



*IBM Real Estate Strategy and Operations  
6300 Diagonal Hwy  
Boulder, CO 80301*

The following narrative is being submitted in accordance with the Boulder Building Performance Ordinance (Ordinance No. 8071), Section 10-7.7-8. – Large Industrial Campus.

### **ISO 14001 and ISO 50001 Certified**

IBM has a long history of driving energy conservation and sustainability through all parts of its business and has been recognized by numerous outside organizations for achieving significant results. Most recently we received the [2017 Climate Leadership Award for Organizational Leadership](#). This award is presented by the U.S. Environmental Protection Agency, C2ES, and the Climate Registry. Specifically, the award recognizes organizations that have developed company-wide comprehensive greenhouse gas inventories and aggressive emissions reduction goals, and who have exemplified extraordinary leadership in their internal response to climate change, and engagement of their peers, partners, and supply chain.

IBM's Global Energy Management Program is integrated within its global Environmental Management System (EMS). IBM takes pride in its world class Global Energy Management Program and regards responsible energy management and investments in energy efficiency as part of its corporate mission. IBM has maintained a single global registration against the [ISO 14001 EMS standard](#) since 1997. In 2012, IBM successfully certified its Global EMS against the [ISO 50001 standard](#) on Energy Management. Under IBM's global registration, the company's largest sites - including the Boulder location - have achieved certification against the ISO 50001 standard. The ISO 50001 standard is one of the most rigorous energy management process certifications, requiring companies to have documented and managed energy management processes, understand their significant energy uses and maintain and execute a commitment to effective energy management across the organization and its operations.

IBM's [Corporate Environmental Policy](#) (Policy) calls for the responsible use of energy throughout its entire business, including conserving energy, improving energy efficiency, and giving preference to renewable over non-renewable energy sources where it makes business sense.

### **IBM's Energy Goals & Objectives**

ISO 50001 requires the organization to create and maintain a set of "Energy Objectives, Energy Targets, and Energy Management Action Plans." IBM has maintained a corporate-wide goal of achieving annual energy conservation savings since 1996. The current target is to achieve annual energy conservation savings equal to 3.5% of IBM's total energy consumption. IBM Boulder maintains a very aggressive local energy goal of achieving 5% energy conservation year-on-year, which is in excess of the corporate-level goal. IBM's Boulder campus achieved this ambitious goal in 2016 and is on track to do the same in 2017.

In March, 2015 IBM [announced two new company-wide goals](#): (1) to procure 20% of its annual electricity consumption from renewable sources by 2020, and (2) to reduce carbon dioxide emissions associated with energy consumption by 35% by year-end 2020 using 2005 as a baseline. IBM only counts the MWh consumption and CO2 emissions avoidance of its renewable electricity purchases over and above the renewables delivered in its utility provided electricity. IBM has established an internal roadmap to meet these two goals and is working hard toward attainment. IBM Boulder has also worked in close collaboration with its local electric utility, Xcel Energy, to analyze potential partnerships and on-site renewable options that will help IBM achieve its energy goals.

### **Data Analytics Driven Energy Management – IBM's Transformation**

IBM formalized its energy conservation and management program in 1974 and has continually improved the program since that time. In recent years, IBM has seen the source of its energy savings shift from traditional industry best practices (e.g. installing variable speed drives on motors, lighting and lighting control upgrades,



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HVAC retro-commissioning) to savings that leverage data analytics and cognitive computing-enabled optimization.

IBM's Boulder campus uses IBM's [advanced data analytics and facilities management solutions](#) to continuously monitor hundreds of air handling units and other equipment for failed controls that may be wasting energy. Often called Fault Detection and Diagnostics (FDD), or monitoring-based commissioning (MBCx), this technology has been fruitful at IBM's Boulder campus as well as at [many clients' locations](#) for identifying opportunities to improve operational energy efficiency and reduce energy use and associated greenhouse gas emissions. In fact, in 2016, savings from these tools was the Boulder campus's single largest source of energy conservation.

IBM's Boulder campus uses chilled water plants to cool its data center space and buildings. In 2016, IBM's second largest source of energy savings came from optimizing its chilled water plants. Colorado's arid climate is uniquely suited for evaporative cooling, and the IBM Boulder site engineering team works continually to maximize the amount of "free" evaporative cooling that can be derived from its chilled water plants. IBM also uses [third-party optimization tools](#) to ensure the chilled water plant's pressures, flows, temperatures, and equipment staging function at optimal efficiency.

In terms of IBM's data center IT loads, IBM's Boulder campus uses data-driven solutions to manage energy consumption. IBM's largest source of savings in data centers has been server consolidation, where the work load from individual servers is consolidated onto a single server or mainframe like an [IBM System Z and Power System servers](#). By consolidating hundreds of individual servers onto a single machine, this results in more efficient computing and less heat for IBM's chilled water plants to process. Additionally, IBM has installed thousands of temperature sensors in its data centers, and is using sophisticated [cooling optimization tools](#) that use the data from these sensors to make equipment staging decision based on machine learning.

IBM takes [environmental stewardship](#) seriously, maintaining a local focus with a global perspective. More detail on IBM's environmental programs can be found in the [IBM Environmental web pages and the IBM and Environment Annual Report](#).