Saving on Snowmaking:
A Case Study

Saving Some Green at Blue Mountain

Blue Mountain Resort

https://www.skibluemt.com/winter-sports/skiing-snowboarding/

Palmerton, PA

"Once I decided to challenge the old ways things were done at Blue Mountain, I knew I was going to need reinforcement from professionals who had many years of experience in order to convince the rest of our organization that change is a good thing—especially when it saves us money! That's when I turned to the experts at EMS." – Barbara Green, CEO

Executive Summary

When Barbara Green became CEO of Blue Mountain Resort, Palmerton, PA, she inherited a ski area known for its physical advantages. She knew its assets—having grown up as a witness to her father's dreams and from working in its operations—but also knew it was lacking in amenities. With the opportunity to turn it around, she came with the vision of making Blue Mountain a destination resort.

Challenges

Green began to create a new vision for the future of the resort and quickly realized she needed to change the culture of the organization in order to grow it. She

questioned the belief that things should be done a certain way because "this is the way we have always done it," and began making operational and investment decisions based upon accounting, engineering, and strategic planning.

When she took over, the ski area was successful at satisfying skiers but the income statement and balance sheet did not reflect its success. Through Green's experience as a controller and CFO, she knew how to break down the business into the areas that needed attention. She knew she needed to measure every department, every function and every cost center and revenue source. This review immediately led to a new accounting system and electronic lift pass checking.

How Automation Helped

For most resorts in the ski business, **energy is the second largest expense after payroll. Energy is perceived as the cost of doing business rather than a cost that can be strategically controlled as part of a business plan.** Coming from industries involved in energy management, Green believed this significant expense could be and needed to be strategically controlled. So, she turned to the energy engineers at EMS Environmental, Inc. in Bethlehem, PA.

EMS Environmental's approach was not simply collecting load data and reporting energy use, but also **understanding how, where, and when energy use impacts not just a business in general, but specifically Blue Mountain's business.** EMS also has the engineering depth to evaluate Blue Mountain's operations and how they can be made more energy efficient while maintaining—and usually improving— the performance and/or quality of the operations vital to the business. Green was able to gain an on-going partner to help her transform a large expense into an investment vehicle.

EMS began with an energy assessment that quantified all of the resort's energy use and came up with a game plan for saving energy throughout the property. EMS put together an overall strategy for short-term and long-term savings across all facets of the business. This strategy involved building envelope efficiency, lighting and controls, HVAC, lifts, slope lights, and snowmaking. EMS also presented energy efficiency incentives from the local electric utility and other funding opportunities that could be generated by making energy efficiency investments.

Central to the strategy was snowmaking. Like most ski areas in Pennsylvania, Blue Mountain expends over 75% of its energy cost on snowmaking. However, snowmaking is an area where lots of energy can be saved. Further, **snowmaking is of such strategic importance to the ski area, that improving its efficiency can also dramatically improve the ski area's ability to open more quickly and deliver quality guest experiences.**

Snowmaking was a classic case of where "the way we have always done it" was costing Blue Mountain money and opportunity. Both Green and EMS recognized that snowmaking energy could not be saved without snowmaker involvement.

As one part of the strategy, EMS introduced the concept of "expensive snow" to help snowmakers make more efficient snowmaking decisions. As part of this tactic, EMS developed a cost-comparison of which types of the many snow guns at Blue Mountain were the most energy efficient per unit of snow made.

Snowmaking measurement sled with automated data collection for ease in measuring snow gun production versus energy use while monitoring conditions at which the snow is being made.

The perceived most-effective snow gun appeared to generate a lot of snow and was the go-to gun when conditions were tough and opening imminent. **EMS worked with the snowmakers to measure the snow gun's output, which turned out to be actually less than more energy-efficient snow guns, and later demonstrated faster opening using other, more efficient snow guns.**

EMS helped further demonstrate that snow could now be made on more trails simultaneously, opening with more trails and moving to full-fare conditions faster.

In an ideal world, the optimum type of snow gun would be placed along all the ski trails in the resort. In practice, the investment over a single season would be financially imprudent. More important, wet bulb, wind, water pressure, pipe sizes and operating conditions vary across the mountain, making one size fits all an unlikely proposition. EMS worked with Blue Mountain relative to the existing snow guns and the opportunities to leverage the most benefit for each of the conditions from the least investment.

Low Energy snow guns expand capacity and are amazing producers in the right application.

EMS focused on the opportunities with automation. Particularly in Pennsylvania, there are limited windows when the weather is suitable for making snow. Portions of the weather window can't be wasted setting up snow guns and then adjusting them to the weather conditions.

Blue Mountain had long since established the need for fixed snow guns and hydrants at industry-leading closely-spaced intervals that did not need to be re-positioned for each snowmaking effort; they could be simply connected and adjusted. With snow gun automation, even these two steps could be eliminated. More importantly, with automation, the snow guns could adjust themselves to weather changes instead of requiring additional labor to service each snow gun while incurring losses in quality and production pending the manual adjustment.

Tight snow gun spacing maximizes production and distribution; located on both sides as appropriate for trail width and wind conditions.

Automation of the snow guns alone would not maximize production response to weather windows. The pumps would need to be automated to eliminate the trimming and adjusting required with hundreds of snow guns activating across the mountain at any one time. The first step was **Variable Frequency Drives** (VFD) for at least one motor in every pump set in order to supply a constant pressure supply that could automatically adjust to changes in snow gun demand.

Automation provides tremendous advantages and, in the right application, is more cost-effective than manual snow guns.

The next step was to make the pumps act like snow guns—automatically configuring and adjusting to demand from the snow gun customers (using a system supplied by TechnoAlpin)—which resulted in the ability to start the snowmaking process within seven minutes of compatible weather conditions while operating more efficiently, resulting in lower hours on the pumps.

Automated constant pressure pumping system is the key to fast startup, productivity and energy efficiency. It shouldn't be a high-wire act.

One of the additional benefits of the automation is the ability to run the snow guns for short periods of time to dust slopes with fresh snow without having to devote a shift to snowmaking which, due to the onerous manual pre-setup and post-production hose-draining steps, is typically the case. The dusting results in better conditions and greater safety for the guests while reducing over-production of snow that virtually-instant startup and shutdown affords.

Results, Return on Investment, and Future Plans

The conversion to more efficient snow guns and automation was expensive. The conversion has been an ongoing process as the resort has to prioritize investments each season. EMS has helped Blue Mountain make the most cost-effective choices to gain the biggest production advantages for each investment, all aimed at maximizing the weather window.

EMS helped Blue Mountain leverage the expense of snow gun upgrades and automation by obtaining custom utility rebates for each snowmaking efficiency improvement.

To date, EMS has obtained over $550,000 in energy efficiency rebates for Blue Mountain. While the energy efficiency rebates greatly helped off-set the cost of the improvements, the greatest savings is the more efficient equipment translates into over 5.5 million fewer kilowatt-hours (kWh) of electricity per year, which translates into an annual savings of $500,000 and avoids 4.9 million pounds of CO_2 greenhouse gases. Also important, with EMS's approach to snowmaking energy as a strategy, Blue Mountain has added top-line revenue with faster opening and recovery throughout the season.

Snowmaking has been just one facet of Blue Mountain's energy strategy. With EMS as a partner, Blue Mountain has made energy efficiency a part of their successful strategy for the resort's future.

"It is important to the entire organization at Blue Mountain to provide a high-quality guest experience year after year. The sustainable snowmaking methods and resort operations implemented by the professionals at EMS Environmental give us confidence in our ability to continue saving money while reducing our environmental footprint—so we can ensure our visitors will always have the best experience on our mountain!" – Barbara Green, CEO