



## Murphy Stores: Capital Projects

*John S. Strong, College of William and Mary*

Tom Becker, Manager of Capital Planning for Murphy Stores, was reviewing possible projects that might be funded in 2007. The slowdown in the housing market had made Murphy's capital committee (which approved all capital spending over \$1 million) cautious about a few investments that were aimed at increasing revenues; the capital committee now wanted to consider reallocating capital funds to cost-saving projects. Becker had previously been a project analyst, but had been promoted to Manager of Capital Planning (reporting to the Chief Financial Officer) not just for his technical financial skills, but also for his willingness to thoroughly discuss projects with members of the store operations and merchandising teams who were on the front lines of the business.

Murphy Stores was a large retailer with multiple brands and formats. There were large "full-line" department stores which carried a complete assortment of apparel, appliances, home goods, and general merchandise. (These stores were similar to Sears or JC Penney or Target.) The second format was smaller hardware stores which carried a moderate assortment of home improvement merchandise, comparable to larger Ace or True Value Hardware stores. The company also had small locally-franchised dealer stores, and tire and auto centers, but which were a much smaller part of the total business. Murphy had 200 full-line department stores and 200 hardware stores, with total revenues of about \$10 billion.

Including online operations, the department store segment had experienced sales growth of about six percent annually for several years. Growth in home improvement spending had driven the hardware store sales growth at nine percent annually over the past five years. Murphy's total capital budget, like many broadline retailers, averaged about 1.5% - 2.0% of revenues, and about 4% - 7% of fixed assets. The 2007 capital budget had been revised downward from an initial \$175 million to \$150 million, as some projects were deferred. Historically, the company had allocated about 40 percent to reinvestment or replacement of existing assets, 35 percent to investments aimed at improving business operations and efficiency, and 25 percent to new growth initiatives. The company's weighted average cost of capital typically was applied for reinvestment or business improvement projects, with a varying premium of 2% to 4% for higher risk projects or growth initiatives.

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The reallocation from revenue growth projects meant that Murphy Stores had approximately \$7 million remaining in its capital budget for 2007. Becker was evaluating two potential cost-saving opportunities: enhanced security systems to reduce theft, and energy-efficient lighting replacements. Becker felt that considering these two potential investments would be well-received by the store operations managers. Becker commented, “Frequently, our operations team feels that the finance group doesn’t really understand what is going on in stores.” Becker felt that these two projects could help store managers deal with the growing amount of stolen merchandise and with the headache of continually having to change burned-out lighting and “dark spots” in departments.

Because both projects involved improvements to existing operations, Becker believed they could be analyzed using the standard weighted average cost of capital for the company. Becker noted,

Our policy is to evaluate cost saving projects in existing stores on a consistent basis. We find it hard to estimate project specific discount rate adjustments. Instead, projects with less information should be subject to greater levels of sensitivity or scenario analysis. When we have undertaken *ex post* reviews, we have found more errors due to incorrect assumptions than any other factor.

Becker noted that the IRR calculations would help assess whether a higher discount rate would lead to a different project recommendation. Becker also commented that it was important not to double-count – that is, taking into account risk by changing variables in the cash flows as well as assuming higher discount rates.

The company’s project evaluation review process assumed the company average tax rate of 39 percent and an average cost of capital of 12 percent, although this discount rate might be adjusted for projects of higher or lower risk. Each year, the capital planning team provided basic assumptions for capital project submissions, so that each division was not making its own determinations of general factors like inflation and the cost of capital. Becker also knew that the cost of capital could change, and had not been re-calculated recently, so he collected relevant financial market data to update his calculations. This data is presented in Exhibit 1 (next page). Being a fairly conservative organization, Murphy Stores had set its target capital structure with long-term debt at 20% of capital and equity at 80% of capital (measured at market values). The company typically used investment grade bond yields as its cost of debt, and believed that medium term Treasury notes and medium term spreads matched the asset lives of most of its investments.

Like many companies, however, Murphy’s practice was to use a discount rate for its base case project evaluation slightly above the exact cost of capital as calculated, because the company felt this was a more conservative way to incorporate changes in financial markets and inherently optimistic project submissions. As one senior executive noted, “Nobody ever submits a project he doesn’t like, so our base case analysis frequently turns out to be overly optimistic.”

Becker knew that finance theory suggested that all positive NPV projects should be funded. However, in practice companies like Murphy Stores established capital budgets that operated within managerial constraints about the extent of external financing, required reinvestments, and the like. These constraints acted as a means of “soft” capital rationing, because any unfunded positive NPV projects were likely to be carried over and undertaken in the following year. Current revenue and expense forecasts indicated that there was no opportunity to increase the capital budget this year. Thus, it was only possible to recommend projects totaling \$7 million.

## Exhibit 1: Financial Market Data, 2007

Murphy Stores Equity Beta	1.20
Treasury bills (90 day)	4.00%
Medium term Treasury notes (10 years maturity)	4.50%
Long term Treasury bonds (30 year maturity)	5.00%
Corporate bonds Investment Grade (A)	6.75%
Corporate bonds Below Investment Grade (CCC)	10.50%
Prime Rate	7.25%
LIBOR (5 years)	5.80%
Expected Inflation	4%
<b>Spreads (R<sub>m</sub> - R<sub>f</sub>)</b>	
R <sub>m</sub> -R <sub>f</sub> (T-bills)	7.50%
R <sub>m</sub> -R <sub>f</sub> (T-notes)	7.00%
R <sub>m</sub> -R <sub>f</sub> (T-bonds)	6.50%
R <sub>m</sub> -R <sub>d</sub> (A rated corporate bonds)	4.75%
Return on S&P 500 (last 52 weeks)	14.60%

Sources: Morningstar, *SBBI Yearbook 2007*; *Standard and Poor's Bond Guide*; *The Wall Street Journal*; Value Line, 2007.

## ELECTRONIC ARTICLE SURVEILLANCE (EAS)

EAS was a technology that utilized tags, entry and exit systems, and audible signals to deter merchandise theft. Many major retailers used EAS extensively. Increasingly, vendors were supplying products to stores with EAS source tags already attached. The most common version, and the one under consideration by Murphy, was the white sensor channels commonly seen just inside the exit doors of many stores. Radio Frequency Identification (RFID) chips were placed inside tags attached to merchandise using special devices that were required to remove them. If an attempt was made to remove a tagged item, a second RFID chip in the sensor channel sounded an alarm. Retail consulting studies indicated that stores that used EAS tended to drive shoplifters to stores without EAS. Other industry estimates suggested that shrink (industry terminology for stolen goods) fell 20% - 50% after EAS systems were installed.

Merchandise shrink was a hotly debated topic in the retail industry. Industry trade groups estimated that stolen merchandise (by customers, employees, suppliers, and system errors) equated to about 1.5% of total retail sales (and as high as 5%-7% in

some sectors). There was much discussion and disagreement as to the source of shrink, but shoplifting by customers and by employees were believed to be much more significant than supplier theft or system reporting errors. Murphy believed that the presence of EAS would not only help reduce customer theft, but also deter employee theft because the tags had to be physically removed.

Current Murphy hardware store shrinkage in 2006 was about 3.1% of sales, up from 1.8% a year earlier. Full-line stores had shrink of 2.8% in 2006, compared with 1.8% in 2005. Full-line stores shrink by selected store departments are shown in Exhibit 2. Hardware store shrink had been growing steadily in recent years. Full-line store shrink had been more variable, but recent data indicated a sharp uptick to 3.6% in the first quarter of 2007.

**Exhibit 2: Shrink as a Percentage of Sales by Category**

<u>Category</u>	<u>2006 Shrink</u>	<u>2005 Shrink</u>
Full-line store, selected departments		
Computers	3.6%	2.1%
Home electronics	3.7%	2.4%
Womens Apparel	4.2%	3.8%
Mens Apparel	3.9%	2.5%
Average- full-line stores*	2.8%	1.8%
Average – hardware stores	3.1%	1.8%

*\* Notes: Averages reported are across all departments, not just the four listed above. Full-line stores shrink in Q1 2007 3.6%*

Source: Company information.

Murphy’s had installed EAS in three stores in high-risk markets in 2005. Store A subsequently experienced shrink of 1.3%, while Store B had a rate of 0.2%. Unfortunately, no pre-installation shrink data was available for these two stores. In Store C, shrink fell from 1.8% pre-EAS to 0.1% after the installation of EAS. Murphy’s currently had EAS installed in 19 full-line stores and 5 hardware stores.

The proposed EAS initiative would install the systems in 23 full-line stores and/or 110 hardware stores in 2007. The initial costs for the full-line stores are shown in Exhibit 3. Ten years was the expected life of the project, with no salvage value. Of the total \$4.6 million required, just over \$3 million would be depreciated on a modified accelerated cost recovery system (MACRS) schedule, with the equipment classified in the seven year recovery period by the IRS. The MACRS seven year depreciation schedule is presented in Exhibit 4. The remainder would be expensed immediately. The only significant cash expense item going forward was the ongoing cost of tags, which needed to be replaced each year. It was assumed that labor costs to install and remove the tags would be taken care of by suppliers or existing sales staff during slow periods, so that there would be no incremental employee costs.

Similar cost estimates for the Hardware stores were shown in Exhibit 5. Again, the only significant expense going forward would be for label tags. However, because hardware stores included many items in which tags could be reused, only one-fourth of label tags would need to be replaced each year.

### Exhibit 3: EAS Project Costs, Full-line Stores

<u>Product/ Item</u>	<u>Cost per Store (thousands \$)</u>	<u>Cost for Project (thousands \$)</u>	<u>Category</u>
Door Pedestal/Alarm	\$ 41	\$ 943	capital
Floor system	27	621	capital
Message Units	3	69	capital
Tags	68	1,564	expense
Installation	21	483	capital
Deactivator/Detachers	40	920	capital
Total capital	\$ 132	\$ 3,036	
Total expense	\$ 68	\$ 1,564	
Total cost	\$ 200	\$ 4,600	

*Note: Capital category is subject to depreciation.*  
Source: Company information.

### Exhibit 4: Modified Accelerated Depreciation Schedule (MACRS) Seven Year Equipment Category

Year	Depreciation Rate %	Year	Depreciation Rate %
1	14.29%	5	8.93%
2	24.49%	6	8.92%
3	17.49%	7	8.93%
4	12.49%	8	4.46%

*Note: Assumes half-year convention for the first year put in service; zero salvage value.*

### Exhibit 5: EAS Project Costs, Hardware Stores

<u>Product/ Item</u>	<u>Cost per Store (thousands \$)</u>	<u>Cost for Project (thousands \$)</u>	<u>Category</u>
Door Pedestal/Alarm	\$ 10	\$ 1,100	capital
Message Units	1	110	capital
Tags	2	220	expense
Installation	2	220	capital
Deactivator/Detachers	6	660	capital
Total capital	\$ 19	\$ 2,090	
Total expense	\$ 2	\$ 220	
Total cost	\$ 21	\$ 2,310	

*Note: Capital category is subject to depreciation. No floor system is required in hardware stores because entry/exit is smaller and therefore can be contained in the door pedestal unit.*  
Source: Company information.

The financial benefit of reducing merchandise theft was also a topic of discussion. From a financial perspective, Becker felt that there were three possible ways to account for the benefit of reduced shrink:

1. Higher sales: Becker recalled that his finance classes in business school emphasized that sunk costs should not be considered in project evaluation. In the case of EAS, the cost of the merchandise was sunk, but the opportunity cost of the merchandise that was stolen was a lost sale. This would mean that the benefit of reducing shrink would be the higher differential sales that would result.
2. Cost savings: Becker also thought that it might be reasonable to assume that the cost to the company was replacing the merchandise that was stolen. Thus the benefit of reducing shrink would be the savings from not having to replenish merchandise – that is, the reduction in cost of goods sold. This meant that Murphy would not assume the replaced item would have been sold.
3. Higher gross margin dollars: Becker thought it would also be a good idea to discuss how the store operations and buying and merchandising teams thought about the benefits of reducing shrink from a managerial perspective. The retailers explained that stolen merchandise would have been sold. Their view was that shrink resulted in a lost sale, but as soon as an item was sold it would be replenished by the supplier. The supplier then included this estimated loss in the product cost paid by Murphy Stores. Murphy's executives thus believed the cost of shrink was the lost gross margin (differential margin = differential sales – differential cost of goods sold).

Becker decided that his analysis should take into account all of these approaches. If the EAS investments were attractive under all 3 approaches, this would likely strengthen support for implementation. If not, further discussion would be warranted. Because gross margin percentages were 44.7% for full-line stores and 40.8% for hardware stores, Becker realized that the calculated benefits from EAS would be higher for sales or cost of goods sold measures compared to the use of differential gross margin dollars. Becker thought it was ironic that the operations and merchandise team, who generally assumed optimistic forecasts, believed in a measure that would result in a lower estimate of financial benefits.

To undertake the analysis in full-line stores, Murphy's gross margin was 44.7%. Thus, each \$1 of lost sales due to shrink represented 55.3 cents of cost of goods, and lost margin of 44.7 cents. If this shrink were reduced, there would be higher sales, lower costs, and higher gross margin dollars, each resulting in higher taxable income.

The systems would be installed in January, 2007, and benefits would begin midway through the year, so that the 2007 benefits would only be for six months. All cash flows were assumed to occur at the end of each year. Because the company did not have a lot of experience with EAS, Murphy's had decided to target its full-line store EAS investments on the categories shown in Exhibit 1. The total 2007 sales represented by these categories in the full-line stores were expected to be approximately \$500 million (an average of \$21.8 million in sales for each of the 23 full-line stores where EAS installation was being considered). Inflation was expected to

average 4%; sales in full-line stores were expected to grow at 6% annually (including inflation).

For hardware stores, the affected 2007 sales were expected to be \$406 million (\$3.7 million times 110 stores). Sales were expected to grow at 9% annually (including the 4% inflation). Hardware store gross margins were 40.8%.

## **LIGHTING REPLACEMENT**

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The next potential project involved replacement of metal halide lighting fixtures with new generation fluorescent lighting (LED lighting was even more efficient, but was limited to more focused lighting, rather than general ceiling illumination of large store areas). The benefits of conversion were expected in three areas. First, the new lighting was much more energy-efficient and would reduce energy consumption 30%-40%. Second, the new lighting would create less heat and was thus expected to decrease air conditioning use. Third, the new lighting was expected to improve brightness and visibility by up to 75% compared with the old lights. Becker also felt that the new lighting technology would support the company's sustainability goals, although he felt it would be very hard to quantify these benefits.

The proposal would install this lighting in 187 hardware stores, at an average cost of \$37,400 per store. Depreciation would be on a seven year MACRS basis. Ten years was the expected life of the project, with no salvage value. There would be negligible effects on bulb replacement rates and other ongoing investments relative to metal halide bulbs. Each store averaged 56.9 kilowatt-hours (kWh) of lighting-related electricity use per hour in 2006. Annual hours of store operation averaged 5,100, with an electricity cost of 7.5 cents per kWh. The lower heat levels produced by the new lighting were expected to reduce hourly electricity requirements for air conditioning in a typical store by 9-10 kilowatts. Air conditioning was typically in operation for 2,000 hours annually. The replacement would occur in early 2007, so again there would only be 6 months of savings in the first year.

## **RECCOMENDATION**

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Tom Becker knew his review would require building different financial models for EAS and for lighting. He felt that the uncertainty of assumptions would require him to pay careful attention to sensitivity and scenario analysis. Becker also realized that the projects were not necessarily mutually exclusive; it was possible to do some mix of EAS and lighting if the results warranted, as long as the total project investment did not exceed the \$7 million of funds available. Becker felt that if the results were particularly attractive, any unfunded projects would receive high priority in the next budget cycle, which would start in only three months. Becker knew that Murphy's capital committee was awaiting his report. Because the capital committee was comprised of the CFO, controller, and heads of the operating units, Becker knew that they would have detailed questions and would expect him to be able to discuss project risks, sensitivities, and scenarios.