

# AT&T Gigaton Goal Overview and Methodology

## Company Overview

AT&T Inc. is a diversified, global leader in telecommunications, media and entertainment, and technology. AT&T Communications provides more than 100 million U.S. consumers with entertainment and communications experiences across TV, mobile and broadband. In addition, AT&T Business serves high-speed, highly secure connectivity and smart solutions to nearly 3 million business customers.

As one of the world's largest companies, AT&T can play a role in creating a better, more environmentally sustainable future. Acting to address climate change and prepare for its impacts is important for our customers, people, communities and operations.

## Background to AT&T's Gigaton Goal

AT&T has long understood that connectivity can enable our customers to reduce greenhouse gas (GHG) emissions to mitigate climate change and in 2015 established the 10x goal to enable customer carbon savings 10 times the footprint of our operations by 2025. This goal was intentionally set as a ratio to create an incentive to both reduce AT&T's own operational emissions and quantify and grow the emissions reductions that AT&T's connectivity and other services enable. The good news is, it worked. AT&T's 2020 operational footprint shrunk to approximately 5.8 million metric tons of CO<sub>2</sub>e. At the end of 2020, AT&T enabled carbon savings of almost 31.3 million metric tons of CO<sub>2</sub>e, 5.4 times the footprint of its own operations.

## AT&T Gigaton Goal Overview

In 2020, AT&T announced the goal to be carbon neutral by 2035. With this new goal, AT&T has committed to significantly reducing its own emissions over the coming years, resulting in a dramatically lower 10x ratio target for customer emissions reductions. This has prompted the need for a new ambitious enablement goal, separate from AT&T's own footprint.

So, in 2021 AT&T decided to go even bigger with its commitment and announced the AT&T Gigaton Goal: to develop connectivity solutions that enable customers to reduce a gigaton (1 billion metric tons) of greenhouse gas emissions by 2035. One gigaton of emissions is roughly equivalent to more than 1.6 million cross country flights. This goal will calculate the cumulative impact of emissions reduction from 2018-2035 and progress against this goal will be reported annually.

## Methodology

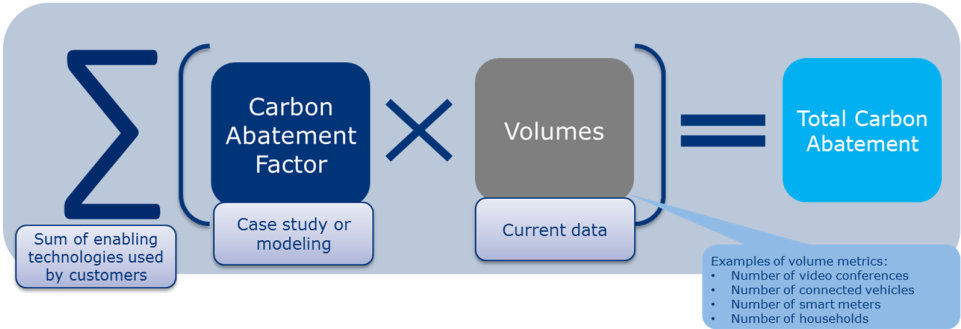
The methodology used to calculate the emissions reduction enabled by AT&T's connectivity and other services as part of the Gigaton Goal will align with the fundamentals established in the [10x Methodology](#). The purpose of this methodology document will be to reiterate key points of the 10x methodology and highlight any differences that will be used to track progress toward the Gigaton Goal.

### **AT&T's Carbon Abatement:**

The methodology approach for AT&T's Gigaton Goal is to assess and measure the carbon abatement enabled by Information and Communications Technology (ICT) technologies in which AT&T's connectivity and other services play a fundamental role. Such technologies are defined as an 'enabling technology'.

Each enabling technology is assessed by determining a carbon abatement factor, which defines the carbon savings per unit of enabling technology. To calculate the total carbon abatement for each technology over a one-year period, the carbon abatement factor is subsequently multiplied by the

volume of the enabling technology being used by customers. Over time, as further data and studies become available and as new services are developed, AT&T aims to expand the number of enabling technologies included in the calculation of the Gigaton Goal.



*Volumes* – As explained above, the carbon abatement will be calculated for the volume of AT&T’s services used by its customers. The volume will normally be derived from sales data on the number of products sold by AT&T. For example, it may reflect the number of connections provided by AT&T or the number of AT&T customers using a particular service.

Figure 1 Carbon abatement methodology

AT&T’s total abatement is the sum of the carbon emissions that its customers avoid by using AT&T connectivity and other services (see Figure 2).

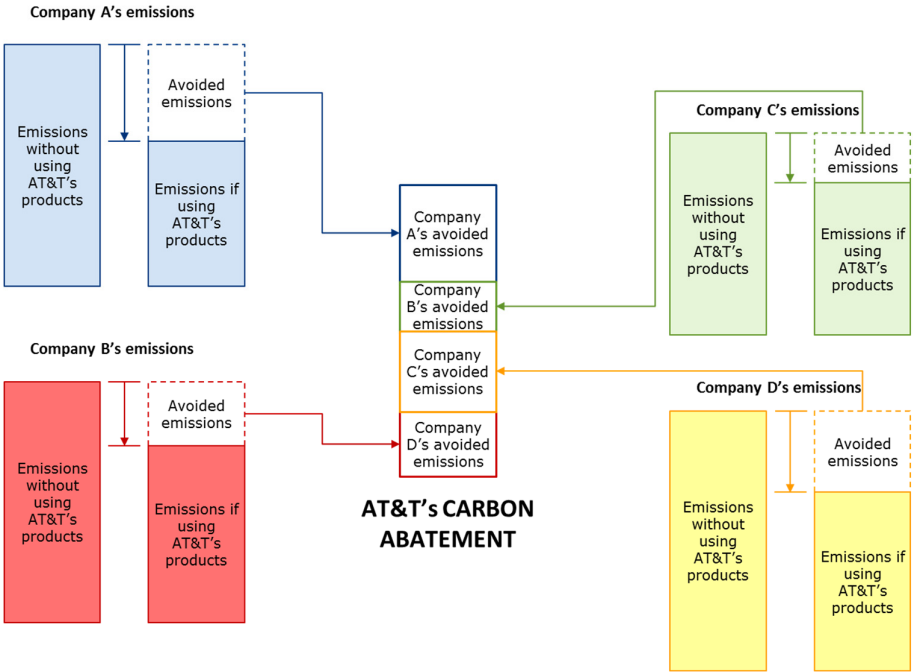


Figure 2 Composition of AT&T's carbon abatement

### **AT&T's Gigaton Goal:**

Unlike AT&T's 10x Goal, AT&T's new Gigaton Goal is a cumulative absolute target. Annual carbon abatement savings will be summed between 2018 and 2035, with the aim of saving a gigaton (1 billion metric tons) of greenhouse gas emissions (measured in metric tons of CO<sub>2</sub>e) over this time period.

Two main points to note:

- To maintain consistency, all solutions identified and included in the carbon abatement calculations, along with their established Business As Usual (BAU) baselines, will be kept the same for the duration of the Gigaton Goal.
- As carbon abatement focuses on the enabled absolute savings of customers, or the wider society, savings of AT&T's own emissions will not be considered as part of the Gigaton Goal, but feed directly into AT&T's carbon neutral goal.

### **Key Concepts of AT&T's Carbon Abatement Methodology**

The following section addresses key concepts, outlines the approach taken for the Gigaton Goal, and highlights differences between case study and non-case study calculations. For more information regarding each concept and a detailed step-by-step carbon abatement calculation guidance, please see AT&T's [10x Methodology](#).

#### **Carbon**

Definition: Shorthand to refer to greenhouse gases that cause global warming. It is measured in metric tons CO<sub>2</sub>e (carbon dioxide equivalent).

#### **BAU Baseline**

Definition: The baseline represents the "before" scenario of a specific process (i.e. what is the most likely alternative solution to be used to achieve a certain outcome in the absence of the enabling technology).

Defining the baseline is a crucial step of the methodology, as the baseline to which the enabling technology will be compared, will impact the scale of the carbon abatement. Though baselines can change as technologies become part of BAU, to maintain consistency, the established BAU baseline for each enabling solution will be kept the same for the duration of the Gigaton Goal.

#### **Functional Unit**

Definition: The functional unit defines the system boundaries in which the BAU scenario is compared to the ICT enabled solution.

In order to quantify cumulative carbon abatement savings, the functional unit for all carbon abatement calculations will cover an annual period. Carbon abatement can initially be calculated over a non-annual time period, but will ultimately be expressed over an annual time period.

### **Enabling Effects**

Definition: Carbon abatement in BAU emissions occurring as a result of the enabling technology implementation.

**1. Primary Enabling Effects** – Primary enabling effects are immediate reduction of BAU emissions occurring as result of ICT system implementation. All quantifiable enabling effects will be included in the calculation of carbon abatement enabled by AT&T's services.

**2. Secondary Enabling Effects** – Secondary enabling effects are those expected to reduce emissions relative to the BAU system, but which occur over a longer timeframe or as a result of increased scale of adoption. As a result, it becomes difficult to establish a direct correlation between the enabling technology and the enabling effect. Secondary enabling effects, therefore, are excluded from the quantitative abatement calculation. Identified secondary effects will be acknowledged and documented in the case study documents.

### **Direct Emissions**

Definition: The emissions associated with the implemented enabling technology.

AT&T will acknowledge and document the impact of direct emissions by calculating its own footprint, published separately in AT&T's annual report, and will exclude direct emissions from the carbon abatement calculation, unless considered to be significant.

### **Rebound Effects**

Definition: Increase in BAU emissions occurring as result of the enabling technology implementation, often driven by behavioral changes in demand for carbon-intensive goods or activities.

Due to data limitations it can often be difficult to quantify rebound effects. As such, rebound effects will be excluded from the carbon abatement calculation of the enabling technologies. If any enablement technology is found to have a large rebound effect, AT&T will take a conservative approach and either adjust calculations accordingly or choose to exclude the technology from the calculations altogether, so as to not overestimate total carbon abatement. Identified rebound effects will be acknowledged and documented in the case study documents.

### **Attribution**

Until a consistent way to allocate emissions reduction is found, full carbon abatement from each enabling technology will be included in AT&T's total carbon abatement where AT&T's services have a fundamental role in enabling the carbon savings.

It should be emphasized that AT&T does not uniquely claim all the carbon abatement of the enabling technology, but rather acknowledges that its service is part of a system with many components that act in concert to enable the carbon abatement.

## **Technology Portfolio**

For the AT&T Gigaton Goal, AT&T will focus on technologies with positive carbon benefits. AT&T will continue to monitor its negative impact, both in terms of its own emissions and the impact that its own technologies have on global emission reduction efforts.

In order to avoid double-counting, AT&T will review its technology portfolio for overlaps between different enabling technologies in case the same carbon abatement is achieved by different technologies. In the case of overlap, the overlapping carbon abatement will only be counted once.

For the Gigaton Goal, AT&T will start by including a limited number of AT&T's services in the carbon abatement calculation, building on the connectivity and other services previously included in the 10x Goal and measurement. Over time, as AT&T places particular focus on adding new solutions, the number of AT&T connectivity and other services included in the technology portfolio will increase to include a fuller and more representative set of technologies.

## **Data Quality – Types of Data, Assumptions, and Sources**

Where possible, carbon abatement calculations for the enabling technology will be based on primary and secondary data, prioritizing the use of available primary data. In the absence of the required data, appropriate modeled data derived from sampling, proxies and assumptions can be used.

In order to prevent the use of assumptions and data from biased sources, multiple sources will be considered for a single parameter and compared against each other wherever feasible. The data used will be periodically reviewed and updated. As non-case study abatement calculations tend to include less primary data than case study based ones, these will be reviewed and updated with a greater frequency.

For each enabling technology assessed, the level of data quality, including any uncertainties, will be documented. The documented information for each case study will be published on AT&T's website. For non-case study solutions that utilize findings from other sources, data quality and uncertainties will be summarised and included in future Gigaton Goal progress updates.

## **Transparency**

For the savings calculated via case studies of the enabling technologies, AT&T will provide a detailed summary of the calculation process and clearly document all assumptions, data sources, gaps and issues it encounters throughout the process of calculating its carbon abatement, provided that this will not compromise any commercially sensitive information. For enabling technologies, that have not been developed as part of a detailed case study, AT&T will provide an overview of the calculations and relevant assumptions and data sources. As this goal is ongoing, updates will be communicated as appropriate via the [AT&T CSR website](#).

## **Reporting**

AT&T will track and report progress of the Gigaton Goal on an annual basis, communicating the results of the carbon abatement calculations in metric tons of CO<sub>2</sub>e as a single value.

## **Review Process**

In order to instill confidence in the carbon abatement enabled by AT&T's services, AT&T will pursue an evolving process to review this effort. AT&T will start with an independent internal review of this effort with the aim to move to a more robust external analysis in the future, as appropriate.

## Appendix

### Summary of Reviewed Documents

While there are no published standards that comprehensively cover the calculation of carbon abatement, the following reference documents provide related coverage of the topic. All documents reviewed here are specific to ICT, but are based on more generic ISO standards, the GHG Protocol standard and the Avoided Emissions Framework developed by the Net Zero Compatible Innovations Initiative (NZCII). AT&T will continue to monitor any developments in this area and the applicability to its own methodology.

#### Established / Historic Documents

- [GeSI ICT Enablement Methodology](#)
- [ITU-T L.1410](#)
- [ETSI TS 203 199](#)
- [Forum for the Future: \*Measuring your way to net positive\*](#)
- [ITU-T L.1430](#)
- [IEC TR 62725: 2013](#)
- [IEC TR 62726:2014](#)
- [BT 3:1 Carbon Abatement Methodology](#)
- [GeSI Mobile Carbon Impact Report](#)
- [GeSI ICT Handbook](#)

*Refer to the 10x Methodology document for more information.*

#### Newer developments

- **GSMA, [The Enablement Effect](#):** This report assesses the avoided emissions enabled by mobile telecommunications technologies at a global scale, using representative countries, covering an extensive range of technology use-cases. The calculation methodology used is consistent with the methodology described in the Avoided Emissions Framework.
- **[Avoided Emissions Framework](#) developed by the Net Zero Compatible Innovations Initiative (NZCII):** A 'best practice', strategic guiding tool for investors and funders in assessing investments in new technologies and solutions that can avoid GHG emissions and moreover limit the increase in global temperatures to well below 2°C. This framework provides guidance and a step-by-step approach to assessing avoided emissions, and includes a comprehensive list of references to related initiatives and methodologies.



# Measuring the Carbon Abatement Potential of AT&T's Products and Services

Methodology to Track Progress Toward AT&T's 10X Goal



2017





# Measuring the Carbon Abatement Potential of AT&T's Products and Services

Methodology to Track Progress Toward AT&T's 10X Goal



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## Table of Contents

|                                                                                           |           |
|-------------------------------------------------------------------------------------------|-----------|
| <b>Measuring the Carbon Abatement Potential of AT&amp;T's Products and Services .....</b> | <b>2</b>  |
| <b>Overview .....</b>                                                                     | <b>4</b>  |
| <b>About this Document .....</b>                                                          | <b>4</b>  |
| <b>1 Introduction to AT&amp;T's 10x Goal .....</b>                                        | <b>5</b>  |
| <b>2 Methodology.....</b>                                                                 | <b>6</b>  |
| 2.1 Development of the Methodology .....                                                  | 6         |
| 2.2 Overview of the Methodology.....                                                      | 7         |
| 2.3 Components of the Methodology .....                                                   | 9         |
| 2.4 BAU - Baseline.....                                                                   | 10        |
| 2.5 Enabling Effects.....                                                                 | 10        |
| 2.6 Direct ICT Emissions.....                                                             | 11        |
| 2.7 Rebound Effects.....                                                                  | 11        |
| 2.8 Functional Unit.....                                                                  | 11        |
| <b>3 Principles.....</b>                                                                  | <b>12</b> |
| 3.1 Data Quality .....                                                                    | 12        |
| 3.2 Attribution .....                                                                     | 13        |
| 3.3 Transparency .....                                                                    | 14        |
| 3.4 Technology Portfolio.....                                                             | 14        |
| <b>4 Steps for Applying the Methodology to Individual Technologies .....</b>              | <b>15</b> |
| 4.1 Step 1: Identify the Enabling Technology and the System Boundary.....                 | 15        |
| 4.2 Step 2: Establish the BAU Baseline and Determine the Functional Unit.....             | 15        |
| 4.3 Step 3: Identify Enabling and Rebound Effects.....                                    | 15        |
| 4.4 Step 4: Identify all Data Requirements and Collect the Data .....                     | 15        |
| 4.5 Step 5: Calculate Carbon Abatement Factor for Individual Services .....               | 16        |
| 4.6 Step 6: Documentation.....                                                            | 16        |
| 4.7 Review and Verification Process.....                                                  | 16        |
| <b>5 Glossary .....</b>                                                                   | <b>18</b> |
| <b>6 Appendix.....</b>                                                                    | <b>19</b> |
| 6.1 Summary of Reviewed Documents.....                                                    | 19        |



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## Overview

AT&T Inc. connects millions around the globe with leading entertainment, mobile, high speed Internet and voice services. The company also helps businesses worldwide serve their customers better with its mobility and highly secure cloud solutions.

AT&T recognizes that climate change is happening and that transitioning to a more resource-efficient world will be a primary determinant of success in the 21st century global economy. AT&T set a goal to enable carbon savings 10 times the footprint of its operations by 2025. The company calls it its "10x" goal and aims to achieve it by enhancing the efficiency of its network and delivering services that enable AT&T's customers to avoid carbon emissions.

This methodology has been developed to guide AT&T during its initial steps toward measuring progress against its 10x goal. The methodology will be updated and refined as AT&T continues to increase its capabilities in this area and extend the range of its carbon abatement portfolio.

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## About this Document

Currently, there is no official standard methodology to calculate the carbon abatement enabled by technology services. Therefore, AT&T worked with the Carbon Trust and BSR – two leading non-government organizations with extensive experience in this area – to build upon existing methodologies and documents published (see [section 2.1](#)) to create a methodology that sets up the framework and guidelines for measuring the carbon abatement of AT&T's services.

For the purposes of this document, the term "[AT&T services](#)" will be used to describe the products and services that AT&T sells to its customers.

The content is divided into four main sections. Section One examines AT&T's 10x goal. Section Two provides a description of the general methodology framework. Section Three establishes a set of principles and guidelines for applying the methodology. Section Four provides a more practical step-by-step process for applying the methodology to calculate the carbon abatement enabled by AT&T's services.

The methodology has been peer-reviewed by a number of experts in the field of carbon abatement measurement. We would like to thank the following people for taking the time to review and provide feedback during the draft stages of this document.

- **Zoe Le Grand**, Principal Sustainability Advisor, Forum for the Future
- **Paul Dickinson**, Executive Chair, Climate Disclosure Project (CDP)
- **Kevin Taylor**, Senior Specialist of Local Engagement; and Matthew Banks, Manager in Climate & Business, World Wide Fund for Nature (WWF)
- **Lev Noryan**, Program Manager in Sustainability & Corporate Responsibility; Jens Malmödin, Ericsson Research; and Mats Pellbäck Scharp, Head of Sustainability, Ericsson
- **John Pflueger**, Principal Environmental Strategist, Dell
- **Stephen Russell**, Senior Associate, World Resource Institute (WRI)



## 1 Introduction to AT&T's 10x Goal

AT&T has set a **public goal** to enable carbon savings 10 times the footprint of its operations by 2025. AT&T refers to it as the "10x goal." To achieve this goal, the company will enhance the efficiency of its own operations and deliver services that enable AT&T's customers to avoid carbon emissions.



In order to accurately track the progress toward AT&T's 10x goal, it is important to develop a clear methodology to monitor the **carbon impacts** of AT&T's operations and the services it provides to customers. AT&T already measures its own emissions and **reports these annually**. In order to calculate progress against the 2025 goal, AT&T must also calculate the carbon abatement\* enabled by the services it offers to its customers. This document details the framework for calculating the carbon abatement enabled by AT&T's services to ensure consistency in monitoring AT&T's progress toward its 2025 goal and beyond.

### **\*DEFINITION OF CARBON ABATEMENT:**

Measurement of the carbon savings resulting from the use of products and services.

### **FLEET MANAGEMENT EXAMPLE:**

AT&T provides Internet of Things (IoT) connections for fleet management systems installed in a customer's vehicle. This connectivity enables the customer to improve maintenance and routing efficiency, resulting in a reduction in total distance driven, and as a result, lower carbon emissions. Without the connection provided by the AT&T network, the fleet management system would not operate and the customer's ability to reduce its carbon emissions would be reduced.



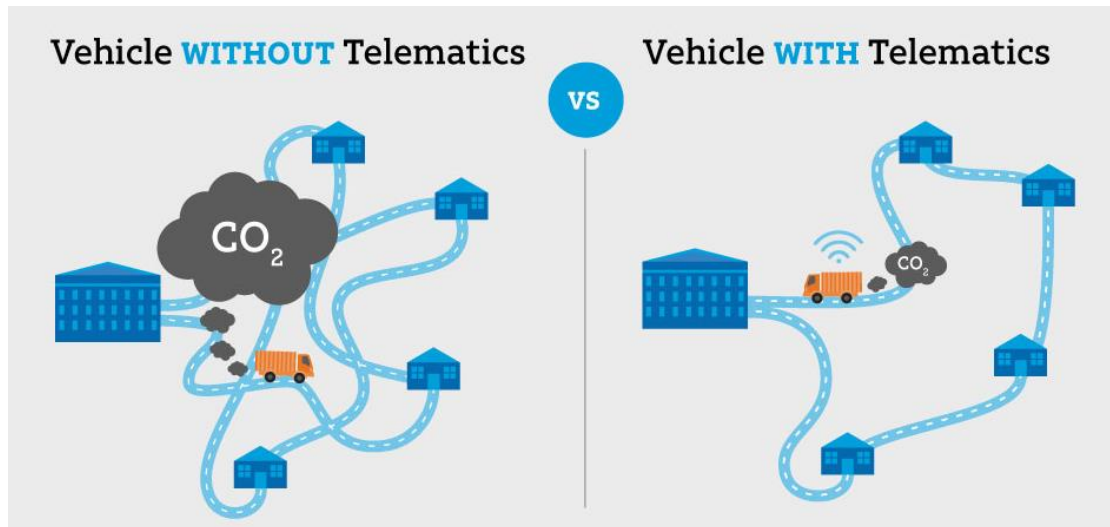


Figure 1 Carbon savings enabled by fleet management systems

## 2 Methodology

### 2.1 Development of the Methodology

As part of developing AT&T's methodology, the team reviewed a number of existing documents that provided a comprehensive overview of current "best practice" carbon abatement calculations and the considerations that need to be taken into account. AT&T's methodology uses the principles and concepts highlighted in these documents as guidance and applies them to the scale and intent of the 10x goal. The reviewed documents include:

#### Formal generic methods and standards:

- Global e-Sustainability Initiative (GeSI) ICT Enablement Methodology<sup>1</sup>
- International Telecommunication Union ITU-T L.1410<sup>2</sup>
- International Telecommunication Union ITU-T L.1430<sup>3</sup>
- International Electrotechnical Commission IEC TR 62726:2014 and 62725:2013<sup>4</sup>
- Forum for the Future "Measuring your way to Net Positive"<sup>5</sup>

<sup>1</sup> Evaluating the carbon-reducing impacts of ICT: An assessment methodology, Boston Consulting Group, GeSI, 2010, [http://gesi.org/files/Reports/Evaluating%20the%20carbon-reducing%20impacts%20of%20ICT\\_September2010.pdf](http://gesi.org/files/Reports/Evaluating%20the%20carbon-reducing%20impacts%20of%20ICT_September2010.pdf)

<sup>2</sup> Methodology for environmental life cycle assessments of information and communication technology goods, networks and services, ITU, 2014, <http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=11430>

<sup>3</sup> Methodology for assessment of the environmental impact of information and communication technology greenhouse gas and energy projects, 2013, <https://www.itu.int/rec/T-REC-L.1430-201312-l/en>

<sup>4</sup> Guidance on quantifying greenhouse gas emission reductions from the baseline for electrical and electronic products and systems, IEC, <https://webstore.iec.ch/publication/7401>



- European Telecommunications Standards Institute ETSI TS 103 199<sup>6</sup>

**Methodology documents produced by companies:**

- BT 3:1 carbon abatement methodology<sup>7</sup>
- GeSI Mobile Carbon Impact report<sup>8</sup>
- GeSI ICT Handbook<sup>9</sup>
- Dimension Data carbon saving methodology<sup>10</sup>

These documents were reviewed for consistency and relevance to AT&T's methodology. A summary of each document can be found in [Appendix A](#). Despite the lack of industry standards for calculating carbon abatement, the AT&T methodology detailed below aligns with key principles highlighted in the documents to ensure that the application of the methodology conforms to industry best practice.

## 2.2 Overview of the Methodology

AT&T's 10x goal compares the carbon abatement enabled by AT&T's services for a given year to AT&T's own operational carbon emissions in the same year. The goal is that by 2025 the carbon abatement for the year will be 10x AT&T's own carbon emissions.

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<sup>5</sup> Measuring Your Way to Net Positive, 2015, Forum for the Future, The Climate Group,  
<https://www.forumforthefuture.org/sites/default/files/Measuring%20Net%20Positive.pdf>

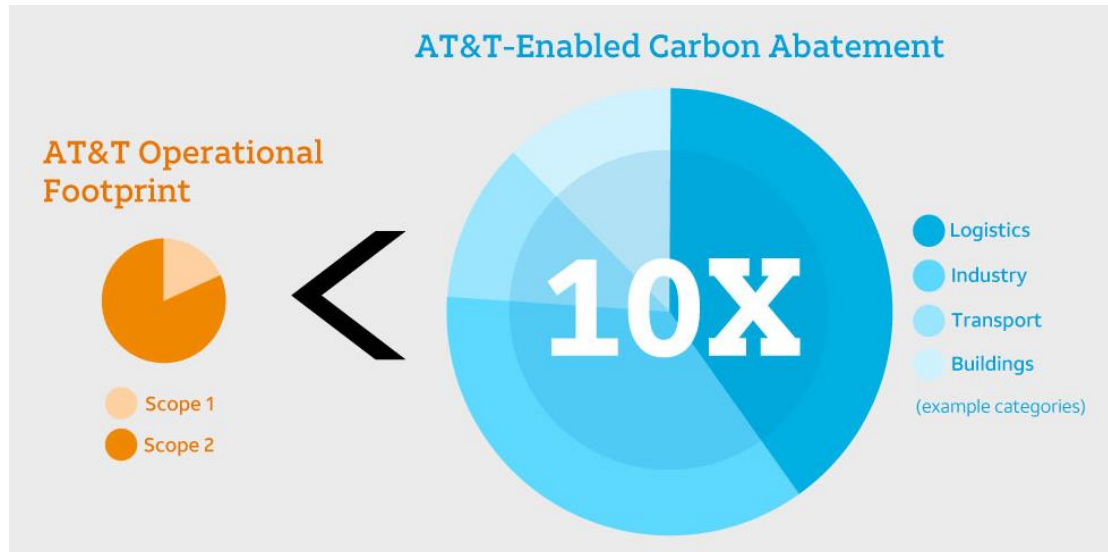
<sup>6</sup> Environmental Engineering (EE); Life Cycle Assessment (LCA) of ICT equipment, networks and services; General methodology and common requirements, ETSI, 2011, [http://www.etsi.org/deliver/etsi\\_ts/103100\\_103199/103199/01.01.01\\_60/ts\\_103199v010101p.pdf](http://www.etsi.org/deliver/etsi_ts/103100_103199/103199/01.01.01_60/ts_103199v010101p.pdf)

<sup>7</sup> BT's 3:1 carbon abatement methodology, Carbon Trust, 2016,  
<http://www.btplc.com/Purposefulbusiness/Energyandenvironment/Our31methodology/BTNetGoodMethodology2016.pdf>

<sup>8</sup> GeSI Mobile Carbon Impact – How mobile communications technology is enabling carbon emissions reduction, Carbon Trust, 2015,  
<http://gesi.org/files/Reports/GeSI%20mobile%20carbon%20impact.pdf>

<sup>9</sup> Carbon Abatement Handbook: A handbook for the calculation of carbon emissions reduction enabled by ICT, Carbon Trust, GeSI, 2016

<sup>10</sup> Environmental Sustainability Targets: Methodology, Dimension Data,  
<https://www.dimensiondata.com/Global/Downloadable%20Documents/Environmental%20Sustainability%20Targets%20-%20Methodology.pdf>



**Figure 2** AT&T's 10x goal: AT&T's own operational emissions compared to AT&T's carbon abatement enabled by AT&T's services

#### **AT&T's Own Emissions:**

AT&T's operational emissions are defined as AT&T's scope 1 and 2 emissions as defined under the Greenhouse Gas (GHG) Protocol Corporate Standard. AT&T already measures its scope 1 and 2 emissions and discloses the details of this [measurement](#) on an annual basis and continuously works to reduce the carbon emissions associated with its own operations. This document, therefore, will not further describe the methodology used to calculate AT&T's own operational emissions.

#### **AT&T's Carbon Abatement:**

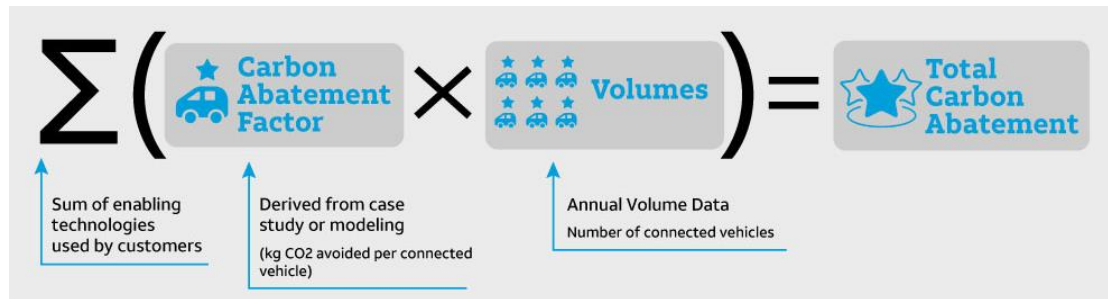
AT&T's carbon abatement measurement timeframe will be aligned with the measurement of AT&T's operational emissions; each element will be compared using data from a single year. The methodology approach is to assess the carbon abatement enabled by Information and Communications Technology (ICT) technologies in which AT&T's services play a fundamental role. In this document, the term "enabling technology" is used to define the complete ICT solution – oftentimes an integrated collection of technology systems, including AT&T's secure connectivity – that enables the carbon abatement. The carbon abatement for all AT&T's services considered is then aggregated to give a total carbon abatement, and this is compared to AT&T's operational carbon emissions to show AT&T's overall carbon impact.

Each enabling technology is assessed by determining a carbon abatement factor that is based on existing academic or industry studies where available, or otherwise based on data or supported assumptions that demonstrate the carbon abatement. In order to calculate the total carbon abatement for each service over a one-year period, the carbon abatement factor is multiplied by the volume of the enabling technology being used by customers. Any emission reductions that are already accounted for in AT&T's own operational emissions will be excluded from the carbon abatement figure to avoid double counting. For example, if AT&T provides a technology that reduces the number of truck rolls required, and the trucks are owned by AT&T, then the



emission reductions associated with the trucks would already be accounted for in AT&T's scope 1 and 2 carbon footprint, and should not be included in the carbon abatement.

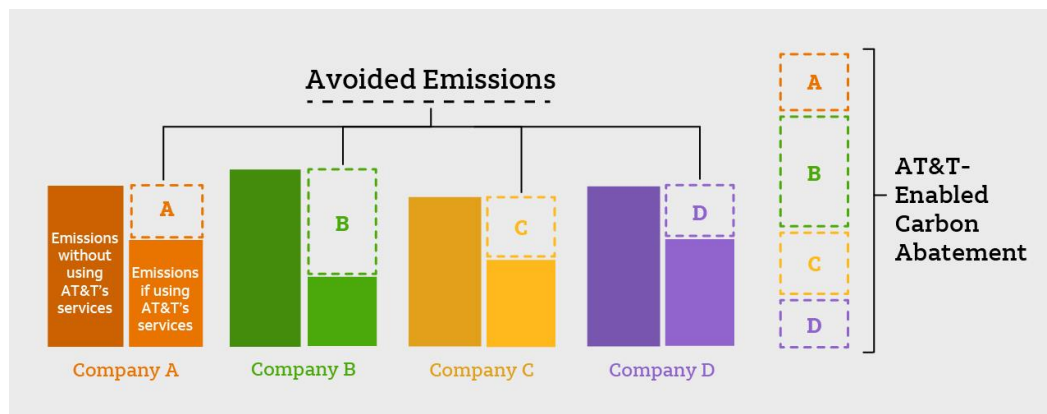
Over time, as further data and studies become available and as new services are developed, AT&T aims to expand the number of enabling technologies included in the calculation of the 10x goal.



**Volumes** – As explained above, the carbon abatement will be calculated for the volume of AT&T's services used by its customers. The volume will normally be derived from sales data on the number of products sold by AT&T. For example, it may reflect the number of connections provided by AT&T or the number of AT&T customers using a particular service.

**Figure 3** Carbon abatement methodology

AT&T's total abatement is the sum of the carbon emissions that its customers avoid by using AT&T services. AT&T's customers therefore have a lower footprint than they would have without AT&T's services (see [Figure 4](#)).



**Figure 4** Composition of AT&T's carbon abatement

## 2.3 Components of the Methodology

The published methodologies referenced in [section 2.1](#) compare the carbon emissions as a result of the enabling technology to a business-as-usual (BAU) baseline. The emissions are typically identified in four categories:





- BAU System – Emissions from the BAU baseline, without the introduction of the enabling technology.
- **Enabling Effects** – Carbon abatement in BAU emissions occurring as a result of the enabling technology implementation.
- Direct ICT Emissions – The emissions associated with the implemented enabling technology.
- **Rebound Effects** – Increase in BAU emissions occurring as result of the enabling technology implementation, often driven by behavioral changes in demand for carbon-intensive goods or activities.

Each of these categories will be explored in more detail in the following sections.

## 2.4 BAU - Baseline

A reasonable and reliable baseline or BAU scenario needs to be defined in order to measure the carbon abatement of the enabling technologies in which AT&T's services play a fundamental role. The baseline represents the "before" scenario of a specific process (i.e. what is the most likely alternative solution to be used to achieve a certain outcome in the absence of the enabling technology). The alternative solution to the enabling technology can either be an absence of a technology or an existing old technology, which will be replaced by the enabling technology. Defining the baseline is a crucial step of the methodology, as the baseline to which the enabling technology will be compared will impact the scale of the carbon abatement. In order to align with the announcement of the 10x goal, the BAU baseline for the different solutions will use 2015 data.

## 2.5 Enabling Effects

Enabling effects, directly or indirectly attributable to the use of the enabling technology, should be identified and assessed in order to calculate the carbon abatement of an enabling technology. The GeSI ICT Enablement Methodology defines two types of enabling effects:

1. **Primary Enabling Effects** – Primary enabling effects are immediate reduction of BAU emissions occurring as result of ICT system implementation.

All primary enabling effects will be included in the calculation of carbon abatement enabled by AT&T's services. If an enabling technology has multiple primary enabling effects and one or more of the effects are difficult to quantify, AT&T will make assumptions – leaning on the side of counting conservatively – to quantify the effect. If the primary enabling effect is already included in AT&T's own operational emissions, then it will be excluded from the calculations.

2. **Secondary Enabling Effects** – Secondary enabling effects are those expected to reduce emissions relative to the BAU system, but which occur over a longer timeframe or as a result of increased scale of adoption.

Secondary enabling effects tend to have an impact over a longer time period. As a result, it becomes difficult to establish a direct correlation between the enabling technology and the enabling effect. Secondary enabling effects, therefore, are excluded from the calculation for AT&T's services. However, any identified secondary effects will be acknowledged and documented.



EXAMPLE:

**PRIMARY ENABLING EFFECTS (INCLUDED):** The reduction in travel emissions enabled by a fleet management system allowing for efficient routing and coordination of vehicles, thereby reducing the total distance traveled and associated emissions.

**SECONDARY ENABLING EFFECTS (EXCLUDED):** A reduction in emissions from the manufacture of new vehicles, resulting from more efficient use of vehicles and lower overall demand for new or replacement vehicles.

## 2.6 Direct ICT Emissions

The direct ICT emissions from the enabling technology relate to any emissions directly or indirectly due to the introduction of the product. This can include embodied carbon emissions of the technology itself (e.g., carbon emitted during the manufacturing of the technology) or energy consumption resulting from the use of the technology. Some of these emissions are already captured in AT&T's operational emissions. Direct ICT emissions, particularly the embodied emissions of enabling technologies, are difficult to quantify and can, depending on the technology, be small in magnitude when compared to the primary enabling effects.<sup>11,12,13</sup> AT&T will acknowledge and document the impact of ICT direct emissions in the end result via the calculation of the AT&T operational footprint, but will exclude direct ICT emissions from the carbon abatement calculation, unless they are considered to be significant.

## 2.7 Rebound Effects

**Rebound effects** occur when carbon emissions increase due to often unintended or ancillary use of the enabling technology. These will be excluded from the carbon abatement calculation of the enabling technologies, as it can often be difficult to quantify rebound effects due to data limitations. As is the case with secondary enabling effects, any identified rebound effects will be acknowledged and documented.

## 2.8 Functional Unit

The **functional unit** defines the system boundaries in which the BAU scenario is compared to the ICT enabled solution. This means that the functional unit should be applicable to both the BAU scenario and the scenario where the enabling technology is used. The functional unit will be clearly defined and measurable.

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<sup>11</sup> Malmudin, J. and Bermark, P. 2015. Exploring the effect of ICT solutions on GHG emissions in 2030. Ericsson. <http://www.atlantipress.com/php/pub.php?publication=ict4s-env-15>

<sup>12</sup> Ericsson. 2011. Case study: Mobile Money Kenya: Life Cycle Assessment of ICT enablement potential. [https://www.ericsson.com/res/thecompany/docs/success\\_stories/case\\_mobile\\_money\\_final.pdf](https://www.ericsson.com/res/thecompany/docs/success_stories/case_mobile_money_final.pdf)

<sup>13</sup> Ericsson. 2009. E-health Croatia: Life Cycle Assessment of ICT enablement potential [https://www.ericsson.com/res/thecompany/docs/success\\_stories/2009/e-health\\_croatia.pdf](https://www.ericsson.com/res/thecompany/docs/success_stories/2009/e-health_croatia.pdf)



In order to compare the carbon abatement enabled by AT&T's services to its own emissions, the functional unit for all carbon abatement calculations will be over an annual period. Carbon abatement can initially be calculated over a non-annual time period, but will ultimately be expressed over an annual time period.

**EXAMPLE:**

**FLEET MANAGEMENT CARBON ABATEMENT:** When calculating the carbon abatement of a fleet management system, the functional unit could be one vehicle or a complete fleet of vehicles. The carbon abatement will be calculated for a typical vehicle, using the average annual mileage and average fuel savings. The carbon abatement factor for one vehicle will then be multiplied by the total number of vehicles over the course of a year.

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## 3 Principles

In order to ensure the carbon abatement enabled by AT&T's services is calculated according to industry best practice, AT&T will follow the following principles.

### 3.1 Data Quality

#### 3.1.1 Assumptions

Where possible, carbon abatement calculations for the enabling technology will be based on available primary or secondary data. In the absence of required data, appropriate assumptions will be made to complete the carbon abatement calculations. All assumptions will be based on surveys, reports or other credible published data. If conflicting information is available for one assumption, the most conservative assumption will be made to avoid overstating the carbon abatement enabled by AT&T's services. Any assumption will be clearly documented along with a justification and evidence supporting the assumption.

#### 3.1.2 Types of Data

Different types of data can be used to calculate the carbon abatement enabled by AT&T's services. The different types of data include primary, secondary and modeled data. Primary data relates specifically to the services being assessed, secondary data is derived from other sources, and modeled data is derived from modeling based on sampling, proxies and assumptions. Primary data will always be the preferred option, although primary data may be substituted with secondary data in the absence of available primary data. Modeled data derived from a number of assumptions may also be used, but only if no other primary or secondary data is available. The level of data quality, including any uncertainties, will be documented.



### 3.1.3 Sources

In order to prevent the use of assumptions and data from biased sources, multiple sources will be considered for a single parameter and compared against each other wherever feasible. The source that offers the most relevant information for the calculation will be identified during the comparison of multiple sources. For example, a study providing a specific piece of data might be geographic-specific and therefore not appropriate to use. In order to avoid using dubious sources, all sources will be checked for unreliable data or inappropriate assumptions. All sources will be documented and clearly referenced.

## 3.2 Attribution

It is crucial to understand and delineate the exact role of AT&T's services in enabling carbon savings for AT&T's customers. Often carbon abatement is a result of multiple unique products and services working together as a single enabling technology. Therefore one product or service alone is not responsible for the carbon abatement of the entire enabling technology. There is currently no consistent way to allocate emissions from carbon abatement. AT&T will include all carbon abatement from the enabling technology in AT&T's total carbon abatement, where AT&T's services have a fundamental role in enabling the carbon savings until a consistent way to allocate emissions is found.

AT&T's services play a fundamental role in enabling carbon savings if the carbon savings made would be impossible without AT&T's service. It should be emphasized that AT&T does not uniquely claim all the carbon abatement of the enabling technology, but rather acknowledges that its service is part of a system with many components that act in concert to enable the carbon abatement.

#### EXAMPLE:

**FUNDAMENTAL ROLE:** Installing a fleet telematics systems within a fleet can reduce carbon by improving individual driving behavior. The telematics system identifies areas of improvement and can feed back the information to the drivers instantaneously via an app. Alternatively, the telematics system could collect the information and the driver can download the information at a later point and improve driving behavior on subsequent journeys. The app is therefore not fundamental in enabling carbon savings, whereas the telematics system and the connectivity are fundamental in enabling the carbon abatement of the technology.





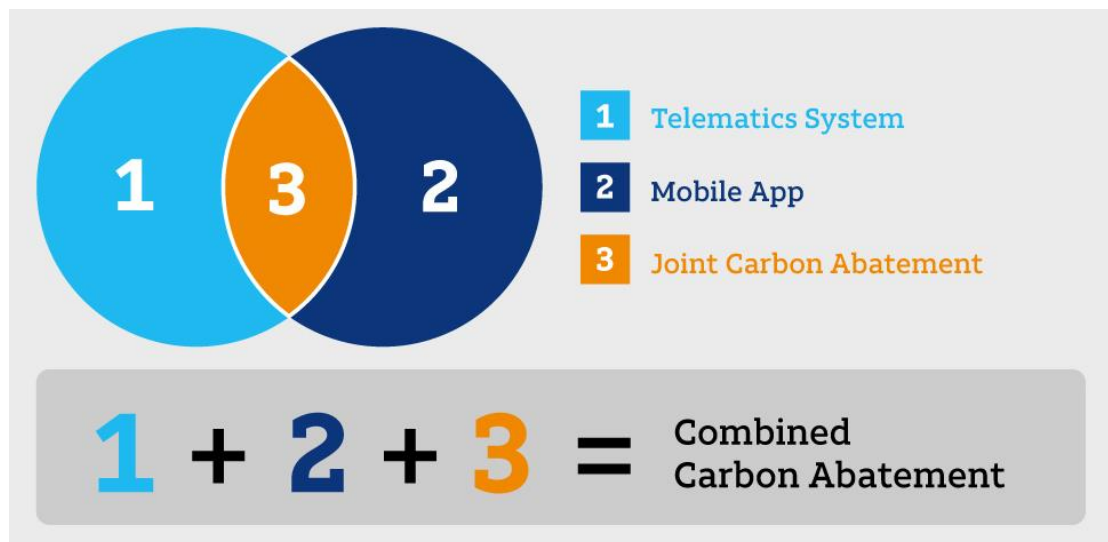
### 3.3 Transparency

Transparency is crucial to the process of calculating the carbon abatement enabled by AT&T's services and its progress against its 10x goal, as it will provide assurance to AT&T's stakeholders that its carbon impact calculations are as robust and accurate as possible. According to the GeSI ICT Handbook<sup>14</sup>, being transparent means: *"being as open as possible about your activities – whether through publication or accessibility or engagement."* In keeping with this definition, AT&T will be transparent about every step of the process and clearly document all assumptions, data sources, gaps and issues it encounters throughout the process of calculating its carbon abatement, provided that this will not compromise any commercially sensitive information. As this project is ongoing, updates will be communicated as appropriate via the [AT&T website](#).

### 3.4 Technology Portfolio

It is unwieldy to pursue all AT&T services in this exercise, especially at the beginning, so AT&T will prioritize technologies with positive carbon benefits. As the program matures, if AT&T identifies a service with a negative carbon abatement impact, AT&T will capture this and describe the impact qualitatively and, if possible, quantify the impact. All AT&T services included in the calculation of AT&T's carbon impact need to have a fundamental role in enabling the carbon abatement of an enabling technology.

In the case where the carbon abatement of two enabling technologies overlap, the overlapping carbon abatement will only be counted once. For example, AT&T could provide vehicle telematics services, as well as a mobile app to improve driver behavior to its customer base, which both enable carbon savings by improving driving behavior. Where AT&T customers have both the mobile app and the telematics system, the overlapping carbon abatement (represented by area 3 in [Figure 5](#) will only be accounted for once.



**Figure 5** Overlap of two different enabling technologies

<sup>14</sup> Carbon Abatement Handbook: A handbook for the calculation of carbon emissions reduction enabled by ICT, Carbon Trust, GeSI, 2016



AT&T will start by including a limited number of AT&T's services in the carbon abatement calculation. Over time, the number of AT&T services included in the technology portfolio will increase to include a fuller and more representative set of technologies.

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## **4 Steps for Applying the Methodology to Individual Technologies**

The following section provides more detailed step-by-step guidelines for calculating the carbon abatement enabled by AT&T's services.

The total carbon abatement enabled by AT&T's services will be calculated by summing the individual carbon abatement results for each enabling technology in the technology portfolio.

### **4.1 Step 1: Identify the Enabling Technology and the System Boundary**

AT&T will identify the enabling technologies in which AT&T's services have a role in enabling carbon abatement for AT&T's customers. If any service is part of a larger system of multiple components that together comprise the enabling technology, AT&T will determine whether the AT&T service has a fundamental role in enabling the carbon abatement of the larger system.

In order to avoid double-counting, AT&T will check for overlaps between different enabling technologies in case the same carbon abatement is achieved by different technologies.

### **4.2 Step 2: Establish the BAU Baseline and Determine the Functional Unit**

AT&T will establish the BAU baseline for the enabling technology and define the functional unit, which is applicable to both the BAU scenario and the enabling technology.

### **4.3 Step 3: Identify Enabling and Rebound Effects**

AT&T will identify all significant enabling (primary and secondary) effects, as well as possible rebound effects. AT&T will determine their likely impact on the carbon abatement of the enabling technology. As part of this analysis, primary effects will be assessed quantitatively. Secondary and rebound effects will not be assessed quantitatively, and will be excluded from the calculation. However, their expected impact will be described qualitatively.

### **4.4 Step 4: Identify all Data Requirements and Collect the Data**

AT&T will identify all the data that needs to be collected for the calculation of the carbon abatement factor, and collect data for the volume of the AT&T service delivered over a one year time period. Data may be from secondary sources, such as academic studies or published reports, as well as primary data from internal case studies.



## 4.5 Step 5: Calculate Carbon Abatement Factor for Individual Services

AT&T will calculate the carbon abatement factor for the individual enabling technology and take into account geographical differences where relevant. There are two options for calculating the carbon abatement factor:

1. Calculate the carbon abatement factor using data from before and after the implementation of the enabling technology over an annual period.
2. Calculate the carbon abatement factor based on an external study or data for a similar scenario. For example, an external study might show a fuel saving of x% from use of vehicle telematics; this fuel savings estimate may then be applied to the average annual fuel consumption to calculate a carbon abatement factor.

The methodology chosen to calculate the carbon abatement factor will depend on the format and accessibility of the available data.

AT&T will calculate the carbon abatement for each product or service by multiplying the carbon abatement factor by the total volume of the AT&T service that is being used by customers for that given year.

## 4.6 Step 6: Documentation

AT&T will clearly document the following for each individual AT&T service that is included in the technology portfolio:

- Description of the enabling technology and explanation of the fundamental role of AT&T's service in enabling the carbon abatement
- BAU baseline
- Primary enabling effects
- Secondary enabling and rebound effects
- Functional unit
- References for data sources and assumptions used to calculate the carbon abatement
- The methodology used to calculate the carbon abatement factor
- Results of the carbon abatement calculation published as a carbon abatement factor in metric tons CO<sub>2</sub>e per functional unit

Additionally, for the full technology portfolio, AT&T will report the results of the carbon abatement calculation in metric tons of CO<sub>2</sub>e as a single value. This will also be expressed as a ratio compared to AT&T's own operational carbon emissions. AT&T will track progress on the 10x goal internally on an annual basis and begin to report externally when the portfolio of measured technologies has reached a meaningful level. Externally, AT&T will report annually on the progress of the development of any new case studies.

## 4.7 Review and Verification Process

In order to instill confidence in the carbon abatement enabled by AT&T's services, AT&T will pursue an evolving process to review and verify this effort. Understanding that it is best practice to carry out an external, independent review of the calculations, AT&T intends to begin simply and expand the review process as data and methodology mature. AT&T will start with an



independent internal review of this effort with the aim to move to a more robust external audit in the future, as appropriate. Steps in the internal review process may include, but are not limited to:

- Conduct a sense check across all collected data and assumptions used for the calculations of the carbon abatement enabled by AT&T's service. To help with this check, and to provide context of the carbon savings when comparing multiple products, the carbon abatement may be expressed in percentage terms of AT&T's own operations' emissions for comparison purposes.
- Cross-check against other available sources. The total carbon abatement figures should also be checked against published figures for similar products if available. Any differences identified during the cross-check should either be explained in the methodology document or might require the calculations to be revisited.
- Check results against total sector emissions by comparing the total carbon abatement figures with 100% of the total sector emissions. If the carbon abatement is a significant portion of the total sector emissions, this might imply that some of the assumptions are overly optimistic, and the calculations should also be revisited to check that all data and assumptions are correct, and ascertain if the result is still reasonable.
- Review whether calculations use outdated assumptions and data and update accordingly.
- A light-touch sensitivity analysis should be carried out where relevant to inform the analysis and drive product innovation internally. A light-touch sensitivity analysis would involve varying key parameters of the carbon abatement calculation by a certain percentage and evaluating the impact of this on the overall result.





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## 5 Glossary

**Carbon:** Shorthand to refer to greenhouse gases that cause global warming. It is measured in metric tons CO<sub>2</sub>e (carbon dioxide equivalent).

**Carbon abatement:** The measurement of the carbon savings resulting from the use of products and services.

**Carbon abatement factor:** Measures the amount of carbon that is saved from the use of ICT products and services per a defined unit of volume. Examples include the carbon savings per connection or per smartphone user.

**Carbon impact:** The difference between the carbon emissions that the organization is responsible for (carbon footprint) and the carbon abatement from the use of the products and services.

**Enabling technology:** The complete ICT system that enables the carbon abatement. This may include multiple products from different vendors that all contribute to the total enabling effect.

**AT&T service:** A product or service sold by AT&T. In the context of this methodology document, the AT&T services included are those that have a carbon impact.

**Functional unit:** "The functional unit defines the performance characteristics delivered by the ICT [solution]."<sup>15</sup> It sets the system boundaries in which the BAU scenario is compared to the ICT solution.

**Enabling effects:** "The avoided emissions due to the activities avoided as a result of using the ICT solution. These are further subdivided into *immediate* [primary] enabling effects and *longer-term* [secondary] enabling effects."<sup>16</sup>

**Rebound effects:** "The increased emissions as a result of using the ICT solution, caused by rebound effects. These rebound effects may be caused by related consequential effects, or by unrelated (and sometimes unintended) effects and are often linked to human behavioral changes. These effects are further subdivided into immediate rebound effects and longer-term rebound effects. Because of the nature of rebound effects, assessing them is inherently uncertain as it is difficult to accurately estimate the effects."<sup>17</sup>

**Primary data:** Any data that is obtained from specific activities related to the use of the enabling technology.

**Secondary data:** Any data that is not obtained from specific activities related to the use of the enabling technology.

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<sup>15</sup> Methodology for environmental life cycle assessments of information and communication technology goods, networks and services, ITU, 2014, <http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=11430>

<sup>16</sup> Carbon Abatement Handbook: A handbook for the calculation of carbon emissions reduction enabled by ICT, Carbon Trust, GeSI, 2016

<sup>17</sup> Ibid.



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## 6 Appendix

### 6.1 Summary of Reviewed Documents

While there are no published standards that comprehensively cover the calculation of carbon abatement, the following reference documents provide related coverage of the topic. All documents reviewed here are specific to ICT, but are based on more generic ISO standards and the GHG Protocol standard.

- **GeSI ICT Enablement Methodology:** *Evaluating the carbon reducing impacts of ICT: An assessment methodology* is a report developed by the Global e-Sustainability Initiative (GeSI) to provide a common framework for assessing low-carbon enabling effects of ICT solutions. It was the first framework of its kind and provided the groundwork for subsequent frameworks, such as the ETSI and ITU standards.
- **ITU-T L.1410:** Methodology for the assessment of the environmental impact of information and communication technology goods, networks and services is a framework from the International Telecommunication Union (ITU) primarily aiming to provide an assessment guideline for the life cycle assessments of ICT goods and services. The report is divided into two parts, where Part II provides an overview for comparative analysis between ICT solutions and a reference product system. Part II refers back to Part I to draw out certain principles and issues. The methodology is based on the ISO 14040 and 14044 standards.
- **ETSI TS 203 199:** Methodology for environmental Life Cycle Assessment (LCA) of Information and Communication Technology (ICT) goods, networks and services is a document developed by the European Telecommunications Standards Institute (ETSI) which superseded the ETSI TS 103 199 report. It is technically equivalent to ITU-T L.1410.
- **Forum for the Future:** *Measuring your way to Net Positive* is a document aimed at providing companies that have an interest in becoming Net Positive with insights on the key principles of the Net Positive concept, best practices and the practices required to become Net Positive.
- **ITU-T L.1430:** Methodology for assessment of the environmental impact of information and communication technology greenhouse gas and energy projects is a second report published by the ITU to compliment the ISO 14064-2 and the GHG Protocol for Project Accounting. It offers guidance on assessing the environmental impact of ICT GHG and energy projects.
- **IEC TR 62725: 2013:** *Analysis of quantification methodologies of greenhouse gas emissions for electrical and electronic products and systems* is a report by the International Electrotechnical Commission (IEC) focusing on GHG emission life cycle assessment of electrical/electronic products, but does not go into more details on the enabling effects of these products.
- **IEC TR 62726:2014:** *Guidance on quantifying greenhouse gas emission reductions from the baseline for electrical and electronic products and systems* also published by the IEC is similar to IEC TR 62725: 2013. Both documents are focused on technical elements and do not discuss normative aspects. However, it differs from IEC TR 62725 by focusing on the enabling effects and covering the methodology for measuring GHG emissions reductions through the use of electrical/electronic products and systems compared to a baseline.
- **BT 3:1 Carbon Abatement Methodology:** This document provides a description of BT's 3:1 carbon abatement calculations, assumptions and data. Along with the general methodology,



it provides an overview of the calculations that measure the carbon abatement impact of products and services for BT's Net Good program.

- **GeSI Mobile Carbon Impact Report:** This study commissioned by the Global e-Sustainability Initiative (GeSI) aims to identify how mobile communication technology is enabling sustainable development. The report assessed the carbon abatement that is enabled by this technology in different sectors and industries.
- **GeSI ICT Handbook:** This handbook is a report providing practical support to practitioners who are calculating the carbon abatement from ICT. This handbook includes a summary of existing methodologies, examples of calculations, and a set of carbon abatement factors.
- **Dimension Data Carbon Saving Methodology:** This document sets out the methodology to calculate Dimension Data's carbon savings targets. The methodology also includes a detailed section on the saving calculations from videoconferencing and cloud computing.