

WHITE PAPER

GHG EMISSIONS

How Telecom Network Operator and Tower Companies
Can Reduce GHG Emissions

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Introduction

This document provides a detailed understanding of the role of the telecom industry in dealing with climate change, including its impact on greenhouse gas (GHG) emissions. As nations around the world commit to reducing their GHG emissions, telecom companies are required to report their GHG emissions and commit to reducing their impact. This document includes the regulations around GHG emissions and some innovative approaches regarding climate change impact reduction by telecom network operators.

“The recent warming is largely attributed to human activity, primarily from the release of carbon dioxide and other GHGs to the atmosphere.”

Climate change is considered one of the most important environmental issues of our time. Although climate change can be caused by both natural processes and human activities, the recent warming is largely attributed to human activity, primarily from the release of carbon dioxide and other GHGs to the atmosphere. The impacts of climate change are far-reaching, affecting all countries, their economies, people’s health, landscapes and wildlife.

Global targets for reductions in GHG emissions require that all economic sectors monitor, report and then act to reduce their contributions to climate change. While the global telecom carbon footprint is relatively small compared to other industry sectors like transportation, automotive or construction, the growing intensity of telecom services use increases the attributable GHG emissions to the telecom industry.



Part 1

Understanding International GHG Emissions Protocols

Energy consumption from telecom networks is an increasing contributor to GHG emissions. Running a diesel generator to power base transceiver stations (BTS) and to control environmental temperature are the two main contributors to GHG emissions by telecom network operators. The carbon emission footprint of the telecom sector has risen significantly and will continue to rise unless telecom network operators act faster to implement Telecom Site Automation to optimize energy-efficiency. There is also an increased need to move towards different sources of energy (biodiesel, fuel cells, pico hydro, wind and photo-voltaic panels). These would all help telecom network operators become more environmentally friendly, and all require various forms of Telecom Site Automation.



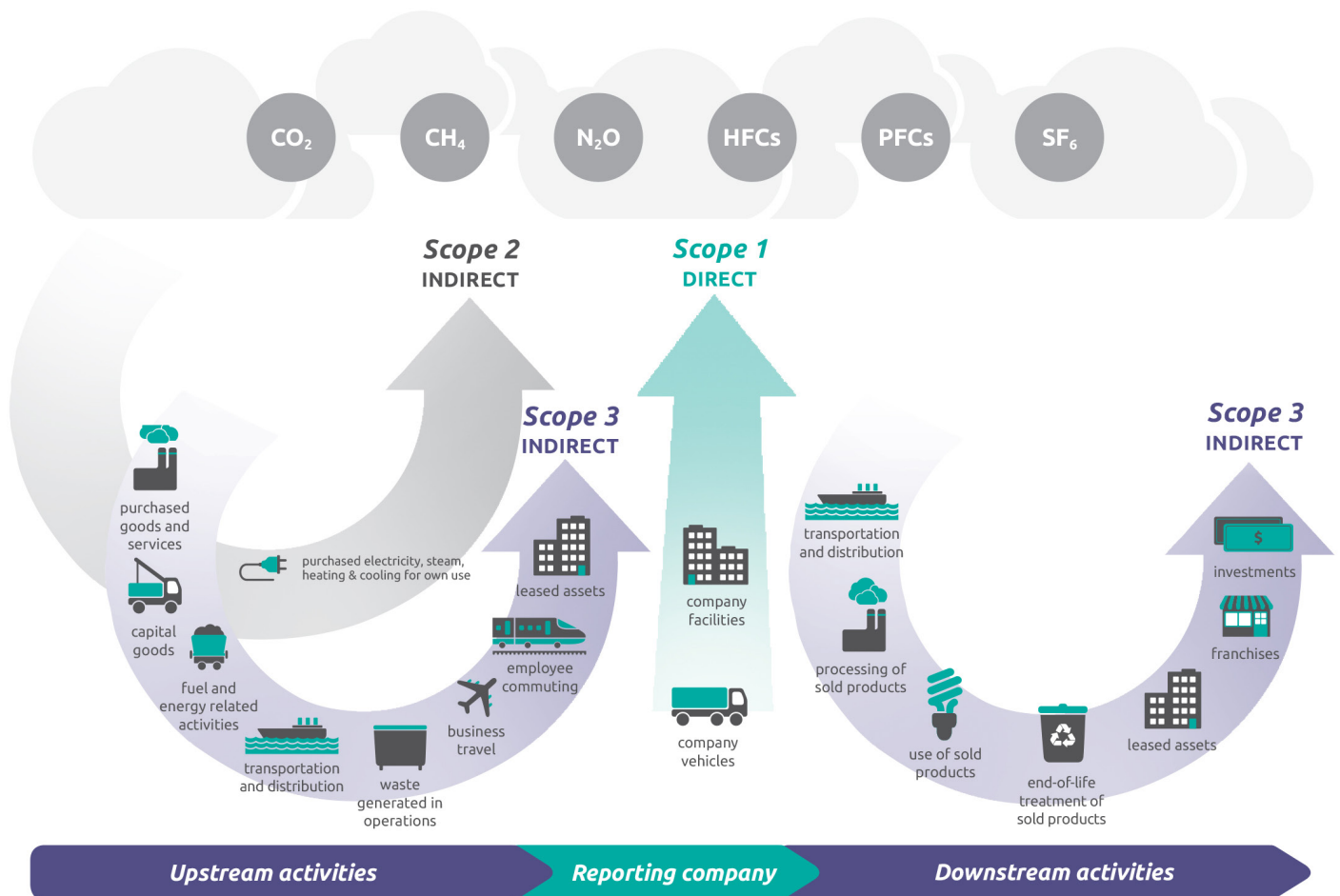
This report takes a closer look at the impact of GHG emissions for telecom network operators and explores important measures that may be taken in order to assist the efforts to reduce impact on climate change, avoid penalties, reduce environmental impact and decrease operational costs. The research points to telecom site automation as an effective solution, with significant short-term and long-term advantages for telecom site operations.

Considering the heightened investors' pressure and the emergence of environmental regulations designed to freeze climate change,

GHG emission is increasingly becoming a management issue for telecom network operators all over the world. In 1997, 37 countries committed to reducing their GHG emissions under the Kyoto Protocol. Ever since, many international institutions have launched several initiatives regarding GHG emissions reductions. The Greenhouse Gas Protocol (GHGP) and the ISO 14064 standard are the most influential global approaches to organizational GHG, aiming to help companies better understand the sources of their GHG emissions and where to focus their reduction efforts.

The Greenhouse Gas Protocol (GHGP)

Built on a 20-year partnership between World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), the GHGP establishes comprehensive global standardized frameworks to measure and manage GHG emissions from both private and public sectors operations, value chains and mitigation actions. GHGP emerged in the late 1990s and now it functions as a universal framework, many companies worldwide using it to inform their internal GHG emissions practices, including many telecom companies. More recently, the GHGP started offering companies and organizations the opportunity to apply for “Built on GHG Protocol” mark that recognizes sector guidance, product rules or tools that are in conformity with GHGP Standards.

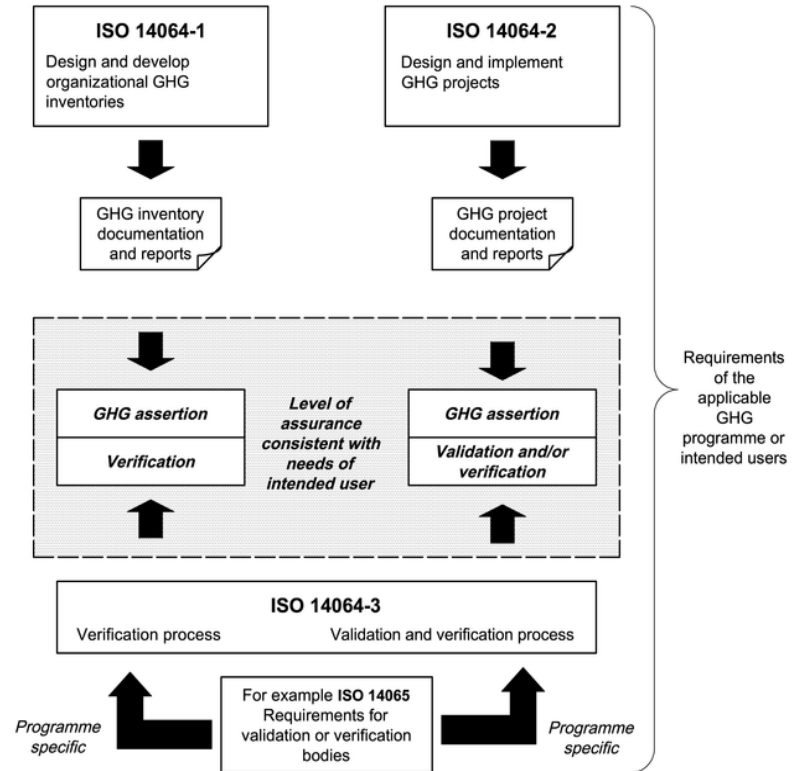


The GHGP Scopes. (Source: [Greenhouse Gas Protocol](#))

ISO 14064

ISO 14064 is an international standard for quantifying and reporting GHG emissions. In March 2006, the International Organization for Standardization (ISO) completed its development of ISO 14064, a three-part international standard for GHG management activities and part of the ISO 14000 series dedicated to environmental management. It provides governments and companies with an integrated set of tools and programs aimed at reducing GHG emissions. The standards include minimum requirements for GHG inventories and offers to both public and private companies opportunities for improved consistency, increased flexibility and decreased effort associated with voluntary GHG inventories.

ISO 14064 is comprised of three standards: ISO 14064-1, ISO 14064-2 and ISO 14064-3.



The three parts of ISO 14064. (Source [ISO](#))

ISO 14064 PART 1

Details principles and requirements for designing, developing, managing and reporting company-level GHG inventories. It includes requirements for determining GHG emissions boundaries, quantifying an organization’s GHG emissions and removals and identifying specific company actions or activities aimed at improving GHG management.

ISO 14064 PART 2

Focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions. It includes principles and requirements for determining project baseline scenarios and for monitoring, quantifying and reporting project performance relative to the baseline scenario.

ISO 14064 PART 3

Details principles and requirements for verifying GHG inventories and validating or verifying GHG projects. It describes the process for GHG-related validation or verification and specifies components such as validation or verification planning, assessment procedures and the evaluation of organization or project GHG assertions.

In 2010, the Information and Communication Industry (ICT) contributed with only 2.5% of the global GHG emissions but this contribution is expected to rise to 14% by 2040. Data centers remain the number one producer of ICT GHG emissions, accounting for 45% of ICT emissions, with communication networks (comprised of BTSs, towers and switches) accounting for 24% of ICT emissions.

Part 2

Reducing GHG Emissions: Opportunities for Telecom Network Operators

1

Decrease Impact on Business Operations

Extreme weather events generated by climate change - flooding, hurricanes, wildfires, temperature changes - have already caused direct physical damage to towers and BTSs but have also increased indirect operations costs.

2

Decrease Impact on Organization's Expenses

Excess use of energy through burning diesel fuel and its price raise have already put the Telecom industry in difficult situations.

3

Regulators and Investors Pressure

International regulatory oversight is increasing and investors are already demanding transparency into how companies are reducing their GHG emissions. Climate change related laws and regulations across the globe already pose risks for telecom network operators.

4

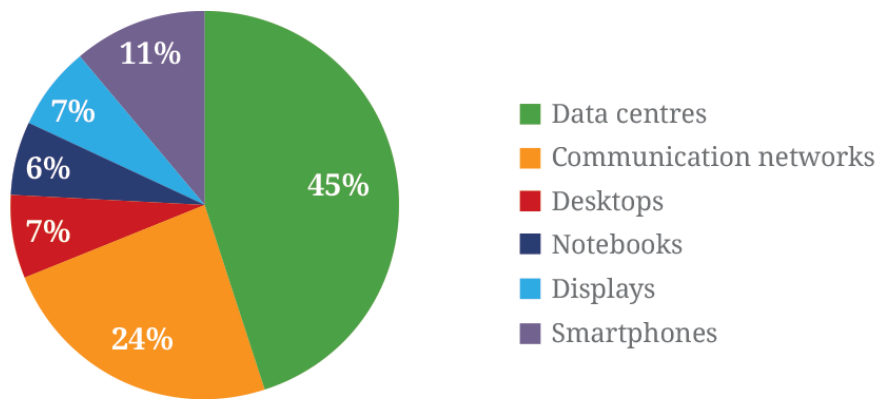
Create Sustainable Businesses

Corporate social responsibility (CSR) has become an important long-term business strategy aiming to ensure the future sustainability of telecom companies around the globe. Their objective is to minimize their environmental impact and improve communities.



Telecom Network Operators' Sources of GHG Emissions

Large amounts of electricity are needed to power telecom network infrastructure, especially considering that only 1 BTS consumes on average around 140W. Most of the electricity for powering the infrastructure comes from the power grids and through burning of fossil fuels like diesel. Both of these sources contribute to GHG emissions but leading telecom network operators across the globe are making efforts towards increasing the energy efficiency of their BTSs.



Source: Journal of Cleaner Production “Assessing ICT global emissions footprint: Trends to 2040 & recommendations” by Lotfi Belkhir, Ahmed Elmeligi, McMaster University Canada (December 2017)

➔ Stationary and Portable Diesel Generators

A significant portion of direct GHG emissions comes from stationary diesel generators that provide back-up power in the event of an outage or from portable generators that support field operations where commercial power is not available. In North America, diesel generators are a critical component of most network disaster recovery operations, which work to keep communications available when a disaster strikes. For instance, in 2017, stationary and portable generators use was heavily impacted by the active hurricane season, as well as wildfires in Southern California. The stationary engine usage in Florida, Puerto Rico and the U.S. Virgin Islands increased by 37%, 472% and 1,564% respectively, in response to these events.

➔ Using Diesel to Power BTS

Diesel generators ensure round-the-clock power supply in remote locations across the world. Telecom cell sites worldwide are deployed with diesel generators as their primary source of power. The environmental impact of diesel fuel combustion is quite serious, both locally and globally.



**How Telecom Companies
Across the Globe are
Taking Action to Reduce
their GHG Emissions**

Europe

Back in 2015, European Union (EU) countries determined their national GHG emissions values and introduced new measures to reduce GHG emissions, contributing to reaching the global target of limiting global warming. The ICT sector has the potential to reduce EU carbon emissions by over 1.5 Gt CO₂e in 2030, an equivalent of 37% of the EU's total GHG emissions in 2012. A number of Telecom companies are performing GHG assessments but most of them are typically carried out as individual projects, rather than as a routine business activity.



Deutsche Telekom

Multinational telecom provider based in Germany and with a presence in over 50 countries, Deutsche Telekom is one of the world's top 10 telecom companies. Deutsche Telekom has set a group-wide climate target to reduce their CO₂ emissions by 20% based on the 2008 value. Their efforts are focused on those areas that use the most energy, especially their networks. With the further expansion of their networks with higher bandwidths and transmission speeds resulting in higher energy consumption, Deutsche Telekom aims to achieve greater energy efficiency in network operation as a key component of their climate protection target. Deutsche Telekom pursues three different approaches to reduce their energy needs:

- ➔ Update their network infrastructure by migrating to IP technology and removing equipment that is no longer needed.
- ➔ Optimize energy generation and supply with the help of technical innovation.
- ➔ Use energy-efficient technology not just for their networks but also for lighting, monitoring, and cooling their systems.

North America

Based on the GHGP, the Climate Registry in North America provides organizations with the tools to help them calculate, verify, report and manage their GHG emissions. The Registry was established in 2007 by US states and Canadian provinces and today is governed by officials from 41 US states, the District of Columbia, 13 Canadian provinces and territories, 6 Mexican states and 4 Native Sovereign Nations. The Registry has more than 430 members from across North America who use the Registry's services to measure and manage their GHG emissions.



AT&T (US)

As part of their commitment to sustainability, the biggest US telecom company, AT&T is creating industry leading innovations to reduce energy consumption in their wireless network. With a 4G network covering more than 400 million people in North America, the cell sites that support their coverage are significant contributors to the AT&T energy footprint. They are leveraging a network automation platform to make intelligent decisions that safely allow a subset of a cell site's capacity to temporarily go into a sleep mode. Their intelligence can determine the timing and duration of the sleep mode, enabling AT&T to reduce its energy footprint while maintaining a premium customer experience.



Africa & Asia-Pacific

A significant proportion of African and Asian countries are some of the world's least developed countries and poorly equipped to deal with the challenges created by climate change. Mandatory emissions reporting and carbon taxes already pose risks to African and Asian telecom operators, showing how serious even the most underdeveloped countries are taking climate change and setting the stage for other countries to join the GHG emissions reduction mission.



MTN Group (South Africa)

MTN is a large multinational Mobile Network Operator (MNO), based in South Africa and operating in many African and Asian countries. With communication networks (comprised largely of towers and BTSs) accounting for 84% of the company's GHG emissions, MTN has put major focus on a combination of efficiencies and investments in lower carbon technologies to reduce emissions. Close to 30% of MTN's savings come from the deployment of diesel hybrid solutions at cell sites, around 15% from energy efficiency and around 20% from the use of alternative energy solutions.

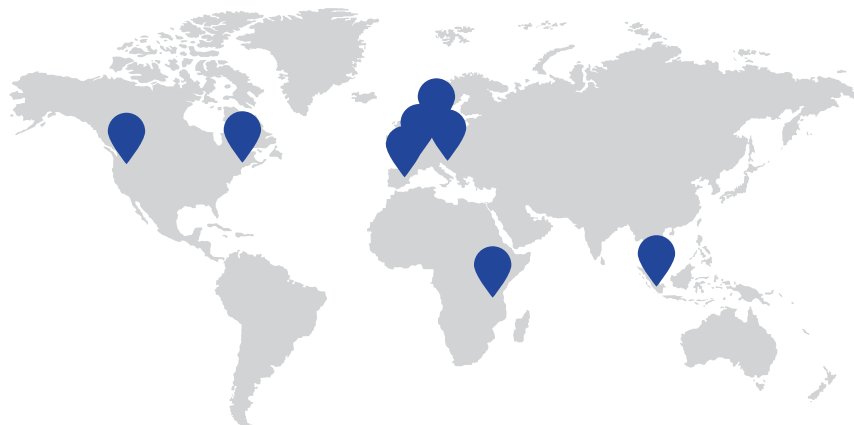


Taiwan Mobile

Taiwan Mobile (Taiwan, Province of China)

Taiwan Mobile (TWM) introduced the ISO 14064-1 GHG inventory in 2012. In 2017 the main source of emissions was the electricity used for operations with the electricity consumption in BTS/rooms being the main source. 83% of TWM's electricity is used in rooms and BTSs and the company regularly monitors and analyzes equipment power through system automation. In 2017, a total of 1,683 BTSs were equipped with smart electricity meters helping the company to easily set annual energy saving goals based on the analysis of the big data collected by these meters. In addition, a smart meter that analyzes and quickly removes obstacles will help TWM to timely recover electricity when a BTS generates abnormal electricity.

How Telecom Companies are Taking Action



Company	Country	GHG Emissions Reduction Targets
Swisscom	Switzerland	Major telecom provider Swisscom commits to reduce its SCOPE 1 GHG emissions by 10%, its SCOPE 2 GHG emissions by 100%, and its SCOPE 3 GHG emissions by 18%, all by 2020 from 2013 levels.
Magyar Telekom	Hungary	Hungarian telecom company, Magyar Telekom commits to reduce absolute SCOPE 1 and 2 GHG emissions 30% by 2030 from a 2015 base year. Magyar Telekom also commits to reduce absolute SCOPE 3 GHG emissions 30% by 2030 from a 2017 base year.
Proximus	Belgium	Belgian mobile telecom company Proximus commits to reduce absolute SCOPE 1 and 2 GHG emissions by 30% between 2015 and 2025. Proximus further commits to reduce total SCOPE 3 GHG emissions by 50% between 2014 and 2040, with an interim milestone target of 10% reduction by 2025.
TELEFÓNICA	Spain	Multinational telecom company, Telefónica, commits to reducing its GHG emissions (SCOPE 1+2) in absolute terms 30% by 2020 and 50% by 2030 from a 2015 base year.
T-Mobile	USA	Mobile Telecom company T-Mobile commits to reduce combined absolute SCOPE 1 and 2 GHG emissions 95% by 2025 from a 2016 base-year. T-Mobile also commits to reduce SCOPE 3 GHG emissions 15 % per customer by 2025 from a 2016 base-year.
Verizon	USA	In April 2019, Verizon announced that the company will go carbon neutral by 2035 in its SCOPE 1 and 2 emissions. All direct sources of emissions owned or controlled by Verizon are the fuel to power its vehicle fleet, heat its buildings and power the back-up generators.
Safaricom	Kenya	The Kenyan mobile Telecom company reduced in 2017 absolute SCOPE 1 emissions by 4% and expects this trend to continue in the following years as the company rolled out renewable energy initiatives and improved its energy efficiency through upgrades of the fuel management system.
Singtel - Singapore Telecommunications	Singapore	Singaporean Telecom company, Singtel Group commits to reduce its SCOPE 1, 2 and 3 GHG emissions 40% by 2030 from a 2015 base year.

Part 3

Telecom Site Automation - An Opportunity to Reduce GHG Emissions

There is an estimated 5 million cell towers deployed worldwide. The vast majority of the off-grid and bad-grid Telecom towers use diesel generators. Considering the resultant GHG emissions plus rising fuel prices, there is a clear need for MNOs and Tower Companies to seriously consider using Telecom Site Automation Solutions.

Using such solutions, telecom companies are able to increase their efficiency and lower costs at the same time. Companies can optimize the operation of their equipment ranging from batteries to HVAC systems and ensure a timely performance. Additionally, they can benefit from the proactive maintenance that extends the equipment's life and from a greatly strengthened on-site security.

“Considering the resultant GHG emissions plus rising fuel prices, there is a clear need for MNOs and Tower Companies to seriously consider using Telecom Site Automation Solutions.”

Automation-powered solutions for telecom site management are driven by technological progress and encourage MNOs and tower companies to see beyond what's currently possible, looking for innovative ways to increase productivity and reduce the costs. Using automation, telecom companies can extend site life during crisis conditions, as well as reduce energy, maintenance, service costs, and environmental impact amounting to approximately 15% of a site's total power consumption.

With telecom site automation solutions, the site's HVAC systems can be used more efficiently, resulting in lower operating expenses. Additionally, they can give network wide telemetry and control of HVAC systems, helping locate sites that are cooling a site too much or not enough. Telecom site automation solutions can be “tuned” from the network operator center over time to more closely match the local cooling needs at sites.

01

Generator Monitoring and Controlling

Energy costs already account for approximately 30% of network operating costs for a large MNO, and upwards of 60% for a tower company (the GSM Association). The high costs are due to an over-dependence on diesel-based solutions to supplement or back-up grid-based energy at bad-grid and off-grid cell sites, considering that 90% of them use diesel generators.

Telecom site automation solutions can be used to alternate between batteries and generators during the loss of AC power. This solution can extend the life of the site per liter of diesel fuel, as well as reduce the overall diesel consumption. A solution to more efficiently monitor and control the generator at a cell site would remotely start and stop the generator via a command from the network operations center (NOC), or would exercise the generator via a configured schedule. Exercising generators “on demand” and as needed can reduce the total generator run times compared to scheduled generator exercising via a “dumb” timer. These solutions can also help avoid generator exercise during times of poor air quality or to conform to noise ordinances.

02

HVAC Energy Efficiency

The second largest energy consumer, surpassed only by the network equipment itself is represented by the HVAC systems used to cool “macro site” cell locations and amounting to approximately 15% of a site’s total power consumption.

With telecom site automation solutions, the site HVAC systems can be used more efficiently, resulting in lower operating expenses. Additionally, they can give network wide telemetry and control of HVAC systems, helping locate sites that are cooling a site too much or not enough. Telecom site automation solutions can be “tuned” from the network operator center over time to more closely match the local cooling needs at sites.

03

Truck Rolls

Access to remote site locations is time-consuming and extremely costly, especially when taking into account the frequency of scheduled site service visits or the need to cover the travel expenses and salaries of the technicians hired to perform such on-site service visits. Telecom site automation reboot solutions allow for reduced or intelligent truck rolls enabling key pieces of DC powered equipment to be remotely rebooted at remote locations, allowing for fewer service visits to be made, reducing overall emissions, as well as reducing network downtime and exposing workers to less chance of accidents.

04

Hybrid Energy Sites

Some initiatives have been taken by telecom players around the globe to reduce operational costs and to increase responsibility towards the environment. Such actions explore the use of a wide range of technologies like biodiesel, fuel cells, pico hydro, wind and photovoltaic panels to fulfill the energy requirement for the Telecom sector with reduced GHG emissions.

The use of renewable energy resources to compensate for GHG emissions is a step towards greener telecom networks. Telecom site automation controllers can be used to control and automate different hybrid energy systems.

Conclusion

Climate change is a significant issue of our times and it is recognized as one of the most dangerous threats to global security. United Nations' Fifth Climate Change Assessment Report highlights the consequences of the human influence on the climate system and states that the recent GHG emissions values are the highest in history. As a consequence, legislative frameworks are evolving in several countries all over the world to drive further governmental and corporate action to reduce GHG emissions.

In response to the increasing public demand for corporate social responsibility (CSR) and a genuine desire to make a positive impact on the environment or simply to lower the costs, the leading telecom service providers and their suppliers are taking important steps towards reducing their carbon footprint. Although cutting GHG emissions is still their primary objective, the Telecom companies should start looking beyond it and find innovative ways to ensure an efficient power management and a smooth infrastructure sharing.

'Going Green' has become a business necessity especially for those telecom operators whose energy costs amount to 25% of their total network operations costs. It has never been more important for the survival of these telecom companies to learn how to benefit from the use of eco-friendly renewable energy sources.

Looking ahead, tackling climate change issues will continue to be on top of the concerns for the telecom industry, so looking for innovative solutions to reduce GHG emissions is vital at this stage. Leading telecom service providers and their partners are starting to consider implementing an energy and carbon reduction strategy, introducing energy efficiency and GHG reduction targets as key performance indicators for business units. The ability of telecom companies to demonstrate evidence of climate change risk identification and management in business processes is going to become even more important in the near future.

Asentria is a 30-year-old company based in Seattle, Washington, and has multiple hardware deployments of 10,000 or greater sites in the largest mobile network operators worldwide.

Resources

- <http://ghgprotocol.org/>
- www.epa.gov
- www.cdp.net
- www.iso.org
- <https://sciencebasedtargets.org>
- https://www.safaricom.co.ke/sustainabilityreport_2018
- https://corp.taiwanmobile.com/pdf/2017_E_CSR.pdf
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Locations

Headquarters

1200 N 96 St
Seattle, WA 98103
USA

EMEA Office

Strada Copilului 20A
București 012244
Romania

Sales & Support

Americas - Asia Pacific

Customer Service: +1-206-344-8800
Sales: +1-206-344-8800; sales@asentria.com
Tech Support: +1-206-344-8800; support@asentria.com

Europe Middle East - Africa

Sales & Tech Support:
+40 37-499-1111
emeasales@asentria.com

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