDigital and ABI Research projected that the 5G ecosystem will see a 160 percent increase in power requirements from 2020 to 2030. The global energy footprint of 5G in 2020, which was 19.8 million tons oil equivalent (Mtoe), is expected to grow to 51.3 Mtoe by 2030 — which for comparison's sake is roughly the same amount of energy expected to be consumed by all the households in the United Kingdom in 2030.

The Impact of Edge Data Centers and AI on Energy Usage

Edge data centers are becoming increasingly important for mobile networks. They provide hosting and computing power for virtualized RAN functions and Mobile Edge Compute (MEC) applications, allowing for low latency data processing close to the source, which is essential for applications like IoT, autonomous vehicles, and real-time applications that rely on fast response times and high bandwidth.

Expanding demand for artificial intelligence is changing the power equation. A significant portion of AI processing happens in large data centers, using powerful servers, such as Graphics Processing Units and specialized AI chips to handle the complex computations involved in AI tasks. The data required to process AI has vastly increased data center usage and exploded the resulting electric demand. As a result, core data centers are now struggling to handle new power requirements.

Between 2023 and 2033, the expansion of data centers and an

acceleration of electrification will drive Europe's power demand up by 40 to 50 percent, according to Goldman Sachs Research². By 2030, the power needs of Europe's data centers will match the current total consumption of Portugal, Greece, and the Netherlands combined.

Government Directives

Telecoms face multiple and varied sustainability-related directives in countries around the world that must be followed. For example, in 2023, the European Union adopted a set of proposals to encourage reducing net GHG emissions by at least 55 percent by 2030, compared to 1990 levels. This will enable the EU to become the first climate-neutral continent by 2050.

Signed in 2015, the landmark international treaty, the Paris Climate Accords, aimed at limiting global warming to well below 2 degrees Celsius, compared to pre-industrial levels. Although the U.S. pulled out of the Paris Agreement, the California Corporate Greenhouse Gas Reporting Program is being developed that will require businesses with total annual revenues over one billion dollars that

¹ Environmentally Sustainable 5G Deployment, Interdigital and ABI Research, 2020

² Powering Up Europe: AI Datacenters and Electrification to Drive +c.40%-50% Growth in Electricity Consumption, Goldman Sachs Research, 2024

do business in California to annually disclose their Scope 1, 2 and 3 emissions for the prior fiscal year.

Another major Greenhouse Gas (GHG) emitter, People's Republic of China, has signaled its desire to combat climate change. In September 2020, China announced that it will "aim to have CO₂ emissions peak before 2030 and achieve carbon neutrality before 2060."

Companies must also disclose information about their environmental and social impact to be compliant with the EU's Corporate Sustainability Reporting Directive (CSRD). Additionally, the Energy Efficiency Directive (EED) aims to make companies more transparent and accountable for their environmental and social impact.

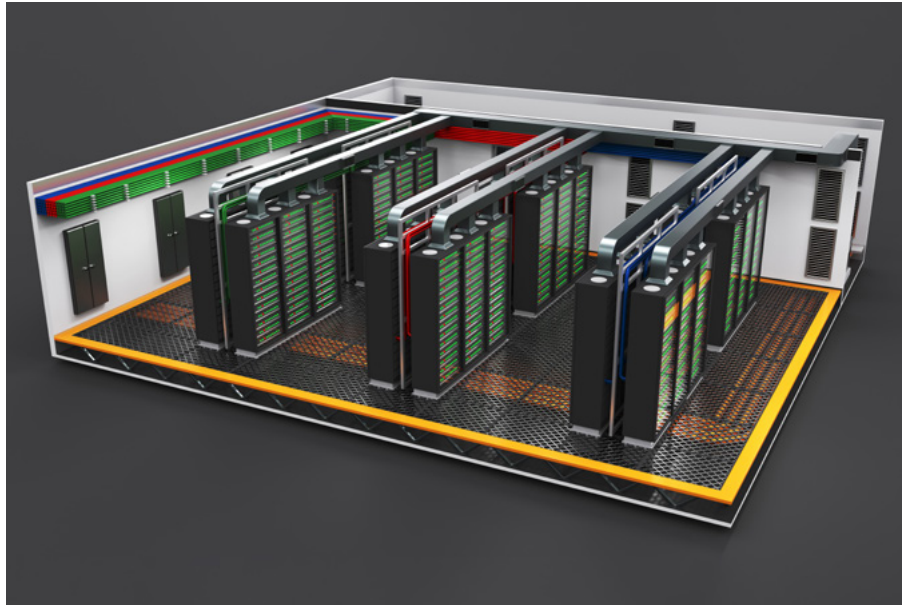
Improving the Bottom Line

Managing a sustainable infrastructure improves energy efficiency and minimizes waste, while reducing equipment in service and operating expenditures. Additionally, reducing GHG emissions involves process and supply chain optimization. As a result, companies can see millions of dollars in savings.

Telecoms can eliminate waste in infrastructure operation by accurately determining capacity needs and limiting resource usage to what's truly necessary. Opting for eco-friendly equipment will also enhance the network's durability with longer lifespans. A well-documented infrastructure will minimize time-consuming troubleshooting and repairs. Additionally, stranded assets can be located, which are powered on but not running equipment with a useful load.

Obtaining Financing

Some investment funds and banks integrate environmental social and governance (ESG) factors, which include sustainability, into their credit risk assessments. ESG can even play a role in whether a company receives an investment



or not. For example, Macquarie Asset Management has set a course to be net zero in its GHG emissions across its portfolio by the year 2050. As a matter of course, the firm considers a broad range of factors when assessing the sustainability of potential investment, including climate change, GHG emissions, biodiversity and ecosystems, resource efficiency, water usage, land use, and waste and pollution.

Carbon Footprint Commitments

Because of these drivers, telecoms are increasingly committing to net-zero carbon output. For example, in order to minimize its carbon footprint, the Telefónica Group has committed to achieve net zero emissions by 2040. To achieve this goal, the telecom will reduce all its emissions by at least 90 percent. The remaining emissions will be neutralized through nature-based solutions, including consuming 100 percent renewable electricity in all of its markets by 2030.

Telefónica climate targets are validated by the Science Based Targets initiative and include Scopes 1, 2 and 3, or in other words carbon emissions linked to their operations and the entire value chain, according to the company.

Challenges

Even with all of the commitments to cut GHG emissions, actual progress in decarbonization has been slow. In order to meet government sustainability mandates, reduce operation expenditures on energy and lower impact on the environment, telecom companies must first know their current carbon footprint. The challenge for telecoms is their vast operations are spread out across IT, data center and network infrastructure assets. As a result, they do not have precise documentation of each piece of equipment and its electrical, heating and cooling needs, especially not in one tool.

In particular, they do not have the knowledge of their energy usage at the granular level of each network component. Consider each mobile site, for example, where the inventory is handled by a managed service provider that inspects the site and maintains it but may not document it and share it with the operator. With information on the network fragmented across multiple databases, finding the GHG emission information is difficult, as well as keeping up with changes over time.

Additionally, there are different types of GHG emissions, which adds complexity. They are classified

into three scopes from 1 to 3, by the GHG Protocol corporate standard. Each has a different level of severity, tracking and reporting requirement. Scope 1 covers direct GHG emissions from sources owned and controlled by a company, and Scope 2 accounts for the GHG emissions created in the generation of electricity consumed by a company. Indirect emissions incorporated into a device or piece of equipment simply by it being manufactured, distributed and set up are known as Scope 3.

Solutions

To quantify a telecom's carbon footprint, a single centralized database, known as an asset digital twin of the network, must be established. It should have a comprehensive inventory and documentation of all infrastructure elements, combining information from all legacy systems.

This single source of truth should have visibility into every component of the operator's vast network, including electricity, heating, and cooling usage. New equipment in both the RAN and the edge data center should be documented only once into the master database, so the solution must be multi-domain.

Emissions potential of each asset should be calculated for its contribution to the overall carbon footprint. Scope 2 and Scope 3 GHG emissions should be captured from the IT, data center and network infrastructures operations, and such a tool must be able to convey live parameter readings.

Tracking the lifecycle of each component of network hardware will give granular insight into its impact on the environment. For example, a hardware piece can be very efficient in operation, but manufacturing, fresh water expenditure and logistics all contribute to the global CO₂ footprint significantly. Software can be used to import and document so-called EPDs — Environmental Product Declarations — to track these indicators.

FNT Sustainability Provides All the Advantages of GHG Emission Documentation with None of the Hassle

Specific sustainability goals for mobile and edge data center providers can be met by using an integrated network asset and infrastructure management software. This is made possible by using FNT Sustainability, a powerful solution component within the FNT Command Platform that correctly documents and manages the carbon footprint of infrastructure-related emissions. The result is an important tool telecoms can use in their quest to improve corporate sustainability. In particular, the full range of eco impact factors are recorded, including embodied CO₂ emissions, fresh water use, mineral resource depletion and acidification. CO₂ emissions during the Use phase of the lifecycle are captured for every element in the IT, data center, and network — for both physical devices as well as virtualized elements.

When it comes to reducing carbon footprint, the more data about the sources of carbon the better. Knowledge of power consumption and heating and cooling provides critical transparency into the

production of GHG emissions, which allows the operator to take strategic steps to improve energy efficiency and minimize waste.

In order to capture Scope 2 and 3 emissions produced by operating the IT, data center and network infrastructures, FNT Sustainability's integrated data structure holds ISO-compliant environmental profile declarations (EPDs) and uploads them to the device master data management.

FNT Sustainability maintains documentation through administration of EPDs on the device model level and supporting data inheritance for any new device. All devices — existing, newly created in a planning mode, and complex ones that have been reconfigured — are supplied with the current and correct emission value overview. FNT's component library includes more than 75,000 predefined devices in photorealistic representation with detailed technical information on all devices.

FNT Sustainability provides the ability to not only hold and document EPDs but also to determine power consumption for an individual piece of equipment, a rack, a PoP, a datacenter or for the whole cluster of providers' locations. CO₂ emissions during the use phase of the life cycle are captured by FNT Command for



every element in the IT, network, and data center infrastructure. The full range of eco impact factors are recorded, including embodied CO₂ emissions, fresh water use, mineral resource depletion and acidification produced by both physical devices as well as virtualized elements.

With the quality documentation recorded across the lifecycle of its components, a telecom can find systems and equipment that aren't performing a useful purpose or unwanted redundancies and shut them down. Capturing this level of information on all installed equipment and managing it across the organization also makes it possible to see and act on relationships and dependencies between the different components of the infrastructure.

Additionally, sound documentation and easy reporting provide the proof of progress that is needed to

apply for the financial assistance programs. Audit-ready overviews of CO₂ footprint data are available for inclusion in financial statements requiring sustainability reporting as required in laws passed in the European Union and in California.

The Advantages of Ongoing GHG Monitoring

FNT Command with FNT Sustainability allows the telecom to analyze the emissions footprint over time to identify areas for remediation and to track progress. CO₂ and other emission values can be tracked in every dimension: zonal location (building, floor, room, cage, rack), manufacturer (with product lines/families, models), organizational unit responsible, and device. Using the ready-to-use FNT analytics dashboarding

configuration, the telecom can make informed decisions on where and how measures can be applied to decarbonize and show progress toward becoming greener.

When planning the future of the infrastructure, the effects on emissions can be predicted via FNT Sustainability, allowing for informed decisions that drive sustainability. An expansion of data center facilities, power consumption, weight, load, and cooling can all be visualized. Hotspots can be identified in a data center and heat-generating equipment can be redistributed across the facility, reducing cooling needs.



Conclusion

GHG emissions are no longer a telecom company's "dirty little secret." Governments, stakeholders and financial institutions are all demanding documentation of the extent to which a company is impacting global warming and the intended reduction of those factors.

However, most telecoms do not have that documentation and cannot efficiently reduce their carbon footprints because they don't know the extent of their GHG emissions. That takes an intimate understanding of their assets. Digitizing IT, data center and network infrastructure assets into a digital twin is the first step in creating visibility and eventually increasing sustainability.

The time is now for telecoms to address their GHG emissions. Global carbon emissions from fossil fuels reached a record high in 2024, according to research by the Global Carbon Project science team, with fossil carbon dioxide emissions of 37.4 billion tons, up 0.8 percent from 2023.

Despite the urgent need to cut emissions to slow climate change, the researchers say there is still "no sign" that the world has reached a peak in fossil carbon dioxide emissions. With over 40 billion tons released each year, the level of CO₂ in the atmosphere continues to rise — driving global warming to an increasingly dangerous level.



// simplify complexity

FNT GmbH, headquartered in Ellwangen (Jagst), Germany, simplifies the management of highly complex digital infrastructures in companies and public authorities with its FNT Command Platform. With the cloud-enabled “software made in Germany”, IT, telecommunications and data center infrastructures can be efficiently recorded as digital twins and documented across all levels from buildings to digital services. The software also offers open interfaces and numerous functions for planning, implementing and automating transformations and changes in an integrated manner. FNT’s customers include more than 500 companies and government agencies worldwide, including more than half of the DAX-40 listed corporations. FNT operates offices in several locations in Germany as well as in New York, Singapore and Timisoara and has an international partner system with market-leading IT service providers and system integrators.

Find out more at <https://www.fntsoftware.com/en/solutions-overview/sustainability>



Mobile World Live is the premier destination for news, insight and intelligence for the global mobile industry. Armed with a dedicated team of experienced reporters from around the world, we are the industry’s most trusted media outlet for breaking news, special features, investigative reporting, and expert analysis of today’s biggest stories.

We are firmly committed to delivering accurate, quality journalism to our readers through news articles, video broadcasts, live and digital events, and more. Our engaged audience of mobile, tech and telecom professionals, including C-suite executives, business decision makers and influencers depend on the unrivalled content and analysis Mobile World Live provides to make informed business decisions every day.

Since 2016, Mobile World Live has also had a team of in-house media and marketing experts who work directly with our brand partners to produce bespoke content and deliver it to our audience in strategic yet innovative ways. Our portfolio of custom work - including whitepapers, webinars, live studio interviews, case studies, industry surveys and more - leverage the same level of industry knowledge and perspective that propels our newsroom.

Mobile World Live is published by, but editorially independent from, the GSMA, producing Show Daily publications for all GSMA events and Mobile World Live TV - the award-winning broadcast service of Mobile World Congress and home to GSMA event keynote presentations.

Find out more at www.mobileworldlive.com

Disclaimer: The views and opinions expressed in this report are those of the authors and do not necessarily reflect the official policy or position of the GSMA or its subsidiaries.

© 2025