



ST. CHARLES MEDICAL CENTER A Green Lights / ENERGY STAR Case Study

For more than a decade, WRI's Sustainable Enterprise Program (SEP) has harnessed the power of business to create profitable solutions to environment and development challenges. BELL, a project of SEP, is focused on working with managers and academics to make companies more competitive by approaching social and environmental challenges as unmet market needs that provide business growth opportunities through entrepreneurship, innovation, and organizational change.

Permission to reprint this case is available at the BELL case store. Additional information on the Case Series, BELL, and WRI is available at: www.BELLinnovation.org.

Mike Severns looked at the report on his desk. As the Director of Facility Services for the non-profit St. Charles Medical Center, he was responsible for recommending a course of action on the hospital's energy conservation program. St. Charles' participation in the Environmental Protection Agency's Green Lights and ENERGY STAR Buildings programs looked like a good idea in principle, but now Severns had to decide whether specific retrofitting projects were worth pursuing, basing his decision on both strict financial analysis and consideration of intangible factors. As he read the report on the various energy conservation measures (ECMs), he began to plan a strategy for analyzing the projects.

Green Lights/ENERGY STAR Buildings

Lighting accounts for 20-25% of all electricity sold in the U.S. Many organizations treat lighting as unavoidable overhead as opposed to an opportunity for investment that can lead to cost savings. To address this, the United States Environmental Protection Agency (EPA) launched the Green Lights Program in 1991. It was a voluntary, non-regulatory program aimed at reducing air pollution by promoting energy efficient lighting. Green Lights participants agreed to look into replacing their current office lighting with newer, more efficient light bulbs and fixtures. If these projects were profitable for the participant, they then agreed to begin retrofitting within a few years. Organizations that joined the Green Lights Program conserved energy and cut their electricity bills, while reducing the amount of carbon dioxide, sulfur dioxide, nitrogen oxide, and heavy metal emissions released into the atmosphere. Green Lights participants also benefited from support from EPA, which provided product information, extensive technical support, and the ability to publicize progress in environmental protection. Improved lighting could even lead to productivity gains in the workplace, a factor of great importance to hospitals in particular.

EPA subsequently moved to address energy conservation in all aspects of corporate facilities. With the Green Lights Program as its foundation, EPA launched the ENERGY STAR Buildings Program, a five-stage process in which EPA asked participants to perform comprehensive facility upgrades, ranging from system tune-ups to improving air-handling systems and heating/cooling plants. As with the Green Lights Program, ENERGY STAR Buildings participants were only asked to pursue improvements that were profitable, which EPA defined as having an Internal Rate of Return of 20%. In 1995, twenty-four Green Lights members were selected as ENERGY STAR Showcase Building participants to demonstrate the effectiveness of the program.¹

St. Charles and Green Lights/ENERGY STAR Buildings

St. Charles Medical Center served as the regional referral center for a population of 140,000 people in a 25,000 square mile area of central and eastern Oregon. In this capacity, the hospital offered virtually every major service except organ transplants and major burn care. Because of its geographic location away from other major medical centers and its cooperative relationships with smaller facilities within its region, direct competition on a local level was limited.² Marketing concerns were therefore minimal, although participation in Green Lights and ENERGY STAR Buildings was expected to enhance the hospital's public image in the region.

Mike Severns looked at the report and considered some of the intangibles. At first glance, St. Charles hospital seemed like a prime candidate for the Green Lights and ENERGY STAR Buildings programs as a major consumer of electricity for lighting, heating/cooling, and sterilization of equipment. St. Charles was a not-for-profit medical center whose mission was "to improve the health of those we serve in a spirit of love and compassion," and a concern for the environment was a natural consequence of this philosophy. Participation in the Green Lights and ENERGY STAR Buildings programs would fit well with the hospital's corporate culture.

As he went on to review the financial data in front of him, Severns knew he had two major factors working in his favor: St. Charles' partnerships with Johnson Controls Incorporated and the Bonneville Power Authority. St. Charles had an established relationship with a performance contractor, Johnson Controls Incorporated (JCI). Performance contractors provided a value-based relationship, providing financial assurances, technical/performance assurances, or both. Therefore St. Charles' risk was substantially reduced through their agreement with Johnson Controls. Through this agreement, St. Charles energy cost reductions were guaranteed to occur and, should there be a shortfall, JCI would pay St. Charles 100% of the shortfall amount. Remarkd Severns:

This is the beauty of Johnson Controls' HealthLink approach. Not a dime of our hospital's money was spent until the final proposal was signed and the project construction began... It made sense to us to not have to pay more for the investment than necessary and JCI's financial assurance gave us the comfort level we needed to invest with our own money.³

Involving JCI in the project ensured that St. Charles had the resources at hand to undertake any or all of

¹ U.S. EPA. "EPA's ENERGY STAR Programs." *Energy and Environmental Management*. Spring 1995.

² Conversation with Michael Severns, 9/95

³ See Appendix 4

the retrofits, listed in Exhibit A.⁴

Severns also knew that the local power utility, Bonneville Power Administration, had awarded an Energy Rebate to St. Charles on the basis of an approved energy model prepared by Johnson Controls. This rebate provided a significant sum of money as an incentive to retrofit. It only applied to certain retrofitting projects, and would therefore have to be factored into any analysis of the projects. This outstanding incentive was the direct result of a partnership between St. Charles, Bonneville Power Administration, JCI, and Central Electric Cooperative.⁵

The ECMs

Severns already had much of the data he would need to make his decisions. The report that he was reading described a variety of retrofitting projects, or energy conservation measures, and provided the costs and savings expected from each one. Energy savings had been calculated for both electrical and thermal utilities, and all expected costs, including any disruptions of the hospital's usual operations, were included. Total maintenance savings and any applicable Bonneville Energy Rebate over the life of the project (assumed to be eight years) were also listed in the report, summarized in Exhibit B.

Eleven different ECMs were being considered, which were divided into three stages for use in planning. Stage I encompassed all Green Lights Program projects, as well as two simple building upgrades. Only projects which would not have detrimental effects upon the hospital's lighting quality were being considered. ENERGY STAR Buildings retrofits were primarily classified into Stages II (Variable Air Volume and controls), and III (heat recovery chiller and variable-flow pumping system). Beyond the projected energy savings, these projects would also have more intangible benefits in the future. As a successful hospital, St. Charles was continually expanding, and had already reached the limitations of its current heating/cooling system. The JCI also presented the most cost-effective method for providing each retrofit, so that Severns himself did not have to decide between leasing or buying the new equipment. This was commonly a major concern in building upgrades.

Stage III retrofits would address this problem, and would also put St. Charles in a position to meet EPA's expected chlorofluorocarbon (CFC) phaseout requirements, avoiding substantial (but unknown) future costs.

Armed with this information, Severns now faced the following questions:

- 1) What factors should be considered when deciding whether to undertake these projects?
- 2) What financial tools -- such as Payback Period, IRR, and NPV -- should be used to analyze the profitability of the ECMs?
- 3) Based upon a spreadsheet analysis of the available information, which ECMs should be undertaken?

⁴ JCI also presented Severns with the most cost-effective method for providing each retrofit, so that he himself did not have to decide between leasing or buying the new equipment. This was commonly a major concern in building upgrades.

⁵ Conversation with Michael Severns 9/95

- 4) What intangible benefits could St. Charles gain by joining Green Lights and **ENERGY STAR** Buildings?
- 5) How would considering all of Stage I ECMs as one project change the analysis? Stages I and II together? Stages I, II and III together?
- 6) Severns thought that the Stage III retrofits would put St. Charles in a better position for the future because they met possible CFC-phaseout restrictions and also gave the hospital greater capacity. Did this information, and his knowledge of other intangible benefits to the projects, change the answer to question 3?

Severns thought for a few minutes, and then turned on his computer ...

Exhibit A

Description of Energy Conservation Measures Under Consideration

<u>Energy Conservation Measure</u>	<u>Description</u>
1) Exit Sign Conversion (Stage I)	Replaces incandescent bulbs with fluorescent bulbs in approximately 45 signs.
2) Energy Efficient Fan Belts (Stage I)	Installs new energy efficient fan belts on target fans.
3) Fluorescent Fixture Retrofit (Stage I)	Reduces number of lamps. Offsets lighting loss by utilizing chromatic lamps with increased wattage. Color rendition is improved under this option.
4) Waterside Economizer (Stage I)	Allows existing cooling tower to replace some functions of water chiller for mechanical refrigeration.
5) Incandescent Retrofit (Stage I)	Replaces approximately 642 incandescent lamps with fluorescent/reflector lighting kits.
6) Parking Lights Replacement (Stage I)	Converts existing mercury vapor parking lamps with high pressure sodium lamps.
7) Premium Energy Efficient Motors (Stage I)	Replaces outdated electric motors with newer models.
8) Occupancy Lighting Controls (Stage I)	Installs infrared controllers in certain offices to prevent wasted lighting
9) Variable Air Volume (Stage II)	Converts 8 systems from constant volume reheat to variable volume reheat.
10) Heat Recovery Chiller (Stage III)	Replaces outdated water chiller with newer, more efficient and reliable model.
11) Variable Flow Pumping (Stage III)	Upgrades the central plant's chilled-water pumping system.

Exhibit B

St. Charles Medical Center Energy Conservation Measures (ECM) Proposal

ECM	Project Cost	kwh/yr saved	Electricity Cost Savings/yr	Therms/Yr saved	Therms cost savings	8-yr Maintenance Savings	BPA incentive
1. Exit Sign Conversion	\$2,598	11,432	\$411	0	\$0	\$10,907	\$1,350
2. Energy Efficient Fan Belts	\$2,108	23,133	\$832	0	\$0	\$0	\$1,456
3. Fluorescent Lighting	\$214,597	728,719	\$26,234	-7,849	-\$2,929	\$110,305	\$145,419
4. Waterside Economizer	\$64,703	187,195	\$6,739	0	\$0	\$0	\$31,823
5. Incandescent to Fluorescent Conversion	\$59,650	280,970	\$10,115	0	\$0	\$85,309	\$19,520
6. Parking Lights	\$19,778	42,324	\$1,524	0	\$0	\$0	\$5,280
7. Energy Efficient Motors	\$73,818	204,285	\$7,356	0	\$0	\$7,090	\$8,490
8. Occupant Control of Lighting	\$7,026	6,460	\$233	0	\$0	\$0	\$490
9. Variable Volume Retrofit	\$734,022	1,740,844	\$62,670	130,497	\$48,675	\$0	\$400,394
10. Heat Recovery Chiller	\$540,512	84,176	\$3,030	18,880	\$21,910	\$141,000	\$0
11. Variable Flow Pumping	\$380,063	124,629	\$4,611	0	\$0	\$0	\$0

This case was prepared by Julie Jubeir and Robert Day of World Resources Effect (WRI) to stimulate class discussion rather than to document effective or ineffective management strategies. Funding was provided through Lisboa Associates from the U.S. Environmental Protection Agency. Copyright © 1996 by WRI. Not for citation, distribution, or duplication without permission of WRI.