

WHEN FIRMS PUBLICIZE ENERGY MANAGEMENT PROJECTS THEIR STOCK PRICES GO UP:

How High? – As much as 21.33% within 150 days of an Announcement!

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ABSTRACT

When selecting projects under a limited budget, a firm should implement the project that will return the most value. Ultimately, firm value is measured by stock price, which can be impacted when the firm makes a major announcement. This paper shows that announcements of energy management projects correlate with a 21.33% increase in stock price within 150 days of the announcement. This increase is *in addition to* the risk-adjusted return the firm would normally experience. *For example, during a “bull market” a firm’s expected return was 10%. After the announcement, the return would increase by 21.33%, for a net return of 31.33%.* These results suggest that investors react positively to energy management projects. This outcome demonstrates one more strategic incentive for firms to implement energy management projects.

INTRODUCTION

The potential for increased profits via *cost-reducing* Energy Management Projects (EMPs) exists in nearly all firms. However, when allocating capital, priority is often given to *revenue-enhancing* projects, such as starting new product lines or joint ventures. Frequently, these projects are perceived to be superior to EMPs, even though they may yield the same increased profit and present value. A justification is that *revenue-enhancing* projects are more likely to attract publicity and investor attention. Investor speculation and reaction to announcements can increase the firm’s stock price. Most EMPs do

not generate as much publicity as joint ventures or new product lines.

If “publicity-gaining” potential is a decision factor during project selection, then a new product line or joint venture would usually be selected over an EMP. But is this a fair comparison? There has not been any research to determine if an EMP announcement increases a firm’s stock price. In theory, it should because most EMPs increase profits (via *cost reduction* instead of *increased revenues*). From a cash flow perspective, an EMP is equivalent to any other profit-enhancing project.

This paper seeks to determine whether an EMP announcement correlates with an abnormal increase in a firm’s stock price. If such announcements positively impact stock price, then the firm has one more incentive to implement EMPs.

LITERATURE REVIEW

The purpose of this literature review is three-fold:

1. To demonstrate that EMPs are credible investments, with relatively low risk;
2. To present some background on stock price reaction to announcements of typical capital investments; and
3. To show that abnormal increases in stock prices from EMP announcements have not been measured.

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Public announcements (such as mergers, joint ventures or new product lines) correlate with abnormal stock price returns.^{1,2} When a firm announces a joint venture (or other revenue-enhancing project) it is trying to attract publicity, which can raise the stock price based on expected future profits. However, since such projects can also be unprofitable, the anticipated cash flows are at risk.

When firms implement EMPs, they also expect improved profits by becoming more cost-competitive. EMPs and equipment replacement projects usually have more predictable cash flows (less risk) than many other types of capital investments, especially new product lines or joint ventures.³ Today, the risk from most EMPs is so low there are many third party lenders who are eager to locate and finance EMPs.⁴ In 1995, leasing (which does include third party leasing and performance contracting) accounted for nearly one third of all equipment utilization.⁵ Thus, EMPs and other facilities improvement projects are recognized as credible investments, however they are frequently put on the “back burner” relative to revenue-enhancing projects.

Maximizing stock price should be a goal of the corporation. Increasing productivity, offering new product lines, and increasing profits are examples of tangible factors that can increase the firm’s stock price. However, stock price may also increase due to intangible factors; such as investor speculation and reaction immediately following an announcement. Executives may incorporate this investor reaction when deciding which projects to implement.

Although investor reaction has not been assessed for EMP announcements, there has been some research in this area. It has been shown that firms increasing expenditures on general facility and equipment improvements had a 1.98% abnormal stock increase immediately after the announcement.⁶ Announcements of joint ventures correlated with a positive abnormal return of 1.95% over a twenty-one day interval, (-10 days to +10 days) centered on the announcement day (day 0).⁷ However, not all joint ventures correlate with positive abnormal stock returns.⁸

The correlation between EMP announcements and stock price has not previously been investigated.

This paper will examine whether EMP announcements correlate with positive abnormal stock price returns. If they do, then perhaps the capital budgeting process should incorporate this benefit.

METHODS

Using the Nexis/Lexis database, the World Wide Web, and other resources, a search for EMP announcements resulted in over 5,500 citations. Of the 5,500 citations, only 23 announcements fit the following criteria:

1. The firm announcing the EMP was publicly traded and its returns were available on the data files of the Center for Research in Security Prices (CRSP).
2. The announcement was the first public information released about the EMP.
3. The EMP must be large enough to represent a significant investment for the company. *For example, if a large fast-food chain was announcing an EMP at only one restaurant, it was deleted from the sample. However, if the EMP was company-wide, it would be included in the sample.*
4. The announcement was made in a major US newspaper, newswire service or a monthly trade magazine between 1986 and 1995.

The 23 announcements which represented the “Complete Sample”, consisted of several sub-samples:

- 16 Announcements made within daily newspapers or via electronic wire (“Daily”)
- 3 Announcements within monthly trade magazines (“Monthly”)
- 4 Announcements of post-implementation results (“Post-Implementation”)

An additional sub-sample was created (“Daily + Monthly”) to maximize the sample size of pre-implementation announcements.

For each announcement, the firm’s name, CRSP identification number and announcement date were entered into the Eventus computer program, which tracks daily stock price performance for every U.S. stock listed within the CRSP.⁹ Eventus uses a common “event-study” methodology to calculate abnormal stock returns, and indicates statistical

significance levels. Statistically, a null hypothesis (H_0) was proposed and tested against an alternative hypothesis (H_a):

H_0 = EMP announcements have no impact on stock price.

H_a = EMP announcements have a positive impact on stock price.

Analysis Intervals

Usually, a firm's stock price performance is analyzed over several time intervals around the announcement date. Often, a stock price improvement can be noticed between the day of the announcement (day 0) and the next trading day (day 1). In this interval, the range is represented by the following notation: (day 0, day 1) or (0,1). Another typical interval for event-study analysis is a two-day interval, one day before the announcement to the announcement date (-1,0).¹⁰

EMP announcements frequently appear in monthly trade magazines, which are distributed to readers on different days in different geographic locations. In this case, an exact announcement date can not be determined. Thus, analysis of the stock performance over a wider interval is appropriate. The (-10, 10) interval represents the period at which EMP announcements would most likely be noticed through monthly trade magazines. In addition, since EMP announcements may not capture as much publicity as other announcements, they require a longer period for the market to "learn" about them.

The (-10,10) interval is useful for identifying if an abnormal stock price increase correlates with an EMP announcement. However, to observe the long-term stock impact, the sub-samples were analyzed over additional intervals, such as (1,100), (1,150), etc.

Applying the aforementioned hypothesis tests to the sub-samples yielded the results that are presented in the following section of this paper. A more detailed explanation of the "event-study" methodology (statistical analysis) is included in the Appendix.

RESULTS

Tables 1 and 2 present the short-term and long-term abnormal returns. The returns are categorized by interval around the announcement date. The level of significance at which H_0 was rejected is also indicated.

The Daily + Monthly sub-sample is the most appropriate sample because it is the largest sample possible that excludes Post Implementation announcements. The Post Implementation sub-sample is substantially different in nature because it represents firms announcing cost savings (increased profits) from projects already implemented.

Using the Daily + Monthly sub-sample, EMPs correlate with a 3.90% increase in stock price, measured from ten days prior to the announcement to ten days after the announcement, (-10, 10). The level of significance was 0.01. See Table 1.

Table 1. Abnormal Return of Firms Announcing Energy Management Projects

Samples	# of Firms in Sample	Day Range From Announcement Date			
		(-5,5)	(-10,10)	(-15,15)	(-20,20)
Complete Sample	23	2.21%, *	2.80%, **	1.06%, *	1.92%, *
Announcements from Daily Newspapers	16	2.89%, **	3.75%, ***	2.31%, **	3.18%, **
Announcements from Monthly Magazines	3	2.31%	6.91%	8.23%	8.50%
Post Implementation Announcements	4	-0.57%	-2.70%	-5.86%	-7.12%
Daily + Monthly Subsamples Combined	19	2.43%, *	3.90%, ***	2.83%, *	3.64%, **
Significant at: * = 0.10 ** = 0.05 *** = 0.01					

Table 2. Long-Term Abnormal Return of Firms Announcing Energy Management Projects

Samples	# of Firms in Sample	Day Range From Announcement Date					
		(1,100)	(1,120)	(1,150)	(1,200)	(1,220)	(1,240)
Complete Sample	23	8.23%, *	11.00%, **	13.93%, ***	12.09%, **	13.75%, **	12.71%, **
Announcements from Daily Newspapers	16	10.67%, **	16.29%, ***	17.66%, ***	13.38%, **	17.10%, **	17.11%, **
Announcements from Monthly Magazines	3	27.05%	21.38%	31.54%	44.89%	42.44%	53.02%
Daily + Monthly Subsamples Combined	19	14.07%, **	18.03%, ***	21.33%, ****	21.73%, ***	23.42%, ***	24.95%, ***

Significant at: * = 0.10
 ** = 0.05
 *** = 0.01
 **** = 0.001

Table 2 shows the long-term performance, where the Daily + Monthly sub-sample correlated with a 21.33% abnormal return over the (1,150) interval, at

the 0.001 significance level. Figure 1 is a graphical illustration of the abnormal returns over the long-term interval.

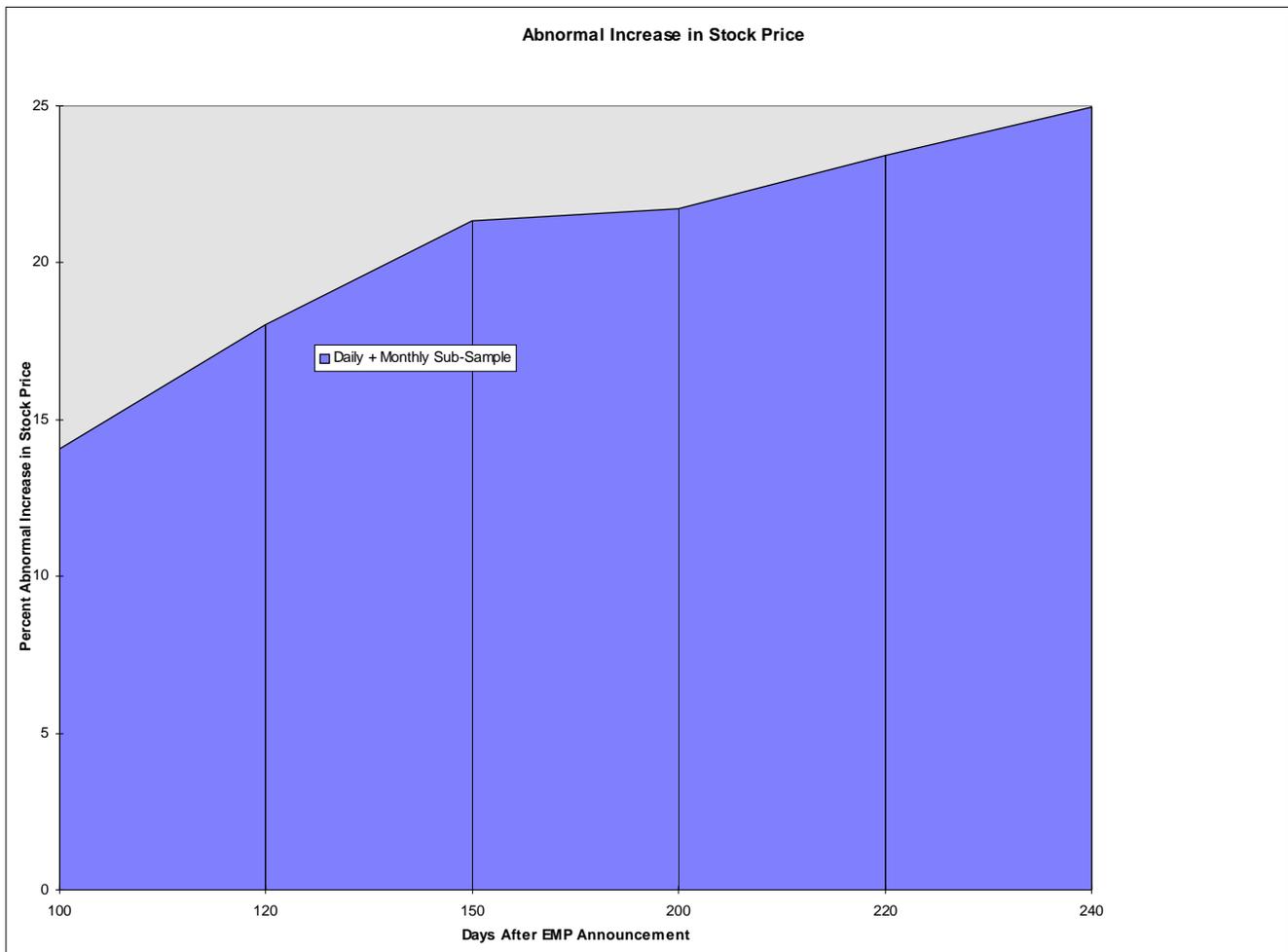


Figure 1. Long-Term Abnormal Return of Firms Announcing Energy Management Projects

CONCLUSION

The results from this study indicate that EMP announcements correlate with significant abnormal increases in a firm's stock price. On average, an EMP announcement correlated with a 21.33% abnormal increase in the firm's stock price. This increase was experienced from the day after the announcement to 150 days after the announcement. This increase is *in addition to* the risk-adjusted return the firms would normally experience. *For example, during a "bull market" a firm's expected return was 10%. After the announcement, the return would increase by 21.33%, for a net return of 31.33%.* Because these EMPs were announced by a diverse group of firms at various periods over a ten-year time span, the significance of these results is impressive. In other words, the EMP is probably the only event that all firms within the sample have in common.

From these results, it appears that shareholders recognize EMPs as low-risk investments that should increase profits and add value to the firm. With the new information presented here, firms may have an additional strategic incentive to implement EMPs.

DISCUSSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

Despite the small scale of this study, the significance of the results is impressive. This study could serve as a "first-step" to understanding investor reaction to EMP announcements. Additional studies with increased sample size and greater stratification would yield more information.

It is interesting to note that detailed cost savings estimates were not always included in the EMP announcements. *For example, many firms simply announced that they were going to retrofit a portion of their facilities, without an estimate of dollar savings.* Perhaps more detailed information was released after the announcement date, triggering greater stock price increases in the long-term intervals. However, it is more likely that shareholders associate EMPs as effective profit enhancing projects that are almost always good for the bottom line.

It would be interesting to determine if there is a relationship between an EMP's potential profits and the value of the abnormal return. The value of the

abnormal return should be related to the amount of increased profit from the EMP. Identifying these values could indicate whether the investor reaction is proportional to the potential added value of the EMP. Calculating these values would require additional information about each firm as well as each project. This could be a focus of additional research.

It was recognized that the type of EMP could influence the magnitude of the abnormal stock increase. Thus, the Complete Sample was further stratified into two sub-samples: EMPs that were Lighting Retrofits and EMPs that were installations of other types of Energy Efficient Equipment (such as HVAC upgrades, chiller upgrades, etc.). The Eventus software analyzed both sub-samples, and the Energy Efficient Equipment sub-sample correlated with a 1.42% increase over the (-10,10) interval, at the 0.01 significance level. The Lighting Retrofit sub-sample yielded no significant returns over the (-10,10) interval. However, because this sub-sample only contained seven firms, this comparison needs to be re-evaluated with a greater sample size. In addition, this analysis was tainted because the post-implementation announcements were included.

It was also recognized that the finance method for each EMP could influence the magnitude of the abnormal stock increase. Since off-balance sheet financing (leasing) is common for EMPs, a comparison was made between EMPs that utilized leasing versus EMPs where the equipment was purchased by the firm (and the debt was carried on their balance sheet). Assuming that stock analysts frequently look at balance sheets to assess a company's performance, it is reasonable to hypothesize that off-balance sheet financed EMPs would correlate with higher abnormal stock returns than EMPs where equipment was purchased by the firm. The Complete Sample was further stratified and analyzed by the Eventus software. The EMPs that were purchased directly by the firm did show a 3.74% increase over the (-10,10) interval, at the 0.01 significance level. The sub-sample of leased EMPs yielded no significant returns over the (-10,10) interval, although this sub-sample included only three firms. Again, the samples were tainted with the post-implementation announcements. Therefore, this comparison needs to be re-evaluated with a larger

sample size, and with the post-implementation announcements removed.

Although the Post-Implementation sub-sample was small, it did not yield any significant positive abnormal returns. In fact, the returns were negative, although not significant. This is intriguing because a post-implementation announcement is basically a statement of increased profits already realized. A more extensive study on the effects of Post-Implementation announcements could reveal if these types of announcements yield different abnormal returns than announcements prior to implementation.

All of the sub-samples mentioned in this Discussion Section should be analyzed over a longer time interval. In addition, increasing the sample size would also improve the validity of the results.

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JOHN R. WINGENDER, JR. PH.D. is a Professor of Finance as well as the Chairman of the Department of Economics and Finance, College of Business Administration at Creighton University in Omaha, Nebraska. His teaching and research interests are in International Finance, Investments, and Event Studies. He has won numerous research and teaching awards and taught at the International Management Center in Budapest, Hungary in 1993 on a Fullbright Award. His research has been published in many quality business journals such as: Management Science, The Journal of Financial and Quantitative Analysis, Industrial Relations and the Journal of Banking and Finance. Dr. Wingender has been a consultant for Fortune 500 companies, as well as for private companies. He hopes to work on future interdisciplinary projects.

ERIC A. WOODROOF, PH.D. has published research papers in numerous international journals and conference proceedings on energy/facility management. His research topics have ranged from lighting maintenance to financing projects. In 1997, Dr. Woodroof showed that when firms publicize their energy management projects, their stock price goes up 21% (on average) above market conditions. In 1998, he was appointed to serve on the Editorial Board for the international journal *Energy Engineering*. In 1999, Woodroof was appointed to the Certified Energy Managers Board for the Association of Energy Engineers.

Dr. Woodroof is a Certified Energy Manager, Certified Lighting Efficiency Professional, Certified Energy Procurement Professional as well as a Green Lights Surveyor. Formerly, the Project Coordinator for the Industrial Assessment Center at Oklahoma State University (OSU), Woodroof has worked with over 120 companies on energy/facility management projects, with savings worth millions of dollars.

Originally from California, Woodroof earned a BS in Physics from the University of California, Santa Barbara. After moving to Oklahoma and completing his Master's Degree with a 4.0 GPA, he received a Presidential Fellowship to complete a Ph.D. in Industrial Engineering and Management at OSU, under Regents Professor Dr. Wayne C. Turner. Continuing his career passion, Dr. Woodroof was recently hired by Johnson Controls, Inc. to manage the industrial accounts in Oklahoma. He sees his new job as a "privilege" to help manufacturers gain a competitive advantage by identifying and implementing profit improvement opportunities.

Shortly after completing his Ph.D. in July 1998, he married Andrea (King) Woodroof, who is a medical student at the University of Oklahoma. Together, they enjoy traveling, hiking, sailing and other water sports.

APPENDIX

Event-Study Methodology

An “event study” is a popular analysis tool for analyzing stock price reactions to particular events. In this study, the “event” is the announcement of an EMP by one of the sample firms. The event date is the first trading day that the market could react to the announcement. Calculating risk-adjusted abnormal returns on and around the announcement date tests the impact of EMP announcements on stock price.

For this study, we use the market model event-study method and test the results for significance with the standardized residual method. The market model event-study method uses a linear regression to predict stock returns; then it compares the predicted value to its actual returns.

The abnormal return (ABR_{jt}) is the difference between the actual return (R_{jt}) on a specific date and the expected return ($E(R_{jt})$) calculated for the firm on that specific date. The expected return is calculated using the parameters of a single index regression model during a pre-event estimation period. The regression model parameters are determined by the following equation:

$$R_{jt} = a_j + b_j R_{mt} + e_{jt}$$

where

- R_{jt} = the return on security j for period t ,
- a_j = the intercept term,
- b_j = the covariance of the returns on the j th security with those of the market portfolio's returns,
- R_{mt} = the return on the CRSP equally-weighted market portfolio for period t , and
- e_{jt} = the residual error term on security j for period t .

To calculate the market model parameters (a_j and b_j), a 220-day estimation period was used that begins 260 days before the announcement date. For each sample firm, the event period begins 30 days before the announcement date and ends 30 days after the announcement date. The expected return ($E(R_{jt})$) is then calculated using the return on the market (R_{mt}) for the specific event period date:

$$E(R_{jt}) = a_j + b_j R_{mt}$$

The abnormal return (ABR_{jt}) for an event date is then calculated by subtracting the expected return (which uses the parameters of the firm from the estimation period and the actual market return for a particular date in the event period) from the actual return (R_{jt}) on that date. The equation is as follows:

$$ABR_{jt} = R_{jt} - E(R_{jt})$$

The average abnormal return (AAR_t) for a specific event date is the mean of all the individual firms' abnormal returns for that date:

$$AAR_t = \frac{1}{N} \sum_{j=1}^N ABR_{jt}$$

where N is the number of firms used in the calculation.

The cumulative average abnormal return ($CAAR$) for each interval is calculated as follows:

$$CAAR = \sum_{t=T_1}^{T_2} AAR_t$$

The standardized residual method is used to determine whether the abnormal returns are significantly different from zero. The standardized abnormal return (SAR_{jt}) is calculated as follows:

$$SAR_{jt} = ABR_{jt} / s_{jt}$$

where

- s_{jt} = the standard deviation of security j 's estimation period variance of its ABR_{jt} 's.

The estimation period variance s_{jt}^2 is calculated as follows:

$$s_{jt}^2 = \frac{1}{D_j - 2} \sum_{k=1}^{D_j} (ABR_{jk}^2)$$

where

$$s_j^2 = \frac{1}{D_j - 2} \sum_{k=1}^{D_j} (ABR_{jk}^2)$$

- R_m = the mean market return over the estimation period, and
- D_j = the number of trading day returns (220) used to estimate the parameters of firm j .

Finally, the test statistic for the null hypothesis (H_0) that the $CAAR_{T_1, T_2}$ equals zero is defined as follows:

$$Z_{T_1, T_2}^j = \frac{CAAR_{T_1, T_2}^j}{\sqrt{Q_{T_1, T_2}^j}}$$

where

$$Q_{T_1, T_2}^j = \left(1 / \sqrt{Q_{T_1, T_2}^j} \right) \sum_{t=T_1}^{T_2} (SAR_{jt})^2$$

and

$$Q_{T_1, T_2}^j = (T_2 - T_1 + 1) \frac{D_j - 2}{D_j - 4}$$

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