



## 2.2 Energy and Emissions

SAS' Environmental Management Program assigns top priority to minimizing energy consumption and related emissions from its operations. The energy and emissions management program includes energy sourcing, conservation and generation, policy compliance, and employee education and engagement.

SAS® software improves processes for collecting, understanding and managing energy and emissions requirements for facilities worldwide, increasing the ability to report and proactively influence consumption trends. The program uses SAS software to identify reduction strategies, develop and monitor performance indicators, understand relationships between measures, determine initiatives with the greatest effect, and communicate strategy, goals and objectives to facilitate execution. Click [here](#) to access dynamic environmental reporting using SAS Visual Analytics.

Key energy and emissions mitigation initiatives include calculating and reporting global carbon footprint, building and maintaining facilities to LEED® guidelines, investing in renewable energy, pursuing new, energy-efficient technologies for operating buildings and data centers, and proactively maintaining SAS-owned facilities to the highest efficiency standards.

SAS also partnered with organizations such as [The Smart Cities Council](#), [Envision America](#) and the [Research Triangle Region Cleantech Cluster \(RTCC\)](#) to help municipalities become smarter by harnessing the explosion of data sourced from connected devices, social media and the Internet of Things (IoT). Increasing the understanding of innovative and environmentally friendly technologies will help improve efficiencies, reduce costs, identify opportunities and mitigate the impacts of climate change.

### Emissions Management and Emissions Mitigation

SAS decreased energy consumption by 7.7 percent in 2017, despite a 1 percent increase in office space, staff growth of 2.2 percent and rapidly expanding data center operations to satisfy growing customer demand for computing and storage solutions.

Building on its corporate sustainability leadership and IoT technology prowess, SAS took steps to establish a “[smart campus](#)” at its Cary, NC, headquarters. Through SAS' advanced, real-time analytics, the smart campus project will improve energy usage while proactively monitoring equipment performance to boost operational longevity. Starting with a handful of buildings, two on-site solar farms, and select waste

containers, the project will eventually span across most of the 24 buildings on campus. By using analytics to help SAS operate more efficiently and identify ways to make improvements on campus, the company can pass on the firsthand insight of products and best practices to customers for their smart city-related initiatives.

**2017 Data**

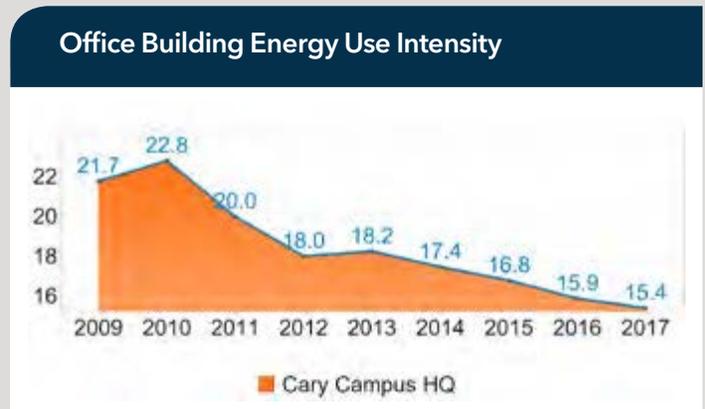
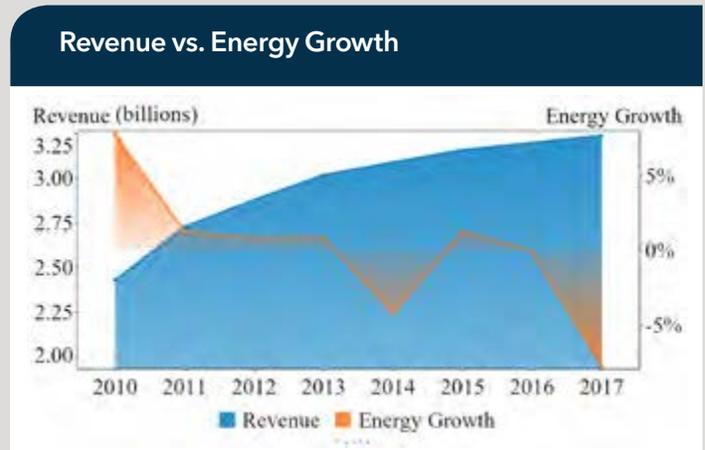
- SAS’ environmental footprint was mitigated by ongoing investment in energy-efficient technologies, smart energy sensors, solar, retro-commissioning of primary office buildings, and adoption of LEED best practices.
- Energy efficiency gains from office buildings (35,661 gigajoules) and data centers (2,345 gigajoules) offset headcount and facility growth in 2017.
- Global scope 1 and scope 2 emissions decreased 4.5 percent.
- Global scope 3 emissions from commercial air travel decreased 4 percent, from 18,685 to 17,950 t CO2e.
- Two primary office buildings at SAS headquarters have more than 300 wireless energy sensors as part of a smart campus initiative to improve access to interval energy data in older SAS buildings.
- SAS achieved LEED Gold certification for its largest office building and data center at its world headquarters. SAS currently has 10 LEED certified buildings globally.
- Use of renewable energy remains a priority for SAS as an integral part of a strategy to reduce emissions. In 2017, SAS renewable energy generation totaled more than 3.5 million kWh.
- SAS continued support for plug-in electric vehicles by providing charging stations with free electricity and premium parking for employees and visitors. SAS now has 94 electric vehicle charging stations with plans for more in 2018.
- SAS offices in France, Netherlands, Spain and the United Kingdom moved to LED lighting for greater efficiency.

In 2017, 78 percent of SAS energy consumption was sourced from electricity suppliers and on-site solar generation. Approximately 28 percent was used for building heating, ventilation and cooling.

**Energy Efficiency**

SAS analyzes operational data to optimize development and delivery of its products and services to customers. The efficiency chart below highlights a sustainable trend of decreasing energy growth against increasing revenues.

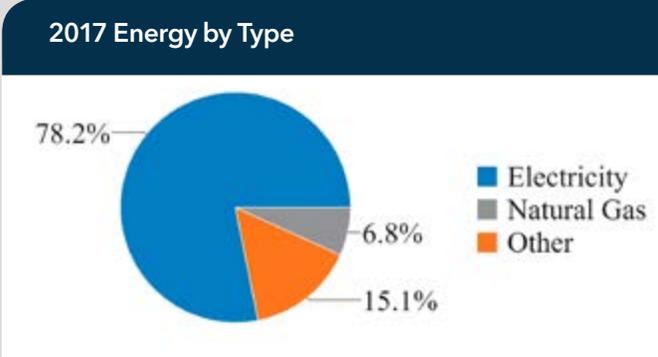
In 2017, SAS’ revenue increased, while overall energy consumption decreased, resulting in a reduced environmental impact for the solutions we provide to our customers.



Energy and carbon use intensities for office buildings decreased 3.1 percent. The 15.4 kWh per square foot for 2017 continues a five-year trend decrease of 15.4 percent. Since 2010, the aggregate intensity has decreased 32.5 percent.

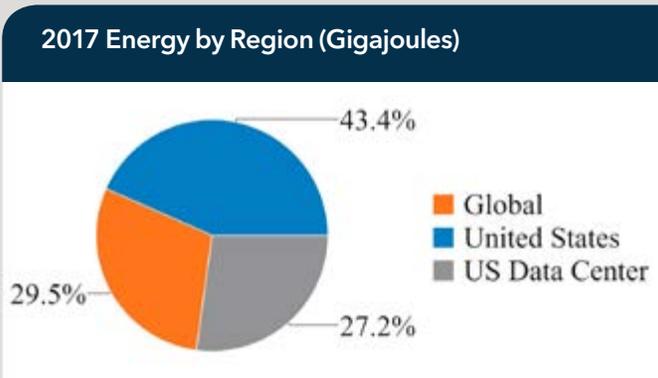
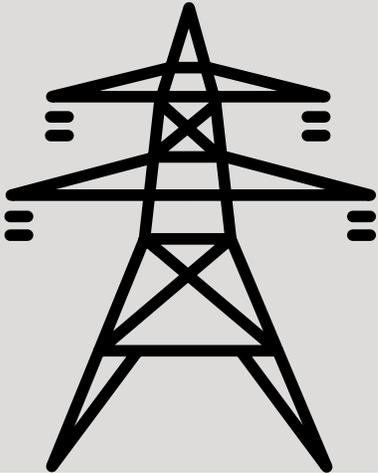
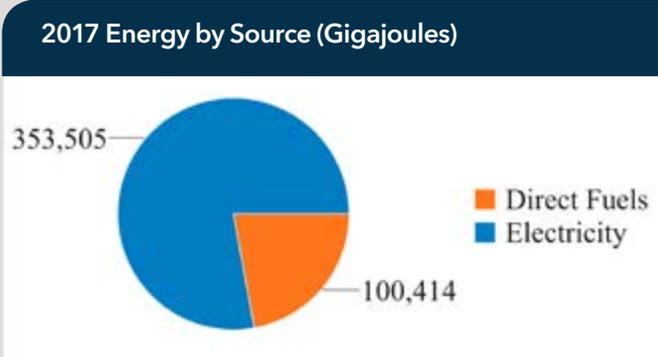
### Energy Trend (Gigajoules)

Regions	2017	2016	2015
Asia Pacific	30,025	32,993	30,180
Canada	11,646	11,535	9,476
EMEA	87,770	100,770	97,163
Latin America	4,240	4,869	4,188
United States	196,831	216,007	220,416
US Data Center	123,406	125,751	130,914
<b>Total</b>	<b>453,919</b>	<b>491,925</b>	<b>492,337</b>



### Energy Variance (Gigajoules)

Regions	2017	2016	Variance	Variance %
Asia Pacific	30,025	32,993	-2,967	-9.0%
Canada	11,646	11,535	111	1.0%
EMEA	87,770	100,770	-13,000	-12.9%
Latin America	4,240	4,869	-629	-12.9%
United States	196,831	216,007	-19,176	-8.9%
US Data Center	123,406	125,751	-2,345	-1.9%
<b>Total</b>	<b>453,919</b>	<b>491,925</b>	<b>-38,006</b>	<b>-7.7%</b>



## Environmental Surveys

SAS annually completes the CDP and EcoVadis Supply Chain surveys to show our customers how environmental and social responsibility is incorporated across operations. In 2017, SAS achieved an overall CDP performance score of B-. The average performance score for more than 3,300 supplier responses was C-. SAS achieved Silver recognition and is ranked in the top 22 percent of all suppliers on the EcoVadis supplier assessment. SAS is ranked in the top 4 percent of all software companies in the environmental category.

### Data Center Operations

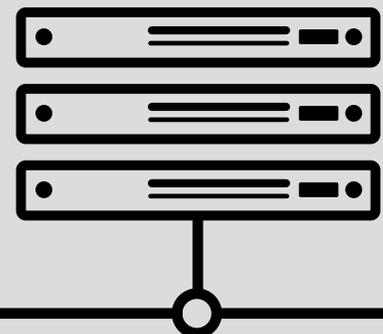
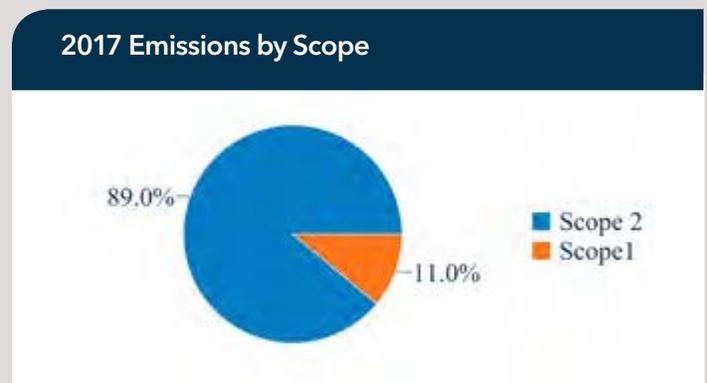
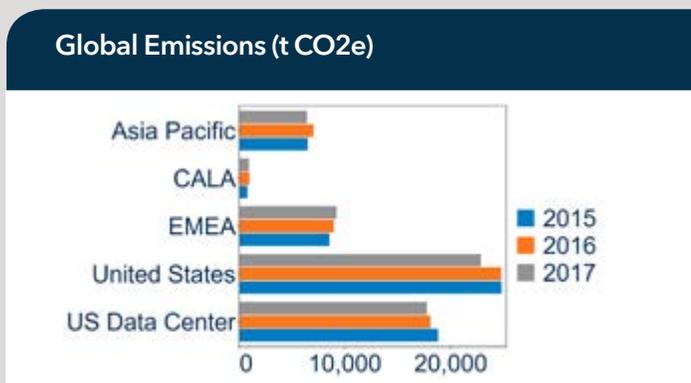
Energy for data center operations is the largest contributor to SAS' environmental footprint. This is due to increased demand by customers for energy and data center space to handle additional computing and storage solutions as well as IT globalization. To maintain the support expected by customers, SAS invested in high-efficiency technologies and designs to construct a new, dedicated computing facility at its world headquarters, emphasizing efficiency, flexibility and sustainability.

SAS data center operations regularly achieve an average power usage effectiveness (PUE) of 1.35 or better. A PUE of 2.0 means that for every watt of IT power consumed, an additional watt is consumed to cool and distribute power. Thus a PUE closer to 1.0 indicates greater efficiency.

#### 2017 Data

Despite adding 43 percent more servers in 2017, SAS data centers managed to decrease energy consumption by 1.9 percent.

Global Emissions Variance (t CO2e)				
Regions	2017	2016	Variance	Variance %
Asia Pacific	6,479	7,060	-581	-8.2%
Canada	620	614	6	1.0%
EMEA	9,232	9,020	212	2.4%
Latin America	347	403	-57	-14.1%
United States	22,893	24,808	-1,915	-7.7%
US Data Center	17,791	18,129	-338	-1.9%
<b>Total</b>	<b>57,362</b>	<b>60,034</b>	<b>-2,673</b>	<b>-4.5%</b>



### Solar and Renewable Energy

Since 2008, when SAS broke the solar energy 1 megawatt barrier for the Southeast US, the capacity of solar installations in North Carolina has grown to 4,308 MW - ranking the state No. 2 nationally. Solar power now accounts for 14 percent of all energy capacity in North Carolina. SAS proved solar was viable, and the community responded.

#### 2017 Data

SAS increased its capacity of solar farms by 140 kW. SAS' nine global solar installations generated 12,727 gigajoules of clean renewable energy. Since 2008, SAS has generated more than 109,000 gigajoules of solar energy - approximately 88 percent was sold to North Carolina utilities in support of the state's Renewable Energy Portfolio Standard.

At a combined 2.3 MW in capacity, SAS' solar farms are located on 12 acres at world headquarters in Cary, NC. The photovoltaic (PV) solar arrays generate 3.8 million kilowatt-hours of clean, renewable energy each year, reducing carbon dioxide emissions by more than 2,000 tons annually - the amount of emissions produced by consuming more than 367,000 gallons of gasoline.

- Solar Farm I (December 2008): 1 MW in capacity, five acres and 5,040 panels; generates 1.6 million kWh of clean renewable energy annually.

- Solar Farm II (July 2010): 1.34 MW in capacity, seven acres and 5,236 panels; generates 2 million kWh of clean renewable energy annually.
- Building C: 405 roof-mounted panels, 74 kW-capacity solar PV system; generates 100,000 kWh of electricity annually.
- Building R: 702 roof-mounted panels, 169 kW-capacity solar PV system; generates 200,000 kWh of electricity annually.
- Building Q: 176 roof-mounted panels, 45 kW-capacity solar PV system; generates 60,000 kWh of electricity annually.
- SAS Sweden: 80 roof-mounted panels, 20 kW-capacity solar PV system; generates 25,000 kWh of electricity annually.
- Building T: 24 roof-mounted 4-by-10-foot solar thermal panels provide hot water for on-site cafeteria.
- Building G: 42 roof-mounted 4-by-10-foot solar thermal panels provide hot water for showers and laundry for the campus gymnasium.
- Building C: Eight roof-mounted 5-by-6-foot evacuated-tube type solar thermal panels produce hot water for on-site cafeteria. The system works in concert with a building HVAC chilled water system and uses additional heat extracted from water-to-water heat pumps.

Solar Energy Trend (Gigajoules)				
Solar Arrays	2017	2016	2015	2014
Rooftop PV	1,239	1,203	1,194	1,041
Rooftop Thermal	443	457	440	362
Solar Farms	10,969	11,835	11,699	12,184
<b>Total</b>	<b>12,650</b>	<b>13,495</b>	<b>13,333</b>	<b>13,586</b>

Solar Energy Variance (Gigajoules)				
Solar Arrays	2016	2017	Variance	Variance %
Rooftop PV	1,203	1,239	36	3%
Rooftop Thermal	457	443	-14	-3%
Solar Farms	11,835	10,969	-867	-7%
<b>Total</b>	<b>13,495</b>	<b>12,650</b>	<b>-845</b>	<b>-6%</b>

All reports are based on actual resource data collected from owned and leased offices, and intensity metrics applied to approximately 21 percent of leased office space that does not have access to actual data. SAS applies the Greenhouse Gas (GHG) Protocol recommended standards and IPCC Fifth Assessment Report (AR5) factors to report emissions inventories under our operational control.

