



# **Ball Aerospace: Boulder Energy Reporting ID EB160 and EB233**

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## **Ball Aerospace (Boulder Energy Reporting ID EB160 and EB233)**

Ball Aerospace is known for its contributions in support of space and earth science, exploration, national security and intelligence programs since 1956. We produce spacecraft, instruments and sensors, radio frequency and microwave technologies, data exploitation solutions, and a variety of advanced aerospace technologies and products that enable exciting missions.

Ball supports environmental monitoring and forecasting programs, including weather, environmental intelligence, precipitation, drought, pollution, vegetation, and biodiversity measurements. The data captured through Ball-built instruments and satellites enables an enhanced understanding of the Earth's ecosystem and the ozone layer, supports weather forecasting, storm tracking and rescue operations, and supports effective management of natural resources, including helping experts to make routine drought assessments and fire prevention plans.

Ball pioneered the development of the commercial remote sensing market, producing imaging systems and spacecraft to help spawn a new market-driven demand for imagery. For example, Ball built WorldView satellites 1, 2 and 3 for DigitalGlobe, offering the best high-resolution imagery data gathering capability. This imagery is used for civil government mapping, land-use planning, disaster relief, exploration, defense and intelligence, visualization and simulation environments, and navigation technology such as Google Maps. The WorldView-3 satellite launched in August 2014 and is the world's first multi-spectral, super-spectral, high-resolution commercial earth-imaging satellite. Locked in orbit 400 miles above Earth, it takes unique images of our planet.

Key scientific discoveries about environmental monitoring and its effects on the Earth relied significantly on instruments and spacecraft built by Ball Aerospace.

- The Joint Polar Satellite System-1 (JPSS-1), the nation's next-generation of polar-orbiting environmental satellites, will enable essential data for civil and military weather forecasting, storm tracking, and climate monitoring.
- The company's Suomi National Polar-orbiting Partnership (Suomi NPP) satellite contributes vital information for national forecasts, severe weather warnings, search and rescue operations, military contingency planning and environmental monitoring.
- The company's Ozone Mapping and Profiler Suite (OMPS) is one of five instruments flying aboard the Suomi NPP satellite returning detailed information about the health of the Earth's ozone layer—the shield that protects us from harmful levels of the sun's ultraviolet radiation.
- The Global Precipitation Measurement (GPM) Microwave Imager (GMI) supports the Global Precipitation Measurement mission, a joint effort between NASA and



the Japan Aerospace Exploration Agency to improve climate, weather and hydrological predictions by providing more accurate precipitation measurements from space. The GMI now serves as a reference standard for calibrating precipitation measurements in the GPM constellation.

- The Ball Aerospace spectrometer for the Tropospheric Emissions: Monitoring of Pollution (TEMPO) mission will, for the first time, make accurate observations of pollution with high resolution and frequency over North America.
- The Ball Aerospace Geostationary Environment Monitoring Spectrometer (GEMS), built for South Korea, is designed to monitor pollution for the Korean peninsula and Asia-Pacific region. Hourly measurements of ozone and aerosols will improve early warnings for potentially dangerous pollution events and monitor long-term climate change.
- Ball Aerospace designed and built the Operational Land Imager (OLI) for the Landsat mission jointly managed by NASA and the U.S. Geological Survey. Data from the Landsat series of satellites enable the nation to manage its natural resources effectively, including helping experts to make routine drought assessments and fire prevention plans; monitor land changes; plan land uses; and better understand the Earth's ecosystem.
- The company developed a Light Detection and Ranging (LIDAR) technology instrument to study forest carbon and monitor the earth's vegetation. When the instrument is flown over forested regions, scientists can estimate biomass and investigate biodiversity trends. Three-dimensional images from the laser system reveal the natural distribution of foliage and fuel for forest fires.
- The high-spatial-resolution, multispectral satellite imagery from the Ball-built WorldView satellites is used for civil government mapping, land-use planning, disaster relief, exploration, defense and intelligence, visualization and simulation environments, and navigation technology such as Google Maps.
- A Ball team is designing, building, and test flying NASA's Green Propellant Infusion Mission (GPIM) to demonstrate and test the capabilities of a high-performance, non-toxic, "green" fuel on orbit. The new propellant is less harmful to the environment, increases fuel efficiency, and diminishes operational hazards for aerospace workers. GPIM helps reduce emissions and use of resources.

Ball Aerospace is a business of Ball Corporation and is an integral part of the company's larger sustainability program. Ball Corporation started its formal sustainability journey with six sustainability priorities "Big 6" in its operations, including electricity and natural gas. And when people wanted more, the company listened. Ball's stakeholders have made it clear that sustainability is most critical to them. That is why Ball is making it one of its top priorities. Sustainability clearly is not a one man job. So together with the help of dedicated employees, dynamic partners, and several multi-



stakeholder partnerships, Ball is up for the challenge. Besides operational excellence, Ball focuses its sustainability efforts on product stewardship, talent management, and community engagement.

Since Ball's operations significantly impact its overall sustainability performance, the company aims to improve its processes and procedures continuously and to increase efficiencies. By introducing innovative technologies supported by its safety and environmental management systems, Ball has improved its safety track record, reduced energy and water consumption, and diverted more waste to beneficial reuse. Global and business-specific data are available at [www.ball.com/data-center](http://www.ball.com/data-center).

For Ball Corporation, more and more of its global customers are committing to ambitious product carbon footprint reduction goals and ask Ball to measure its contributions. To better support its customers and reduce risk, the company increased its knowledge and capabilities to assess its products' environmental footprints and developed its own target. The target (referred to as Cut/4 CARboN) reflects a two-pronged approach: Ball is committed to reducing the carbon footprint of its most common beverage can formats per region by 10 percent from 2010 to 2020 through efforts that are in its control, such as optimizing the weight of its cans and its plants' energy efficiency.

With a 10 percent reduction through the end of 2014, Ball is on pace to meet the global target. All Cut/4 CARboN calculations are extensively reviewed and are based on ISO 14044 compliant LCA models, as well as the GHG Protocol Product Life Cycle Accounting and Reporting Standard. While carbon dioxide emissions are only one aspect of the company products' sustainability profiles, it is the aspect Ball stakeholders are most interested in and where standards for accounting and reporting exist. For a more holistic perspective, Ball monitors other relevant impacts like water and safety.

Ball was named the industry leader for container and packaging companies on the 2016 Dow Jones Sustainability Indices (DJSI) for the fourth consecutive year. Ball maintained its best-in-class position on both the DJSI World Index and the Dow Jones Sustainability Index North America (DJSI NA).

Ball became a member of the FTSE4Good Index Series on the London Stock Exchange in 2009 and has been confirmed as a member every year since then. The FTSE4Good Index Series measures the performance and facilitates investment into companies that meet globally recognized environmental, social and governance (ESG) standards.

NYSE Euronext, the world's largest exchange group, and Vigeo Eiris, a leading European expert in assessing responsible performance, launched a range of socially responsible investment indices in 2013. Ever since then, Ball has been selected as a member of the Euronext Vigeo US 50 index (last confirmation November 2016). The index comprises the 50 most advanced U.S. companies in the areas of Environmental, Social and Governance performance.



Ball has been selected for inclusion in the Calvert Responsible Index Series, covering the Calvert U.S. Large Cap Core Responsible Index (CALCOR), the Calvert U.S. Large Cap Growth Responsible Index (CALGRO), and the Calvert U.S. Large Cap Value Responsible Index (CALVAL). All three indices represent a portfolio of large capitalization stocks listed on U.S. stock exchanges that meet Calvert's Environmental, Social, and Governance (ESG) criteria for index inclusion.

As part of oekom research's Corporate Rating, an assessment of over 100 social and environmental criteria, Ball qualifies as one of oekom's "Prime" companies. Therefore, Ball is eligible to be included in oekom's Prime Universe. Of companies rated by oekom research, only three, including Ball, have achieved Prime status within our industry.

Ball Corporation qualified for inclusion in the 2017 Sustainability Yearbook, published by RobecoSAM, receiving the Industry Leader and Gold Class distinction for the fourth year in a row. The Yearbook looks at companies' prior year sustainability performance and ranks them as Gold, Silver or Bronze. 2017 marks the seventh year in a row that RobecoSAM included Ball in its book. RobecoSAM, the investment specialist focused exclusively on Sustainability Investing, has evaluated the sustainability performance of more than 2,000 corporations annually since 1999.

Newsweek, in partnership with Corporate Knights Capital and leading sustainability experts, ranked Ball 24th among the 500 largest U.S. companies on overall environmental performance in 2016. The Newsweek Green Rankings evaluate the 500 largest publicly-traded companies in the U.S. by market capitalization and score them based on performance on eight key performance indicators, including: energy productivity, greenhouse gas emissions, water and waste; reputation; sustainability pay link and board committee; and third party verification of environmental metrics.

In September 2015, governments around the world officially adopted the United Nations Sustainable Development Goals (SDGs)—global goals to end poverty, protect the planet and ensure prosperity for all by 2030. Ball is committed to helping make the SDGs a reality. All of its sustainability priorities and associated goals are aligned with and contribute to 10 of the 17 SDGs. Ball's main contribution will derive from its operations and its value chain. Ball will focus on shared value creation—through jobs, investments and economic growth, environmental protection, research and development, and the high sustainability standards to which the company holds itself and its suppliers accountable.

When working toward the global goals, Ball's employees and their community engagement are valuable resources. This is why Ball joined IMPACT 2030, the only business-led effort designed to harness the power of corporate volunteers to address the SDGs. IMPACT 2030 believes that a commitment to corporate volunteering—when used in concert with the UN, peer companies, government, academia and civil society—is a powerful tool to accelerate the use of sustainable development principles and inspire the private sector to take positive action.



As a result of its environmental management programs, Ball Aerospace was one of four companies that were the charter members in the State of Colorado's Environmental Leadership Program in November of 1999. Ball Aerospace continues to participate in this program, which recognizes entities that Go Beyond environmental compliance requirements.

To drive measureable progress within operations and hold the company accountable for improving its processes, each Ball plant commits to two-year sustainability goals—one goal for each Big 6 metric. Progress is reported yearly for Ball Aerospace, aggregated as one plant within Ball, and evaluated by senior management within Ball's Sustainability Steering Committee. For Ball Aerospace, a standardized measurement system that enables year-to-year comparisons on Big 6 metrics is used. The high visibility of the company's performance with respect to these metrics helps drive accountability, engagement, and progress toward these goals.

To support Ball Corporation's global sustainability efforts, Ball Aerospace sets sustainability goals across its building portfolio in lieu of setting them for individual buildings or municipalities. This allows Ball Aerospace to take a broad approach to sustainability and energy reduction. There are not specific goals per building or per industrial complex as defined by the City of Boulder as this sub-optimizes the allocation of resources available to support energy reduction efforts as a whole. Sustainability goals are normalized to provide standardized year-to-year comparisons. Ball Aerospace normalizes based on dollars of sales while high production business units' normalization is based on number of units produced.

Ball Corporation committed to improve greenhouse gas emissions intensity from its operations by 10 percent, compared to a 2010 baseline, and improve energy efficiency by 2 percent. Currently, Ball Corporation is developing a science-based greenhouse gas emission reduction target, which is expected to be launched in fall 2017.

Ball Aerospace's 2016 energy goals, established in late 2015 for its two-year sustainability commitment to Ball Corporation, was an increase cap of 3.0 percent in electrical consumption over the 2015 baseline and an increase cap of 2.5 percent for natural gas consumption over the 2015 baseline. As previously stated, energy consumption for Ball Aerospace is normalized over sales. The goals are positive because in late 2015, when the 2016 goals were established, sales were forecasted to relatively flat while the previous addition of more buildings should increase consumption. In fact, Ball Aerospace's overall electrical energy consumption per square foot has continually decreased since 2010 an average of 1.8% annually. For ID EB160, the company has seen a decrease in electrical consumption since 2014. As well for the same industrial complex, Ball Aerospace's cumulative utility usage savings has generally increased year-to-year since 2008. For ID EB233, the company has seen a general decrease in electrical consumption since 2012 and a general decrease in natural gas consumption since 2013.



For the reporting year of 2016, Ball Aerospace implemented many energy sustainability projects within its Colorado portfolio with the potential to save over 1,100 MWh annually:

- Replaced existing lighting in three cleanrooms in a Boulder, CO large industrial complex with high efficiency LED fixtures (on EB160 campus).
- Installed controls and systems in seven clean rooms in a Boulder, CO large industrial complex to set back the air flow during non-working hours (on EB160 campus).
- Replaced existing interior office lighting throughout a Boulder, CO building with LED fixtures (not associated with registered campus).
- Replaced existing lighting with high efficiency LED fixtures and installed a lighting control panel in a cleanroom in a Broomfield, CO building (outside of Boulder's jurisdiction).
- Replaced existing interior office lighting throughout a Westminster, CO building with LED fixtures (outside of Boulder's jurisdiction).