

Improving the Environmental Credentials of the SIM Industry

Exploring TCA's commitment to supporting mobile operators' efforts to reduce carbon emissions.

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1. Introduction



To identify and encourage sustainable practices across the mobile industry, Trusted Connectivity Alliance (TCA) has established a dedicated Sustainability Working Group. The group brings together leading companies to support the entire mobile industry to transition towards greener practices. This means not only achieving the targets laid out in the United Nation’s Sustainability Development Goals (SDG), but integrating the blueprint that it and other initiatives provide for more sustainable practices into governance and policies across the SIM supply chain.

In November 2022, in line with the COP27 United Nations Climate Change Conference in Egypt, the group released a [position paper](#) outlining TCA and its members commitment to building a greener connectivity ecosystem. In the paper, the group identified the widespread commitment and strong progress already made by the industry, whilst acknowledging that significant challenges remain ahead.

Recognising that the transition towards sustainability is a journey, the Sustainability Working Group is now examining how its members can support the ecosystem’s transition by adopting greener practices across their supply and value chains.



In this paper, the Sustainability Working Group will offer guidance on:

The drivers for more sustainable connectivity

The tools and frameworks operators are implementing to measure their carbon footprint and accelerate the decarbonisation of their supply chains

The Sustainability Working Group’s commitment to improving the environmental credentials of the products and services it is delivering to the mobile industry.



2. Drivers for More Sustainable Connectivity

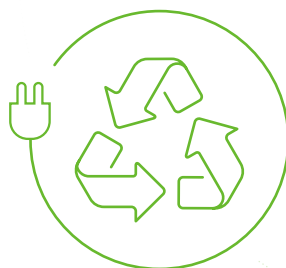
In 1997, member parties of the United Nations adopted the Kyoto Protocol, bringing together 191 nations in the first major international effort to slow the effects of global climate change. To build on these efforts, in 2015 the United Nations Framework Convention on Climate Change (UNFCCC) set forth the Paris Agreement at the COP21. This time, 196 countries adopted the legally binding treaty aimed at limiting global warming to +1.5°C compared to pre-industrial levels by the end of the century.

In response to these urgent climate goals, the mobile and connectivity industry took the lead in demonstrating a strong commitment to sustainability. In 2016, it was the first industry to adopt the United Nations' Sustainable Development Goals and has been recognised as a 'breakthrough' industry by the UN Climate Change Champions.

Since then, in an effort to mitigate growing energy demands and associated greenhouse gas (GHG) emissions, the mobile industry has collaborated on the adoption of an industry-wide roadmap to achieve Net-Zero by 2050. Today, more than 80% by revenue of the global mobile industry is disclosing its climate impact assessments and GHG emissions data according to the international disclosure system (source: GSMA).

Yet the fact remains that telecommunications is an energy-intensive industry. The acceleration of digital transformation and consumer demand for new and innovative technologies threatens to increase GHG emissions. Beyond carbon generation, waste management, particularly disposal of plastic waste, negatively impacts wildlife and natural environments and contributes to the climate crisis further by emitting greenhouse gases during decomposition.

Achieving Net-Zero by 2050 will require operators to examine how their supply chains support or hinder their own sustainability goals. The entire ecosystem must remain committed to finding new methods and technologies to limit emissions across the industry, while also offering innovative solutions to help other sectors minimise their impact.



3. Measuring Carbon Emissions

The first step toward successfully addressing a problem is gaining a full understanding of the depth and breadth of the issues at play. In order to decide how best to accelerate decarbonisation, operators must determine how significant their contribution to greenhouse emissions are, and then set reasonable, measurable targets to reach their goals.

Encouraging carbon disclosures across the industry ▼

The Carbon Disclosure Project (CDP) was established in 2000 to provide a global reporting system for greenhouse gas emissions. Once again, the mobile industry has led the charge toward Net-Zero by 2050 by achieving widespread carbon disclosure by operators and key suppliers.

In 2021, 60 mobile operators disclosed their climate impact to the CDP. In 2022, 66% of the industry by connections and 82% of the industry by revenue, had disclosed their climate impact (Source: GSMA).

Despite the broad participation by operators, however, a significant part of the ecosystem continues to neglect reporting its impact. Of total global connections, 2.8 billion (34%) are currently provided by mobile operators that do not disclose their carbon status (Source: GSMA). Since management of decarbonisation depends on disclosure, the TCA Sustainability Working Group is committed to supporting operators and suppliers in the process of reporting their GHG emissions to the CDP.



Setting achievable targets ▼

To help create a framework for decarbonisation goals, the mobile industry came together in February of 2020 to agree upon a Science-Based Target. This sector-specific decarbonisation pathway was designed to support operators, fixed networks operators and data center operators in the process of setting their own goals to reduce GHG emissions.

The effort was achieved in collaboration with the Science Based Targets Initiative (SBTi), an organisation dedicated to achieving ambitious climate action in the private sector by enabling organisations to set science-based emissions reduction targets.

Setting SBTi-approved targets requires organisations to follow a five-step process:

- 1 **Commit** by registering online
- 2 **Develop** targets using guidance developed for the mobile industry
- 3 **Submit** your target for validation
- 4 **Communicate** by announcing your target and informing your stakeholders
- 5 **Disclose** your progress

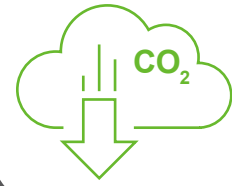
Operators take action ▼

Already, operators have used the guidance laid out by the mobile industry and SBTi to develop sound, achievable strategies to reduce current carbon emissions, avoid sources of new carbon emissions, and remove current carbon from their supply chain. Telia Sweden, for example, has partnered with TXO to develop a circular economy based on three principles: designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Telia Company is working towards a zero-waste goal by supporting the continual use of resources and adopting TXO's circular economy services, which include:

- **Identifying, testing and repairing equipment for internal reuse**
- **Sourcing and refurbishing pre-owned products for spares and new deployments**
- **De-installing surplus items and selling them to other operators**
- **Turning to WEEE recycling as a final step in the process**

Orange has also ramped up efforts to become Net-Zero Carbon by 2040 and has committed to reducing emissions across Scope 1, 2, and 3 of its operations. Orange's efforts focus on mitigating not only its own CO₂ emissions, but also the indirect emissions related to its energy consumption, and the emissions generated upstream by suppliers and downstream by customers.

These three commitments correspond to scopes 1, 2 and 3 of the operators Greenhouse Gas Protocol, validated by the SBTi.



For the period 2020 – 2030, the main strategy to decarbonise the ICT sector, at the pace necessary to align with 1.5°C trajectories, includes the implementation of simultaneous, vigorous and urgent actions in the following fields:

Continued implementation of energy efficiency plans

Switch to renewable / low carbon electricity supply

Encouragement of carbon consciousness among end-users

To decarbonise the ICT sector at this speed requires the sector to utilise all of these mechanisms. To continuously improve energy performance is fundamental and is also driven from a cost perspective. However, the ICT sector is based on the use of electricity and energy efficiency measures alone would not be sufficient. Thus, all three mechanisms need to be addressed to decarbonise in line with 1.5°C trajectories.

From SBTi's [Guidance for ICT Companies Setting Science Based Targets](#)

Reducing carbon emissions from beginning to end of the value chain ▼

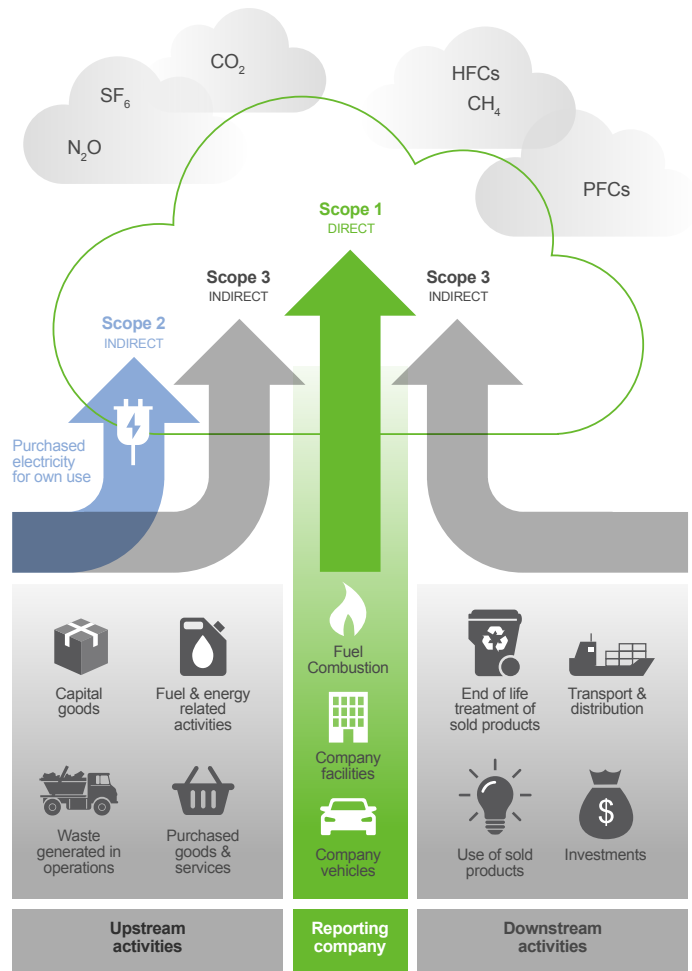
Operators that set science-based targets according to the SBTi guidance will be directed to evaluate and reduce emissions across Scope 1, 2, and 3 of their operations.

- **Scope 1** refers to the emissions created directly by an operator. This includes anything from on-site heating and cooling with oil, natural gas, or refrigerants within buildings to the CO₂ emitted by vehicles for network maintenance.
- **Scope 2** refers to the indirect emissions, such as the electricity purchased from a local power utility.
- **Scope 3** refers to the emissions that are not produced by the operator itself but is still indirectly responsible for, up and down its value chain. This might include emissions from the manufacture of network equipment or emissions created by customers when using the network.

Without a doubt, Scope 3 emissions represent the largest percentage of GHGs in an operator's value chain and are often the hardest to quantify.

Scope 3 emissions contribute to approximately 70% of an operator's total GHG emissions. As a result, operators are using GHG emissions to guide their product purchasing and vendor selection decisions. For example, AT&T has integrated sustainability performance metrics into sourcing decisions for 80% of its expenditures. The company wants at least half of its suppliers to set their own science-based Scope 1 and Scope 2 GHG targets by 2024. (source: [Light Reading](#))

Developing and using SBTi-backed targets empowers operators to adopt a strategic approach that aligns organisational efforts with an industry-backed carbon mitigation hierarchy. These targets focus first on carbon reduction across an operator's operational footprint first (Scope 1 and 2), followed by the reduction of value chain emissions (Scope 3).



TCA's commitment

TCA is committed to supporting its members in their efforts to help their customers transition to sustainable practices by improving the environmental credentials of the products and services that they deliver. As suppliers, members of the Sustainability Working Group have an important role to play in helping customers to better monitor and reduce their Scope 3 emissions.

As part of this effort, the Sustainability Working Group is currently investigating options to support its members' lifecycle assessment efforts with specific guidelines applicable to the industry. These guidelines will support all phases and steps used to reduce carbon emissions created from materials production to shipping.

4. Mitigating Impact by Reducing Plastic

While measuring impact is critical in the race toward Net-Zero, it's only the beginning. The majority of carbon emissions linked to mobile phones are created during manufacturing processes. For example, a single iPhone X is responsible for creating approximately 79 Kg of CO₂ throughout its lifecycle, with 80% generated before it even leaves the factory (Source: reboxed.co).

Finding innovative ways to mitigate the carbon impact of operators and their suppliers will unlock true progress in the quest for decarbonisation. The TCA Working Group recognises and supports a number of established efforts to reduce CO₂ emissions and material waste across the entire connectivity ecosystem.

Reducing plastic (and SIM size) is an important first step ▼



Plastic production and waste also have significant detrimental impact on the environment. It is reported that SIM shipments reached 4.35 billion in 2021 (source: TCA), generating an estimated 20,000 tons of plastic waste (source: Thales). This is a significant contribution that must be acknowledged.

Telecommunications operators have started to address this problem by adopting circular business models that emphasise recycling and repurposing materials to minimise waste. One global operator has launched a business-to-business solution that enables operators across different markets to repurpose excess stock like fixed-line equipment and decommissioned hardware. This initiative supports the company's 2025 target of recycling, reselling, reusing all its network waste (Source: techmonitor.ai).

Beyond the reduction of plastic waste, the connectivity ecosystem has another opportunity to play a significant part in building a more sustainable future: smaller SIM cards. The SIM industry is not bound to any specific size of SIM card carrier and can leverage this opportunity to reduce its impact. The half card size, for example reduces the size of SIM cards. This not only reduces the amount of plastic used, but it also optimises the pallet load so that more cards can be shipped more efficiently.

This is only the start of the journey towards Net-Zero ▼



Indeed, reducing plastic is one of the first steps that SIM providers can take to immediately reduce their carbon footprint. But it is certainly not the only step. In addition to reducing the size of SIM cards, many SIM manufacturers are turning to more environmentally friendly, recycled materials which will help support the move to a circular economy model.

What is the circular economy?

The circular economy is a means to produce goods and services in a sustainable way by limiting the waste of natural resources. It aims to keep products and materials within the product cycle for as long as possible through recycling, reusing and remanufacturing.



5. Lowering CO2 Emissions Across the Supply Chain

The Sustainability Working Group recognises that the decarbonisation of the mobile industry will require a transition to more sustainable materials and practices across the entire supply chain. Efforts to decarbonise must span from production to packing and packaging, and from shipping to the process by which products are eventually discarded.

To reduce CO₂ emissions, what other factors should be considered across the supply chain?

Choosing recycled materials



The industrial process for manufacturing smartphones requires a lot of raw materials. While the exact composition varies from brand to brand, according to GSMA on average over 50 different materials are used to produce a smartphone, including precious materials like copper that are mined and can have negative environmental impacts.

SIM card manufacturers can play their part to help reduce the environmental impact of the mobile industry by using post industrial and post consumer materials. For example, recycled plastics can be used to produce new components, and scrap materials from manufacturing can also be collected and re-processed into a raw material form.

Switching to greener packing and packaging



Packing and packaging represents another important opportunity for TCA members to advance sustainability practices and accelerate decarbonisation. As the first thing that end-users experience, it's important to align SIM strategies and packing and packaging with ecological goals. Eco-packing solutions allow operators to broadcast their green ambitions and associate sustainability efforts with key messaging and branding.

The Sustainability Working Group is committed to advancing the use of eco-packing solutions. For example, paper and packaging materials that come from sustainable sources, and water-based varnish or vegetable-based inks offer greener options. The group has also sought to remove the use of single-use plastic for SIM shipments. For example, one possibility involves replacing plastic tape with paper tape. If it takes roughly 50 centimetres of tape to seal a box of 500 SIM cards, if 4.3 billion SIM cards are shipped each year, the switch to paper tape could lead to making 4300 kilometres of tape more sustainable.

Post industrial vs post consumer: What's the difference?



Post industrial material means any waste or scrap material that is generated from a manufacturing process.

Post consumer on the other hand refers to materials generated by end users of the product, for example shipping boxes or plastic bottles.

Beyond manufacturing, CO₂ emissions produced by SIM vendors will also depend on two other key factors, 1) how energy-efficient their facilities are and, 2) how much their own manufacturing ecosystem relies on renewable energy.

Packing vs. Packaging



While some people use the terms interchangeably, packing and packaging are actually two separate things. Packing refers to cover (in most cases, a box) that a product is shipped in, while packaging describes the promotional materials around an item that provide information about the product and its brand.



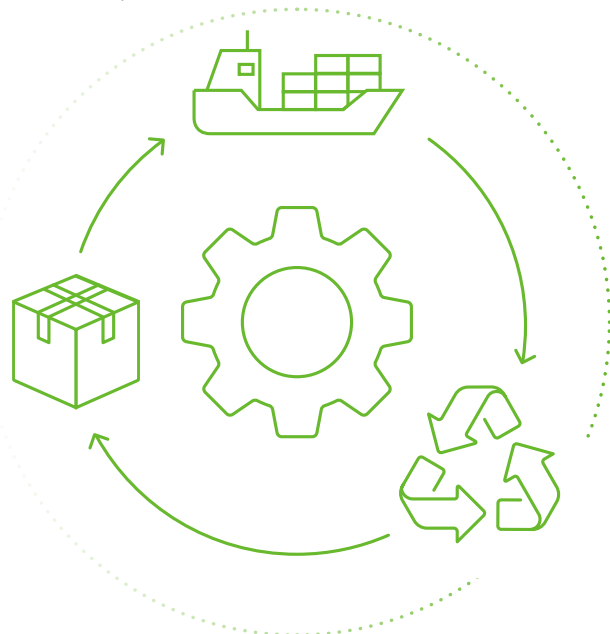
Using greener shipping methods ▼

Although air freight and sea freight each undoubtedly have a huge environmental impact, there is a considerable difference in the amount of emissions each method of shipping produces (source: [The Guardian](#)).

A study by Defra found that 2 tonnes of freight carried for 5,000 km by a small container ship creates 150kg of CO₂e (a measure of relative global warming potential) compared to 6,605kg of CO₂e if the freight is carried by plane for the same distance.

For the SIM industry, switching to sea freight represents a significant opportunity to reduce CO₂ emissions. It also means that a high volume of goods can be moved, reducing fuel consumption and offering a better economy of scale at the same time.

To limit the environmental impact of transportation on the finished products ahead of delivery, it also makes sense to limit the distance between the suppliers of each raw material integrated in the SIM, and the SIM manufacturing plant. This includes inbound transportation (between suppliers and factories) and outbound transportation (between factories and operators).



Transitioning to low-carbon power sources ▼

The source of electricity used in the production process also plays a part in the final product's environmental credentials, and relies on two main criteria:

- The energy mix in place in the country of production. National policy makers drive the speed of transition from traditional to renewable power. The [International Energy Agency \(IEA\)](#) provides accurate data on the environmental energy transition of a majority of countries.
- The decision of the product manufacturer to acquire renewable energy or even produce its own source of energy, for example by installing solar panels. It then becomes a choice for the operator and supplier to steer towards the adoption of such power sources.



Promoting reuse and recycling in end of life management ▼

Educating people and organisations on how they can play a part, as end users, in reducing the carbon footprint of the mobile industry will also be vital to achieving climate goals.

Already, the industry can promote reuse and recycling of e-waste. Operators are encouraging sustainable end of life management by using Plastic Recycling Symbols to indicate when plastic can be recycled. The European Union's WEEE Directive is also helping facilitate the correct treatment of waste electrical and electronic equipment (WEEE), including the SIM card. Although the WEEE directive has not been implemented by all 27 EU member states, the Sustainability Working Group is supporting customers in the countries where the directive is applied and recognises the importance of this initiative in creating a more sustainable future.



▼ **Recognising sustainability**

ISO 14001:2015 can help the mobile industry take sustainability to the next level. The standard contributes to United Nation’s Sustainable Development Goals, including Goal 12: Responsible consumption and production and Goal 13: Climate action, both of which are significant opportunities to address some of the biggest and most immediate environmental threats.

In accordance with the standard, a growing number of operators have improved the amount of scrap waste created during manufacturing processes. ISO 14001:2015 helps organisations create an effective Environmental Management System (EMS), allowing them to benchmark their current environmental performance (e.g. energy use, transport planning, materials reuse, renewable energy generation, waste creations, waste segregation and recycling) and set out ways to improve on it. [source: ISO]



TCA’s commitment ▼

The mobile industry has made important strides in promoting eco-friendly alternatives to traditional SIM cards. However, the pace of the transition is not as fast as it could—or should—be to reach Net-Zero by 2050.

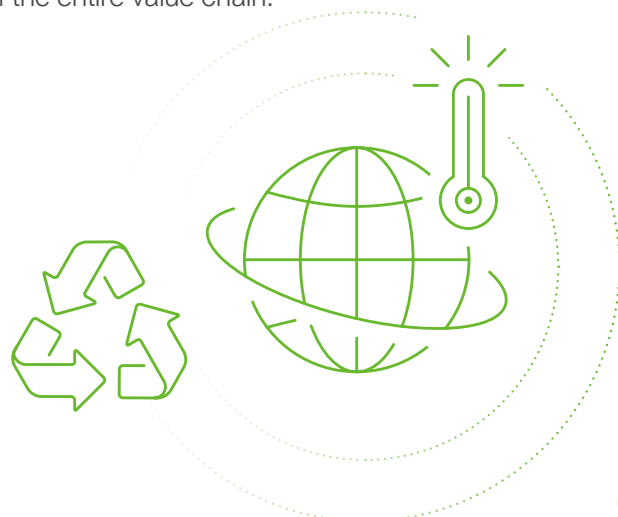
Using recycled and sustainable materials and upcycling are still new initiatives that must gain more traction in the market. TCA’s Sustainability Working Group is committed to supporting this effort. Already Working Group members are adopting processes to decrease the carbon footprint of their own organisation by reducing plastic and using recycled materials.

The Working Group also recognises the leading role that the mobile industry must play in helping other sectors reduce their carbon footprint through digitalisation. TCA is committed to supporting the mobile industry to meet carbon reduction and neutrality climate goals, and in doing so, create an ecosystem that cultivates sustainable innovation and supports the decarbonisation of the entire value chain.

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What about carbon offsetting?

For operators and suppliers who have thoroughly studied their impact and determined that they have exhausted all possibilities to mitigate their own GHG emissions, carbon offsetting can be used to compensate for emissions through participation in programmes designed to make equivalent reductions of CO2 in the atmosphere.

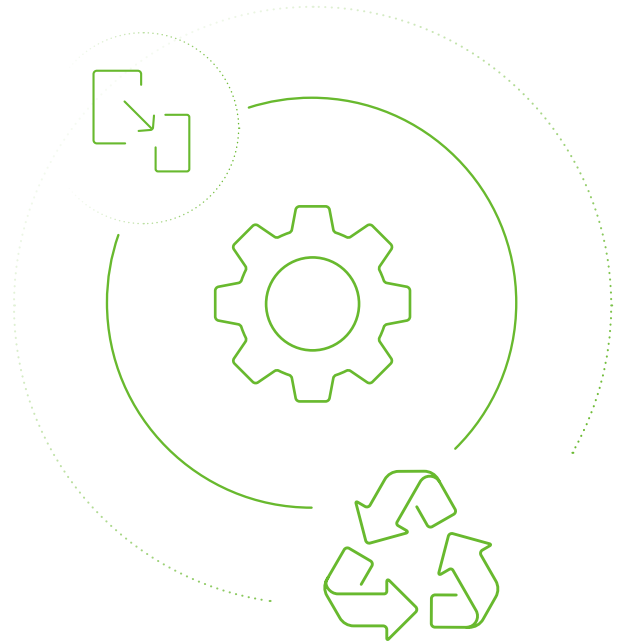


6. Conclusion: Towards Trusted, Sustainable Connectivity

While accelerating decarbonisation is the ultimate goal, it's important to remember that mitigating impact is a journey. Operators and suppliers must be committed for the long haul. It's not enough to transition to half card and recycled card SIM products and then stop. Instead, the mobile industry must transition towards a circular economy that promotes recyclable and recycled materials.

This is a journey that requires stakeholders to incorporate multiple strategies into their sustainability roadmap and continue to search for and adopt new means of reducing GHG emissions. It means carefully scrutinising how Scope 3 emissions can be reduced at every step in the supply chain, and searching for ways to recoup the cost of sourcing recycled materials, transition to sustainable packing and packaging, choose greener shipping methods, and help educate end users on how they can play their part in the circular economy to close the loop.

Each of these initiatives represents a big undertaking, full of complex and costly challenges. The TCA Sustainability Working Group is committed to supporting members every step of the way.



7. About Trusted Connectivity Alliance



Trusted Connectivity Alliance (TCA) is a global, non-profit industry association working to enable trust in a connected future. The organisation's vision is to drive the sustained growth of a connected society through trusted connectivity which protects assets, end user privacy and networks.

TCA members are leaders within the global Tamper Resistant Element (TRE) ecosystem and work collectively to define requirements and provide deliverables of a strategic, technical and marketing nature. This enables all stakeholders in our connected society to benefit from the most stringent secure connectivity solutions that leverage TCA members' expertise in tamper proof end-to-end-security.

TCA members are:



www.trustedconnectivityalliance.org