

2022 AT&T Gigaton Goal Progress Update

March 2023

Progress Summary

AT&T has long understood that connectivity and our other services can enable our customers to reduce greenhouse gas (GHG) emissions to mitigate climate change. In 2021, we announced the AT&T Gigaton Goal to enable customers to reduce a gigaton (1 billion metric tons) of GHG emissions by 2035, through the use of AT&T connectivity and other services. One gigaton of emissions is roughly equivalent to more than 1.6 million cross country flights.

We measure our progress against this goal by calculating the cumulative impact of emissions reduction starting in 2018, when we first calculated our emissions reduction enablement, until 2035. Progress against this goal is reported annually. At the end of 2022, we calculated cumulative emissions reductions of 149.2 million metric tons of CO₂e, achieving 15% of our goal in the first five years. We are still at the beginning of our journey and expect our progress to accelerate with the development of new technologies and continued uptake of existing solutions.

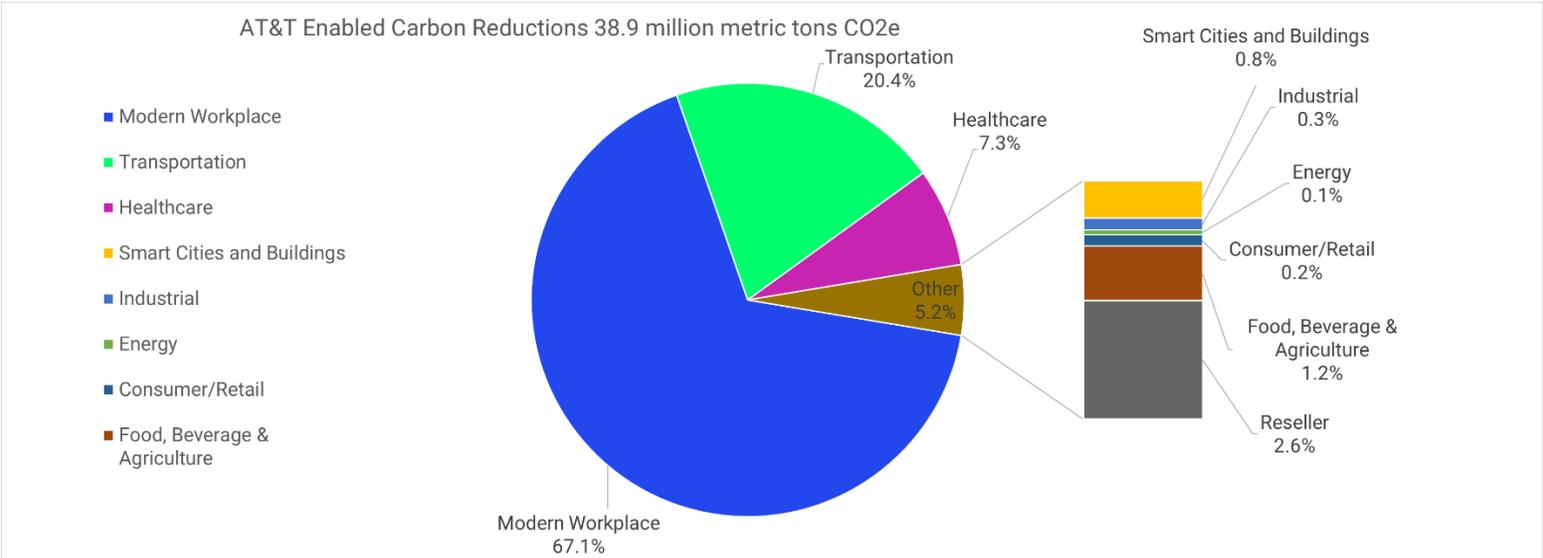
	2018	2019	2020	2021	2022
Annual Enabled Emissions Reduction (million metric tons)	17.1	24 ¹	31.3	37.9	38.9
Cumulative Enabled Emissions Reduction (million metric tons)	17.1	41.1	72.4	110.3	149.2

By the numbers – High-level summary of impact areas

We have identified 9 key Impact Areas where AT&T connectivity can play a fundamental role in reducing emissions. Here is a summary of their relative impact in 2022:

¹ Note: Per our [10x Methodology](#), we calculate avoided emissions every 2 years, so we used the average of 2018 and 2020 for 2019 avoided emissions.

Impact Area	Carbon avoided (tCO ₂ e) (rounded)	Percentage of total
Modern Workplace	26,097,777	67.1%
Transportation	7,921,832	20.4%
Healthcare	2,856,788	7.3%
Smart Cities and Buildings	319,626	0.8%
Industrial	100,203	0.3%
Energy	46,090	0.1%
Consumer/Retail	94,915	0.2%
Food, Beverage & Agriculture	463,032	1.2%
Reseller ²	1,015,563	2.6%
Total	38,915,827	100%



² Eight impact areas were originally identified in the [2018 Progress Report](#). Since then, the impact area 'Reseller' has been added to the list.

Overview of abatement factors by impact area

We've identified a collection of activities for each impact area and worked with The [Carbon Trust](#) to develop an abatement factor that represents the average emissions reduction that can be achieved using an AT&T-enabled solution. Below is a summary of those activities, their abatement factors and the relative impact of each activity.

Modern Workplace

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Telecommuting - Remote Working	Residential internet connections ³	1,472.95
Video Conferencing - Desk-based	Video conferencing seats	3,700.00
Cloud Connectivity	Virtual network circuits to Cloud Service providers	18,686.71
FlexWare	Number of connections	566.20
Video Optimizer	Number of users	0.01

Transportation

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Fleet Management	Connected vehicles	577.67
EV Charging	Connected charging stations	3,803.60
Smart Pallets	Number of composite pallets	71.60
Carsharing	Number of cars	34,663.02

Healthcare

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Remote Patient Monitoring	Connected remote monitoring devices	1,019.06

³ In 2022, the abatement factor for telecommuting also includes the carbon savings from AT&T's sale of voice & collaboration solutions which enable remote working, in addition to residential internet connections which contribute to the same enablement. The calculation method of emissions savings per internet connection has remained the same, however, there is an apparent increase in the abatement factor figure compared to 2021 due to the incorporation of the additional remote working carbon savings from voice and collaboration solutions.

Conversely, the abatement factor increase has been limited by a revision in the secondary data used to calculate average one-way commuting distance in the U.S. to reflect a shorter average commuting distance based on more recently available data.

Smart Cities and Buildings

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Efficient Building Equipment Funding	Number of sites	167,617.86
Energy Building Management System - EBMS	Connected building management systems	12,140.68
Smart Parking	Parking service connections	269.97
Street Lighting	Streetlights	21.90
Advanced Water Metering Infrastructure	Number of houses	0.52
Efficient Cooling Towers	Number of units	1,553.85

Industrial

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Concrete Management (GCP)	Cubic meters of concrete	4.72

Consumer/Retail

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Smart Landscape Irrigation	Number of sites	901.84

Food, Beverage and Agriculture

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Food Waste to Energy	Number of sites	84,408.30
Smart Farm Irrigation	Number of connections	16,910.10
Durable Ag Sensors	Number of connections	11,534.59

Energy

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Residential Smart Meters	Connected residential smart meters	147.70
Oil and Gas Pipeline Monitoring	Number of rectifiers	98.24
Solar PV Optimization	Number of systems	4.39

Reseller

Activity	Item units	Abatement factor (kg CO ₂ e/unit/year)
Reseller	Number of connections	710.58

Methodology summary

In this section, we will define the type of data collected and the research used to calculate the carbon abatement factor for each activity.

Emission factors from the following sources are used throughout the calculations to develop the carbon abatement factors:

- [eGrid 2021](#)
- [BEIS 2022](#)
- [EPA](#)
- [IEA 2022](#)
- [Ecoinvent v3.8](#)

Detailed in the table below are the references and assumptions used specifically for each activity.

Modern Workplace

Activity	References and assumptions
Telecommuting - Remote Working	<p>Percentage of people sometimes working remotely: Returning to the Office: The Current, Preferred and Future State of Remote Work</p> <p>Total employed in the U.S.: Labor Statistics Employed 2022 and Labor Force Statistics 2022</p> <p>Distance commuted: Bureau of Transportation, Omnistats</p> <p>Forms of commuting and vehicle occupancy: Bureau of Transportation Statistics, Principal Means of Transportation to Work (Table 1-41) 2020</p> <p>DEFRA 2022 emission factors for motorcycle, regular taxi, public transport (average); EPA and DEFRA 2022 for typical passenger car (with adjustment for EVs based on IEA 2021 projections)</p>
Video Conferencing - Desk-based	<p>Internal case study: An annual figure of "typical equivalent travel distance to physical meetings if these had taken place instead of video calls" was calculated from data collected by a provider of video conferencing and based on the use of a managed video conferencing service over the period of a year. The case study considered the number of people involved in the video conferences and their locations. It also assumed that 4% of the travel distance was by car, and 96% was by air.</p> <p>Meeting avoidance factor of 32%: Cisco research quoted by BT (no longer published online)</p> <p>DEFRA 2022 emission factors for long-haul air travel and car travel (with adjustment for EVs based on IEA 2021 projections)</p>

Cloud Connectivity	<p>Adjusted energy mix factors for electricity for the cloud providers, based on their disclosed use of renewable energy:</p> <p>Microsoft Azure Amazon Web Services Oracle Google HP Salesforce IBM Softlayer</p> <p>The following assumptions were used: 160 Mbps bandwidth per customer, 250 users per customer, typical equivalent configuration would have 8 physical servers (4 physical servers hosting email, groupware, and file storage, with 4 additional servers for backup / cache / test)</p>
FlexWare	<p>AT&T case study: AT&T FlexWareSM puts common network functions on one device, reducing space, electricity usage, and emissions</p>
Video Optimizer	<p>AT&T case study: AT&T Video Optimizer helps developers improve viewers' mobile app and video experience while lowering energy usage and emissions</p>

Transportation

Activity	References and assumptions
Fleet Management	<p>Typical fuel savings of between 5% and 15%: Energy Savings Trust: A Guide to Telematics. A figure of 10% fuel saving was used in the calculations.</p> <p>Emission factor for gasoline: EPA Greenhouse Gases Equivalencies Calculator</p> <p>Average fuel consumed per vehicle per year: Bureau of Travel Statistics – Light Duty Vehicle, fuel consumption and travel (with adjustment for EVs based on IEA 2021 projections)</p>
EV Charging	<p>AT&T case study: ChargePoint uses AT&T connectivity to help businesses scale access to electric vehicle (EV) charging stations and reduce greenhouse gas emissions</p>
Smart Pallets	<p>AT&T case study: Unlocking the Potential of Connected, Reusable Pallets</p>
Carsharing	<p>tCO₂e saved per year per household: Greenhouse Gas Emission Impacts of Carsharing in North America</p> <p>Calculations assume 1 household is equivalent to 1 member of a carsharing platform, and an average of 70 members per car.</p>

Healthcare

Activity	References and assumptions
Remote Patient Monitoring	<p>Average of 1.5 of hospital admissions per year: Focus on: Hospital admissions from care homes</p> <p>Average of 5.4 days per hospital stay: OECD: Length of Hospital Stay</p>

	<p>Average 125 kgCO₂e per day per hospital stay: Guest post: Calculating the carbon footprint of the NHS in England</p> <p>Average 7.38 km journey to hospital: OECD How's Life In Your Region</p> <p>The savings calculated derive from reduction in hospital emissions due to reduced hospital stays and reduced need to travel to hospital.</p>
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Smart Cities and Buildings

Activity	References and assumptions
Efficient Building Equipment Funding	AT&T case study: "Efficiency-as-a-Service" Enables AT&T to Reduce Lighting Bills and Emissions
Energy Building Management System – EBMS	AT&T case study: Using the Internet of Things to reduce facility costs and emissions
Smart Parking	SFMTA Study: Pilot Project Evaluation – pilot project assessing how effectively a smart parking solution delivered expected benefits, by comparing pilot and control areas. Data on reduced CO ₂ e and reduced vehicle miles travelled used for calculations.
Smart Street Lighting	Average yearly consumption of ~221 kWh/year: World Lighting Council Report on Incandescent vs LED lights and U.S. Energy Department Report Assumed carbon reduction: Intel: Smart Street Lights for Brighter Savings and Opportunities
Advanced Water Metering Infrastructure	Internal case study: A pilot project with 502 houses, assessing impact of advanced metering infrastructure (AMI) with AT&T connectivity. The internal case study found that by increasing visibility into the performance of water utilities, organizations achieved improved water safety and reduced water leakages, which also reduced water-related waste, emissions and costs.
Efficient Cooling Towers	Emissions savings per unit calculated from EcoLab: Partners for Greater Purpose, Sustainability Report 2019

Industrial

Activity	References and assumptions
Concrete Management (GCP)	<p>Average fuel consumption of truck at Idle of 0.84 gallons per hour fuel (delivery truck unloaded): Vehicle Idle Reduction Savings Worksheet</p> <p>The following assumptions were used: the average value of cement reduced for a typical Verifi customer is 10 kg per cubic meter of concrete delivered, the average cement composition is 25% Portland cement and 75% pozzolana and fly ash (15-40%), the fuel type of all concrete delivery trucks is assumed to be diesel, the average fuel consumption of a delivery truck is 0.01 liters per drum revolution.</p>

Consumer/Retail

Activity	References and assumptions
Smart Landscape Irrigation	AT&T case study: Lowe's Uses HydroPoint and AT&T to Reduce Water Consumption and Carbon Footprint

Food, Beverage and Agriculture

Activity	References and assumptions
Food Waste to Energy	AT&T case study: Emerson's Grind2Energy integrates AT&T IoT to turn food waste into clean energy
Smart Farm Irrigation	AT&T case study: Rice Farmers Use Internet of Things to Enable Water and Emissions Reductions
Durable Ag Sensors	AT&T case study: Soiltech uses AT&T Internet of Things connectivity to optimize food from soil to storage, helping increase yield, reduce waste and lower emissions

Energy

Activity	References and assumptions
Residential Smart Meters	<p>Electricity savings per meter: Ofgem study – GB-wide smart meter roll out for the domestic sector</p> <p>EIA: average electricity consumption per US household</p>
Oil and Gas Pipeline Monitoring	AT&T case study: OmniMetrix uses AT&T IoT connectivity to help customers monitor oil and gas pipelines, helping reduce inspection time, costs, fuel usage, and emissions
Solar PV Optimization	<u>Internal case study:</u> Solar PV with AT&T's IoT connectivity enabled users to monitor, troubleshoot and improve the performance of installed solar systems. This visibility was found to decrease emissions by reducing the need for a technician to visit site (reducing travel emissions) and increasing uptime in electricity generation (generating additional renewable electricity that can be introduced into the grid).

Reseller

Activity	References and assumptions
Reseller	Average abatement of AT&T IoT enabled solutions used as a proxy. Average includes abatement from: Fleet Management, EV Charging, Smart Pallets, Remote Patient Monitoring, Efficient Building Equipment Funding, Energy Building Management System, Smart Parking, Smart Street Lighting, Residential Smart Meters, Smart Farm Irrigation, Durable Ag Sensors, Oil and Gas Pipeline Monitoring, Advanced Water Metering Infrastructure, Solar PV Optimisation, Efficient Cooling Towers and Carsharing.