

Ice Mountain

Stanwood, Michigan



Case Study

ICE MOUNTAIN IS MICHIGAN'S FIRST LEED-CERTIFIED FOOD AND BEVERAGE FACILITY

Ice Mountain's Stanwood Michigan water bottling plant became the first LEED-certified food and beverage production facility in the state and the second in the nation in 2003. Leadership in Energy and Environmental Design, or LEED, is a voluntary, third party certification program developed by the United States Green Building Council. This program promotes environmental stewardship through its green design and construction standards. Ice Mountain's Stanwood plant exemplifies green construction and sustainability through its environmentally-friendly features, economic success, social policies, and community contributions.

Ice Mountain is a subsidiary of Nestlé Waters North America. Nestlé's architects, engineers, and independent business and engineering consultants collaborated to create Ice Mountain's 717,742 square foot Stanwood plant. The project was completed in two phases and combines state-of-the-art beverage processing and manufacturing equipment with green construction and sustainable site design.

Construction and Materials

Studies and surveys on aquatic life, soils, wildlife, wetlands, riparian areas, surface waters, water quality, precipitation levels, and recharge patterns were used to design the layout of the plant and surrounding



areas. Planners used the data to design a plant that protected the natural ecosystem, preserving more than 73 acres of natural meadows, wetlands, and forest.

The plant's building specifications and construction process minimized the development footprint, or amount of land used to construct the plant. The raised floor

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elevation reduced site development disturbances and negative impacts to the surrounding wetlands. The flooring consists of a concrete slab footing foundation with no basement and is raised with fill dirt utilized from the site. These features minimize disturbance to the soil and mitigate any impact to the area's natural drainage pattern. More than 25 percent of the plant's materials



contain recycled content. These resources included steel and other metals in addition to recycled concrete, fly ash, linoleum, recycled content acoustical ceiling panels, and recycled toilet partitions. Approximately 75 percent of the construction waste by weight was salvaged and sent to a recycling company. Salvaged materials included crushed concrete for road base, land clearing debris, wood, metals, gypsum board, and corrugated cardboard. The plant's construction process reduced the amount of raw materials used and saved high performance building materials from being landfilled.

The plant's stainless steel equipment includes water storage silos and a pipeline for transporting water. Stainless steel is 100 percent recyclable, resists corrosion, and is very durable.

The plant operates a financially supportive site-wide recycling program for materials generated during production processes. The plant achieves a 75 percent salvage rate for all raw materials. Materials include plastic PET and HDPE bottles, plastic wrappers, and corrugated items. This program promotes greater awareness of

environmental stewardship to employees and provides a cost effective way to reduce waste. A cooperative reuse program among customers, pallet manufacturers, and Ice Mountain ensures that wood pallets are reused until no longer functional.

Energy

The well-insulated shell, entrance airlocks, and low-E windows with thermal breaks and insulated glazing maximize energy efficiency. Full-height glazing and transom windows fill office and other plant spaces with natural light. Interior high efficiency lighting and minimal impact exterior lighting reduce energy consumption. The T-8 fluorescent fixtures with electronic ballasts meet primary ambient lighting needs. Energy efficient compact fluorescent fixtures are installed in task lighting applications. Occupancy sensors and timed switching minimize artificial lighting. These features decrease the amount of energy and natural resources used. The overall efficiency of this system also also reduces the plant's long term energy costs.

The plant has a Thermoplastic Polyolefin (TPO) roofing membrane. The TPO is 100 percent recyclable and can be ground up and reused. This rubber does not contain chlorine compounds, which can be hazardous to wildlife in the environment. The TPO roofing resists algae and mold growth, which can decrease reflectivity and energy efficiency. The roof's high reflectivity reduces plant energy cooling costs and reduces absorption of solar radiant heat.

The plant's heating, ventilation, and air conditioning (HVAC) system uses state-of-the-art equipment called Direct Digital Control and is designed to eliminate Chlorofluorocarbon (CFC) greenhouse gas emissions. The system includes a filtration system, energy efficient motor, and control system to optimize energy consumption. The DDC controls enable managers to identify system trends and improve overall performance and safety. Ice Mountain

rewards employees for making environmentally-sound transportation choices. Special parking lot spaces are reserved for alternative forms of transportation including car pools, bicycles, and electric vehicles. Parking lot electric outlets make it possible for employees to charge electric vehicles at work.

Air

On-site manufacturing processes include injection molding, blow molding, bottle filling, labeling, palletizing, and packaging. The plant's blow molding processes yield no air emissions and operate on a closed loop cycle. Other manufacturing process equipment is emissions free and does not require special emissions control equipment. Additional cool air and ventilation required for manufacturing is provided by the plant's central chiller system. This system uses an ammonia chiller non-Hydrochlorofluorocarbon (HCFC) refrigerant. Because the plant does not create emissions, no catalysts or air cleaning equipment are needed.

Water Management

The plant's stormwater management system manages the rate, volume, and treatment of stormwater. This system is controlled by an on-site network of water detention ponds, retention ponds, grass lined swales, sloped water drainage courses filled with vegetation, rock or compost, shallow overland flow, and wetlands discharge.

Shallow landscaped depressions settle soluble materials, separating stormwater from pollutants. Stormwater infiltration through the soils further removes soluble nutrients from stormwater. Biological and chemical processes also stabilize these nutrients and eliminate them from stormwater. These landscape features filter particulate, pollutants and sediments from stormwater.

This system removes 80 percent of suspended solids and 40 percent of phosphorous and improves and protects water quality on site, minimizing stormwater runoff, and maximizing the infiltration of treated stormwater. The plant's low maintenance sustainable landscape reduces potable water consumption for irrigation by 100 percent. This landscape consists of native drought-tolerant trees which require no additional irrigation once established. Native Michigan field grasses mitigate the intrusion of invasive species. This feature provides habitat for wildlife and plant species, encouraging the development of healthy ecosystems. This sustainable landscape reduces costs associated with water use and site maintenance.

The plant employs low-flow and water-saving lavatory fixtures to control individual water use. The installation of waterless urinals, high efficiency lavatory fixtures, sensor operated toilets, and low-flow shower heads achieves increased water efficiency. These fixtures reduce water consumption 42 percent over conventional system and decrease the plant's water consumption while improving the cost effectiveness of the plant's operations.

Economics

Plant construction used local labor and materials, promoting businesses and economic growth within Michigan and the Midwest. Local workmanship played a vital role in the plant's development; 80 percent of the plant's subcontractors were Michigan-based. Over 40 percent of the materials used throughout the plant were locally manufactured. More than 3 million dollars worth of materials and products were purchased within 500 miles of the site. As of 2006, the number of employees working at the plant has nearly doubled. Ice Mountain spends 155.8 million dollars annually with its Michigan network of suppliers, distributors, and marketing partners.

Society

Social responsibility plays an integral role in Ice Mountain's day-to-day operations. Ice Mountain adheres to Nestlé's Good Neighbor Policy, which highlights the corporation's commitment to issues such as stakeholder communication, water resource education, and community assistance. Ice Mountain's new employees participate in an orientation program which educates them about sustainability in the workplace and everyday life.

Ice Mountain has played a key role in community events, organizations, and environmental stewardship programs. Ice Mountain promotes the protection and the preservation of the Muskegon River Watershed through its Environmental Stewardship Fund. Ice Mountain also sponsors Water Education for Teachers (project WET), which provides annual funding for training and water education festivals.

Sustainability

The Nestlé Environmental Management System (NEMS) is an integrated system that helps Ice Mountain to monitor and manage plant processes, systems, and environmental performance. It controls the consumption of natural resources and the production of waste, using a combination of computer systems and operational procedures. System managers use consumption and waste data to establish goals for improving the environmental performance of the plant. The NEMS allows the plant to chart its progress toward environmental sustainability while enabling the plant to operate efficiently.

The Stanwood plant highlights Ice Mountain's dedication to sustainable development. Environmental, economic, and social considerations influenced the plant's design, construction, and operations. These

considerations included the use of recycled materials, water saving fixtures, an energy efficient roof, and native landscaping.

Ice Mountain's LEED- certified Stanwood plant provides a blueprint for the development of sustainable food and beverage production facilities. The plant's use of environmentally-friendly building materials, state-of-the-art equipment, water and energy conservation measures, and site planning reflect attention to green design. The Stanwood plant's economic success, social policies, and community contributions signal a long-term commitment to sustainability. According to Gordon Gayda, senior project manager, "As a company whose very business centers on good environmental stewardship, we wanted to create a facility that is consistent with this commitment." Dedication to this commitment embodies the design and policies guiding Ice Mountain's Stanwood plant.

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