

# AT&T 10x Case Study:

*"Efficiency-as-a-Service" Enables AT&T to Reduce Lighting Bills and Emissions* 

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AT&T believes technology plays a critical role in reducing carbon emissions and we are using the power of our network to create a better, more sustainable world. We've set a 10x carbon reduction goal to enable carbon savings 10 times the footprint of our operations by the end of 2025. To meet this goal, we're working companywide to make our own operations more efficient. We're also working with our customers and technology partners to implement and scale carbonsaving solutions. This case study discusses and quantifies the carbon benefits of using AT&T technology to improve efficiency, and is one in a series sharing our learning as we make progress toward our 10x goal. For more information about our goals, our progress, and to view more case studies like this, visit AT&T's 10x website.

## The Challenge:

Overcoming the Upfront Costs of Energy Efficiency. Companies are increasingly focused on energy efficiency for a variety of good reasons. Using energy more efficiently can help businesses reduce costs and address stakeholder expectations to decrease emissions and associated climate impacts. Improving energy efficiency typically requires replacing aging equipment with more energyefficient technologies – often requiring significant upfront capital expenditure that can make it difficult to justify the required investment. Organizations need a model to overcome that challenge and boost energy efficiency.

"Since 2008, the AT&T Energy Program has aggressively pursued energy efficiency projects at our facilities. There came a point in time when the readilyfundable projects – those with high return on investment – were gone. We needed a way to continue the momentum, and EaaS helped us overcome funding hurdles and expand our portfolio of projects tremendously."

– John Schinter, Assistant Vice President, Energy, AT&T

# The Solution:

Efficiency-as-a-Service (EaaS) can create immediate electricity and cost savings without upfront capital investment. Using AT&T Internet of Things (IoT) connectivity, EaaS providers can accurately measure and model the energy savings that companies can realize through implementation of energy-efficient technologies. That information helps EaaS providers generate immediate electricity cost savings for their users, while also allowing them to pay for the

installation of the technology over time.

#### How does the EaaS model work?

Consider the electricity usage pattern for lighting in a typical office building in which the lights are usually on during working hours, and low at night. As you can see in Figure 1, more efficient smart lighting can help reduce the electricity needed to power the lights, and sensors can help ensure they are only turned on when needed. Although these equipment upgrades can produce significant savings on utility bills, upfront investment costs can be prohibitive. EaaS providers help companies



Page 2

overcome that barrier by using cost models to accurately demonstrate energy savings that could be realized by installing energy-efficient smart lighting technologies. Based on that information, the company and the EaaS provider may enter into an agreement under which the EaaS provider agrees to fund installation and maintenance of the energy efficiency technology, including IoT connectivity. This system sends almost real-time lighting usage information to a centralized system that measures and validates electricity savings for their customer.

As depicted in Figure 2, when engaged in a typical EaaS program, the company pays two electricityrelated bills – one a significantly decreased bill to its electric utility, and one to the EaaS provider based on the amount of energy cost savings enabled by the energy-efficient technology. While there are two bills, the total cost on those bills is typically only 75-90% of the bill before the efficiency upgrade, thereby producing an immediate utility savings for the company. These payments continue until the EaaS provider has been compensated (typically 5-10 years), after which the company retains the energy-efficient equipment and enjoys the full financial benefits of the reduced energy usage – an energy budget reduction windfall.

Energy & Cost	Energy	Cost	Energy	Cost
Utility Lighting Energy Bill	Lighting Energy Savings	Net Savings	Lighting Energy Savings	Net Savings
		EaaS Bill		
	Lighting Energy Used	Utility Lighting Energy Bill	Lighting Energy Used	Utility Lighting Energy Bill
Before Upgrade	During EaaS Program Lighting Upgrade		After EaaS Program Lighting Upgrade	

#### Figure 2:

AT&T IoT connectivity makes the invisible visible by helping EaaS providers accurately quantify the energy efficiency of the new equipment, allowing customers to see and get the benefit of those savings without incurring large upfront costs and waiting months or years for savings to prove out.

"A key component to this program is the ability to meter the savings and collect the data in near real-time. Metering allows us to see how much energy was saved in a given month, which in turn allows us to accurately make the EaaS payment for the energy savings that were delivered in that month."

- Robert Butrico, Senior Energy Manager, AT&T

Page 3



**AT&T's Implementation:** An EaaS solution using AT&T IoT connectivity has been used to deploy efficient lighting systems at hundreds of AT&T facilities, including administrative buildings, data centers, retail stores, work centers and telecommunications equipment buildings across the United States. We expect this program to continue to expand in the coming years as we look at ways to use this model for different applications and in more buildings. We are also working with technology and business collaborators to leverage AT&T IoT technology to create EaaS programs that enable similar benefits for companies that are having trouble funding energy efficiency projects in administrative and retail buildings.

**Sustainability Impact Overview:** By overcoming investment hurdles, the EaaS model allows AT&T to install more energy-efficient equipment, reducing emissions from purchased electricity. The new equipment also typically has lower maintenance requirements, thus reducing fuel use from truck trips. As of the end of 2017, the EaaS program enabled AT&T to reduce electricity consumption in **647 facilities** that produced almost **\$20M** of annual avoided electricity utility payments, and reduced electricity usage by **183 million kilowatt hours**. That's the equivalent of over **97,500 metric tons** of CO<sub>2</sub>e. These greenhouse gas emissions are equivalent to:



Not consuming almost 11M gallons of gasoline<sup>1</sup> or



Taking almost 21K cars off the road<sup>2</sup> or



33 wind turbines running for a year<sup>3</sup>

"Our corporate sustainability initiatives at AT&T are built on the fundamentals of the triple bottom line. As such, financial responsibility is critical to our continued success, and the EaaS program has been a tremendous asset in helping us grow our environmental programs in a financially responsible manner."

- Charles Herget, AVP Sustainability Integration, AT&T

2 Ibid.

<sup>1</sup> https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

<sup>3</sup> lbid. (however, using the electricity kWh saving figures rather than the conversion with marginal national US factors used in the EPA equivalencies calculator)



Our typical office building<sup>4</sup> achieved energy savings of over 500,000 kWh each year with EaaS. If this solution were deployed at **1,000** similar office buildings across the US, it could contribute to annual carbon savings of almost **280,000 metric tons** CO<sub>2</sub>e, equivalent to:



Not consuming over 30M gallons of gasoline<sup>5</sup> or

Taking almost 60K cars off the road<sup>6</sup> or



 $^{\uparrow}$  89 wind turbines running for a year<sup>7</sup>

#### Using the EaaS program, AT&T:

- 1. Realizes the electricity and carbon-saving benefits of more efficient equipment without upfront investment.
- 2. Reduces recurring electricity expense slightly from the beginning of the program term,
- 3. Reduces electricity expense dramatically and retains the use of the high-efficiency equipment after the term of the program, typically 5 – 10 years.

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<sup>4</sup> Average for AT&T administration buildings (excluding non-office buildings and data centers).

<sup>5</sup> https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

<sup>6</sup> Ibid.

<sup>7</sup> Ibid. (however, using the electricity kWh saving figures rather than the conversion with marginal national US factors used in the EPA equivalencies calculator)



### **Carbon Impact Methodology**

Carbon Trust and BSR (Business for Social Responsibility) collaborated with AT&T in the development of a methodology to measure the carbon benefits of AT&T's technology. The details of the methodology can be found on the AT&T 10x website. Here is a brief summary of the analysis for this case study:

Description of the Enabling Technology	AT&T connectivity enables Efficiency-as-a-Service (EaaS) providers to track energy and cost savings resulting from an upgrade in energy- efficient equipment. The AT&T EaaS case study focuses on lighting equipment (e.g. LED lightbulbs, sensors and control systems). AT&T connectivity plays a fundamental role in enabling the EaaS model, as without the connectivity the third party funding partner would not be able to track energy savings and the lack in certainty would prevent the initial investment.	
Impact Category	This case study focuses on carbon impacts	
Materiality	In facilities where renewable energy is unavailable, electricity use produces greenhouse gas emissions that contribute to climate change. AT&T is developing solutions to reduce energy use and its resulting emissions and climate change impacts.	
Attribution of Impacts	The carbon savings in this solution are attributed to AT&T, as its connectivity technology plays a fundamental role in enabling the solution. These savings will result in a reduction in AT&T's Scope 2 carbon emissions.	
Enabling and Rebound Effects		
Primary Effects	New energy-efficient lighting equipment allows AT&T to save energy and reduce their carbon emissions.	
Secondary Effects	Using LEDs rather than heat-intensive fluorescent bulbs lowers cooling (HVAC) requirements. LEDs also have higher life expectancy, reducing the number of maintenance trips required to change lightbulbs.	
Rebound Effects	None	
Trade-Offs or Negative Effects	This technology does not appear to create other outsized or irreparable environmental or social impacts.	
Carbon Burden from the Enabling Technology	The carbon burden from the enabling technology is the embodied carbon emissions associated with the new equipment and the trips (referred to as truck rolls) required for installation.	
Carbon Abatement Calculation		
Scope	The carbon abatement calculation provides the total carbon saved by AT&T in 2017 through the EaaS program minus the additional carbon emissions from the truckrolls required for the installations of the new equipment.	
Timeframe	Calculations in this case study were performed using data from 2016 and 2017. Savings data for 630 facilities was collected in 2016 and assumed to be consistent in 2017. Savings data from 17 additional facilities were collected in 2017 and added to the original set from 2016.	
Functional Unit	The carbon abatement factor calculates the carbon savings (metric tons CO₂e) per facility using more energy-efficient lighting equipment.	

Page 6



Methodology	Energy savings are calculated using metered energy consumption. The metered energy savings are then converted into carbon savings using Environmental Protection Agency (EPA) emission factors. Savings from decreased cooling requirements are assumed to be 40% of metered energy savings. The total number of truck roll miles is calculated using the average number of truck rolls and the average distance per truck roll. The number of total truck roll miles is converted into carbon emissions using EPA emission factors.		
Key Assumptions	For sites with no truck roll data we assumed 2 truck rolls per year driving a distance of 56 mile one-way trip based on average truck roll data. In total, the carbon emissions from truck rolls are equivalent to only 0.002% of the total avoided carbon from reduced energy use in lighting.		
Exclusions	<ul> <li>Embodied carbon emissions associated with equipment (e.g. LED lights; sensors; etc.)</li> <li>Carbon savings associated with reduced maintenance trips to site (due to longer lifetime of LED lights)</li> </ul>		
Data Sources	<ul> <li>Metered savings from EaaS for 2016 and 2017</li> <li>EPA emission factors eGRID 2016 combined with Defra 2016 Well-to- Tank emission factors</li> <li>Number of truck rolls per installation by site</li> </ul>		
Results			
Carbon Abatement Factor	<ul> <li>151 metric tons of CO₂e per facility for all facilities included in this case study, including administrative buildings, data centers, retail stores, work centers and telecommunications equipment buildings across the United States.</li> <li>280 metric tons of CO₂e per facility for adminstrative buildings in the United States.</li> </ul>		