

# IBM's contributions towards achieving the United Nations Sustainable Development Goals

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## Introduction

The United Nations (UN) Sustainable Development Goals (SDGs) are 17 interconnected and equally valued initiatives aimed to build a sustainable and inclusive world by 2030. Unanimously committed to by 193 nations in 2015, these goals build on the previous eight Millennium Development Goals. The 17 SDGs contain 169 proposed targets with implementation strategies for countries to adopt. In response, governments, businesses, civil society and the UN are mobilizing and/or demonstrating efforts to contribute toward achieving these goals.

IBM's commitment to global service and sustainability dates back nearly five decades. In 1969, IBM CEO Thomas J. Watson Jr. wrote:

"We accept our responsibilities as a corporate citizen in community, national and world affairs; we serve our interests best when we serve the public interest... We want to be at the forefront of those companies which are working to make our world a better place."

IBM's leadership in gender and workplace equality predate that. We hired our first women and African

American employees in 1899. In 1984, we became one of the first companies to include sexual orientation as part of our commitment to nondiscrimination.

We issued our first formal corporate policies on providing a safe and healthful workplace, environmental protection, and conserving energy and natural resources in 1967, 1971 and 1974 respectively. These policies were updated over time and consolidated into one corporate policy on environmental affairs in 1990.

From 2010 through 2017, the IBM Smarter Cities Challenge® program combined IBM talent and technology to tackle urban challenges. More than 800 high-performing IBMers collaborated with leaders in 138 cities on 6 continents for actionable solutions.

The P-TECH™ (or Pathways in Technology Early College High School) education model pioneered by IBM in partnership with educators in 2011 is a groundbreaking public education reform initiative designed to address both education and workforce development issues. P-TECH helps to strengthen regional economies with a workforce more prepared for new-collar jobs and provides current, relevant



technical and professional education opportunities to young people from primarily disadvantaged backgrounds.

Through our powerful IBM Cloud™ platform, we are changing how the world works by delivering innovative capabilities such as computation and storage, data and Watson services, and Internet of Things (IoT) and blockchain services. With blockchain, IBM is playing an active role in the achievement of enhanced food security and improved nutrition through better data across food supply chains.

Today, as Ginni Rometty, our chairman, president and CEO has stated, “we remain dedicated to leading the world into a more prosperous and progressive future; to creating a world that is fairer, more diverse, more tolerant, more just.”

The pages that follow detail how IBM is uniquely positioned to contribute to the 17 SDGs across five key areas: products, services, and solutions; workplace diversity and inclusion; environmental programs; supply chain; and corporate citizenship initiatives.

Additional information about the United Nations Sustainable Development Goals can be found at: <https://sustainabledevelopment.un.org/>.

## Products, services and solutions

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IBM values innovation that matters, not just for our company, but also for our clients and the world — and this commitment includes the application of our expertise and technologies to solve environmental challenges. Our products, services and solutions enable our clients to conserve natural resources, reduce the environmental impacts associated with their operations, and make informed decisions that drive improved sustainability. We are enabling water agencies to monitor and manage environmental stressors, cities to increase the accuracy of pollution forecasting, property managers to conserve energy in buildings, farmers to improve crop yield and food safety, and more. The environmental benefits resulting from IBM's investment in these technologies and solutions and their implementation far exceed the benefits that can be realized from reducing the environmental impact of our own operations by advancing the sustainability of our clients globally and society-at-large.

We have identified seven SDGs that are particularly relevant to our leadership efforts in creating products, services and solutions to address sustainability issues at scale.

### Blockchain

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As individuals and businesses alike are embracing digital technologies to become more efficient, IBM is

uniquely positioned to harness the power of blockchain — a distributed, immutable ledger technology — to create end-to-end solutions for digital traceability, supply chain transparency, and secure exchange of information across a variety of transactions and networks of participants. As a founding member of the Linux Foundation's Hyperledger project, IBM has extensive expertise in blockchain technology and is deploying it in the cloud environment.

Recognizing its value in solving significant business problems, IBM is pioneering the use of blockchain in developing solutions that will reshape industries in domains as varied as finance, healthcare, supply chain, and manufacturing. Through the application of blockchain technology, IBM is helping to address business and sustainability challenges of our clients, while also contributing to the achievement of the UN SDGs.

With blockchain, IBM is playing an active role in the achievement of enhanced food security and improved nutrition through better data across food supply chains. For example, IBM has demonstrated how a digitized food tracking system can benefit and improve food safety in China. Leveraging a blockchain technology solution, IBM researchers created a model with end-to-end traceability, full supply chain transparency, and greater supply chain efficiencies. From a single receipt, retailers can

obtain vital data, including information on suppliers, production locations, and quality and safety inspections. Inherent features of blockchain help build trust in the exchange of information and enable easier detection of contamination sources, helping to create safer food supply chains.

IBM is also exploring the potential of blockchain technology to help improve drug research and public health. To meet global challenges in the secure and efficient exchange of health data, IBM signed a research initiative with the U.S. Food and Drug Administration (FDA) in January 2017. IBM and the FDA are exploring how a blockchain framework can support secure, efficient and scalable exchange of health data needed across all stages of the biomedical discovery lifecycle, including clinical trials data, genomic data, and clinical evidence data. As the promise of blockchain in healthcare becomes increasingly evident, IBM is working to create the technologies to enable a scalable and decentralized data sharing ecosystem that can lead to new discoveries to improve public health and also result in the controlled, compliant sharing of patient information.

#### About IBM Blockchain

IBM is rapidly expanding its blockchain capabilities and actively working with companies to understand what it takes to make blockchain ready for business. Food supply chains and healthcare are two areas that are poised for dramatic change using blockchain networks. For more information about IBM Blockchain, visit <https://www.ibm.com/blockchain>.

#### Watson IoT

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IBM's Watson™ portfolio of solutions represent a new era in cognitive computing. The solutions, delivered through the cloud, analyze high volumes of data, understand complex questions posed in natural language, and propose evidence-based answers. Watson continuously learns, gaining in value and knowledge over time, from previous interactions. IBM offers Watson solutions and applications for a range of industries to gain insights

from structured and unstructured data and to scale client expertise.

IBM's Watson IoT™ platform is enabling an instrumented digital world. Leveraging cognitive engines on this platform, IBM is making sense of the data deluge produced by thousands of connected things – sensors, devices, machines, buildings, vehicles, and people – and building specialized, integrated solutions to solve industry and business challenges. With Watson IoT, IBM is creating opportunities to improve resource efficiency, reduce greenhouse gas emissions and pollution, improve food security, and mitigate the adverse impacts of weather. Watson IoT is changing the approach to a sustainable environment through better situational awareness, enabling us to change our behavior based on what our connected world is telling us, and contributing to the global effort to achieving a sustainable planet as envisioned by the SDGs.

For example, Watson IoT is shaping the future of agriculture and enabling more sustainable farming by providing farmers with insight into meteorological data. IBM is using “hyperlocal” weather forecasting provided by in-field weather sensors to help farmers improve agricultural productivity. Access to accurate, localized weather conditions impacting the land is helping farmers make more informed decisions on field operation scheduling, harvest timing, equipment deployment, soil needs and nutrient requirements.

Watson IoT connected networks also share real-time data that can be valuable to cities – from reducing the negative impacts of urban activities, to increasing resiliency, to improving the accuracy of environmental forecasting. Green Horizons, a 10-year global initiative launched by IBM in 2014, is harnessing the power of Watson IoT to model and forecast air pollution. IBM's China Research Laboratory has been working with the Beijing Environmental Protection Bureau to create and continually enhance a pollution forecasting and management system that analyzes current emissions and predicts weather effects on pollutant

dispersal. In partnership with IBM, the city of Beijing achieved a 35 percent reduction in fine particulate matter (PM<sub>2.5</sub>) emissions between 2013 and 2017. Building on the successful partnership with the Beijing Environmental Protection Bureau and forging numerous collaborations in other cities across China, IBM has taken the initiative global with new commercial and research engagements across four continents including those in India, South Africa, Japan, the United Kingdom and the United States. For more information on Green Horizons projects, visit: <http://www.research.ibm.com/green-horizons/>.

IBM's Green Horizons initiative is also supporting the global shift from fossil fuels to renewable energy – which is necessary to help achieve reductions in carbon dioxide emissions. IBM has developed a renewable energy forecasting system to help utility companies predict how much available renewable energy sources they will have ahead of time. Combining information on solar farm and wind turbine locations and sizes with weather forecasting data, the system can predict the performance of wind and solar energy farms with 90 percent accuracy several days ahead. These capabilities enable better utilization of available renewable energy and more effectively integrate new capacity into the grid, leading to energy savings in thousands of megawatts that would otherwise be lost. The system has already been deployed at numerous wind and solar energy farms around the world. One example is China's largest renewable energy initiative, the Zhangbei Demonstration Project, which is now able to integrate 10 percent more renewable energy into the national grid.

IBM is also using IoT technology to provide services and solutions to help building managers and operators make smarter decisions to reduce their energy use. IBM IoT Building Insights uses Augmented Intelligence (AI) and Brick Uniform Building Metadata Schema to deliver an up-to-date and accurate view of every building in an enterprise. Whether it be for energy diagnostics and prediction or future occupancy insights, IBM's IoT Building

Insights platform is designed to consolidate, store, analyze, and learn from the things and people in buildings. IBM IoT Building Insights starts by connecting data from various sources. These include IoT sensors, main meters and sub-meters, as well as data coming from any building management system. Using this data, the system begins to learn the behavior of the things and people in the building with respect to energy usage. A knowledge graph of client buildings and assets is created within the semantic metadata layer. The analysis uses AI models and historical data to create a baseline for each building, identify anomalies, predict energy consumption and identify waste.

At PhotonStar Technology Ltd., Watson IoT data is combined with the local weather forecast, allowing operators to anticipate weather conditions and adjust building temperature, lighting, heating, and cooling parameters to eliminate wasted energy. The solution can save up to 50 percent of heating costs by triggering proactive decisions based on live weather conditions. For example, building managers can remotely turn on building heating systems when cold weather is moving in. The solution also enables automatic window shade lowering or raising in response to changes in sunlight and temperature.

Watson IoT technology is also being used to strengthen the resilience of water ecosystems. In June 2013, IBM, Rensselaer Polytechnic Institute, and the FUND for Lake George announced a multi-year collaboration, "The Jefferson Project at Lake George," with the goal to monitor, understand, and predict environmental stressors associated with this natural ecosystem. The partners created a resiliency model using millions of measurements collected from IoT sensor platforms in Lake George. Insights from the Jefferson Project can be used and are made available to any organization globally, including government agencies, in assisting their efforts to protect freshwater sources and sustain ecosystem functioning.



### About Watson IoT

IBM is investing to expand Watson's IoT capabilities. Applying cognitive IoT insights from these end-to-end solutions, clients can optimize resource efficiency, eliminate waste, increase productivity, and drive sustainable business outcomes. For more information about Watson IoT, visit <https://www.ibm.com/internet-of-things/>.

### Watson Health

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IBM's Watson Health™ business unit is dedicated to the development and implementation of cognitive and data-driven technologies to advance health. Watson Health technologies are tackling a wide range of the world's biggest healthcare challenges including cancer, diabetes, drug discovery and more through data and cognitive insights. There are a variety of ways in which Watson Health serves as a catalyst to achieve the targets of the SDG for health.

**Drug Discovery** – When researchers can uncover novel patterns and connections more quickly they can accelerate discovery, which can lead to effective pharmaceuticals going to market and reaching patients sooner.

The IBM Watson™ for Drug Discovery offering helps our clients to understand what is currently known with great speed and scale, and generates evidence-based hypotheses with more confidence. In life sciences, Watson for Drug Discovery is currently in use tackling challenging diseases such as amyotrophic lateral sclerosis (ALS) and Parkinson's with tangible results.

For example, the Barrow Neurological Institute used Watson for Drug Discovery to explore unidentified genes and proteins that may be linked to ALS. In a matter of months, the system rank-ordered all of the nearly 1,500 RNA-binding proteins encoded by the human genome and proposed predictions regarding which proteins might be associated with ALS. The Barrow team then examined Watson's top evidence and found eight of the top 10 ranked proteins proved to be linked to ALS. They further found that Watson

for Drug Discovery had uncovered five never-before linked proteins associated with ALS. In November 2017, this study was published in the journal *Acta Neuropathologica*.

For more information about Watson for Drug Discovery and the innovation it is supporting, visit <https://www.ibm.com/us-en/marketplace/ibm-watson-for-drug-discovery>.

**Oncology** – The IBM Watson™ for Oncology offering, trained by Memorial Sloan Kettering (MSK), complements the work of oncologists, supporting them in clinical decision-making by enabling them to access evidence-based, personalized treatment options from more than 300 medical journals, more than 200 textbooks, and nearly 15 million pages of text. Watson for Oncology evaluates the patient's clinical data, including dozens of clinical attributes relevant to the individual's treatment plan. Then, potential treatment options based on MSK training are generated for each patient with the associated reference material. The physician then determines and discusses the appropriate treatment with the patient. A growing body of data supports the use of Watson for Oncology in cancer care. For example, the *Annals of Oncology* published a full study led by oncology leaders at Manipal Hospitals in India. Their tumor board found Watson for Oncology was concordant with their own tumor board's treatment decisions in 93 percent of breast cancer cases.

For more information about Watson for Oncology, visit <https://www.ibm.com/watson/health/oncology-and-genomics/oncology/>.

**Genomics** – The IBM Watson™ for Genomics offering identifies and supports the interpretation of genomic data and provides insights as to whether that data is actionable.

For example, in a study published in November 2017 in *The Oncologist*, University of North Carolina Lineberger Cancer Center researchers used IBM Watson for Genomics to assess whether cognitive computing was as effective as a panel of cancer experts in identifying therapeutic options for tumors



with specific genetic abnormalities. In a retrospective analysis of 1,018 cancer cases, the molecular tumor board identified actionable genetic alterations in 99 percent of 703 cases, which Watson also confirmed. Using the curated Watson for Genomics gene list, researchers identified additional potentially actionable genomic information in 324 patients, 96 of whom were not previously identified as having an actionable mutation. The Watson for Genomics analysis took less than 3 minutes per case.

In July 2017, *Neurology Genetics* published a study that found Watson for Genomics accurately interpreted whole genome sequencing data for a glioblastoma patient in 10 minutes compared to 160 expert human hours.

For more information about Watson for Genomics, visit <https://www.ibm.com/watson/health/oncology-and-genomics/genomics/>.

#### About Watson Health

Whether advancing toward a big-picture vision or delivering meaningful experiences to a single individual, our mission is to improve lives and enable hope. We arm health professionals with the technology and expertise they need to power thriving organizations, support vibrant communities and solve health challenges for people everywhere. For more information about Watson Health, visit <https://www.ibm.com/watson/health/>.

## Workforce diversity and inclusion



At IBM, diversity, gender equality and inclusion are critical in IBM's mission to build a workplace that attracts, develops, excites and retains talent. With diversity, gender equality and inclusion, we think differently, we see differently, and we deliver differently, and through doing so, we deliver meaningful value to our clients.

IBM has led in gender equality and inclusion for more than a century, hiring its first women and African American employees in 1899. Today, these concepts have been woven into the fabric of IBM. They are business priorities and a part of our values.

### Women in the workplace

IBM is committed to development and advancement of women in our workplace. From our first three women hires in 1899 to IBM's ongoing recognition for working mothers, multicultural women, and executive women, we continue to drive a culture of inclusion where women can thrive.

We've done this through initiatives such as Elevate — a leadership development program focused on helping to prepare women to be considered for advancement from middle-management positions into senior leadership roles through customized learning plans, coaching, and shadowing opportunities. The program, which began in 2015, has reached over 700 women across 20 countries. About half of the participants have already been promoted into senior roles in the company.

"IBM thinks about diversity the way we think about innovation — both are essential to the success of our business. When we innovate, technology becomes smarter for clients and creates new opportunities for growth. When we incorporate diversity into our business, we create better innovations and outcomes. IBM has embraced diversity, and it gives opportunities for IBMers and our clients to achieve their full potential." — Ginni Rometty, Chairman, President and Chief Executive Officer, IBM

In addition, IBM is helping foster next generation developers by supporting programs that empower women in technology. Our global diversity and inclusion initiatives have strategically and purposefully focused on technical women's career development and advancement, based on our belief that "you can't be what you can't see." In a world where less than 5 percent of CEOs at S&P 500 companies are women, IBM continues to take pride in our Chairman's leadership and the diverse perspective that offers us.

IBM has made numerous achievements towards providing a gender equal workplace. In 2016, IBM started [Tech Re-Entry](#), a 12-week "returnship" program for skilled women re-entering the workforce after taking a break. The program provides an opportunity to work as an intern on high-level projects with a senior level mentor for 12 weeks when re-entering the workforce.

Most recently, IBM was honored with the prestigious 2018 Catalyst Award for leadership in building a workplace that values diversity and inclusion for its program, "Leading the Cognitive Era Powered by the Global Advancement of Women." IBM was the only tech company honored in 2018 and the only company in the history of the award to be recognized for a fourth time.

## Diversity constituencies

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As a multinational technology company and one of the world's largest information technology (IT) sector employers, with more than 365,000 employees worldwide, IBM is recognized as a global thought leader in the development and implementation of inclusion programs and policies. IBM is committed to providing a safe, open and inclusive working environment for all of its employees across the globe.

In 1995, IBM commissioned eight executive task forces — Asian, Black, Hispanic, Lesbian/Gay/Bisexual/Transgender (LGBT), Men, Native American, People with Disabilities, and Women. The task forces were asked to look at IBM through the lens of their group and develop strategies to welcome these groups, help them to maximize productivity, and to advocate for them. One of the results of this work was the implementation of the IBM Global and U.S. Constituency Councils. Today, the councils continue to ensure that IBM attracts, retains, and develops the best talent from their respective constituencies and creates an inclusive environment.

Since its inception in 2002, IBM has participated in the Human Rights Campaign (HRC) Corporate Equality Index. The HRC is a nationally recognized voice for advocacy, information and guidance on lesbian, gay, bisexual, transgender and queer (LGBTQ) workplace issues. It strives to advance LGBTQ equality at work and create workplaces free from discrimination. IBM has received a perfect 100 score and the designation of being a "Best Place to Work for LGBT Equality" since 2003.

## Accessibility and persons with disabilities

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Including people with different abilities in IBM's workforce is based on sound business judgment and is anchored in IBM's principles and Human Resource strategy. Through training and a recruitment guide, IBM helps recruiters understand how to effectively provide reasonable accommodations when

recruiting people with different abilities and to know what support is available for them within IBM.

For more than 100 years, IBM has been creating accessible solutions designed to adapt to the abilities of all individuals, including people with disabilities; the aging population; novice technology users; and, people with language, learning and literacy challenges. Some early innovations included a Braille printer, a talking typewriter, and the first commercially-viable screen reader. More recently, IBM launched an automated captioning and editing solution and the Mobile Accessibility Checker, which increases the usability of mobile apps and content by ensuring adherence to accessibility standards and regulations.

In 2017, IBM was recognized by the U.S. Business Leadership Network as the Employer of the Year for its commitment to building a better working world through its strategies and actions resulting in measurable results in disability inclusiveness in the workplace, marketplace and supply chain.

## Employee engagement

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IBM's Business Resource Groups (BRGs) are an integral part of IBM's commitment to diversity and inclusion. BRG programs and initiatives support IBM business objectives while providing an additional path for IBMers to engage and achieve their full potential and whole sense of self. BRGs are based on enhancing career development, promoting an inclusive work environment, and generating business value. IBM now has 50,000 employees who belong to 300 BRG chapters registered in 50+ countries. BRG involvement is 100 percent voluntary and open to all employees. Recent groups added include an LGBT+ BRG in Russia and our first Women's BRGs in Saudi Arabia and Pakistan.

## Environmental programs



IBM is committed to environmental leadership in all of its business activities, and we maintain and execute our programs under a global environmental management system (EMS) that ensures we operate with our same high standards, wherever in the world we may operate. IBM's first corporate policy on protecting the environment was issued in 1971. It was updated in 1974 to include energy and materials conservation and recycling.

We believe the way we operate aligns with the UN SDGs, ranging from our programs to conserve energy, water, and other resources; to our commitments to source renewable energy; to the way we design our products to be reused, recycled and disposed of properly at the end of their useful lives; to how we prevent pollution from our operations. At IBM, environmental protection will always be at our forefront, because we have long believed that what is good for the environment is also good for our business.

### Global environmental management system

IBM's [environmental policy](#) provides the strategic framework for the company's global environmental management system (EMS) and objectives. These objectives address areas such as workplace safety, the conservation of energy and other natural resources, environmental protection, and the development and manufacture of environmentally preferable products.

In 1997, IBM became the first major multinational company to earn a single global registration of its EMS to the International Organization for

Standardization (ISO) 14001 standard. We achieved this credential within just one year of the finalization of the first edition of the standard, in part due to the results already delivered under our environmental policy and the early implementation of our global EMS. IBM has sustained this certification for 20 years and in 2017, we completed an update to our global EMS to transition our certification to the 2015 edition of the standard.

IBM's global EMS covers its environmental intersections across the company, including research, product development and manufacturing, real estate operations, procurement and logistics, and asset recovery operations.

**Environmental goals** – Environmental goals are an important part of IBM's EMS and help to demonstrate the company's commitment to environmental protection. We design our goals to address significant environmental aspects and impacts of our operations and to drive continual improvement of our environmental performance. These goals cover energy and water conservation, renewable electricity sourcing, carbon dioxide emissions reduction, product stewardship and waste management. IBM's voluntary goals, as well as our performance against them and our contribution to specific SDGs are discussed in their respective sections below.

**Voluntary environmental initiatives** – Another important aspect of IBM's long-standing commitment to environmental leadership is its collaboration with governments, nongovernmental organizations, leading companies, thought leaders and citizens to protect and preserve the planet. For example, in 1992, IBM became a charter member of the U.S. Environmental Protection Agency's (EPA) ENERGY STAR Computer Program and helped EPA define criteria for computers and monitors. IBM was also one of two industry founding partners that worked with World Wildlife Fund to create its Climate Savers program in 2000.

IBM has been a longstanding member of the Wildlife Habitat Council (WHC), a nonprofit organization dedicated to promoting habitat conservation and management on corporate lands. Five IBM sites in the United States currently have their wildlife habitat management and conservation education program certified by the WHC: Armonk, New York (IBM's Corporate Headquarters); Boulder, Colorado; Research Triangle Park, North Carolina; San Jose, California (IBM's Almaden Research Center); and San Jose, California (IBM's Silicon Valley Laboratory).

For more information on these and other voluntary partnerships in which IBM participates, please see our annual [IBM and the Environment Report](#).

### Energy conservation and climate protection

IBM was an early and sustained leader in energy conservation and climate protection. We formalized

our global energy conservation program in 1973 and issued our first corporate policy on energy conservation in 1974. In 2007, IBM published its [position](#) on climate change: IBM recognizes that climate change is a serious concern that warrants meaningful action on a global basis to stabilize the atmospheric concentration of greenhouse gases (GHGs). We believe that all sectors of society and the economy, as well as governments worldwide, must participate in solutions to climate change.

To that end, IBM's environmental strategy and programs address the key climate change challenges underlying the UN SDGs. They cover energy conservation and efficiency of our operations and logistics, sourcing energy from renewable generation assets, developing energy-efficient products, and designing and operating energy-efficient buildings, including data centers.

**Energy conservation** – Energy conservation is a major component of our comprehensive, multifaceted climate protection program because the release of carbon dioxide (CO<sub>2</sub>) by utility companies powering our facilities, or from our use of fuel for heating or cooling, represents the greatest potential climate impact associated with our operations. Because of that, a principal focus of IBM's climate objectives has been its energy conservation goal.

IBM has had a specific, numeric annual energy conservation goal for decades, setting its first energy conservation goal in 1975. The results of this early focus on energy conservation have been significant. From 1990 through 2017, IBM conserved 7.4 million



2017 energy conservation savings by project category

- 52% Data centers
- 16% Heating, ventilation and air conditioning
- 11% Building controls
- 9% Central utility plant
- 7% Lighting
- 2% Continuous commissioning
- 3% Other

megawatt-hours (MWh) of electricity, avoiding 4.4 million metric tons of CO<sub>2</sub> emissions and saving \$616 million through its energy conservation actions.

IBM's energy conservation goal is to achieve annual energy conservation savings equal to 3.5 percent of IBM's total energy use. In 2017, IBM achieved this goal, attaining a 4.2 percent savings from its energy conservation projects.

Annual energy conservation savings					
	2013	2014	2015	2016	2017
% of total energy use	6.7	6.7	6.3	5.3	4.2

Each year, IBM executes thousands of energy conservation projects across all energy consuming areas of its operations. IBM considers energy conservation to be a cornerstone of climate protection. IBM will continue to conserve energy and improve the energy efficiency of its operations, products and services while collaborating with and encouraging its global suppliers to do likewise. More information on energy conservation projects can be found in the energy conservation and climate protection section of the most recent [IBM and the Environment Report](#).

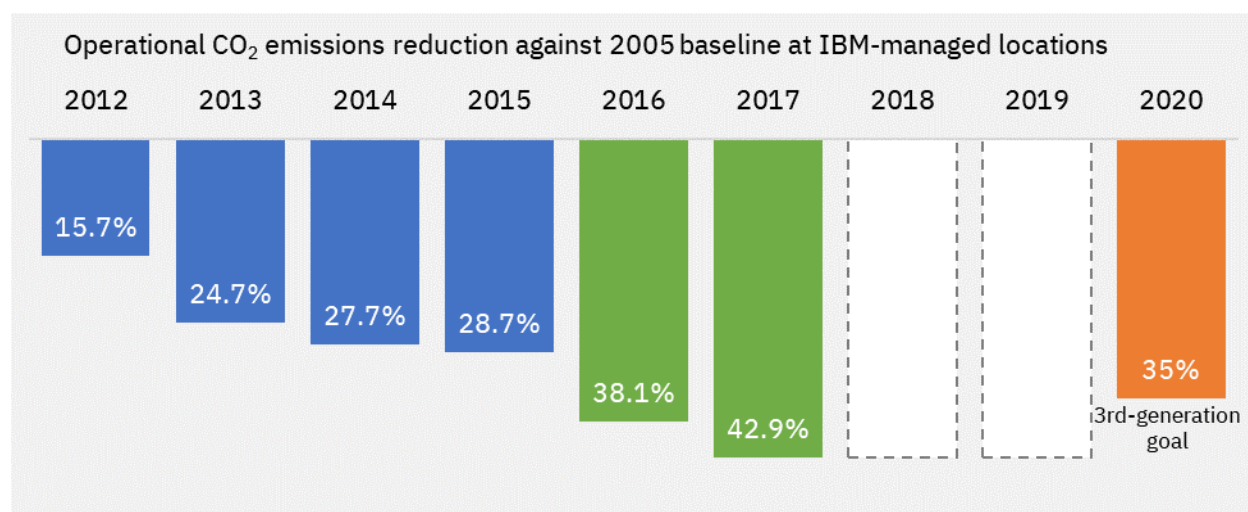
**Operational CO<sub>2</sub> emissions management** – From 2000 to 2016, IBM set and achieved three

successive CO<sub>2</sub> emissions reduction goals. We set our first such goal in 2000 and our second in 2007. In 2015, we established our third-generation CO<sub>2</sub> emissions reduction goal, which called for IBM to reduce CO<sub>2</sub> emissions 35 percent by 2020 against a base year of 2005.

We achieved that goal in 2016, and in 2017 we demonstrated additional emissions reduction progress by implementing energy conservation and efficiency projects. As of year-end 2017, CO<sub>2</sub> emissions have been reduced by 42.9 percent versus a baseline of 2005 and adjusted for acquisitions and divestitures. We drove this result by a continued focus to reduce our energy consumption and a robust renewable electricity procurement program.

IBM is also reducing CO<sub>2</sub> emissions associated with transporting parts and products through the efficient design of its packaging, working with suppliers on their packaging designs and optimizing logistics.

**Renewable electricity** – Another important way IBM is reducing its GHG emissions and contributing to the SDGs is through its increasing use of renewable energy. IBM's sustained commitment is demonstrated by actions dating back more than a decade. Our most recent renewable electricity procurement goal, set in February 2015, is to purchase 20 percent of our electricity consumption



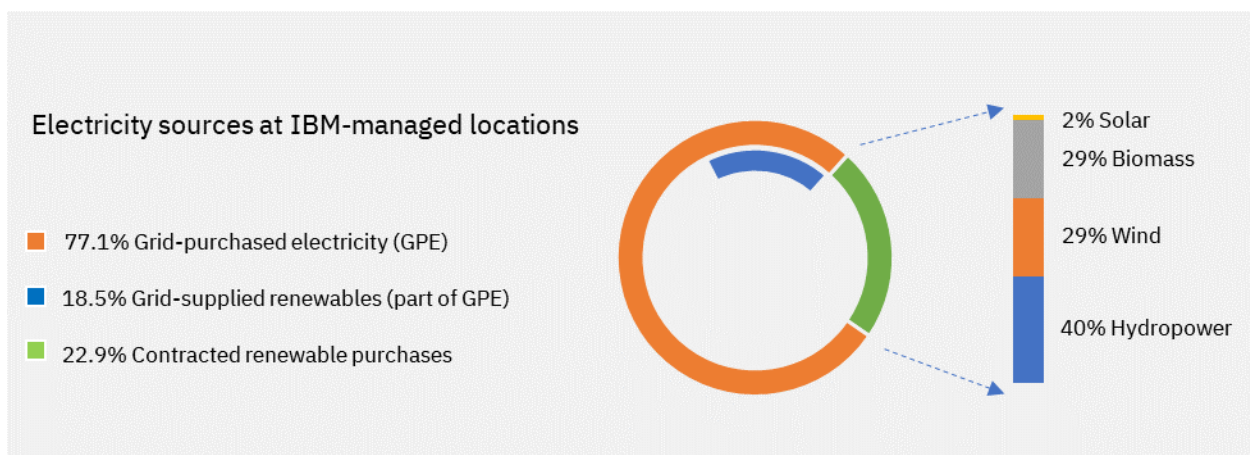
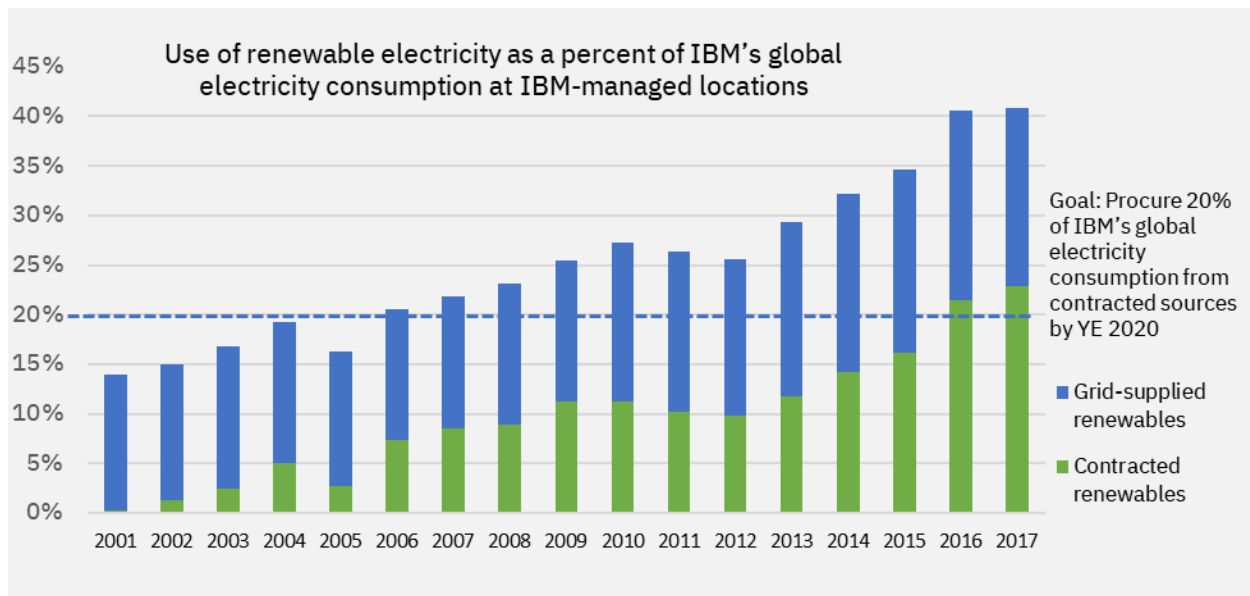


from renewable sources by 2020, over and above the quantity of renewable energy provided as part of the mix of electricity that we purchase from the grid.

In 2017, IBM achieved this goal by contracting with its utility suppliers to purchase approximately 779,000 MWh of renewable electricity, representing 22.9 percent of our global electricity consumption. IBM avoided 275,000 metric tons of CO<sub>2</sub> emissions through these purchases. Combining our contracted renewable electricity purchases and the amount of renewable electricity IBM received as part of the grid

mix, 41.4 percent of our global electricity supply in 2017 was generated from renewable sources.

We procure renewable electricity generated from wind, large and small hydro, biomass, and solar installations around the globe. IBM's contracted renewable electricity purchases have occurred in 20 countries: Australia, Austria, Belgium, Brazil, Denmark, Finland, France, Germany, India, Ireland, Italy, the Netherlands, Peru, Portugal, Spain, Sweden, Switzerland, Taiwan, the United Kingdom and the United States.





## Product stewardship

IBM's Product Stewardship program was established in 1991 to bring additional focus to the corporate environmental affairs policy objectives on product environmental design and performance. Throughout the 1990s and continuing through today, IBM has introduced many industry-leading practices in design for the environment, product environmental metrics and product recycling.

IBM's product stewardship initiatives address the SDGs by promoting energy efficiency; managing scarce resources; and developing and offering products, services, and solutions that enable GHG emissions reductions for IBM and its clients, all while reducing the need for additional resources and waste disposal. Specifically, the program's objectives are to develop, manufacture and market products that are increasingly energy efficient, that can be upgraded and reused to extend product life, that incorporate recycled content and environmentally preferable materials and finishes, and that can be recycled and disposed of safely.

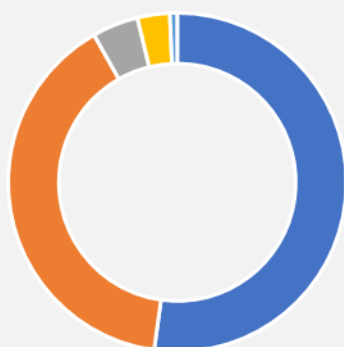
**Product energy efficiency** – IBM has combined hardware and software technologies to improve the energy efficiency of IT equipment and data centers. Some examples of new products IBM has developed with increased performance and improved energy

efficiency can be found on [IBM's energy efficient products, services and solutions webpage](#).

IBM has two goals related to product energy efficiency. The first goal is to continually improve the computing power delivered for each kilowatt-hour of electricity used with each new generation or model of a product. The second goal is to qualify its new server and storage products to the ENERGY STAR program criteria where practical, and where criteria have been developed for the specific server or storage product type. Information regarding performance against these goals can be found on our [2017 voluntary performance goals and results webpage](#).

IBM also actively assists regulatory and standards bodies in the development of product energy efficiency standards.

**Product recycling and reuse** – IBM began offering product takeback programs in Europe in 1989, and has extended and enhanced them over the years, offering solutions to commercial customers in countries where we do business. In many countries and U.S. states, we offer solutions to household consumers for the end-of-life management of computer equipment, either through voluntary IBM initiatives or external programs in which we participate.



2017 product end-of-life management operations  
(% by weight of 26,500 metric tons processed)

- 52.2% Recycled
- 39.6% Resold
- 4.4% Reused
- 3.1% Waste-to-energy
- 0.7% Landfill & incineration

Our goal is to reuse or recycle end-of-life products such that the amount of product waste sent by our product end-of-life management (PELM) operations to landfills or to treatment by incineration does not exceed a combined 3 percent (by weight) of the total amount processed. In 2017, IBM's global PELM operations processed 26,500 metric tons (58.4 million pounds) of end-of-life products and product waste and sent approximately 0.7 percent by weight of end-of-life products and product waste directly to landfill or incineration for treatment.

From 1995, when we first began including product recovery in our annual corporate environmental report, through the end of 2017, IBM has documented the collection and processing of approximately 1 million metric tons (about 2.3 billion pounds) of product and product waste worldwide.

**Product packaging** – IBM has had a program focused on the environmental attributes of its product packaging since the late 1980s. Our corporate environmental requirements for product packaging are included in our environmental packaging guidelines, which were first published in 1990 and have been updated as needed over the years. IBM also has shared its packaging guidelines with its suppliers.

Under IBM's program, packaging engineers design solutions that minimize toxic substances by specifying nontoxic materials and inks. We keep packaging to a minimum while achieving protection of the product being shipped. We also collaborate with suppliers to use recycled and recyclable materials and promote reuse. The design of rugged products, the efficient use of protective packaging, and the environmental benefits resulting from improvements in transportation efficiency are addressed and tracked. The reach of IBM's environmental packaging program includes our supply chain and business partners, which will be discussed in further detail in the supply chain section of this report.

Each year, this program generates savings for our business while reducing a significant amount of

packaging materials. In 2017, IBM saved an estimated 141 metric tons of packaging materials through redesigning packaging for parts and assemblies shipped to manufacturing locations, and for finished products shipped to clients worldwide. These efforts delivered an estimated annual materials and transportation cost savings of \$983,000.

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### Materials and process stewardship

As an integral part of its global EMS, IBM routinely and consistently monitors and manages the substances used in its development and manufacturing processes, and in its products and operations. IBM's focus on environmentally preferable substances and materials considers the weight of scientific evidence for potential adverse effects on human health or the environment when selecting substances for use in the company's products and processes. Through these scientific assessments, we seek to identify potential substitutes that may be more environmentally preferable. To that end, IBM leads its industry in maintaining corporate programs and strategic skills in chemical management and toxicology to evaluate materials used in our products and processes. Our materials and process stewardship program also has a unique contribution to the SDG for responsible consumption and production.

**Environmentally preferable substances and materials** – IBM voluntarily prohibits or restricts substances of concern from our processes and products, even before regulations require that we do so. When IBM develops new processes or significantly modifies existing processes, we conduct a scientific assessment of all substances used in the process, including those that have been approved previously. IBM does this by first identifying potential substitutes that may have less impact on the environment, health and safety; and then by eliminating, restricting and/or prohibiting the use of substances for which a preferable alternative is available that is capable of meeting the quality and safety requirements of our processes and products.

We also communicate IBM's restrictions on specific substances and other environmental requirements for our products through our [Engineering Specification: Baseline Environmental Requirements for Supplier Deliverables to IBM](#).

As a result of initiatives in both product and process stewardship, we have proactively prohibited the use of certain substances, restricted their use or found alternative substances to use in our processes and products – even when current laws permit such use. For a complete list of prohibited substances, see our [materials use webpage](#).

### Pollution prevention

Pollution prevention is an important aspect of IBM's long-standing environmental efforts and it includes, among other things, the management of wastes. The best way to prevent pollution is to reduce the generation of waste at its source. This has been a basic philosophy behind IBM's pollution prevention program since 1971. Where possible, we redesign processes to eliminate or reduce chemical use and to substitute more environmentally preferable chemicals.

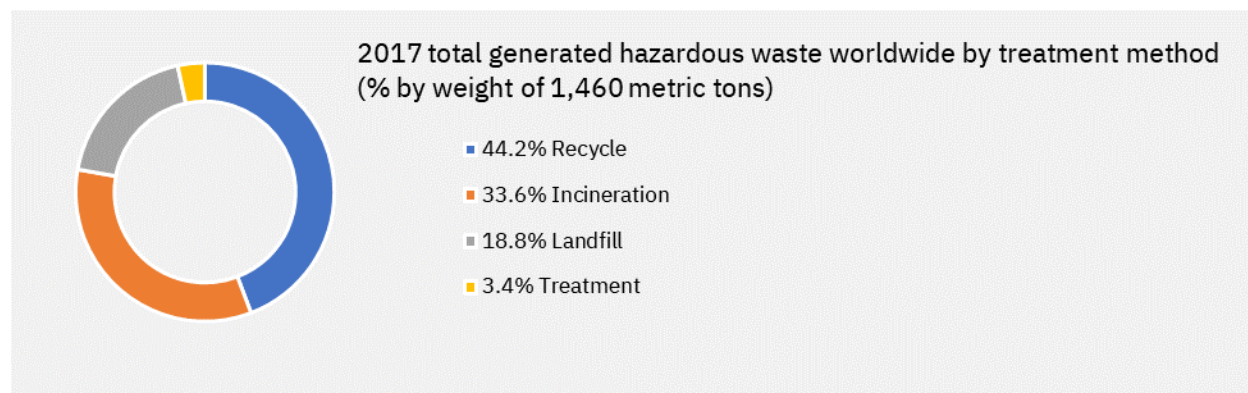
IBM's pollution prevention efforts are helping advance progress towards meeting the SDG targets for responsible consumption and production, by maintaining programs for proper management of the chemicals used in our operations and assessing our hazardous and nonhazardous waste disposal methods.

**Hazardous waste** – IBM focuses on preventing pollution through a comprehensive, proactive waste management program with the following hierarchy: 1) prevention, 2) reuse, 3) recycling, 4) recovery, 5) other treatment, and 6) land disposal. The graphic below shows disposition of the hazardous waste IBM generated during 2017.

**Nonhazardous waste** – IBM has also focused for decades on preventing the generation of nonhazardous waste, and where this is not practical, recovering and recycling the materials that are generated. Nonhazardous waste includes paper, wood, metals, glass, plastics and nonhazardous chemical substances.

We established our first voluntary environmental goal to recycle nonhazardous waste streams in 1988. Our current goal is to send an average of 75 percent (by weight) or more of the nonhazardous waste generated at locations managed by IBM to be recycled. In 2017, we recovered and sent 87.8 percent (by weight) of the nonhazardous waste generated by IBM worldwide to be recycled.

IBM implemented source reduction and waste prevention initiatives that prevented the generation of an estimated 185 metric tons of nonhazardous waste in 2017. IBM also achieved a 7,600 metric ton year-over-year reduction in the generation of nonhazardous waste.



Total annual nonhazardous waste quantity and recycling performance (metric tons x 1,000)					
	2013	2014	2015	2016	2017
Sent for recycling	55.9	91.7	45.6	38.4	32.4
Total generated*	65.0	106.7	53.5	44.5	36.9
% recycled (by weight)	86.0%	85.9%	85.2%	86.3%	87.8%
* Total generated nonhazardous waste excludes sanitary wastewater sent to publicly owned treatment systems.					

## Water conservation

The preservation of water resources and protection of watersheds have been important areas of focus for IBM throughout our history and represent opportunities where we can contribute to the SDGs for clean water and responsible consumption.

Over many decades, IBM has set stringent standards to monitor and control water discharges that are generated from its operations, including industrial wastewater and sanitary wastewater discharges. Considering the potential environmental impacts to receiving waters, we require our locations which have water discharges to have programs in place to prevent the direct discharge of untreated wastewater, as well as to ensure that chemicals are not disposed of in stormwater or sanitary wastewater discharge drainage systems which are not designed or intended for that purpose.

IBM established its first water conservation goal in the year 2000, focusing on the significant use of water in our microelectronics manufacturing operations. From 2000 to 2015, IBM's water conservation efforts avoided the accumulated use of 21.3 million cubic meters of water in those operations.

IBM divested its semiconductor manufacturing operations in 2015, substantially reducing its direct water use. Our current water use is primarily associated with cooling at our large facilities and

data centers, and for irrigation and domestic purposes. We have since reassessed the environmental impacts of our water use and have identified 45 data centers and other large IBM locations located in water-stressed regions. We did this by using the World Business Council for Sustainable Development's Global Water Tool, which highlights places around the globe with highly stressed, or extremely highly stressed, water resources. Following this assessment, IBM established a new goal in 2016 to achieve ongoing year-to-year reductions in water withdrawals at these locations, even though many of these locations had already undertaken projects to reduce water consumption.

In 2017, IBM reduced water withdrawals at these data centers and other large IBM locations in water-stressed regions by 2.9 percent versus 2016.

Annual reduction in water withdrawals at data centers and other large IBM locations in water-stressed regions		
	2016	2017
Annual water reduction	6.6%	2.9%
Water reuse and recycling (percent of total withdrawals)	5.4%	5.4%

## Supply chain

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IBM's contributions to addressing the SDGs include our actions to address the environmental and social responsibility aspects of our supply chain, which is comprised of approximately 12,000 suppliers across nearly 100 countries.

IBM requires its suppliers to adopt a common set of practices for socially responsible behavior, and at a minimum, establish and maintain an environmental management system that measures performance across their business activities. IBM either directly, or through a third-party auditor, conducts periodic audits of suppliers' performance in addressing their social and environmental responsibilities.

IBM works diligently with its suppliers to promote best practices and encourage continuous improvement to meet our expectations as we continue to expand the definition and scope of a responsible supply chain and aid in developing sound global markets with conflict-free materials and equal opportunity.

### Management system requirements

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IBM does business with suppliers who are environmentally and socially responsible and encourages environmental and social responsibility awareness with these suppliers. In 2004, IBM

established environmental and social requirements for IBM suppliers via IBM's Supplier Conduct Principles and supporting audit program. Since 2010, IBM has required that suppliers with whom we hold a commercial contract establish and maintain a management system that addresses the intersections of their operations with employees, society and the environment. Our objective is to help our suppliers build their own capability to succeed in this area by measuring performance and establishing voluntary, quantifiable environmental goals in the areas of waste, energy and GHG emissions. In addition, we require our suppliers to publicly disclose results associated with these voluntary environmental goals and other environmental aspects of their operations. IBM suppliers are also required to conduct self-assessments and audits, as well as management reviews, of their system. Finally, we require our suppliers to communicate these requirements to their own suppliers who perform work that is material to the products, parts or services supplied to IBM.

The full set of requirements may be found on [IBM's social and environmental management system supplier requirements webpage](#).

## Responsible Business Alliance Code of Conduct

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In 2004, IBM was one of the founding members of the Electronic Industry Citizenship Coalition, which has now changed its name to the Responsible Business Alliance (RBA), and helped them develop their supplier code of conduct. IBM uses the RBA Code of Conduct as a single code for our global supply base. The RBA Code establishes standards to ensure that working conditions in the electronics industry supply chain are safe, that workers are treated with respect and dignity, and that business operations are environmentally responsible and conducted ethically. We work with our suppliers to foster their full compliance to the RBA Code, and we expect them to cascade these standards to their extended sources of supply engaged in the production of goods and services for IBM. We consider these standards in our supplier selection process and monitor ongoing performance, as needed, by periodic third-party supplier compliance audits.

## Environmental evaluation of suppliers

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In 1972, IBM issued a corporate directive requiring the environmental evaluation of suppliers of hazardous waste services. We expanded this directive to include product recycling and disposal suppliers in 1991.

The objectives of our requirements for suppliers and our supplier evaluation program include:

- Ensuring that IBM does business with environmentally responsible suppliers who are actively managing and reporting on their environmental intersects and impacts
- Helping our suppliers build capabilities and expertise in the environmental area
- Preventing the transfer of responsibility for environmentally sensitive operations to any company lacking the commitment or capability to manage them properly
- Reducing environmental and workplace health and safety risks of our suppliers

We evaluate these suppliers prior to doing business with them and every three years thereafter. Our objective is to use only those suppliers that have a strong focus on environmental management, including complying with laws and regulations as well as sound management practices.

## Sourcing of packaging materials

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IBM is working to minimize the overall environmental impact of its packaging by implementing sustainability actions into the procurement of paper packaging materials from its supply chain. IBM's corporate environmental requirements for product packaging, first published in 1990, extend their reach to include our global supply chain.

IBM established its voluntary environmental goal for the responsible sourcing of paper and paper/wood-based packaging in 2002, which required that the paper and paper/wood-based packaging directly acquired by IBM be procured from suppliers that source from sustainably managed forests, where such sources exist. When this goal was first established, sufficient quantities of sustainably sourced paper and packaging materials were not available to meet business needs.

Continued focus on this objective by IBM and our suppliers over the years has allowed IBM to attain this goal consistently for more than 95 percent of paper and paper/wood-based packaging that we directly acquired. In 2016, we enhanced the goal requiring suppliers either to disclose sources for paper/wood to IBM, or to provide evidence that sources have been certified to be from sustainably managed forests by an accredited third-party certification scheme. In 2017, 98 percent of the paper and paper/wood-based packaging IBM directly procured worldwide came from suppliers that warranted that the source was derived from forests managed in an ecologically sound and sustainable manner. Requirements in support of this goal are incorporated into our standard supplier



specifications for paper and paper/wood-based packaging.

### Conflict minerals

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A sustainable and responsible supply chain is important to IBM and we are taking steps to only market products whose tantalum, tin, tungsten, and gold (3TG) originate from conflict-free regions. IBM recognizes the potential adverse impacts associated with mining 3TG in conflict regions of Central Africa. To neutralize these impacts, we expect our suppliers and, in turn, their suppliers to adhere to the RBA Code of Conduct and only source 3TG from conflict-free sources. We participate in industry initiatives to create and deploy supply chain verification processes (such as the Responsible Minerals Initiative, the Conflict Minerals Reporting Template and the Conflict-Free Smelter Program). These efforts are important elements of our work to affirm that 3TG in our supply chain originates from conflict-free sources.

For more details on our overall conflict minerals work and plans for achieving our objective in the future, please see our [2017 Conflict Minerals Report](#).

### Supplier diversity

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IBM has long recognized that diversity is critical to fostering innovation and delivering value to clients — and that supplier diversity adds to our competitive advantage while ensuring equal opportunities, stimulating growth in a global marketplace, driving development in growing economies, and helping social mobility. We are actively contributing to the SDGs by expanding the scope of our supply chain to incorporate emerging markets, as well as increasing spending levels with minority and women-owned suppliers.

IBM created its supplier diversity program in 1968, with the goal to provide opportunities to diverse suppliers who can add value to our supply chain in every region where we operate. Suppliers qualify as diverse by being at least 51 percent owned by

people from an ethnic minority (as defined in each country or region), or by women, military veterans, people with disabilities or LGBT individuals.

In 2000, IBM was the first information technology firm to join the Billion Dollar Roundtable, an organization that encourages businesses to increase their spending with diverse suppliers. Since then, IBM has annually conducted greater than \$1 billion in business with first-tier diverse suppliers in the United States (companies with which IBM has direct business relationships are considered “first-tier suppliers”).

In 2003, IBM expanded its supplier diversity program beyond the United States to seek relationships with diverse suppliers in every country where we operate. With the growth of this initiative and our involvement in the Billion Dollar Roundtable, IBM has conducted more than \$2 billion in business annually with first-tier diverse suppliers globally since 2006.

We have also extended requirements to second-tier suppliers, requiring our direct suppliers to seek diversity through their supply chains. Our goal is to seek suppliers that can provide value to our supply chain, and to promote economic opportunities for historically disempowered groups wherever we operate. IBM’s 2017 global supply chain spend was \$24.8 billion with over 13,000 first-tier suppliers in 100-plus countries.

In keeping with our commitment to supplier diversity, IBM is a member of, or interacts with many international affiliates of the National Minority Supplier Development Council, including the Canadian Aboriginal and Minority Supplier Council, Minority Supplier Development China, Minority Supplier Development U.K., South Africa Supplier Development Council and Supply Nation. These organizations certify minority owned businesses in their respective regions. In addition, IBM is a founding corporate member of WEConnect International which certifies women-owned businesses in 24 countries.



IBM will continue fostering diversity in its global supply chain as its business needs evolve, and we will work with external organizations to support the identification and development of diverse firms in countries where we have purchasing needs.

## Corporate citizenship initiatives

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At IBM, we approach societal challenges by applying our talent and technology to create innovative solutions for education, economic development, environmental sustainability, healthcare and more.

Through an integrated portfolio of programs, our [corporate citizenship](#) initiatives are contributing to the UN SDGs by advocating for cultural, geographic, and gender equality and providing opportunities for women and those from low-income backgrounds to participate in education and the global economy.

IBM is also harnessing data and designing analytics systems to enhance the ability of health practitioners and public administrators to identify, engage and assist at-risk populations affected by diseases and conditions such as cancer, obesity, cardiovascular disease and nutrition poverty. With the participation of volunteers around the world, IBM provides — free of charge — the massive computing power that humanitarian researchers need to find cures for disease and investigate solutions to protect and preserve healthy environments. Furthermore, we have been

instrumental in helping small businesses grow and create jobs by connecting them to large companies' supply chains.

IBM is proud to be one of the founding partners of IMPACT 2030, a global, private sector-led collaboration created to mobilize corporate volunteers to directly contribute to achieving the UN SDGs by 2030. IBM also continues to play an important role in supporting the UN SDGs through our employee-led pro-bono initiatives.

### Corporate Service Corps

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Inspired by the Peace Corps, IBM launched its [Corporate Service Corps \(CSC\)](#) in 2008, dispatching its top talent to strategic markets around the world. The CSC program groups IBMers from different countries into multi-cultural, cross-functional teams that deploy for month-long assignments to assist community organizations as they address high-priority issues such as education, the environment, health and economic development, and to develop

recommendations for short-term and long-term actions.

The CSC seeks strategic partnerships with other resourceful organizations to amplify the program's social impact all around the world. IBM has now helped dozens of other companies put together similar programs, including FedEx, John Deere and JPMorgan Chase. It has collaborated on engagements with other corporations, including GSK, Dow Chemical and BD, and it has formed strategic partnerships with government and nongovernmental organizations such as USAID, International Medical Corps, The Nature Conservancy, and The Global FoodBanking Network, in addition to the Peace Corps.

The CSC is closely aligned with and leverages IBM's product and service strategies, including cloud computing, data analytics, and mobile computing. Cloud computing is especially relevant in growth markets because of the money-saving aspects of using shared services. Data analytics helps city leaders provide superior services to citizens. And mobile technologies enable citizens to gain access to critical services.

Since its inception in 2008, the CSC program has contributed over 4,000 participants on over 350 teams to 40 countries around the world, delivering over \$80 million in donated intellectual capital on over 1,400 projects. In 2017, CSC deployed 402 top-talent IBMers from 49 countries to 31 cities in 18 countries, and extended our partnership with the Peace Corps.



Highlights from CSC's engagements include:

- A CSC team worked with the Society for Elimination of Rural Poverty (SERP) in

Vijayawada, India, to develop recommendations for an integrated management information system (IMIS), allowing the organization to maximize the value of IT investment so that it is most compatible with the SERP mission of helping people in rural areas, living below the poverty line, to improve their standard of living.

- Working with The Global FoodBanking Network (GFN), a team assigned to Toluca, Mexico, helped increase the number of food donors by 41 percent and the number of people fed by 15,000 each month. Following this success, the CSC assigned additional teams to work with GFN in Merida and Monterrey, Mexico; Guayaquil, Ecuador; Barranquilla and Cali, Colombia; and Mendoza and Cordoba, Argentina.
- An IBM CSC team helped formulate a national supply chain for medicine in Ghana.
- In Ghana, we supported girls' education by enabling TECHAiDE, a social enterprise, through information and communications technology-enabled solutions, and by advising the Ministry of Gender, Children and Social Protection and the Ministry of Education on information management systems to support an extensive female mentorship strategy.
- A CSC team in Kenya helped enable the Women's Enterprise Fund to deliver entrepreneurial training to 89,000 women and to launch 25 new business clubs.
- In Ethiopia, teams working with International Medical Corps helped 46,000 Ethiopians become more resilient through improved water, sanitation and hygiene practices.
- In Romania, the CSC provided Petru Maior University of Targu Mures with a high-performance computing center roadmap and marketing plan so that the university is able to increase the number of collaborations aimed at producing economic development and creating jobs.
- In Bulgaria, the CSC provided a foundation that is installing air quality measuring stations throughout Sofia with a solution for operational efficiency and automation, so they can engage

## Scope of IBM Corporate Service Corps projects for women



**30 countries**  
with a women- and  
girls-focused project



**61%**  
(475 projects)  
support sectors that  
serve women (basic  
services)



**40%**  
(314 projects)  
with women as primary  
clients and  
beneficiaries



**\$42 million**  
– the value of pro bono  
consulting services  
provided for women-  
and girls-focused  
projects

more citizens and better analyze the causes of environmental pollution, educate society about these causes, and encourage government action with a focus on promoting change at the individual and household levels.

- In Brazil, a CSC team worked with The Nature Conservancy to improve a tool it had created to enable municipal, state and the central government to monitor tree cutting activities — with a goal of slowing illegal deforestation in the Amazon basin and helping to address climate change.

### IBM Volunteers

[IBM Volunteers](#) is our expanded, refreshed and renamed initiative to support our employees' and retirees' volunteer efforts. Launched in 2003, the On Demand Community® program has recorded over 21 million hours of service in all corners of the world, including 1.2 million hours in 2017. The program is designed to help IBMers apply their professional and technical skills in their communities, but it is open to everyone.

The new website offers free resources — most available in multiple languages — that anyone can use to plan and conduct a wide range of volunteer activities. It also connects IBMers with other

service-minded colleagues and helps them find opportunities to help local organizations. The January 2018 relaunch introduced the SkillsBuild™ initiative with the goal of reaching 1 million students every year for the next five years with engaging, hands-on activities that introduce 21st-century skills and technologies: coding, AI, robotics and more. The SkillsBuild educational resources are publicly available at no charge.

**IBM Community Grants** – IBMers who report their community service through IBM Volunteers can apply for IBM Community Grants to benefit the schools and community organizations where they volunteer. IBM awarded 2,800 cash grants worth a combined \$3.8 million in 2017.

**Volunteer Excellence Awards** – The IBM Volunteer Excellence Award recognizes exceptional service to communities by IBMers, individually or in teams. Our award recipients developed technical solutions for not-for-profit organizations, created a program to help elderly people use new technology, generated environmental ideas and campaigns, and promoted STEM skills to thousands of students worldwide.

— Michal Chorev motivates girls in Israel to study computer science. In 2015, she co-founded a nationwide initiative that each year delivers workshops on app development to more than 2,000

ninth-grade girls from 70 schools, led by 200 female technical professionals.

— Simon Christiansen recruited a volunteer team to develop a system for a social services organization in Denmark that pairs adult mentors with disadvantaged children. The solution, which tracks and manages volunteers' work, is now being implemented at another not-for-profit agency.

— After an IBM Impact Grant devised a social media strategy for the Malaysian Mental Health Association (MMHA), three IBMers volunteered to implement the plan. Social media has helped MMHA dramatically improve its engagement with at-risk young people and exceed its fundraising goal by 20 percent.

— The IBM Peru team worked with Peru's Minister of Environment to get Peruvians involved in making environmentally friendly decisions in their daily lives. They developed a digital campaign, called "Pon de tu parte" or "Do your part." The team designed, built and maintained the web and social media presence for the campaign, with the objective of obtaining positive environmental sustainability commitments from one million citizens. The campaign was cited as a best practice for planners working on the 2016 United Nations COP21 summit.

## IMPACT 2030

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IBM joined Ritz-Carlton, SAP and UPS as founding members of IMPACT 2030, a global, private-sector-led collaboration dedicated to mobilizing corporate volunteers in service to achieving the SDGs by 2030. IMPACT 2030 is designed to marshal the power of human capital to address the UN's 17 SDGs in developed and developing nations, by aligning companies and their employee volunteer efforts with the SDGs, advancing the practice of employee volunteering, and creating real and sustainable change. IMPACT 2030 convenes leaders from corporations, the United Nations, civil society, academia, and philanthropic organizations from around the world. Each IMPACT 2030 partner

company has committed to applying its employee volunteer actions towards one or more of the SDGs.

## Smarter Cities Challenge

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In 2017, IBM completed its final projects under one of our largest philanthropic initiatives, the Smarter Cities Challenge® program. The Smarter Cities Challenge provided cities around the world with grants of IBM expertise and technology to address their top strategic challenges. It involved working with city authorities to devise strategies to manage congestion, pollution, poverty and other urban challenges.

In the Smarter Cities Challenge program's eight-year history, we deployed more than 800 high-performing IBM experts to help leaders of over 138 cities worldwide improve the quality of life of their residents with actionable solutions, focusing on issues such as social equity, economic development, emergency management and the environment.

The program's impact has been recognized by the White House and the federal governments of South Korea and Australia, as well as by the Committee Encouraging Corporate Philanthropy and *The New York Times* columnist Nicholas Kristof, among others.

Highlights from Smarter Cities Challenge engagements include:

- IBM consultants and city authorities used data analytics to design efficient delivery routes for a mobile food market program. Using these routes, the Birmingham-Jefferson County Transit Authority and Community Food Bank of Central Alabama are establishing access to groceries for residents in need.
- In partnership with Twitter, and using IBM's cognitive and social media analytics capabilities, Smarter Cities Challenge helped the Melbourne, Australia government understand how their citizens were receiving and disseminating information during emergency events. This enabled the city to revise its communications

plan to better address the needs of citizens before, during and after emergencies.

- In Dublin, Ireland, an IBM team that included financial experts from HSBC developed an assessment of the business potential for municipally owned and distributed solar energy.
- In San Jose, California, an IBM team helped address the affordable housing crisis by developing new web applications and data analytic tools that supported the city's affordable housing initiatives and assisted residents in finding available affordable housing units.

## Impact Grants

[IBM Impact Grants](#) deliver pro bono consulting expertise and integrated software solutions — with particular emphasis on cloud, mobile, analytics and cognitive — specifically designed to support not-for-profit and educational organizations in their efforts to serve our communities and help them tackle society's toughest challenges. Since the program's launch in 2012, we've delivered more than 3,000 grants with a combined market value of \$85 million. Our Impact Grant portfolio has expanded every year, enabling IBM to be more agile and responsive to the

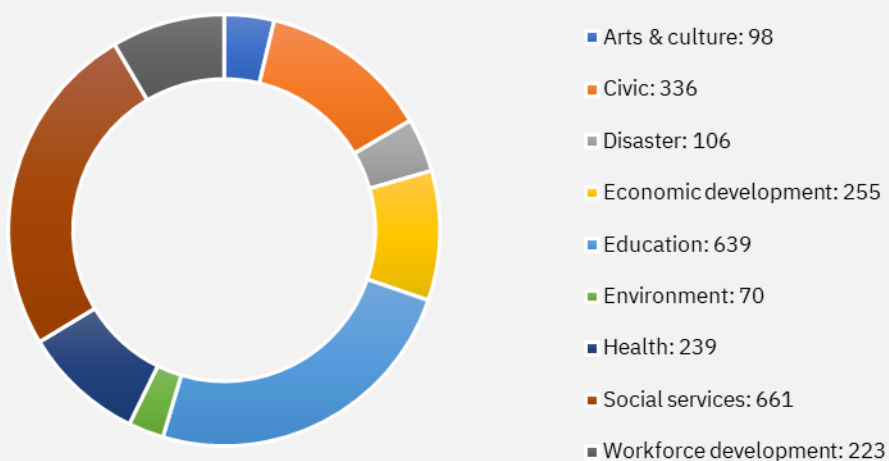
evolving needs of the nonprofit sector, especially those in health, education, disaster, job, and youth empowerment.

In 2017, we delivered 422 grants in 28 countries valued at \$14 million, while Impact Grants engaged over 400 nonprofit organizations in 60 countries in 2016, with consulting and software to support their work to resettle refugees, disrupt human trafficking, respond to natural disasters, contain infectious diseases, and much more.

Examples of awarded Impact Grants include:

- A team of IBM researchers and consultants introduced IBM's Green Horizons solution to the National Institute of Environmental Research, part of Korea's Ministry of Environment, to improve the forecasting accuracy of air quality, resulting in better health and well-being of the citizenry in the areas where the solution is measuring this type of data. As part of the project, the team leveraged existing forecast data from China, along with new data from Korea data sources to help with forecasting and conducting predictive analytics for 19 types of air quality modeling.

Number of Impact Grants by social issue



- In Turkey, we delivered a technology roadmap grant to the country's only NGO focused on teacher development. Teachers Academy Foundation is using our recommendations to enhance their online services to 125,000 teachers.
- IBM provided a Leading with Data Impact Grant to the Wildlife Habitat Council (WHC) to assess the current state of their data environment and develop an understanding of the organization's data and analytics maturity. The results of the analytics work showed a strong need for a Technology Roadmap Impact Grant to help the organization better understand technologies to support data initiative. The output of these projects has helped WHC execute realistic data and analytics initiatives relating to their Conservation Certification system.
- IBM helped Nigeria's National Association of Women Entrepreneurs provide business planning training for small businesses.
- IBM provided an analytics solution to the Shenzhen Center for Disease Control, China, using Watson™ technology and our SPSS® software platform, to help further their mission of infectious disease prevention and control — shouldering the monitoring, alerting and treatment of emergency public health events in Shenzhen for 12 million citizens by building a self-adaptive online machine-learning module that provides cognitive-based modeling for epidemic disease prediction and analysis of case numbers and trends.
- A grant of IBM i2® Analyst's Notebook® software is helping DeliverFund, a U.S. not-for-profit, use cyber-intelligence to fight human trafficking by identifying and tracking networks through their online activity.
- Smithsonian Environmental Research Center (SERC) requested a Leading with Data Impact Grant to help the organization find ways to improve their data acquisition and management methods for real-time data from dozens of active environmental experiments and monitoring systems arrayed across the

ecosystems of SERC's Chesapeake Bay property. By doing so, the SERC would be able to more fully integrate data collected from individual experiments and sensors and provide better analysis and dissemination of results to various constituents around the world.

### [P-TECH 9-14 school model](#)

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In countries around the world, the race is on to prepare today's and tomorrow's workers with the skills required for careers in an evolving, knowledge-based economy. IBM works with educators and other key stakeholders globally to create innovative models and technologies that fundamentally transform teaching and learning in ways that better prepare people of all ages to engage meaningfully in 21st century opportunities.

To address the widening skills gap and ensure that young people master the skills that today's jobs require, IBM in collaboration with the New York Public Schools and The City University of New York, created the innovative [P-TECH™](#) 9-14 School Model (Pathways in Technology Early College High School) in 2011 to transform the structure of schooling, connecting secondary education directly to college and career.

P-TECH enables students, from primarily socioeconomically disadvantaged backgrounds, to earn both their high school diploma and a cost-free, industry-recognized associate degree at the same time, graduating with the skills and credentials required to continue their education in a four-year postsecondary institution or to enter into entry-level careers. Since its launch, P-TECH has scaled to 110 schools across the U.S., Australia, Morocco, and Taiwan. Students have already graduated to "new collar" jobs with IBM or have used their associate degree in Applied Science to transition to four-year colleges or universities.



## Teacher Advisor with Watson

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As part of our efforts to support teachers with the latest technologies, IBM, in partnership with educators, has developed [Teacher Advisor](#), a free, IBM Watson-powered web tool that is intended to support teachers as they plan highly effective lessons, with the end goal of raising student achievement, while saving teachers valuable time. This philanthropic resource serves math teachers in grades K-8 as of August 2018, and has over 8,000 quality lesson plans, student facing activities, and classroom strategies, all vetted by educators and math coaches.

Teachers easily access content through Watson-powered AI search, which has been trained by math experts to understand math language in a more nuanced way. As a result, teachers searching for materials to address specific student needs are able to access relevant, quality resources more quickly.

Teacher Advisor is a philanthropic collaboration between IBM, the American Federation of Teachers, UnboundEd, and external philanthropic funding partners, such as the Carnegie Corporation of New York, the Ford Foundation, and the Stavros Niarchos Foundation.

## IBM Health Corps

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[IBM Health Corps](#) is a social impact program through which IBM partners with health organizations to address urgent public health needs around the world. Leveraging IBM's expertise in data, technology, and design, we work to nurture new ideas in order to expand access to health services and to improve health systems and population outcomes. IBM experts work on-site for three weeks to help empower and equip health organizations to eliminate health disparities and deliver lasting change. Launched in 2016 at the World Health Care Congress, the program has executed eight initiatives to date.

Highlights of IBM Health Corps projects include:

- With the Gorgas Memorial Institute for Health Studies in Panama, IBM Health Corps developed a mobile disease surveillance system to connect public health investigators tracking Zika and dengue mosquitos with epidemiologists and policy makers. Visualization of field data facilitates rapid decisions for infectious disease control across Panama.
- ChemoQuant, an online chemotherapy forecasting tool developed by IBM Health Corps in conjunction with the American Cancer Society (ACS) and the Clinton Health Access Initiative (CHAI), helps to increase access to lifesaving cancer treatment in Africa, by aiding ministries of health to quantify their cancer treatment needs, prepare budgets, and plan procurement.
- IBM Health Corps and the American Cancer Society worked with the National Comprehensive Cancer Network (NCCN) and the African Cancer Coalition (ACC) to create the NCCN Harmonized treatment guidelines for sub-Saharan Africa. IBM Health Corps built the IBM Cancer Guidelines Navigator — a digital tool that helps oncologists reference and identify evidence-based treatment options that provide the highest standard of care given resource constraints.
- IBM Health Corps worked with Duke Health in Durham, North Carolina, to design a solution for sharing and mapping community health information among dozens of local clinics and agencies. The IBM Health Corps team devised a technical strategy for the system to facilitate greater collaboration on community health.

## World Community Grid

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IBM's [World Community Grid®](#) initiative is the world's largest volunteer computing initiative dedicated to tackling scientific projects that benefit humanity and humanitarian research. This philanthropic initiative enables anyone with a computer or Android device and an internet connection to donate their spare computing power to help researchers find the next breakthrough. By

harnessing the unused computing power of more than 750,000 volunteers' computers around the world, researchers can access dedicated computing time worth hundreds of millions of dollars and conduct research — research that could have taken decades or years — in weeks or months. World Community Grid essentially turns each connected device into one part of a massive virtual supercomputer. It breaks down complex research experiments into millions of smaller units and sends them to individual devices to work on when they're idle. The results are then collected and delivered to researchers.

It's even possible for researchers to run projects that are otherwise unaffordable or unimaginable, such as comparing all the genes from all the thousands of organisms in a soil sample, helping farmers raise better strains of rice with higher crop yields, modeling water flows at an atomic level of detail, or searching through a library of more than 30 million chemical compounds to find a treatment for the Zika virus. We also are collaborating with IBM Cloud™ and The Weather Company® (an IBM business) to launch projects addressing climate change and environmental research.

Since 2004, World Community Grid volunteers have provided more than 1.6 million years of computing time to support 29 projects, including research into treatments for AIDS, Ebola, Zika virus, cancer, and tuberculosis.

Highlights of other World Community Grid projects include:

- World Community Grid joined the battle against childhood cancer with a project to search for new treatments for neuroblastoma, a common form of childhood cancer. Out of more than three million drug candidates screened by 200,000 volunteers, seven promising drug candidates with no apparent side effects were identified.
- The Computing for Clean Water project used World Community Grid to make a breakthrough discovery. Scientists with this project simulated water flow through carbon nanotubes to help

understand processes that could lead to improved global access to clean water.

- World Community Grid helped develop affordable solar energy as Harvard University announced the discovery of more than 35,000 compounds with the potential to double the rate of efficiency of most carbon-based solar cells in production today, after scanning more than 2.3 million materials.

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New Orchard Road  
Armonk, NY 10504

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