ENVIRONMENT

Multiplying Efficiencies

At FedEx, we connect people and possibilities around the world, responsibly and resourcefully. Building on a philosophy we call Practical Sustainability, we work to multiply efficiencies, minimize impacts and apply innovative solutions to enable opportunities for our business and customers. Central to our Practical Sustainability philosophy are four interconnected building blocks — performance, transparency, innovation, and leadership — that drive strategic, transformational stewardship to strengthen our operations, grow our business, and add value to society.

The FedEx Express International headquarters in Hoofddorp, the Netherlands, is one of the greenest offices in Europe. The carbon-neutral, LEED Platinum building conserves energy with features like intelligent lighting controls and produces more energy than it consumes through solar panels and a combined heat and power plant that runs on biological waste.
Reduce, Replace, Revolutionize

Reduce, Replace, Revolutionize is the global strategy that informs our approach to Practical Sustainability.

Reduce: Minimize or eliminate impacts from activities and operations.

Replace: Apply the right solutions in the right applications.

Revolutionize: Discover and utilize cutting-edge technologies and solutions.

Throughout the organization, our Reduce, Replace, Revolutionize strategy guides environmental efforts to drive efficient use of resources and cost savings in four key areas:

- Aircraft efficiency
- Vehicle efficiency
- Sustainable facilities
- Sustainable materials and recycling

In each of these areas, our Practical Sustainability philosophy helps us determine the right sustainability initiatives, which are then guided by input from the experts on our Sustainability Impact Teams (SITs). Collectively, these efforts have contributed to an approximately 37 percent reduction in CO₂ emissions intensity (on a revenue basis) across the enterprise from FY09 to FY18, a period in which revenue grew by 84.5 percent.

Team member engagement is also central to success in achieving our sustainability strategy and goals. A variety of internal programs encourage FedEx team members to actively contribute to our continued progress at reducing fuel emissions, energy use and waste in the workplace. Examples include FedEx® Fuel Sense and Eco Drive at FedEx Express, Energy Watch at FedEx Freight, Simplify Your Center at FedEx Office, and EarthSmart Champions at FedEx Ground.

37% decrease in CO₂ emissions intensity (on a revenue basis) since FY09

2,690,828 metric tons of CO₂e emissions avoided from enterprise-wide fuel and energy saving initiatives in FY18*

*Includes on-site solar, building lighting retrofits, FedEx Fuel Sense, aircraft fleet modernization, FedEx Express vehicle efficiency, and FedEx Freight intermodal rail usage.
Energy and GHG Emission Reduction

FedEx operates a fleet of more than 670 aircraft and more than 180,000 owned and contracted on-road and non-road vehicles (including some 80,000 company-owned vehicles over which we have operational control) around the world. The fuel used to power this fleet represents a significant operational cost, as well as our most material environmental impact, accounting for almost 6 percent of operating expenses and 92 percent of our emissions footprint in FY18. Our continued rapid growth means we must seek new approaches and available technologies to optimize efficiency in our vehicle and aircraft fleets, and facilities. Through these efforts we have been able to decrease our GHG emissions intensity on a gross revenue basis. We are proud of the continued reductions we have made in GHG emissions intensity and have adopted a number of strategies to continue improving efficiency:

- Setting ambitious fuel efficiency and emission reduction targets.
- Modernizing our aircraft and vehicle fleet.
- Incorporating alternative fuels into our fleet.
- Using more purchased transportation, including interline commercial air carrier and intermodal rail transport.
- Engaging team members and customers in energy efficiency initiatives.
- Advocating for regulatory and policy changes that support emissions reduction, efficiency improvements, and cleaner technology.

See the Data Appendix for FY18 and year-over-year results on:

- Direct and indirect energy consumption
- Direct and indirect GHG emissions
- Emissions intensity
- Other significant air pollutants

<table>
<thead>
<tr>
<th>FedEx Initiatives</th>
<th>FY18 Cost Savings Estimates ($)</th>
<th>FY18 Emissions Avoided (metric tons CO₂e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft fleet modernization, FedEx® Fuel Sense operational improvements</td>
<td>$394 million</td>
<td>1,970,391</td>
</tr>
<tr>
<td>Fuel-efficient driving, vehicle technology improvements, alternative fuel usage</td>
<td>$65 million</td>
<td>240,171</td>
</tr>
<tr>
<td>and electric vehicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermodal rail transport</td>
<td>$134 million</td>
<td>296,510</td>
</tr>
</tbody>
</table>

The Role of Interline and Intermodal Transport in Our Emissions Intensity Calculations

Where appropriate, we use interline commercial air carrier transport to maximize system and network efficiency and lower costs, which in turn reduces fuel use and emissions. We collaborate with others to carry FedEx packages on routes where our aircraft have less than a full load. This makes our air operations in that region more efficient. We also use intermodal rail for some FedEx Freight and FedEx Ground shipping, which provides the efficiency of rail for the long-haul portion, and the convenience of trucks to deliver freight to the originating intermodal terminal and the final destination.

These practices have shifted some emissions from Scope 1 to 3. To maintain transparency, we are including Scope 1, 2 and 3 as part of our CO₂ emissions intensity reduction (on a gross revenue basis). We have reduced our CO₂ emissions intensity (on a revenue basis) by approximately 37 percent from FY09 through FY18. Including just our Scope 1 and 2 emissions as part of this intensity comparison would have shown a greater reduction of approximately 43 percent for the same period.
Aircraft Efficiency

Goal: Reduce aircraft emissions intensity 30 percent from a 2005 baseline by 2020.

Progress: 22.6 percent reduction since 2005 baseline.

Goal: Obtain 30 percent of jet fuel from alternative fuels by 2030.

Progress: The first delivery of commercially viable and available alternative jet fuels is anticipated in 2020.

With the world’s largest dedicated all-cargo air fleet, making sure our aircraft operate as efficiently as possible is essential to both our operational performance and environmental commitments. We apply the three-part Reduce, Replace, Revolutionize approach to meet our ambitious operational goals and maximize efficiency.

This means we:

• Reduce fuel use in flight operations through our global FedEx® Fuel Sense program.
• Replace and modernize our planes with more efficient aircraft.
• Revolutionize our operations by exploring and employing alternative fuels and technologies.

In FY18, this approach achieved strong results. Our aircraft modernization and FedEx Fuel Sense programs saved more than 204 million gallons of fuel and avoided more than 1.97 million metric tons of CO₂e emissions during the fiscal year.

Commitment to Sustainable Aviation

FedEx is committed to efforts that will make aviation more sustainable. For the last several years, we have participated in the effort to develop the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) program alongside our industry association. This year CORSIA was adopted by the International Civil Aviation Organization (ICAO), a specialized agency of the United Nations, which has the authority to enforce the provisions of the program. CORSIA will complement the aviation industry’s multi-pronged strategy, which includes development of alternative fuels to reduce emissions on a lifecycle basis and the advancement of engine and airframe technology to improve efficiency. CORSIA is designed to achieve the international aviation industry’s goal of carbon neutral growth starting in 2020. In 2019 and 2020, airlines will report emissions from international flights in accordance with the requirements of CORSIA, and the data will be used to set the 2020 emissions baseline. Beginning in 2021, FedEx and other airlines subject to the requirements of CORSIA will be responsible for purchasing and retiring carbon credits to offset emissions in excess of the baseline set in 2020.

Progress against Aircraft Emission Goals

<table>
<thead>
<tr>
<th>Year</th>
<th>Revised goal 30%</th>
<th>Original goal 20%</th>
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</thead>
<tbody>
<tr>
<td>2009</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>10.6%</td>
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<td>2012</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>2020</td>
<td>30.0%</td>
<td></td>
</tr>
</tbody>
</table>

1 Revised goal set in 2011: Reduce aircraft CO₂ emissions intensity by 30 percent by 2020, using FY05 as the baseline year.
2 Original goal set in 2008: Reduce aircraft CO₂ emissions intensity (on a pounds-per-ATM basis, or Available Ton Mile) 20 percent from a 2005 baseline by 2020. FedEx was the first U.S. airline to make a public commitment to reduce aircraft emissions.
3 In 2011, we changed from reporting by calendar year to reporting by fiscal year.
4 In the 2013 Global Citizenship Report, we reported that we had reduced our aircraft CO₂ emissions intensity in FY13 to a total reduction of 22.3 percent from 2005 levels. This result occurred from a comparison against our original 2005 calendar year benchmark. However, in comparison against our FY05 benchmark, which differs from the calendar year, the total reduction in emissions intensity was 20.2 percent from 2005.
Aircraft Efficiency (continued)

Reduce
FedEx® Fuel Sense
Since 2006, the FedEx Fuel Sense program has leveraged the insights and ideas of aviation team members and experts who have built a culture of fuel-saving behavior and systems. A total of 59 projects have been identified, and 655 million gallons of jet fuel have been saved since then as well. Collectively, FedEx Fuel Sense programs saved more than 94 million gallons of jet fuel in FY18, and avoided more than 912,000 metric tons of CO₂e emissions, an increase of 7.4 percent over FY17 savings.

During FY18, three FedEx Fuel Sense programs contributed considerably to efficiency and operational cost savings:

• **Auxiliary Power Unit (APU) Program** — This program changed the way we think of using the APU, a small jet engine primarily used to power the aircraft systems while in the gate. We substitute ground (electric) power instead of operating the APUs, and have set new parameters for when the APUs should be powered up and shut down. During FY18, this program saved almost 11 million gallons of fuel and avoided 104,000 metric tons of CO₂e.

• **Cost Index Programs** — Flight dispatchers utilize a feature in their flight planning system that balances fuel costs with aircraft speed to plan each flight at the lowest cruise speed to arrive at its destination on time. During FY18, this program helped to lower operating costs, saved 8 million gallons of fuel, and avoided 77,000 metric tons of CO₂e.

• **Top of Climb Optimization** — This program re-evaluates the expected flight arrival time when an aircraft reaches top of takeoff climb. Using actual takeoff time, the program can determine any changes to expected arrival time. If the flight is expected to arrive early, the dispatcher calculates a slower cruise speed to save fuel while maintaining an on-time arrival. This program was based on improved decision-making and coordination between flight crews and dispatchers, and saved 515,000 gallons of fuel and $959,000 in associated fuel costs in FY18.

Replace
Aircraft Modernization
Through our ongoing modernization program, FedEx maintains one of the world’s largest and most innovative all-cargo aircraft fleets. Our aircraft modernization strategy delivered even more benefits in FY18, saving 109,644,262 gallons of fuel and avoiding 1,058,368 metric tons of CO₂e, a 22.7 percent increase over the previous year.

We have been working to reduce aircraft emissions since 2005, our baseline year, and announced our first reduction goal in 2008. Since 2005, our aircraft emissions intensity has decreased by 22.6 percent.

However, our progress falls short of the overall improvements needed to meet our 2020 reduction goal. Continued higher shipping volumes and the need to maintain older aircraft marked for retirement while we await production of more efficient replacements have presented challenges to meeting our goal. In June 2018, FedEx Express committed to purchase an additional 12 Boeing 777 Freighters and 12 Boeing 767 Freighters, and as of February 2019 has pending orders for 21 Boeing 777F aircraft and 57 Boeing 767F aircraft, with delivery scheduled from 2019 through 2025. The inclusion of these new aircraft will improve fleet efficiency, operating costs and operational flexibility for FedEx Express.

Our feeder aircraft fleet, which covers shorter routes, is also being upgraded. In FY18, we entered into agreements to purchase 50 Cessna SkyCourier 408 aircraft and 30 ATR 72-600F aircraft, which improve fuel efficiency, reliability and operating costs.

For details on our aircraft fuel and emissions savings, see the Data Appendix. For details about our aircraft purchase commitments, see the 2018 Annual Report.

Revolutionize
Aircraft Biofuels
Our goal to obtain 30 percent of jet fuel from alternative fuels by 2030 underscores our commitment to explore all avenues to reducing emissions from our aircraft. We have collaborated with our industry, government agencies, academia and alternative fuel suppliers in search of viable, cost-effective alternatives. In FY18, the journey to aviation biofuels reached a milestone. Red Rock Biofuels, which will supply low-carbon, renewable jet fuel to FedEx Express, broke ground on a biodiesel refinery. The first delivery of alternative jet fuel is anticipated in 2020.

Also in FY18, the ecoDemonstrator, a Boeing 777F built for FedEx Express, became our first plane to fly 100 percent on biofuel during a short-term period that also tested and gathered data on 35 new technologies. Read more about this specially equipped plane here.
Vehicle Efficiency

Goal: Increase FedEx Express vehicle fuel efficiency 50 percent from a 2005 baseline by 2025.

Progress: 39.6 percent improvement from a 2005 baseline.

The FedEx global ground transportation fleet includes more than 180,000 on-road and non-road vehicles, approximately 80,000 of which are company-owned vehicles within our operational control. By applying our Reduce, Replace, Revolutionize approach, we are improving the fuel economy of FedEx fleet vehicles and reducing GHG emissions:

- **Reduce** miles driven and fuel used through efficiencies such as optimizing route structures and using innovative tracking that correlates driver behaviors with fuel efficiency.
- **Replace** older elements of our vehicle fleet with the most up-to-date and efficient technology viably available.
- **Revolutionize** our fleet through timely testing and adoption of innovations, such as electric and alternative fuel technologies, where applicable, as well as exploration of emerging technologies like autonomous vehicles, mobile command centers and robots.

Through FY18, our efforts collectively resulted in a 39.6 percent improvement in FedEx Express vehicle fuel efficiency from our 2005 baseline.

See the Data Appendix for FY18 and year-over-year results on:

- Vehicle fuel use (diesel, gasoline, propane, Liquefied Natural Gas, Compressed Natural Gas)
- Number of alternative fuel vehicles (hybrid, electric, Liquefied Natural Gas, Compressed Natural Gas, Liquefied Petroleum Gas, hydrogen fuel cell)
- Fuel saved and emissions avoided through vehicle efficiency efforts

### Progress against Fuel Economy Goals

<table>
<thead>
<tr>
<th>Year</th>
<th>New goal 50%¹</th>
<th>Revised goal 30%²</th>
<th>Original goal 20%³</th>
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<tr>
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<tr>
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<tr>
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<tr>
<td>2017</td>
<td>33.5%</td>
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</tr>
<tr>
<td>2018</td>
<td>37.9%</td>
<td>39.6%</td>
<td>39.6%</td>
</tr>
</tbody>
</table>


**23m**

gallons of fuel saved, a 9.3 percent improvement over FY17

**240,171**

metric tons of CO₂e emissions avoided, equivalent to the emissions from 51,428 passenger cars driven for one year
**Reduce and Replace**

**Technology and Operations**
Across the enterprise, we work to utilize the emission technology available in each market for our vehicles.

This enables us to reduce emissions and minimize the impact of the remaining legacy vehicles in the fleet. The effects of this approach are especially notable at FedEx Express, which operates more than 85,000 company-owned and contracted vehicles around the world and has committed to maintaining a robust emission strategy, well ahead of low-emission zone and other regulatory requirements.

Innovative approaches such as platooning, which we demonstrated with Volvo Trucks North America in FY18, offer the potential to increase truck fuel efficiency while enhancing safety. When two or three trucks can drive closely behind one another, fuel efficiency improves as a result of reduced drag, which accounts for up to 25 percent of a truck’s fuel consumption. Our platooning demonstration allowed trucks to follow each other in a safe and controlled manner by using automated vehicle-to-vehicle communication in which the lead truck has the ability to detect an issue by radar and signal to the following trucks for automated responses using collision mitigation and other technology. This is an example of our efforts to both reduce fuel use and revolutionize our fleet at the same time. See the Safety section and press release for more on this promising approach to efficiency and safety.

FedEx Freight also continued replenishing some of its fleet early in FY18, replacing older tractors and other equipment with newer models that enhance efficiency and safety. However, as with our aircraft modernization program, some of the older tractors slated for replacement have been kept in service to accommodate company growth.

**Intermodal Rail Transport**
Use of intermodal rail transport at FedEx Freight, which is 70 percent more efficient than transport by road, saved an additional 25,846,666 gallons of fuel and avoided 296,510 metric tons of CO₂e emissions, a nearly 12 percent increase over FY17. This reflects a 10 percent increase in rail miles for FedEx Freight intermodal shipping during FY18 compared to the previous year.

An 11 percent increase in diesel fuel savings due to greater use of intermodal rail helped to offset the impact of retaining some older vehicles and improve overall emissions reductions at FedEx Freight during FY18.
Revolutionize
Alternative Fuel Vehicles
At FedEx, we are continuing our “revolutionize” approach to alternative fuel and vehicle technologies. The continued adoption of alternative fuel and advanced technology vehicles will play a critical part in reducing our global GHG emissions, while also benefiting the broader transportation industry. We are intensifying efforts toward greater use of electric vehicles and exploring fuel cell-powered vehicles, among other advanced technologies.

Electric Vehicles
Advances in battery technology are making it possible to electrify segments of the transportation sector, including parts of the FedEx vehicle fleet. As a result, in FY18, we were able to add 445 electric vehicles to our global fleet, resulting in more than 2,554 electric vehicles in service by the end of the fiscal year, including forklifts, airport ground service equipment and delivery trucks.

In FY18, FedEx Freight also completed assessments to determine return on investment and optimization factors for selecting electric versus propane forklifts. The assessment evaluated infrastructure installation costs, charging requirements, propane purchase costs, and other factors to determine when electric or propane forklifts are the better choice. Future plans at FedEx Freight include incorporating the Tesla Semi electric tractors into the fleet. However, delivery is not anticipated for several years and will require infrastructure upgrades for large electric vehicles. To this end, we are currently focusing on our facilities to make sure they are equipped to charge many electric vehicles at once. See the Sustainable Facilities section for details on the ways we are beginning to upgrade our infrastructure with new technology and incorporate additional on-site solar installations to power an electric fleet.

FedEx Express is continuing to increase its use of electric vehicles — which not only reduce emissions, but also lower maintenance costs. In 2019, we expect to acquire 1,000 Chanje V8100 electric vehicles for FedEx Express in California, a significant step in our efforts to scale up the electrification of our fleet, especially for urban delivery. These vehicles can travel more than 150 miles when fully charged and have the potential to help save 2,000 gallons of fuel while avoiding 20 metric tons of CO₂e emissions per vehicle each year. Outside the U.S., FedEx Express is testing electric vehicles in China and Europe, with a view to strategically scale the adoption of commercially viable models in those markets soon.

Electrification Coalition
The FedEx commitment to electric vehicles as a path to further reduce emissions and enhance operational efficiency starts at the top. Since 2009, our Chairman and CEO, Frederick W. Smith, has served on the Electrification Coalition. This nonpartisan, not-for-profit group of business leaders is committed to promoting policies and actions that facilitate deployment of electric vehicles on a mass scale. Mr. Smith also has advocated for transportation electrification through the Electrification Coalition by championing the development of the Coalition’s Fleet Electrification Roadmap, a comprehensive analysis of the business case for electric-drive technology adoption among the more than 16 million commercial, corporate, and government fleet vehicles in the United States. For more information, see the Coalition website.
Vehicle Efficiency (continued)

Biodiesel and Other Fuels
Across the FedEx enterprise, we continued adding alternative fuels to our fleets in FY18, including biodiesel, liquefied natural gas (LNG), compressed natural gas (CNG), propane and fuel cells.

FedEx Ground sells biodiesel to contracted service providers through a network of more than 80 fuel island locations. In FY18, 70 percent of diesel sold to service providers consisted of various biodiesel blends, avoiding almost 55,000 metric tons of CO₂e emissions. Beyond providing pre-blended biodiesel at those fuel island locations, 27 locations also have on-site blending technology. We plan to expand the fuel island network throughout the U.S. based on careful evaluation of each geography and extend the saving benefits of the fuel program. During FY18, FedEx Ground also worked with a propane distributor in Illinois to install our first propane fueling facility, and another facility is expected to be announced later in 2019.

In FY18, we had more than 330 CNG and LNG vehicles in service. Our fleet now includes more than 100 CNG tractors at FedEx Freight, reducing diesel fuel use and emissions. FedEx Freight continues to monitor the development of natural gas vehicles and explore additional opportunities to add more to the fleet. However, the availability of natural gas engines capable of meeting our freight needs is limited.

Hydrogen fuel cell technology offers the potential for low-emission alternatives to traditional engines, and could provide excellent range for longer routes. FedEx Express currently operates 15 fuel cell cargo tugs at the Memphis World Hub and continues seeking extended-range electric vehicles, but fueling infrastructure remains an impediment. Through a U.S. Department of Energy grant, FedEx Express recently evaluated a medium-duty fuel cell vehicle with an extended range.

Innovations for Urban Mobility
Operating effectively in congested urban areas requires ongoing innovation. FedEx seeks to identify innovative last-mile delivery solutions as the number of vehicles in cities continues to outpace infrastructure. We are evaluating emerging technologies through a number of pilot programs. For example, in one pilot, FedEx Express is assessing the potential role of artificial intelligence to connect vehicles to infrastructure, such as traffic lights, which could help optimize routes. Another pilot explores innovative approaches that would allow us to transport a large batch of packages to one area of a city, then use small electric vehicles or vans to deliver them to their final destinations. This would help to minimize the number of larger delivery vans and trucks in congested city centers.

### Alternative Fuel Vehicles

<table>
<thead>
<tr>
<th>Vehicles</th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
</tr>
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<tbody>
<tr>
<td>Total Alternative Fuel Vehicles</td>
<td>2,724</td>
<td>2,865</td>
<td>3,873</td>
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<tr>
<td>Hybrid</td>
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<tr>
<td>Electric</td>
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<tr>
<td>Compressed Natural Gas/Liquefied Natural Gas</td>
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<td>220</td>
<td>331</td>
</tr>
<tr>
<td>Liquified Petroleum Gas (LPG) (Propane)</td>
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<tr>
<td>Hydrogen Fuel Cell</td>
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</tr>
</tbody>
</table>

(1) Total does not include propane-powered forklifts. FY18 increase due to inclusion of on-road LPG vehicles at TNT.
Sustainable Facilities

**Goal:** Seek Leadership in Energy and Environmental Design (LEED) certification on all new U.S. FedEx Express buildings.

**Progress:** On track, with five additional LEED-certified facilities in FY18.

The efficient operation of our more than 5,000 air and ground hubs, local stations, freight service centers, and retail locations is critical to achieving our sustainability goals and our business objectives. From efficient facility design and construction, to state-of-the-art energy management and waste minimization practices, we are working to make our worldwide facilities more sustainable.

Our operating companies improve efficiency in many ways, including by certifying facilities to external standards, where viable, that encompass a host of environmental criteria. These include:

**LEED**
- In FY18, FedEx Express completed five new LEED-certified facilities in the U.S., bringing the total number to 19 facilities covering an area of 825,142 square meters.
- FedEx Express operates three LEED-certified facilities outside the U.S., including the FedEx Express International headquarters in Hoofddorp, the Netherlands, which is certified LEED Platinum.
- FedEx Ground has six LEED-certified facilities.
- FedEx Office has one LEED-certified facility.

**ISO 14001**
- FedEx Express operates 561 facilities certified to the ISO 14001 environmental management system standard.
- Two more FedEx Supply Chain facilities in the U.S. achieved ISO 14001 certification in FY18, bringing the total to three facilities for that operating company.

**BREEAM (Building Research Establishment Environmental Assessment Method)**
In Europe, FedEx Express International uses BREEAM as the standard for all new buildings. For offices, our minimum building standard is BREEAM Excellent, and for warehouses, our minimum standard is BREEAM Good.

**Other Facility Sustainability Programs**
The FedEx Ground EarthSmart Champions program aims to increase employee participation and engagement in sustainability initiatives in every facility. The program grew significantly in FY18, adding 212 champion sites, an 85 percent increase over the previous year. The FedEx Freight GREEN Site internal certification program, which recognizes facilities that complete certain actions to reduce environmental impacts, like recycling and conserving energy, included all FedEx Freight sites in FY18.
Facility Energy Efficiency
Energy efficiency is an important component of our sustainable facilities approach, encompassing both our Reduce and Replace strategies.

Lighting Retrofits
As in previous years, lighting retrofits — including upgrading to LED for interior and exterior lights and installing motion sensors and lighting control systems, among other upgrades — make up a large part of our energy efficiency projects. In FY18, we upgraded an additional 27 facilities. Along with previous retrofits, these upgrades saved more than 230 million kWh of electricity and avoided 171,252 metric tons of CO₂e emissions in FY18. Since the program began in 2007, lighting retrofits at 1,112 facilities have saved more than 1.2 billion kWh of electricity.

Energy Management Systems
Centralized energy management systems also contribute to our efficiency efforts by setting temperature controls to adjust for occupied and vacant building times, controlling lighting, and identifying the most energy-intensive buildings and potential energy-saving opportunities. At FedEx Office, a new energy management system was rolled out at 508 stores in FY18, with others planned for the coming year. We also have centralized energy management systems in place at 27 facilities across other operating companies.

However, recent assessments have shown the combination of LED lighting and motion sensors enhances efficiency as much as sophisticated control systems, and therefore remains our primary lighting efficiency measure. Where possible, we also work with suppliers to help them increase the energy efficiency of equipment in our facilities that support FedEx operations. For example, during FY18, we collaborated with key technology suppliers to update our data center infrastructure. The program reduces power consumption by 62 percent, from 70 kilowatts per hour to 26.6 kilowatts per hour, and is expected to save more than $1 million in energy costs over five years.
Renewable Energy
Goal: Expand on-site energy generation and continue to procure renewable energy for facilities.
Progress: 3 new solar installations in FY18.

Revolutionizing Energy Management
Expanding on-site renewable energy generation and procuring renewable energy are examples of revolutionizing our facilities. At 24 FedEx facilities, renewable and alternative energy systems — including on- and off-site solar, as well as fuel cell technologies — generated almost 33 million kWh of clean energy in FY18. These installations reduce GHG emissions and operating expenses, advance our renewable energy goals and demonstrate industry leadership. With the addition of three new on-site solar installations during FY18, FedEx on-site solar generation capacity grew to more than 21 million kWh at 23 facilities in FY18. This is equivalent to the annual electricity consumption of 2,342 homes. One of our newest renewable energy installations is a FedEx Ground on-site solar project in Hawaii that features our first implementation of energy storage through state-of-the-art Powerwalls, which are rechargeable lithium ion batteries with liquid thermal control.

In addition, electricity generated by on-site fuel cells totaled 12.8 million kWh in FY18, an increase of 33 percent over FY17. Along with on-site solar, these revolutionary energy initiatives underscore our ongoing commitment to reducing emissions through best available technologies. As renewable energy technology continues to evolve, we seek new ways to revolutionize our energy management approach. This includes greater investments in solar energy and fuel cell technology that we hope will allow us to create our own on-site microgrid pilots. Already, three FedEx facilities are powered by both fuel cells and solar, and we have begun exploring the possibility of replacing diesel backup generators with on-site solar, fuel cells, combined heat and power technology, and energy storage. Together, these advancements could create a microgrid and provide a more efficient alternative to generators that, while historically necessary, largely sit unused.

We also continue to closely monitor opportunities to purchase off-site renewable energy, although certain regulatory and accounting structures present obstacles. We currently purchase off-site renewable energy in the State of Washington and continue looking for other locations where the practice is viable.

See the Data Appendix for details on our efficient facilities.

33 m
kWh of clean energy generated at 24 facilities in FY18
FedEx-branded packaging — the familiar envelopes and corrugated boxes provided to our customers and used to protect their shipments in transit — is the largest volume of material we purchase each year.

We also purchase other types of materials for our operations, such as vehicle maintenance supplies, other packaging supplies and pallets.

**Responsible Packaging**

Minimizing packaging and maximizing recycling volume conserve resources, reduce waste and improve transportation emissions efficiency. As of FY18, 100 percent of FedEx-branded packaging is recyclable, and 54 percent is made from recycled content. For FY18, we began reporting the third-party-certified content percentage of our packaging materials, which reached 55 percent for the year, mostly from certified corrugated packaging. To reduce the potential for wasted packaging, we have approved packaging specifications and ordering allocations. Quarterly audits of our packaging suppliers further ensure branded packaging meets all specifications and guidelines. The FedEx Sourcing team also evaluates each critical packaging supplier annually on environmental management practices, continuously monitoring and improving sustainability programs where possible.

Optimizing packaging by making weight, size and content adjustments helps customers ship more efficiently, such as through dimensional, or dim, weight pricing based on package volume. This allows us to make the best use of space in our aircraft, vehicles and distribution centers, improves loading efficiency, and reduces emissions. Dim weight pricing also encourages customers to make packaging adjustments that maximize product density and reduce packaging materials.

FedEx Packaging Services works with customers to optimize package size and design, which reduces their costs and environmental impacts. Our specialty engineers assess existing packaging and recommend more efficient designs, followed by performance testing to make sure the redesigned packaging meets customer needs with just the right amount of material. We also work to make sure our customers’ packages are delivered free of any damage that could lead to a return and replacement.

For details about the volume and percentages of packaging materials, paper, and other operational materials with recycled content, see the [Data Appendix](#).
Sustainable Paper
After corrugated packaging, paper represents our most used material, so our operating companies have implemented a variety of strategies to responsibly source, use, and recycle paper.

Those efforts delivered notable results in FY18. We doubled the percentage of paper purchased with recycled content over FY17. Across the FedEx enterprise, the vast majority of our paper use takes place during printing operations at approximately 2,000 FedEx Office locations. Providing customers with sustainable paper options is essential, so we stock clearly labeled, sustainably sourced paper options, which we encourage customers to choose. The FedEx Office forest-based product procurement policy includes vendor requirements for responsible forest-management practices, as well as recycled-content standards.

FedEx Office applies a holistic approach to responsibly sourcing, using and recycling paper, as well as managing operations. This includes engaging team members and customers in our sustainable practices, along with a forest-based product procurement policy that encourages manufacturing of innovative, sustainable paper products. We purchase the vast majority of our paper from suppliers who are certified by sustainable forest programs, such as the Forest Stewardship Council (FSC). In fact, 99.7 percent of all paper purchased by FedEx Office during FY18 was third-party-certified, including 88 percent that was FSC certified. In addition to purchasing our paper from certified forest programs, we are looking to reduce tree pulp consumption overall. We continue purchasing “tree-free” products, or those that use alternative fibers, like agricultural residues. We plan to continue researching these alternatives and others to ensure the continued reduction of our paper footprint.

For more information about our supplier purchasing policies, please see the CSR Overview section. For the percentages of FSC and other third-party-certified sustainable paper used by FedEx Office year over year, see the Data Appendix.

Engaging our Customers
At FedEx Office and other operating companies, we aim to make it easy for our customers to reduce material use and increase recycling. FedEx Office® Print Online, for instance, allows our commercial customers to print locally, avoiding unnecessary shipping and enabling them to preview projects before production, which reduces wasted pages.

The longstanding paper shredding and recycling service at FedEx Office allows customers to bring any documents, including sensitive items such as tax returns, to a FedEx Office location and have them securely and confidentially shredded, then recycled. During FY18, almost 9.9 million pounds of paper were shredded and recycled.

Waste and Recycling
As our business grows to meet the accelerating demands of e-commerce and other shipping needs, our waste management strategies help ensure we recycle more of our own waste and encourage customers to recycle our packaging.

In FY18, 78 percent of the solid waste generated in our operations was sent to recyclers, an increase of 7 percentage points over the previous year, and the volume of landfilled waste dropped by almost 23 percent in FY18 over FY17. Our operating companies use different waste reduction and recycling strategies to maximize waste diversion for their unique operations. At FedEx Ground, some smaller facilities send their recyclable items to a larger facility where they are combined and picked up for recycling. This allows our waste management vendors to limit the number of facilities visited to pick up recyclables. We also diverted close to 22,500 metric tons of wood waste materials, including pallets, away from landfills in FY18.

Also in FY18, FedEx Ground reduced waste further by eliminating the core on plastic film — widely used to wrap and secure packages — and replacing it with a reusable core. Roughly 900,000 cardboard cores will no longer need to be recycled or sent to landfills, which is equal to diverting almost 1.2 million pounds of paper. In addition, this film is lighter than its predecessors, making it easier for team members to handle.

For details about the volume of waste generated, recycled and landfilled year over year across FedEx operating companies, see the Data Appendix. Included are:

- Solid waste
- Hazardous waste
- Non-hazardous regulated waste
- Universal waste
- Electronic waste