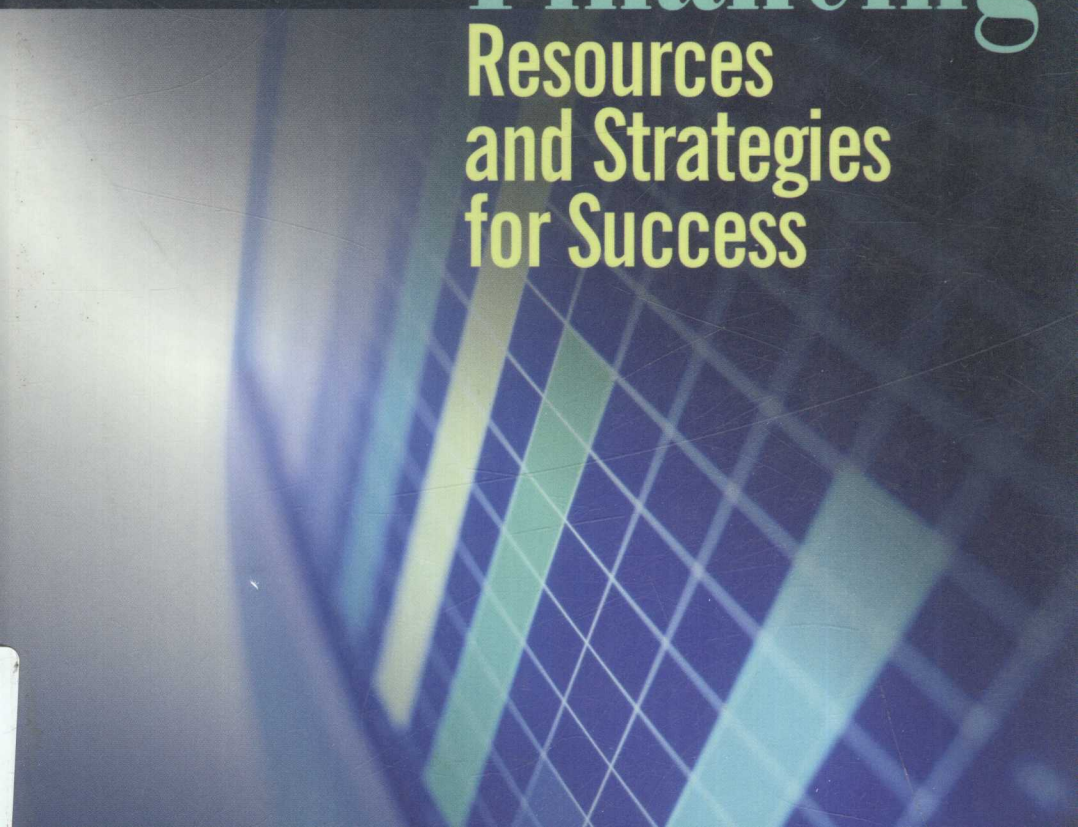
Albert Thumann, P.E., C.E.M., and Eric A. Woodroof, Ph.D., C.E.M., CRM

Energy Project Financing

Resources and Strategies for Success



Energy Project Financing: Resources and Strategies for Success

Albert Thumann, P.E., C.E.M.
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Energy Project Financing: Resources and Strategies for Success

Foreword

The landscape for implementing energy efficient projects is rapidly changing. The need for energy project financing has never been greater. The factors influencing energy project financing have been brought about by legislation, oil prices surging past $120 a barrel, and the growing concern for global warming.

In December of 2007, the Energy Independence and Security Act was passed into law. This act promotes energy savings performance contracting in the federal government, and provides flexible financing and training of federal contract officers. The Energy Policy Act of 2005 reauthorizes energy service performance contracting through September 30, 2016.

The purpose of this book is to provide the key success factors for structuring a finance energy project and getting it approved by top management. The goals of the authors are threefold: First, we want to explore as many financing options as possible. Second, we want to provide the tools to make a comprehensive financial analysis. Third, we want to broaden the readers' horizons with new trends in the industry.

There are many correct ways to assemble and finance an energy management project. The number of possibilities is only limited to one's creativity. So be flexible and keep searching until you find the "win-win" deal for everyone.

Albert Thumann, PE, CEM

Contributors

CHAPTER 1, 2, 6, 8, & 9

Eric A. Woodroof, Ph.D., CEM., CRM, shows clients how to make more money and simultaneously help the environment. During the past 15 years, he has helped over 250 organizations improve profits with energy-environmental solutions. He has written over 25 professional journal publications and his work has appeared in hundreds of articles. Dr. Woodroof is the chairman of the board for the Certified Carbon Reduction Manager program and he has been a board member of the Certified Energy Manager Program since 1999. Dr. Woodroof has advised clients such as the U.S. Public Health Service, IBM, Pepsi, Ford, GM, Verizon, Hertz, Visteon, JPMorgan-Chase, universities, airports, utilities, cities and foreign governments. He is friends with many of the top minds in energy, environment, finance, and marketing. He is also a columnist for several industry magazines, a corporate trainer, and a keynote speaker. Eric is the founder of ProfitableGreenSolutions.com and can be reached at 888-563-7221.

CHAPTER 3

Neil Zobler, President of Catalyst Financial Group, Inc., has been designing energy finance programs and arranged project-specific financing for demand side management (DSM) and renewable energy projects since 1985. Catalyst, a specialist in energy and water conservation projects, has arranged financings for over $1 billion. Neil's clients include U.S. EPA ENERGY STAR, the Inter-American Development Bank, over 20 electric and gas utilities (including Con Edison Co. of NY, PG&E, TVA), engineering companies and vendors, and hundreds of individual companies and organizations. He speaks regularly for organizations including the Government Finance Officers Association, the Association of School Business Officials, National Association of State Energy Officers, Association of Government Leasing & Finance, and the Council of

Great City Schools and is on the task force of The American College & University Presidents Climate Commitment/Clinton Climate Initiative program. He has been published widely in finance and energy periodicals. Neil is fluent in Spanish and helped design financing programs for energy projects in Mexico , Peru and El Salvador. Neil has a BA in Finance from Long Island University (LIU) and has completed post-graduate studies in marketing at the Arthur T. Roth Graduate School at LIU. His email address is nzobler@catalyst-financial.com.

Caterina (Katy) Hatcher is the US EPA ENERGY STAR National Manager for the Public Sector. She works with education, government, water and wastewater utility partners to help them improve their energy performance through the use of ENERGY STAR tools and resources. Katy has been working for the US Environmental Protection Agency for about 11 years. She holds a degree from the University of Virginia 's School of Architecture in City Planning.

EPA offers ENERGY STAR to organizations as a straightforward way to adopt superior energy management and realize the cost savings and environmental benefits that can result. EPA's guidelines for energy management promote a strategy for superior energy management that starts with the top leadership, engages the appropriate employees throughout the organization, uses standardized measurement tools, and helps an organization prioritize and get the most from its efficiency investments.

EPA's ENERGY STAR Challenge is a national call-to-action to improve the energy efficiency of America 's commercial and industrial facilities by 10 percent or more. EPA estimates that if the energy efficiency of commercial and industrial buildings and plants improved by 10 percent, Americans would save about $20 billion and reduce greenhouse gas emissions equal to the emissions from about 30 million vehicles.

CHAPTER 5

Ryan Park is one of the most influential individuals in the downstream integration market of the solar electricity industry. He was one of the founding members of REC Solar Inc., which now installs more

solar electricity systems every year than any other company in the United States.

Ryan is currently responsible for developing the commercial sales team, structuring large solar projects, and establishing new strategic partnerships. Ryan graduated with honors from California Polytechnic (Cal Poly), San Luis Obispo and is committed to improving the world through renewable energy technologies, energy efficiency, and empowering people.

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Barney L. Capehart, Ph.D., C.E.M., is a professor emeritus of industrial and systems engineering at the University of Florida, Gainesville. He has broad experience in the commercial/industrial sector, having served as director of the University of Florida Industrial Assessment Center from 1990 to 1999. He has personally conducted over 100 audits of industrial facilities and has assisted students in conducting audits of hundreds of office buildings and other nonindustrial facilities. He has taught a wide variety of courses and seminars on systems analysis, simulation, and energy-related topics.

APPENDIX A

David B. Pratt, Ph.D., P.E., is an associate professor and the undergraduate program director in the School of Industrial Engineering and Management at Oklahoma State University. He holds B.S., M.S., and Ph.D. degrees in industrial engineering. Prior to joining academia, he held technical and managerial positions in the petroleum, aerospace, and pulp and paper industries for over 12 years. He has served on the industrial engineering faculty at his *alma mater*, Oklahoma State University, for over 16 years. His research, teaching, and consulting interests include production planning and control, economic analysis, and manufacturing systems design. He is a registered Professional Engineer, an APICS Certified Fellow in production and inventory management, and an ASQ Certified Quality Engineer. He is a member of IIE, NSPE, APICS, INFORMS, and ASQ.

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Chapter 1

Background on the Need for Financing Energy Projects

Eric A. Woodroof, Ph.D., CEM, CRM

INTRODUCTION

Most facility managers agree that energy management projects (EMPs) are good investments. Generally, EMPs reduce operational costs, have a low risk/reward ratio, usually improve productivity, and even have been shown to improve a firm's stock price.[1] Despite these benefits, many cost-effective EMPs are not implemented due to financial constraints. A study of manufacturing facilities revealed that first-cost and capital constraints represented over 35% of the reasons cost-effective EMPs were not implemented.[2] Often, the facility manager does not have enough cash to allocate funding, or cannot get budget approval to cover initial costs. Financial arrangements can mitigate a facility's funding constraints,[3] allowing additional energy savings to be reaped.

Alternative finance arrangements can overcome the "initial cost" obstacle, allowing firms to implement more EMPs. However, many facility managers are either unaware or have difficulty understanding the variety of financial arrangements available to them. Most facility managers use simple payback analyses to evaluate projects, which do not reveal the added value of after-tax benefits.[4] Sometimes facility managers do not implement an EMP because financial terminology and contractual details intimidate them.[5]

To meet the growing demand, there has been a dramatic increase in the number of finance companies specializing in EMPs. At a recent energy management conference, finance companies represented the most common exhibitor type. These financiers are introducing new

payment arrangements to implement EMPs. Often, the financier's innovation will satisfy the unique customer needs of a large facility. This is a great service; however, most financiers are not attracted to small facilities with EMPs requiring less than $100,000. Thus, many facility managers remain unaware or confused about the common financial arrangements that could help them implement EMPs.

The authors hope that by reading this book you will have new opportunities open for you and be able to get more projects implemented!

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Chapter 2

Financing Energy Management Projects

Eric A. Woodroof, Ph.D., CEM, CEP, CLEP

INTRODUCTION

Financing can be a key success factor for projects. This chapter's purpose is to help facility managers understand and apply the financial arrangements available to them. Hopefully, this approach will increase the implementation rate of good energy management projects, which would have otherwise been cancelled or postponed due to lack of funds.

Most facility managers agree that energy management projects (EMPs) are good investments. Generally, EMPs reduce operational costs, have a low risk/reward ratio, usually improve productivity, and even have been shown to improve a firm's stock price.[1] Despite these benefits, many cost-effective EMPs are not implemented due to financial constraints. A study of manufacturing facilities revealed that first-cost and capital constraints represented over 35% of the reasons cost-effective EMPs were not implemented.[2] Often, the facility manager does not have enough cash to allocate funding or cannot get budget approval to cover initial costs. Financial arrangements can mitigate a facility's funding constraints,[3] allowing additional energy savings to be reaped.

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To meet the growing demand, there has been a dramatic increase in the number of finance companies specializing in EMPs. At a recent energy management conference, finance companies represented the most common exhibitor type. These financiers are introducing new payment arrangements to implement EMPs. Often, the financier's innovation will satisfy the unique customer needs of a large facility. This is a great service; however, most financiers are not attracted to small facilities with EMPs requiring less than $100,000. Thus, many facility managers remain unaware or confused about the common financial arrangements that could help them implement EMPs.

Numerous papers and government programs have been developed to show facility managers how to use quantitative (economic) analysis to evaluate financial arrangements.[4,5,6] *Quantitative analysis includes computing the simple payback, net present value (NPV), internal rate of return (IRR), and life-cycle cost of a project with or without financing.* Although these books and programs show how to evaluate the economic aspects of projects, they do not incorporate qualitative factors like strategic company objectives, which can impact the financial arrangement selection. Without incorporating a facility manager's qualitative objectives, it is hard to select an arrangement that meets all of the facility's needs. A recent paper showed that qualitative objectives can be at least as important as quantitative objectives.[9]

This chapter hopes to provide some valuable information that can be used to overcome the previously mentioned issues. The chapter is divided into several sections to accomplish three objectives. These sections will *introduce the basic financial arrangements* via a simple example and *define financial terminology.* Each arrangement is explained in greater detail while applied to a case study. The remaining sections show *how to match financial arrangements to different projects and facilities.* For those who need a more detailed description of rate of return analysis and basic financial evaluations, refer to Appendix A.

FINANCIAL ARRANGEMENTS: A SIMPLE EXAMPLE

Consider a small company, "PizzaCo," that makes frozen pizzas and distributes them regionally. PizzaCo uses an old delivery truck that breaks down frequently and is inefficient. Assume the old truck has no salvage value and is fully depreciated. PizzaCo's management would

like to obtain a new and more efficient truck to reduce expenses and improve reliability. However, they do not have the cash on hand to purchase the truck. Thus, they consider their financing options.

Purchase the Truck with a Loan or Bond

Just like most car purchases, PizzaCo borrows money from a lender (a bank) and agrees to a monthly re-payment plan. Figure 2-1 shows PizzaCo's annual cash flows for a loan. The solid arrows represent the financing cash flows between PizzaCo and the bank. Each year, PizzaCo makes payments on the principal, plus interest based on the unpaid balance, until the balance owed is zero. The payments are the negative cash flows. Thus, at time zero when PizzaCo borrows the money, it receives a large sum of money from the bank, which is a positive cash flow that will be used to purchase the truck.

The *dashed* arrows represent the truck purchase as well as savings cash flows. Thus, at time zero, PizzaCo purchases the truck (a negative cash flow) with the money from the bank. Due to the new truck's greater efficiency, PizzaCo's annual expenses are reduced, which is a savings. The annual savings are the positive cash flows. The remaining cash flow diagrams in this chapter utilize the same format.

PizzaCo could also purchase the truck by selling a bond. This arrangement is similar to a loan, except investors (not a bank) give PizzaCo a large sum of money (called the bond's "par value"). Periodically, PizzaCo would pay the investors only the interest accumulated. As Figure 2-2 shows, when the bond reaches maturity, PizzaCo returns the par value to the investors. The equipment purchase and savings

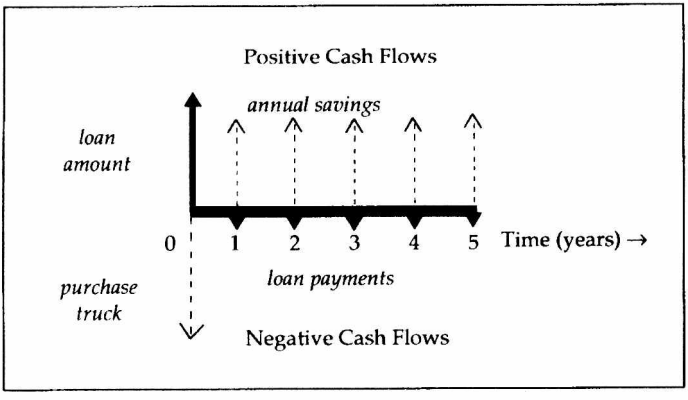

Figure 2-1. PizzaCo's Cash Flows for a Loan.

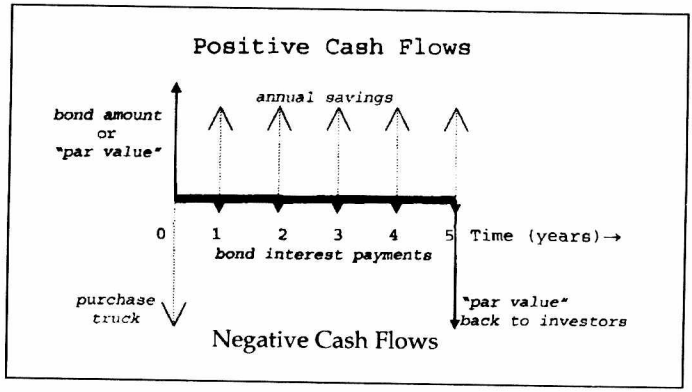

Figure 2-2. PizzaCo's Cash Flows for a Bond.

cash flows are the same as with the loan.

Sell Stock to Purchase the Truck

In this arrangement, PizzaCo sells its stock to raise money to purchase the truck. In return, PizzaCo is expected to pay dividends back to shareholders. Selling stock has a similar cash flow pattern as a bond, with a few subtle differences. Instead of interest payments to bondholders, PizzaCo would pay dividends to shareholders until some future date when PizzaCo could buy the stock back. However, these dividend payments are not mandatory, and if PizzaCo is experiencing financial strain, it is not required to distribute dividends. On the other hand, if PizzaCo's profits increase, this wealth will be shared with the new stockholders, because they now own a part of the company.

Rent the Truck

Just like renting a car, PizzaCo could rent a truck for an annual fee. This would be equivalent to a "true lease" or "operating lease." The rental company (lessor) owns and maintains the truck for PizzaCo (the lessee). PizzaCo pays the rental fees (lease payments), which are considered tax-deductible business expenses.

Figure 2-3 shows that the lease payments (solid arrows) start as soon as the equipment is leased (year zero) to account for lease payments paid in advance. Lease payments "in arrears" (starting at the end of the first year) could also be arranged. However, the leasing company may require a security deposit as collateral. Notice that the savings cash flows are essentially the same as the previous arrangements, except

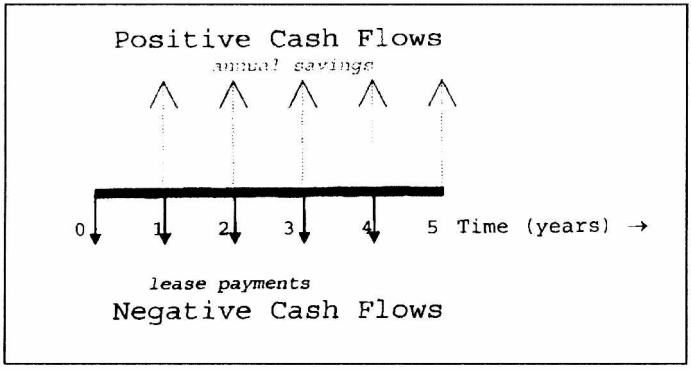

Figure 2-3. PizzaCo's Cash Flows for a True Lease.

there is no equipment purchase, which is a large negative cash flow at year zero.

In a true lease, the contract period should be shorter than the equipment's useful life. The lease is cancelable because the truck can be leased easily to someone else. At the end of the lease, PizzaCo can either return the truck or renew the lease. In a separate transaction, PizzaCo could also negotiate to buy the truck at the fair market value.

If PizzaCo wanted to secure the option to buy the truck (for a bargain price) at the end of the lease, then they would use a capital lease. A capital lease can be structured like an installment loan, however ownership is not transferred until the end of the lease. The lessor retains ownership as security in case the lessee (PizzaCo) defaults on payments. Because the entire cost of the truck is eventually paid, the lease payments are larger than the payments in a true lease, (assuming similar lease periods). Figure 2-4 shows the cash flows for a capital lease with advance payments and a bargain purchase option at the end of year five.

There are some additional scenarios for lease arrangements. A "vendor-financed" agreement is when the lessor (or lender) is the equipment manufacturer. Alternatively, a third party could serve as a financing source. With "third party financing," a finance company would purchase a new truck and lease it to PizzaCo. In either case, there are two primary ways to repay the lessor:

1. With a "fixed payment plan," where payments are due whether