A NEW HUE OF *green* FOR THE MANAGEMENT ACCOUNTANT

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With energy prices at historically high levels, there's ample incentive for companies to consider investing in energy-saving technology that's both cost efficient and environmentally friendly. Management accountants can help the cause by preparing cost-benefit analyses of alternative investment possibilities that contribute to the further "greening" of the United States. This creates a win-win situation for all.

Jiminy Peak's wind turbine generates cost savings for the resort while benefitting the environment.

PHOTOGRAPH: SONJA STARK/WWW.PILOTGIRLPRODUCTIONS.COM

One real-life example of this has taken hold at Jiminy Peak Mountain Resort, a medium-sized ski and snowboard area in the Berkshire Mountains of western Massachusetts. Jiminy Peak recently completed a very successful wind turbine project that adds a high degree of stability to its energy costs, helps fulfill a corporate mission to protect the environment, and allows the use of "green" marketing to attract even more visitors to its popular ski slopes.

A History of Innovation

Jiminy Peak, which dates back to the late 1940s, is located about 30 miles east of Albany, N.Y. Through good management and sound development, the resort has evolved over the years into a popular winter ski destination with 45 runs and nine lifts. Savvy marketing and attractive mountain facilities have enabled Jiminy Peak to operate profitably, even in the summer. Winter sports draw about 250,000 visitors annually, while summer pulls in roughly another 100,000 for mountain biking and other activities.

Jiminy Peak's business is energy-intensive because machines make most of the snow, especially early in the season. Even with strong conservation efforts over many years that reduced annual energy usage by 25%, the resort consumes about 7.5 million kilowatt hours of electricity per year—or about what a small town might consume. Of this, roughly 60% is used during the winter months.

Rising winter energy costs spurred the resort to start thinking of new ways to lower its bills. Costs had jumped

about 90% from the 2003-2004 season to the 2005-2006 season, largely because of a surge in oil prices. Jiminy Peak had already slashed its electricity costs as much as it could before the increase: More than 1,800 new compact fluorescent bulbs in the lodge replaced incandescent bulbs; outdoor lights on the ski runs were programmed to dim during night maintenance work; and half the snowmaking system was converted to gravity-feed. Jiminy Peak was even a test site for the development of high-efficiency "guns" for the snowmaking machines. The new technology uses about 40% less electricity than the old version.

But there was only so much Jiminy Peak could do to conserve energy with its existing facilities and still offer high-quality recreational services. The eventual solution arrived in a glow of green.

Harnessing the Wind

Brian Fairbank had been in the ski resort business long enough to know that tops of the Berkshire Mountains can get very windy in the winter. As president of Jiminy Peak, Fairbank decided to put his mountaintop to good use in helping to stabilize the resort's cost of electricity.

Fairbank knew that harnessing the wind would be a complicated, specialized process, so he hired Sustainable Energy Developments of Ontario, N.Y., to examine the feasibility of such an enterprise. With Sustainable's help, Jiminy Peak received a small grant from the Massachusetts Technology Collaborative to conduct a formal feasibility study. As might be expected, in addition to technical and financial issues, a great deal of effort went into ensuring no negative impact on endangered species, birds, and wetlands.

The original plan called for Jiminy Peak to install a 1-megawatt wind turbine with financing provided by a $582,000 grant from the Renewable Energy Trust Fund, administered by the Massachusetts Technology Collaborative, and a $1.8 million loan from a local bank. (Funding for the Renewable Energy Trust Fund comes from a charge on Massachusetts electric bills.)

Unfortunately, the resort discovered that trying to purchase a single wind turbine was like trying to buy a single slice of bread—manufacturers normally dealt with "wind farms" that purchased upwards of 10 units at a time. Because the factories were running at full capacity, they weren't interested in an order for one unit; in fact, not a single supplier responded to Jiminy Peak's request for proposals.

Finally, GE Energy, a unit of General Electric, agreed to provide a wind turbine to Jiminy Peak within a year, but its smallest model had a capacity of 1.5 megawatts and was substantially more expensive than the 1-megawatt size. The local bank would have to be willing to increase the loan to $3.3 million, and Jiminy Peak would have to be sure it wasn't buying more capacity than it needed. With electricity, the issue is matching generation with consumption since it can't be stored for use later.

Too Much Power, or Not Enough?

Capacity really wasn't a problem. The larger GE model would still provide only one-third of Jiminy Peak's annual electricity needs. Nevertheless, projections showed that in times of sufficiently strong winds, the turbine could churn out power 24 hours a day, seven days a week, often when the resort doesn't need much power. Fortunately, the winds on Jiminy Peak are at their strongest during the winter months, which is precisely when the resort needs more electricity to provide for snowmaking. Plus, excess electricity could be automatically diverted to the power grid and sold.

The Zephyr turbine is about 80 feet higher than the Statue of Liberty. Each of its three blades is longer than three school buses parked end to end.

An important financial component of the project was the sale of renewable energy credits (RECs) to a third party. There's a ready market for these credits because they certify that the buyer purchased renewable energy. A REC marketing company in Pennsylvania agreed to purchase Jiminy Peak's credits for three years at a total minimum price of around $500,000, or $166,667 per year.

In considering the resort's request for the higher loan amount, the local bank became concerned that the REC deal extended for only three years of the 10-year term of the loan. At this stage, the Massachusetts Technology Collaborative stepped in and signed a contract with Jiminy Peak to guarantee the purchase of the credits for the remaining seven years. With that, the loan became viable, and the project—now known as "Zephyr" after the myth-

Table 1: Should You Invest in Renewable Energy?

	Yes	No
1. Is the investment consistent with your organization's strategy?		
2. If "yes," proceed to question 3. If "no," is now the time for your organization to consider a new environmental strategy?		
3. Is the project's business-risk level acceptable?		
4. Does the project have a positive NPV/IRR > the minimum required rate of return and an acceptable payback period?		
5. Have the environmental and other nonfinancial factors been identified and evaluated?		
6. Is long-term financing available for the project?		
7. If a loan is required, are the interest rate and resultant financial risk acceptable?		
8. Should the investment be made based on the above analysis?		
9. If the answer is "yes," have the appropriate construction permits, environmental permits, and other clearances been obtained?		
10. If the answer to question 9 is "yes," proceed with the purchase and installation. If there are mutually exclusive alternatives, repeat the appropriate steps for each option before making a choice.		

ical Greek god of the west wind—proceeded. Jiminy Peak got its wind turbine.

A Green Initiative that Saves Greenbacks

In addition to the annual income from the RECs, Zephyr, as the turbine itself has come to be known, generates about $160,000 per year from the sale of excess electricity to the power grid and $46,000 annually in production tax credits for the first 10 years. The project also qualifies for five-year accelerated depreciation. Maintenance and insurance cost approximately $75,000 per year.

The Zephyr turbine is about 80 feet higher than the Statue of Liberty. Each of its three blades is longer than three school buses parked end to end, and it had to be transported by special convoy from the Port of Albany. The resort positioned the turbine so that its backdrop is mainly mountainside, not blue sky, showing a real concern for the esthetics of the terrain. Zephyr can generate electricity in wind speeds anywhere between 6 and 55 miles per hour but is considerably more productive in the blustery winter months. Its total output could power more than 600 homes for a year.

Jiminy Peak's wind turbine was the first installed by a mountain resort in North America. Many resorts, such as Vail and Aspen, claim to use electricity generated by wind power, but they're only purchasing RECs—a good effort at greening but a far cry from owning and operating a wind turbine. In fact, Jiminy Peak was also the first privately owned business in America to use its own wind turbine of 1-megawatt or greater capacity to generate power for its own use.

The resort estimates that each year Zephyr will offset the emissions of 7.1 million pounds of carbon dioxide (CO_2), which is often linked to global warming through the greenhouse effect; 33,000 pounds of sulfur oxide (SO_x), which contributes to smog and is a major cause of acid rain; and 10,000 pounds of nitrogen oxide (NO_x), which is found in smog and is linked to asthma. How many capital budgeting decisions actually help clean up the environment as a routine side effect?

In 2007, after the turbine went online, the resort surveyed its new guests and uncovered an interesting statistic: About 25% said they patronized Jiminy Peak because of its well-publicized environmental commitment. How many cost-saving measures actually cause an increase in sales?

Needless to say, Jiminy Peak management is pleased with Zephyr's performance, which has saved $450,000

Table 2: Abbreviated Budget Performance Report for a Hypothetical Wind Turbine Project

DESCRIPTION	EXPECTED	ACTUAL	VARIANCE*	VARIANCE %*
FINANCIAL				
Additional revenue from environmentally oriented resort guests	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Additional revenue from opening resort early	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Additional revenue from wind turbine tours	$XX,XXX	$XX,XXX	$XXX U/F	X U/F
Revenue from electricity sold to the grid	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Internal electricity cost savings	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Maintenance, insurance, and other operating costs	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Payback to date	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Investment and installation costs	$X,XXX,XXX	$X,XXX,XXX	$X,XXX U/F	X U/F
NONFINANCIAL				
Installation time (days)	XXX	XXX	XX U/F	X U/F
ENVIRONMENTAL				
Electricity used by the grid (kilowatts)	XXX,XXX	XXX,XXX	XXX U/F	X U/F
CO_2 reductions	XXX,XXX	XXX,XXX	XXX U/F	X U/F
SO_x reductions	XXX,XXX	XXX,XXX	XXX U/F	X U/F
NO_x reductions	XXX,XXX	XXX,XXX	XXX U/F	X U/F
Number of reported bird kills	0	X	X U	X U
Noise pollution 300 feet from turbine (decibels)	XX	XX	X U/F	X U/F
COMMUNITY				
Additional hotel, restaurant, and other retail revenues from increased number of resort guests	$XXX,XXX	$XXX,XXX	$XXX U/F	X U/F
Increased traffic on roads (number of vehicles)	X,XXX	X,XXX	XXX U/F	X U/F

*Key: U/F means Unfavorable or Favorable variances.

annually in energy costs and has helped the resort to thrive during the recent economic downturn. (For more information, see "Wind power helps ski resort during recession," at http://articles.cnn.com/2009-02-27/tech/ski.wind.turbine_1_jiminy-peak-mountain-resort-wind-turbine-zephyr?_s=PM:TECH.)

Imitation, of course, is the sincerest form of flattery. In October 2009, Bolton Valley Resort in northern Vermont became the second ski resort in the nation to install a wind turbine. (For more information, go to http://northernpower.kiosk-view.com/bolton-valley.)

The Role of Management Accountants

As with all capital expenditure proposals, management accountants can compare the benefits and costs of projects with environmental features, such as Zephyr. This includes preparing capital budgeting analyses of the expected cash inflows and outflows and projecting the expected environmental benefits. Table 1 provides a suggested 10-step checklist to determine if a renewable energy project, or any other major capital expenditure for that matter, is suitable for your organization.

Management accountants can report the results of post-investment audits and routine budget variances that compare the actual results to the expected financial, nonfinancial, environmental, community, and other benefits and costs. For example, on the environmental side, the expected and actual levels of decibel noise pollution and avian life disruption that the wind turbine causes can be reported. Likewise, the expected and actual levels of CO_2, SO_x, and NO_x can be compared, say, every quarter. Management accountants can also report the expected and actual kilowatt hours of electricity generated by the wind turbine, including electricity sold to the grid, which displaces electricity previously generated by conventional power stations.

Table 2 shows an abbreviated version of a possible budget performance report that compares financial, nonfinancial, environmental, and community benefits and costs of a wind turbine. Of course, variances deemed significant in absolute and/or percentage terms should be investigated further by the manager responsible for them to determine reasons for the unexpected deviations. Some hard-to-measure benefits and costs would have to be estimated in some acceptable way from externally collected information to, for example, project the additional hotel, restaurant, and other retail revenues gained from an increased number of resort visitors.

Management accountants can also prepare a lifecycle analysis comparing cumulative expected and actual financial, environmental, and other benefits and costs. It's probably a good idea to add appropriate financial, environmental, and other metrics related to various aspects of renewable energy performance to the balanced scorecards, unit scorecards, and personal scorecards of executives and managers because "what you measure is what you get." Management accountants can help executives and lower-level managers prepare these scorecard metrics, too.

With the Wind at Their Backs

Brian Fairbank and his crew are now well-versed in implementing a wind turbine system. During the many months from conception to actual power generation on August 15, 2007, Team Fairbank was involved in myriad environmental, technical, financial, and strategic issues and decisions. In fact, they gained so much knowledge that they began a consulting company, distinct from Jiminy Peak, called EOS Ventures, LLC. The new company's initial focus was on wind projects but has evolved into designing, installing, and commissioning solar energy systems, too.

Few management accountants are experts in the details of renewable energy projects. But with the ever-increasing cost of energy bedeviling businesses, a management accountant's understanding of financial and tax matters can play an important role in the analyses needed to find creative—and "green"—ways of coping. **SF**

Authors' Note: *We would like to thank University of North Florida student Jody Ratliff for his research contribution and Katie Fogel of Jiminy Peak Mountain Resort for her assistance. We also used information contained on Jiminy Peak's Internet sites (www.jiminypeak.com and http://jiminy.lsw.com), including its* Forever Green *magazine, published in 2007, and from www.eos-ventures.com.*

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