Chapter 1

Financing Energy Management Projects

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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 can not 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.

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), or 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 which 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 1-1 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, they receive a large sum of money from the bank, which is a positive cash flow (which 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 1-2 shows, when the bond reaches maturity, PizzaCo returns the par value to the investors. The equipment purchase and savings cash flows are the same as with the loan.

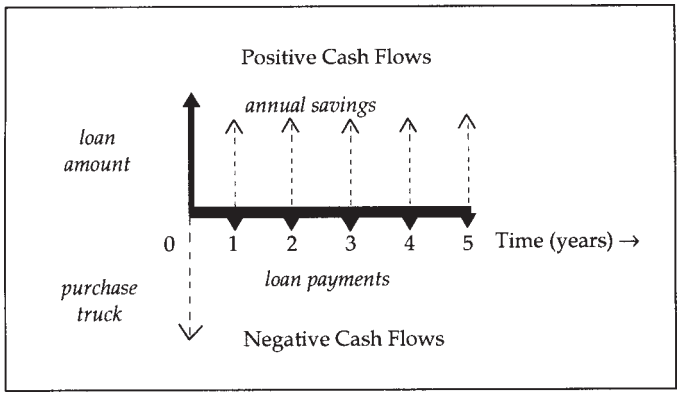


Figure 1-1. PizzaCo's Cash Flows for a Loan.

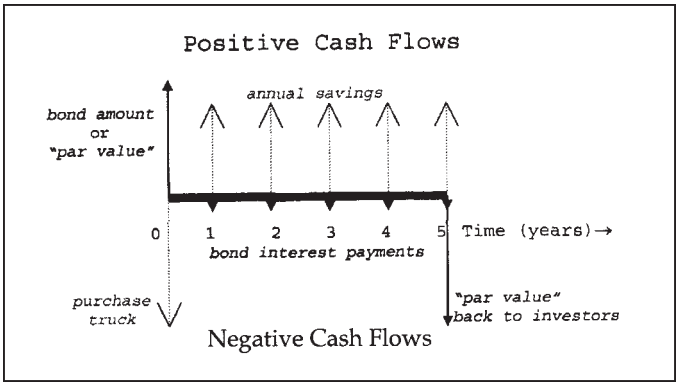


Figure 1-2. PizzaCo's Cash Flows for a Bond.

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 does not need 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." 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 1-3 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 there is no equipment purchase, which is a large negative cash flow at year zero.

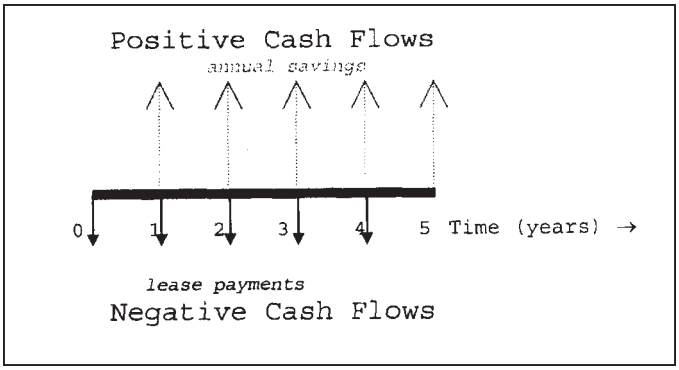


Figure 1-3. PizzaCo's Cash Flows for a True Lease.

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 1-4 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 or not the new truck actually saves money.

2. With a "flexible payment plan"; where the savings from the new truck are shared with the third party, until the truck's purchase cost

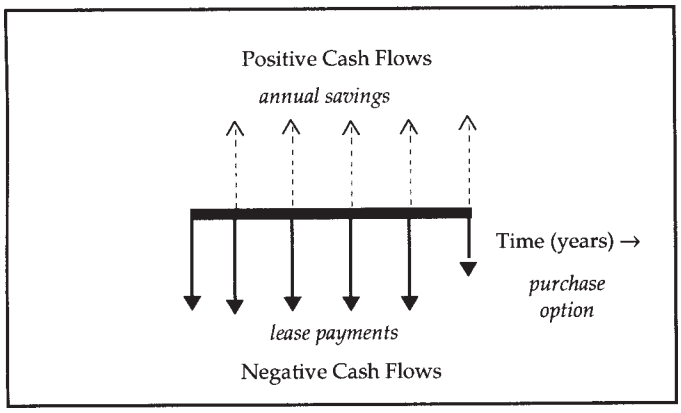


Figure 1-4. PizzaCo's Cash Flows for a Capital Lease.

is recouped with interest. This is basically a "shared savings" arrangement.

Subcontract Pizza Delivery to a Third Party

Since PizzaCo's primary business is not delivery, it could subcontract that responsibility to another company. Let's say that a delivery service company would provide a truck and deliver the pizzas at a reduced cost. Each month, PizzaCo would pay the delivery service company a fee. However, this fee is guaranteed to be less than what PizzaCo would have spent on delivery. Thus, PizzaCo would obtain savings without investing any money or risk in a new truck. This arrangement is analogous to a performance contract. A performance contract can take many forms however the "performance" aspect is usually backed by a guarantee on operational performance from the contractor. In some Performance Contracts, the Host can own the equipment and the guarantee assures that the operational benefits are greater than the finance payments. Alternatively, some performance contracts can be viewed as "outsourcing", where the contractor owns the equipment and provides a "service" to the Host.

This arrangement is very similar to a third-party lease and a shared savings agreement. However with a performance contract, the contractor assumes most of the risk, (because he supplies the equipment, with little or no investment from PizzaCo). The contractor also is responsible for ensuring that the delivery fee is less than what PizzaCo would have spent. For the PizzaCo example, the arrangement would designed under

the conditions below.

- The delivery company owns and maintains the truck. It also is responsible for all operations related to delivering the pizzas.

- The monthly fee is related to the number of pizzas delivered. This is the performance aspect of the contract; if PizzaCo doesn't sell many pizzas, the fee is reduced. *A minimum amount of pizzas may be required by the delivery company (performance contractor) to cover costs*. Thus, the delivery company assumes these risks:
  1. PizzaCo will remain solvent, and
  2. PizzaCo will sell enough pizzas to cover costs, and
  3. the new truck will operate as expected and will actually reduce expenses per pizza, and
  4. the external financial risk, such as inflation and interest rate changes, are acceptable.

- Because the delivery company is financially strong and experienced, it can usually obtain loans at low interest rates.

- The delivery company is an expert in delivery; it has specially skilled personnel and uses efficient equipment. Thus, the delivery company can deliver the pizzas at a lower cost (even after adding a profit) than PizzaCo.

Figure 1-5 shows the net cash flows according to PizzaCo. Since the delivery company simply reduces PizzaCo's operational expenses, there is only a net savings. There are no negative financing cash flows. Unlike

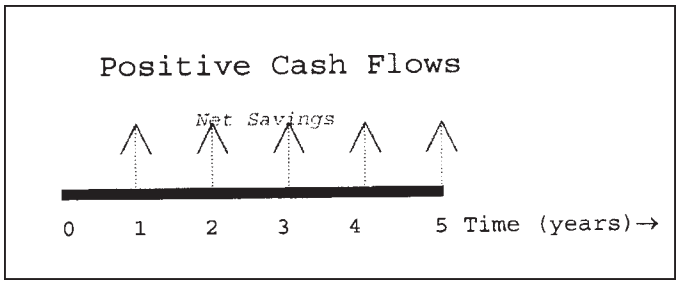


Figure 1-5. PizzaCo's Cash Flows for a Performance Contract.

the other arrangements, the delivery company's fee is a less expensive substitute for PizzaCo's in-house delivery expenses. With the other arrangements, PizzaCo had to pay a specific financing cost (loan, bond or lease payments, or dividends) associated with the truck, whether or not the truck actually saved money. In addition, PizzaCo would have to spend time maintaining the truck, which would detract from its core focus: making pizzas. With a performance contract, the delivery company is paid from the operational savings it generates. Because the savings are greater than the fee, there is a net savings. Often, the contractor guarantees the savings.

Supplementary Note: Combinations of the basic finance arrangements are possible. For example, a shared savings arrangement can be structured within a performance contract. Also, performance contracts are often designed so that the facility owner (PizzaCo) would own the asset at the end of the contract.

FINANCIAL ARRANGEMENTS: DETAILS AND TERMINOLOGY

To explain the basic financial arrangements in more detail, each one is applied to an energy management-related case study. To understand the economics behind each arrangement, some finance terminology is presented below.

Finance Terminology

Equipment can be purchased with cash on-hand (officially labeled "retained earnings"), a loan, a bond, a capital lease or by selling stock. Alternatively, equipment can be utilized with a true lease or with a performance contract.

Note that with performance contracting, the building owner is not paying for the equipment itself, but the benefits provided by the equipment. *In the Simple Example, the benefit was the pizza delivery. PizzaCo was not concerned with what type of truck was used*.

The decision to purchase or utilize equipment is partly dependent on the company's strategic focus. If a company wants to delegate some or all of the responsibility of managing a project, it should use a true lease, or a performance contact.[10] However, if the company wants to be intricately involved with the EMP, purchasing and self-managing the equipment could yield the greatest profits. When the building owner

purchases equipment, he/she usually maintains the equipment, and lists it as an asset on the balance sheet so it can be depreciated.

Financing for purchases has two categories:

1. *Debt Financing*, which is borrowing money from someone else, or another firm. (using loans, bonds and capital leases)

2. *Equity Financing*, which is using money from your company, or your stockholders. (using retained earnings, or issuing common stock)

In all cases, the borrower will pay an interest charge to borrow money. The interest rate is called the "cost of capital." The cost of capital is essentially dependent on three factors: (1) the borrower's credit rating, (2) project risk and (3) external risk. External risk can include energy price volatility, industry-specific economic performance as well as global economic conditions and trends. The cost of capital (or "cost of borrowing") influences the return on investment. If the cost of capital increases, then the return on investment decreases.

The "minimum attractive rate of return" (MARR) is a company's "hurdle rate" for projects. *Because many organizations have numerous projects "competing" for funding, the MARR can be much higher than interest earned from a bank, or other risk-free investment*. Only projects with a return on investment greater than the MARR should be accepted. The MARR is also used as the discount rate to determine the "net present value" (NPV).

Explanation of Figures and Tables

Throughout this chapter's case study, figures are presented to illustrate the transactions of each arrangement. Tables are also presented to show how to perform the economic analyses of the different arrangements. The NPV is calculated for each arrangement.

It is important to note that the NPV of a particular arrangement can change significantly if the cost of capital, MARR, equipment residual value, or project life is adjusted. Thus, the examples within this chapter are provided only to illustrate how to perform the analyses. The cash flows and interest rates are estimates, which can vary from project to project. To keep the calculations simple, end-of-year cash flows are used throughout this chapter.

Within the tables, the following abbreviations and equations are used:

EOY	=	End of Year
Savings	=	re-Tax Cash Flow
Depr.	=	Depreciation
Taxable Income	=	Savings - Depreciation - Interest Payment
Tax	=	(Taxable Income)*(Tax Rate)
ATCF	=	After Tax Cash Flow = Savings – Total Payments – Taxes

Table 1-1 shows the basic equations that are used to calculate the values under each column heading within the economic analysis tables.

Regarding depreciation, the "modified accelerated cost recovery system" (MACRS) is used in the economic analyses. This system indicates the percent depreciation claimable year-by-year after the equipment is purchased. Table 1-2 shows the MACRS percentages for seven-year property. *For example, after the first year, an owner could depreciate 14.29% of an equipment's value. The equipment's "book value" equals the remaining unrecovered depreciation. Thus, after the first year, the book value would be 100%-14.29%, which equals 85.71% of the original value. If the owner sells the property before it has been fully depreciated, he/she can claim the book value as a tax-deduction.**

APPLYING FINANCIAL ARRANGEMENTS: A CASE STUDY

Suppose PizzaCo (*the "host" facility*) needs a new chilled water system for a specific process in its manufacturing plant. The installed cost of the new system is $2.5 million. The expected equipment life is 15 years, however the process will only be needed for 5 years, after which

To be precise, the IRS uses a "half-year convention" for equipment that is sold before it has been completely depreciated. In the tax year that the equipment is sold, (say year "x") the owner claims only Ω of the MACRS depreciation percent for that year. (This is because the owner has only used the equipment for a fraction of the final year.) Then on a separate line entry, (in the year "x"), the remaining unclaimed depreciation is claimed as "book value." The x* year is presented as a separate line item to show the book value treatment, however x* entries occur in the same tax year as "x."

Table 1-1. Table of Sample Equations used in Economic Analyses.

A	B	C	D	E	F	G	H	I	J
EOY	*Savings*	*Depreciation*	*Principal*	*Payments Interest*	*Total*	*Principal Outstanding*	*Taxable Income*	*Tax*	*ATCF*
n									
n+1		= (MACRS %)*			=(D) +(E)	=(G at year n)	=(B)–(C)–(E)	=(H)*(tax rate)	=(B)–(F)–(I)
n+2		(Purchase Price)				–(D at year n+1)			

Table 1-2. MACRS Depreciation Percentages.

EOY	*MACRS Depreciation Percentages for 7-Year Property*
0	0
1	14.29%
2	24.49%
3	17.49%
4	12.49%
5	8.93%
6	8.92%
7	8.93%
8	4.46%

the chilled water system will be sold at an estimated market value of $1,200,000 (book value at year five = $669,375). The chilled water system should save PizzaCo about $1 million/year in energy savings. PizzaCo's tax rate is 34%. The equipment's annual maintenance and insurance cost is $50,000. PizzaCo's MARR is 18%. Since at the end of year 5, PizzaCo expects to sell the asset for an amount greater than its book value, the additional revenues are called a "capital gain," (which equals the market value – book value) and are taxed. If PizzaCo sells the asset for less than its book value, PizzaCo incurs a "capital loss."

PizzaCo does not have $2.5 million to pay for the new system, thus it considers its finance options. PizzaCo is a small company with an average credit rating, which means that it will pay a higher cost of capital than a larger company with an excellent credit rating. As with any borrowing arrangement, if investors believe that an investment is risky, they will demand a higher interest rate.

Purchase Equipment with Retained Earnings (Cash)

If PizzaCo did have enough retained earnings (cash on-hand) available, it could purchase the equipment without external financing.

Although external finance expenses would be zero, the benefit of tax-deductions (from interest expenses) is also zero. Also, any cash used to purchase the equipment would carry an "opportunity cost," because that cash could have been used to earn a return somewhere else. This opportunity cost rate is usually set equal to the MARR. In other words, the company lost the opportunity to invest the cash and gain at least the MARR from another investment.

Of all the arrangements described in this chapter, purchasing equipment with retained earnings is probably the simplest to understand. For this reason, it will serve as a brief example and introduction to the economic analysis tables that are used throughout this chapter.

Application to the Case Study

Figure 1-6 illustrates the resource flows between the parties. In this arrangement, PizzaCo purchases the chilled water system directly from the equipment manufacturer.

Once the equipment is installed, PizzaCo recovers the full $1 million/year in savings for the entire five years, but must spend $50,000/year on maintenance and insurance. At the end of the five-year project, PizzaCo expects to sell the equipment for its market value of $1,200,000. Assume MARR is 18%, and the equipment is classified as 7-year property for MACRS depreciation. Table 1-3 shows the economic analysis for purchasing the equipment with retained earnings.

Reading Table 1-3 from left to right, and top to bottom, at EOY 0, the single payment is entered into the table. Each year thereafter, the savings as well as the depreciation (which equals the equipment purchase price multiplied by the appropriate MACRS % for each year) are entered into the table. Year by year, the taxable income = savings – depreciation. The taxable income is then taxed at 34% to obtain the tax for

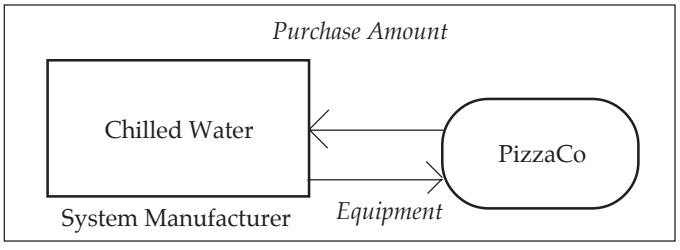


Figure 1-6. Resource Flows for Using Retained Earnings

Table 1-3. Economic Analysis for Using Retained Earnings.

EOY	*Savings*	*Depr.*	*Payments*			*Principal*	*Taxable*	*Tax*	*ATCF*
			Principal	*Interest*	*Total*	*Outstanding*	*Income*		
0					2,500,000				-2,500,000
1	950,000	357,250					592,750	201,535	748,465
2	950,000	612,250					337,750	114,835	835,165
3	950,000	437,250					512,750	174,335	775,665
4	950,000	312,250					637,750	216,835	733,165
5	950,000	111,625					838,375	285,048	664,953
5*	1,200,000	669,375					530,625	180,413	1.019.588
		2,500,000							
					Net Present Value at 18%:				$320,675

Notes: Loan Amount: 0

Loan Finance Rate: 0%

MARR 18%

Tax Rate 34%

MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5

Accounting Book Value at end of year 5: 669,375

Estimated Market Value at end of year 5: 1,200,000

EOY 5* illustrates the Equipment Sale and *Book* Value

Taxable Income: =(Market Value - Book Value)

=(1,200,000 - 669,375) = $530,625

each year. The after-tax cash flow = savings - tax for each year.

At EOY 5, the equipment is sold before the entire value was depreciated. EOY 5* shows how the equipment sale and book value are claimed. In summary, the NPV of all the ATCFs would be $320,675.

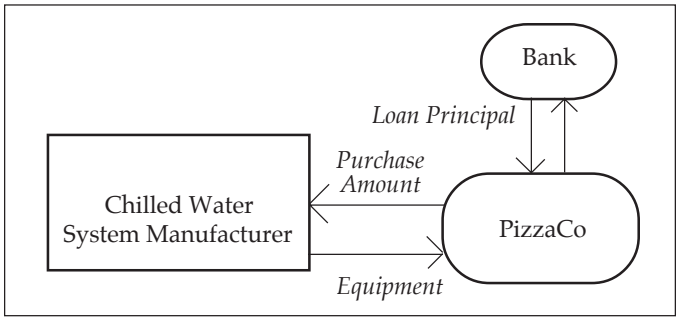
Loans

Loans have been the traditional financial arrangement for many types of equipment purchases. A bank's willingness to loan depends on the borrower's financial health, experience in energy management and number of years in business. Obtaining a bank loan can be difficult if the loan officer is unfamiliar with EMPs. Loan officers and financiers may not understand energy-related terminology (demand charges, kVAR, etc.). In addition, facility managers may not be comfortable with the financier's language. Thus, to save time, a bank that can understand EMPs should be chosen.

Most banks will require a down payment and collateral to secure a loan. However, securing assets can be difficult with EMPs because the equipment often becomes part of the real estate of the plant. *For example, it would be very difficult for a bank to repossess lighting fixtures from a retrofit*. In these scenarios, lenders may be willing to secure other assets as collateral.

Application to the Case Study

Figure 1-7 illustrates the resource flows between the parties. In this arrangement, PizzaCo purchases the chilled water system with a loan from a bank. PizzaCo makes equal payments (principal + interest) to the bank for five years to retire the debt. Due to PizzaCo's small size, cred-



1-7. Resource Flow Diagram for a Loan.

ibility, and inexperience in managing chilled water systems, PizzaCo is likely to pay a relatively high cost of capital. For example, let's assume 15%.

PizzaCo recovers the full $1 million/year in savings for the entire five years, but must spend $50,000/year on maintenance and insurance. At the end of the five-year project, PizzaCo expects to sell the equipment for its market value of $1,200,000. Tables 1-4 and 1-5 show the economic analysis for loans with a zero down payment and a 20% down payment, respectively. Assume that the bank reduces the interest rate to 14% for the loan with the 20% down payment. Since the asset is listed on PizzaCo's balance sheet, PizzaCo can use depreciation benefits to reduce the after-tax cost. In addition, all loan interest expenses are tax-deductible.

Bonds

Bonds are very similar to loans; a sum of money is borrowed and repaid with interest over a period of time. The primary difference is that with a bond, the issuer (PizzaCo) periodically pays the investors only the interest earned. This periodic payment is called the "coupon interest payment." *For example, a $1,000 bond with a 10% coupon will pay $100 per year. When the bond matures, the issuer returns the face value ($1,000) to the investors*.

Bonds are issued by corporations and government entities. Government bonds generate tax-free income for investors, thus these bonds can be issued at lower rates than corporate bonds. This benefit provides government facilities an economic advantage to use bonds to finance projects.

Application to the Case Study

Although PizzaCo (a private company) would not be able to obtain the low rates of a government bond, they could issue bonds with coupon interest rates competitive with the loan interest rate of 15%.

In this arrangement, PizzaCo receives the investors' cash (bond par value) and purchases the equipment. PizzaCo uses part of the energy savings to pay the coupon interest payments to the investors. When the bond matures, PizzaCo must then return the par value to the investors. See Figure 1-8.

As with a loan, PizzaCo owns, maintains and depreciates the equipment throughout the project's life. All coupon interest payments are tax-deductible. At the end of the five-year project, PizzaCo expects

Table 1-4. Economic Analysis for a Loan with No Down Payment.

EOY	*Savings*	*Depr.*	*Payments Principal*	*Payments Interest*	*Total*	*Principal Outstanding*	*Taxable Income*	*Tax*	*ATCF*
0				2,500,000					
1	950,000	357,250	370,789	375,000	745,789	2,129,211	217,750	74,035	130,176
2	950,000	612,250	426,407	319,382	745,789	1,702,804	18,368	6,245	197,966
3	950,000	437 2	490,368	255,421	745,789	1,212,435	257,329	187,492	116,719
4	950,000	312:2:00	563,924	181,865	745,789	648,511	455,885	55,001	49,210
5	950,000	111,625	648,511	97,277	745,789	0	741,098	251,973	-47,761
5*	1.200.000	669.375			530.625	180.413	1. 019.588		
		2,500,000							
					Net Present Value at 18%:				$757,121

Notes: Loan Amount: 2,500,000 (used to purchase equipment at year 0)
Loan Finance Rate: 15% MARR 18%
Tax Rate 34%

MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5
Accounting Book Value at end of year 5: 669,375
Estimated Market Value at end of year 5: 1,200,000
EOY 5* illustrates the Equipment Sale and *Book* Value
Taxable Income: =(Market Value - Book Value)
=(1,200,000 - 669,375) = $530,625

Table 1-5. Economic Analysis for a Loan with a 20% Down-Payment,

EOY	*Savings*	*Depr.*	*Payments*			*Principal*	*Taxable*	*Tax*	*ATCF*
			Principal	*Interest*	*Total*	*Outstanding*	*Income*		
0					500,000	2,000,000			–500,000
1	950,000	357,250	302,567	280,000	582,567	1,697,433	312,750	106,335	261,098
2	950,000	612,250	344,926	237,641	582,567	1,352,507	100,109	34,037	333,396
3	950 ′ 000	437250	393,216	189,351	582,567	959,291	323,399	109,956	257,477
4	950,000	312:250	448,266	134,301	582,567	511,0241	503,449	171,173	196,260
5	950,000	111,625	511,024	71,543	582,567	0	766,832	260,723	106,710
5*	1.200,000	669,375					530,625	180,413	1.019,588
		2,500,000							
					Net Present Value at 18%:				$710,962

Notes: Loan Amount: 2,000,000 (used to purchase equipment at year 0)
Loan Finance Rate: 14% MARR 18%
500,000 Tax Rate 34%
MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5
Accounting Book Value at end of year 5: 669,375
Estimated Market Value at end of year 5: 1,200,000
EOY 5* illustrates the Equipment Sale and *Book* Value
Taxable Income: =(Market Value - Book Value)
=(1,200,000 - 669,375) = $530,625

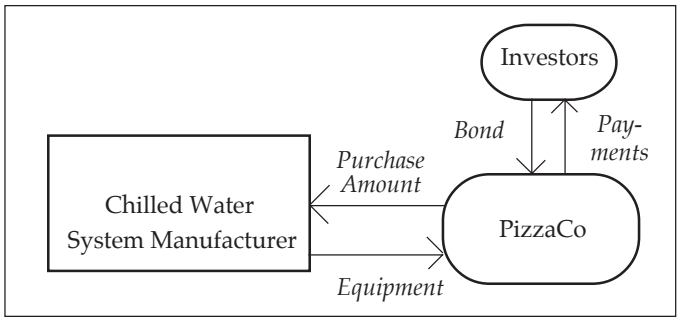


Figure 1-8. Resource Flow Diagram for a Bond.

to sell the equipment for its market value of $1,200,000. Table 1-6 shows the economic analysis of this finance arrangement.

Selling Stock

Although less popular, selling company stock is an equity financing option which can raise capital for projects. For the host, selling stock offers a flexible repayment schedule, because dividend payments to shareholders aren't absolutely mandatory. Selling stock is also often used to help a company attain its desired capital structure. However, selling new shares of stock dilutes the power of existing shares and may send an inaccurate "signal" to investors about the company's financial strength. If the company is selling stock, investors may think that it is desperate for cash and in a poor financial condition. Under this belief, the company's stock price could decrease. However, recent research indicates that when a firm announces an EMP, investors react favorably.[11] On average, stock prices were shown to increase abnormally by 21.33%.

By definition, the cost of capital (rate) for selling stock is:

$$\text{cost of capital}_{\text{selling stock}} = D/P$$

where D = *annual dividend payment*
P = *company stock price*

However, in most cases, the after-tax cost of capital for selling stock is higher than the after-tax cost of debt financing (using loans, bonds and capital leases). This is because interest expenses (on debt) are tax deductible, but dividend payments to shareholders are not.

In addition to tax considerations, there are other reasons why the

Table 1-6. Economic Analysis for a Bond.

EOY	*Savings*	*Depr.*	*Payments Principal*	*Payments Interest*	*Total*	*Principal Outstanding*	*Taxable Income*	*Tax*	*ATCF*
0						2,500,000			
1	950,000	357,250		375,000	375,000	2,500,000	217,750	74,035	500,965
2	950,000	612,250		375,000	375,000	2,500,000	-37,250	-12,665	587,665
3	950,000	437,250		375,000	375,000	2,500,000	137,750	46,835	528,165
4	950,0 0	312,250		375,000	375,000	2,500,000	262,750	89,335	485,665
5	950,000	111,625	2,500,000	375,000	2,875,000	0	463,375	157,548	-2,082,548
5*	1.200.000	669.3751					530,625	180,413	1,019,588
		2,500,000							
					Net Present Value at 18%:				953,927

Notes: Loan Amount: 2,500,000 (used to purchase equipment at year 0)
Loan Finance Rate: 0% MARR 18%
Tax Rate 34%

MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5
Accounting Book Value at end of year 5: 669,375
Estimated Market Value at end of year 5: 1,200,000
EOY 5* illustrates the Equipment Sale and *Book* Value
Taxable Income: =(Market Value - Book Value)
=(1,200,000 - 669,375) = $530,625

cost of debt financing is less than the financing cost of selling stock. Lenders and bond buyers (creditors) will accept a lower rate of return because they are in a less risky position due to the reasons below.

- Creditors have a contract to receive money at a certain time and future value (stockholders have no such guarantee with dividends).
- Creditors have first claim on earnings (interest is paid before shareholder dividends are allocated).
- Creditors usually have secured assets as collateral and have first claim on assets in the event of bankruptcy.

Despite the high cost of capital, selling stock does have some advantages. This arrangement does not bind the host to a rigid payment plan (like debt financing agreements) because dividend payments are not mandatory. The host has control over when it will pay dividends. Thus, when selling stock, the host receives greater payment flexibility, but at a higher cost of capital.

Application to the Case Study

As Figure 1-9 shows, the financial arrangement is very similar to a bond, at year zero the firm receives $2.5 million, except the funds come from the sale of stock. Instead of coupon interest payments, the firm distributes dividends. At the end of year five, PizzaCo repurchases the stock. Alternatively, PizzaCo could capitalize the dividend payments, which means setting aside enough money so that the dividends could be

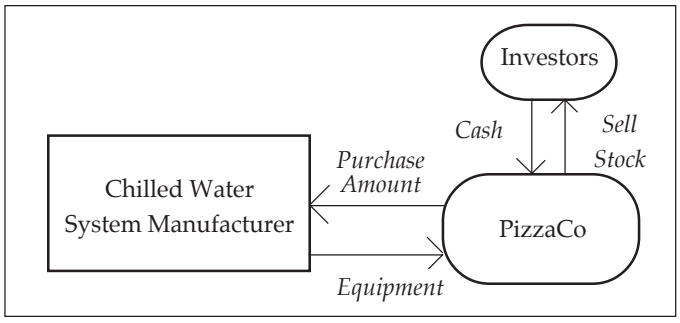


Figure 1-9. Resource Flow Diagram for Selling Stock.

paid with the interest generated.

Table 1-7 shows the economic analysis for issuing stock at a 16% cost of equity capital, and repurchasing the stock at the end of year five. (For consistency of comparison to the other arrangements, the stock price does not change during the contract.) Like a loan or bond, PizzaCo owns and maintains the asset. Thus, the annual savings are only $950,000. PizzaCo pays annual dividends worth $400,000. At the end of year 5, PizzaCo expects to sell the asset for $1,200,000.

Note that Table 1-7 is slightly different from the other tables in this chapter:

Taxable Income = Savings – Depreciation, and
ATCF = Savings – Stock Repurchases - Dividends - Tax

Leases

Firms generally own assets, however it is the use of these assets that is important, not the ownership. Leasing is another way of obtaining the use of assets. There are numerous types of leasing arrangements, ranging from basic rental agreements to extended payment plans for purchases. Leasing is used for nearly one-third of all equipment utilization.[12] Leases can be structured and approved very quickly, even within 48 hours. Table 1-8 lists some additional reasons why leasing can be an attractive arrangement for the lessee.

Basically, there are two types of leases; the "true lease" (a.k.a. "operating" or "guideline lease") and the "capital lease." One of the primary differences between a true lease and a capital lease is the tax treatment. In a true lease, the lessor owns the equipment and receives the depreciation benefits. However, the lessee can claim the entire lease payment as a tax-deductible business expense. In a capital lease, the lessee (PizzaCo) owns and depreciates the equipment. However, only the interest portion of the lease payment is tax-deductible. In general, a true lease is effective for a short-term project, where the company does not plan to use the equipment when the project ends. A capital lease is effective for long-term equipment.

The True Lease

Figure 1-10 illustrates the legal differences between a true lease and a capital lease.[13] A true lease (or operating lease) is strictly a rental agreement. The word "strict" is appropriate because the Internal Revenue Service will only recognize a true lease if it satisfies the following criteria:

Table 1-7. Economic Analysis of Selling Stock.

EOY	*Savings*	*Depr.*	*Stock Transactions*			*Taxable Income*	*Tax*	*ATCF*
			Sale of Stock	*Repurchase*	*Dividend Payments*			
0			$2,500,000 from Stock Sale is used to purchase equipment, thur ATCF = 0					
1	950,000	357,250			400,000	592,750	201,535	348.465
2	950,000	612,250			400,000	337,750	114,835	435,165
3	950,000	437,250			400,000	512,750	174,335	375,665
4	950,000	312,250			400,000	637,750	216,835	333,165
5	950,000	111,625		2,500,000	400,000	838,375	285,048	-2,235,048
5*	1,200,000	669,375				530,625	180,413	1,019,588
		2,500,000						
					Net Present Value at 18%:			477,033

Notes: Value of Stock Sold (which is repurchased after year 5 2,500,000 (used to purchase equipment at year 0)
Cost of Capital = Annual Dividend Rate: 16% MARR = 18%
Tax Rate = 34%

MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5
Accounting Book Value at end of year 5: 669,375
Estimated Market Value at end of year 5: 1,200,000
EOY 5 illustrates the Equipment Sale and Book Value*
Taxable Income: = (Market Value - Book Value)
= (1,200,000 - 669,375) = $530,625

Table 1-8. Good Reasons to Lease.

Financial Reasons
• With some leases, the entire lease payment is tax-deductible.
• Some leases allow "off-balance sheet" financing, preserving credit lines
Risk Sharing
• Leasing is good for short-term asset use, and reduces the risk of getting stuck with obsolete equipment
• Leasing offers less risk and responsibility

1. the lease period must be less than 80% of the equipment's life, and

2. the equipment's estimated residual value must be (20% of its value at the beginning of the lease, and

3. there is no "bargain purchase option," and

4. there is no planned transfer of ownership, and

5. the equipment must not be custom-made and only useful in a particular facility.

Application to the Case Study

It is unlikely that PizzaCo could find a lessor that would be willing to lease a sophisticated chilled water system and after five years, move the system to another facility. Thus, obtaining a true lease would be unlikely. However, Figure 1-11 shows the basic relationship between the lessor and lessee in a true lease. A third-party leasing company could also be involved by purchasing the equipment and leasing to PizzaCo. Such a resource flow diagram is shown for the capital lease.

Table 1-9 shows the economic analysis for a true lease. Notice that the lessor pays the maintenance and insurance costs, so PizzaCo saves the full $1 million per year. PizzaCo can deduct the entire lease payment of $400,000 as a business expense. However PizzaCo does not obtain ownership, so it can't depreciate the asset.

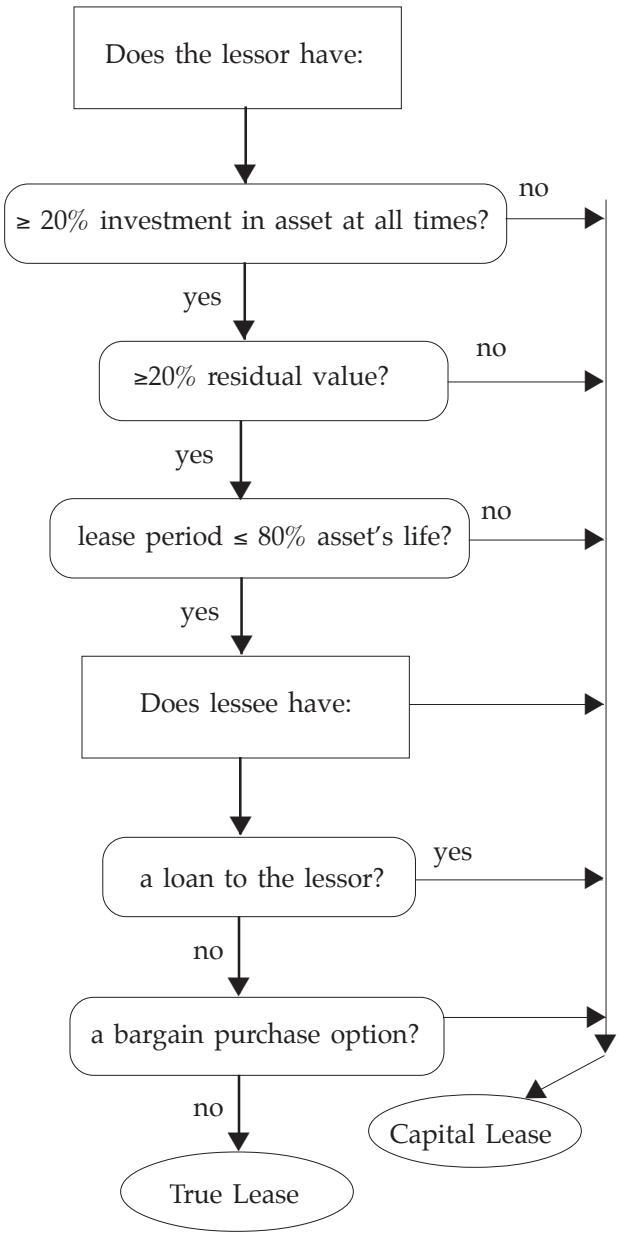


Figure 1-10. Classification for a True Lease.

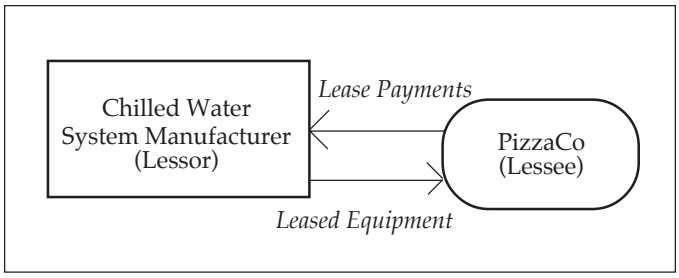


Figure 1-11. Resource Flow Diagram for a True Lease.

The Capital Lease

The capital lease has a much broader definition than a true lease. A capital lease fulfills any one of the following criteria:

1. the lease term (75% of the equipment's life;
2. the present value of the lease payments ≥ 90% of the initial value of the equipment;
3. the lease transfers ownership;
4. the lease contains a "bargain purchase option," which is negotiated at the inception of the lease.

Most capital leases are basically extended payment plans, except ownership is usually not transferred until the end of the contract. This arrangement is common for large EMPs because the equipment (such as a chilled water system) is usually difficult to reuse at another facility. With this arrangement, the lessee eventually pays for the entire asset (plus interest). In most capital leases, the lessee pays the maintenance and insurance costs.

The capital lease has some interesting tax implications because the lessee must list the asset on its balance sheet from the beginning of the contract. Thus, like a loan, the lessee gets to depreciate the asset and only the interest portion of the lease payment is tax deductible.

Application to the Case Study

Figure 1-12 shows the basic third-party financing relationship between the equipment manufacturer, lessor and lessee in a capital lease. The finance company (lessor) is shown as a third party, although it also could be a division of the equipment manufacturer. Because the finance

Table 1-9. Economic Analysis for a True Lease

EOY	*Savings*	*Depr.*	*Payments*			*Principal*	*Taxable*	*Tax*	*ATCF*
			Principal	*Interest*	*Total*	*Outstanding*	*Income*		
0					400,000		-400,000		-400,000
1	1,000,000				400,000		600,000	204,000	396,000
2	1,000,000				400,000		600,000	204,000	396,000
3	1,000,000				400,000		600,000	204,000	396, 000
4	1,000,000				400,000		600,000	204,000	396,000
5	1,000,000						1,000,000	340,000	660,000
						Net Present Value at 18%:			$953,757

Notes: Annual Lease Payment: 400,000
MARR = 18%
Tax Rate 34%

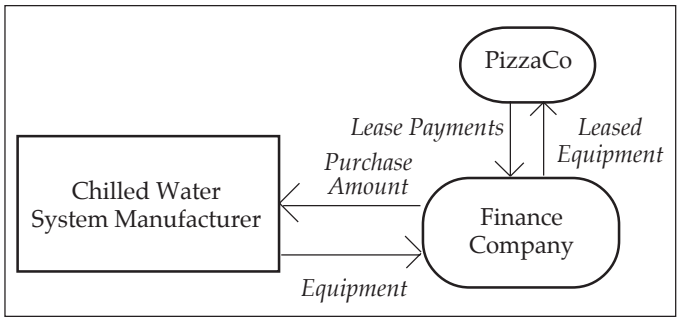


Figure 1-12. Resource Flow Diagram for a Capital Lease.

company (with excellent credit) is involved, a lower cost of capital (12%) is possible due to reduced risk of payment default.

Like an installment loan, PizzaCo's lease payments cover the entire equipment cost. However, the lease payments are made in advance. Because PizzaCo is considered the owner, it pays the $50,000 annual maintenance expenses, which reduces the annual savings to $950,000. PizzaCo receives the benefits of depreciation and tax-deductible interest payments. To be consistent with the analyses of the other arrangements, PizzaCo would sell the equipment at the end of the lease for its market value. Table 1-10 shows the economic analysis for a capital lease.

The Synthetic Lease

A synthetic lease is a "hybrid" lease that combines aspects of a true lease and a capital lease. Through careful structuring and planning, the synthetic lease appears as an operating lease for accounting purposes (enables the Host to have off-balance sheet financing), yet also appears as a capital lease for tax purposes (to obtain depreciation for tax benefits). Consult your local financing expert to learn more about synthetic leases; they must be carefully structured to maintain compliance with the associated tax laws.

With most types of leases, loans and bonds the monthly payments are fixed, regardless of the equipment's utilization, or performance. However, shared savings agreements can be incorporated into certain types of leases.

Performance Contracting

Performance contracting is a unique arrangement that allows the

Table 1-10. Economic Analysis for a Capital Lease.

EOY	*Savings*	*Depr.*	*Payments in Advance*			*Principal*	*Taxable*	*Tax*	*ATCF*
			Principal	*Interest*	*Total*	*Outstanding*	*Income*		
0			619,218	0	619,218	1,880,782		-619,218	
1	950,000	357,250	393,524	225,694	619,218	1,487,258	367,056	124,799	205,983
2	950,000	612,250	440,747	178,471	619,218	1,046,511	159,279	54,155	276,627
3	950,000	437,250	493,637	125,581	619,218	552,874	387,169	131,637	199,145
4	950,000	312,250	552,874	66,345	619,218	0	571,405	194,278	136,503
5	950,000	111,625					838,375	285,048	664,953
5*	1,200,000	669,375					.530,625	180,413	1,019,588
		2,500,000							
						Net Present Value at 18%:			$681,953

Notes: Total Lease Amount: 2,500,000
However, Since the payments are in advance, the first payment is analogous to a Down-Payment
Thus the actual amount borrowed is only = $500,000 - 619,218 = 1, 880,782
Lease Finance Rate: 12% MARR 18%
Tax Rate 34%
MACRS Depreciation for 7-Year Property, with half-year convention at EOY 5
Accounting Book Value at end of year 5: 669,375
Estimated Market Value at end of year 5: 1,200,000
EOY 5* illustrates the Equipment Sale and Book Value
Taxable Income: =(Market Value - Book Value)
=(1.200.000 - 669,375) = $530,625

building owner to make necessary improvements while investing very little money up-front. The contractor usually assumes responsibility for purchasing and installing the equipment, as well as maintenance throughout the contract. But the unique aspect of performance contracting is that the contractor is paid based on the performance of the installed equipment. Only after the installed equipment actually reduces expenses does the contractor get paid. Energy service companies (ESCOs) typically serve as contractors within this line of business.

Unlike most loans, leases and other fixed payment arrangements, the ESCO is paid based on the performance of the equipment. In other words, if the finished product doesn't save energy or operational costs, the host doesn't pay. This aspect removes the incentive to "cut corners" on construction or other phases of the project, as with bid/spec contracting. In fact, often there is an incentive to exceed savings estimates. For this reason, performance contracting usually entails a more "facility-wide" scope of work (to find extra energy savings), than loans or leases on particular pieces of equipment.

With a facility-wide scope, many improvements can occur at the same time. For example, lighting and air conditioning systems can be upgraded at the same time. In addition, the indoor air quality can be improved. With a comprehensive facility management approach, a "domino-effect" on cost reduction is possible. For example, if facility improvements create a safer and higher quality environment for workers, productivity could increase. As a result of decreased employee absenteeism, the workman's compensation cost could also be reduced. These are additional benefits to the facility.

Depending on the host's capability to manage the risks (equipment performance, financing, etc.) the host will delegate some of these responsibilities to the ESCO. In general, the amount of risk assigned to the ESCO is directly related to the percent savings that must be shared with the ESCO.

For facilities that are not in a good position to manage the risks of an energy project, performance contracting may be the only economically feasible implementation method. *For example, the US Federal Government used performance contracting to upgrade facilities when budgets were being dramatically cut. In essence, they "sold" some of their future energy savings to an ESCO, in return for receiving new equipment and efficiency benefits*.

In general, performance contracting may be the best option for facilities that:

- are severely constrained by their cash flows;
- have a high cost of capital;
- don't have sufficient resources, such as a lack of in-house energy management expertise or an inadequate maintenance capacity*;
- are seeking to reduce in-house responsibilities and focus more on their core business objectives; or
- are attempting a complex project with uncertain reliability or if the host is not fully capable of managing the project. *For example, a lighting retrofit has a high probability of producing the expected cash flows, whereas a completely new process does not have the same "time-tested" reliability. If the in-house energy management team cannot manage this risk, performance contracting may be an attractive alternative*.

Performance contracting does have some drawbacks. In addition to sharing the savings with an ESCO, the tax benefits of depreciation and other economic benefits must be negotiated. Whenever large contracts are involved, there is reason for concern. One study found that 11% of customers who were considering EMPs felt that dealing with an ESCO was too confusing or complicated.[14] Another reference claims, "with complex contracts, there may be more options and more room for error."[15] Therefore, it is critical to choose an ESCO with a good reputation and experience within the types of facilities that are involved.

There are a few common types of contracts. The ESCO will usually offer the following options:

- guaranteed fixed dollar savings;
- guaranteed fixed energy (MMBtu) savings;
- a percent of energy savings; or
- a combination of the above.

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*Maintenance capacity represents the ability that the maintenance personnel will be able to maintain the new system. It has been shown that systems fail and are replaced when maintenance concerns are not incorporated into the planning process. See Woodroof, E. (1997) "Lighting Retrofits: Don't Forget About Maintenance," Energy Engineering, 94(1) pp. 59-68.

Obviously, facility managers would prefer the options with "guaranteed savings." However this extra security (and risk to the ESCO) usually costs more. The primary difference between the two guaranteed options is that guaranteed fixed dollar savings contracts ensure dollar savings, even if energy prices fall. *For example, if energy prices drop and the equipment does not save as much money as predicted, the ESCO must pay (out of its own pocket) the contracted savings to the host.*

Percent energy savings contracts are agreements that basically share energy savings between the host and the ESCO. The more energy saved, the higher the revenues to both parties. However, the host has less predictable savings and must also periodically negotiate with the ESCO to determine "who saved what" when sharing savings. There are numerous hybrid contracts available that combine the positive aspects of the above options.

Application to the Case Study

PizzaCo would enter into a hybrid contract; *percent energy savings/ guaranteed arrangement*. The ESCO would purchase, install and operate a highly efficient chilled water system. The ESCO would guarantee that PizzaCo would save the $1,000,000 per year, but PizzaCo would pay the ESCO 80% of the savings. In this way, PizzaCo would not need to invest any money, and would simply collect the net savings of $200,000 each year. To avoid periodic negotiations associated with shared savings agreements, the contract could be worded such that the ESCO will provide guaranteed energy savings worth $200,000 each year.

With this arrangement, there are no depreciation, interest payments or tax-benefits for PizzaCo. However, PizzaCo receives a positive cash flow with no investment and little risk. At the end of the contract, the ESCO removes the equipment. At the end of most performance contracts, the host usually acquires or purchases the equipment for fair market value. However, for this case study, the equipment was removed to make a consistent comparison with the other financial arrangements.

Figure 1-13 illustrates the transactions between the parties. Table 1-11 presents the economic analysis for performance contracting.

Note that Table 1-11 is slightly different from the other tables in this chapter: Taxable Income = Savings – Depreciation – ESCO Payments.

Table 1-11. Economic Analysis of a Performance Contract.

EOY	*Savings*	*Depr.*	*ESCO Payments*	*Total*	*Principal Outstanding*	*Taxable Income*	*Tax*	*ATCF*
0								
1	1,000,000			800,000		200,000	68,000	132,000
2	1,000,000			800,000		200,000	68,000	132,000
3	1,000,000			800,000		200,000	68,000	132,000
4	1,000,000			800,000		200,000	68,000	132,000
5	1,000,000			800,000		200,000	68,000	132,000
					Net Present Value at 18%:			$412,787

Notes: ESCO purchases/operates equipment. Host pays ESCO 80% of the savings = $800,000.
The contract could also be designed so that PizzaCo can buy the equipment at the end of year 5.

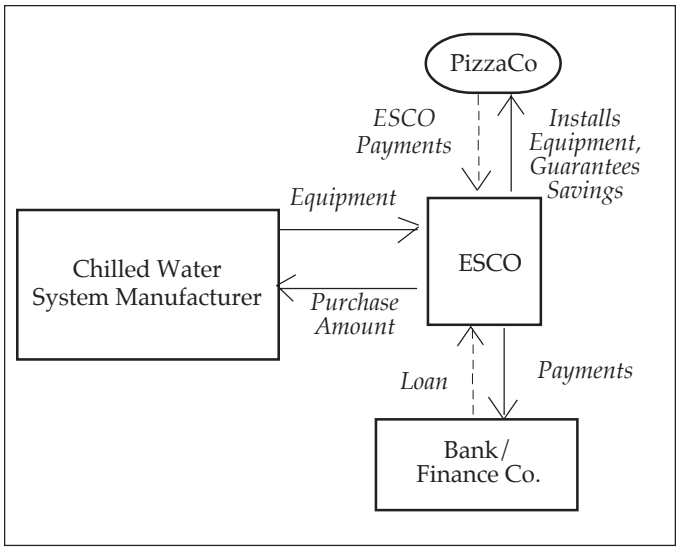

Figure 1-13. Transactions for a Performance Contract.

Summary of Tax Benefits

Table 1-12 summarizes the tax benefits of each financial arrangement presented in this chapter.

Additional Options

Combinations of the basic financial arrangements can be created to enhance the value of a project. A sample of the possible combinations are described below.

* In some Performance Contracts, the Host can own the equipment and the guarantee assures that the operational benefits are greater than the finance payments. Alternatively, some performance contracts can be viewed as "outsourcing", where the contractor owns the equipment and provides a "service" to the Host.

- Third party financiers often cooperate with performance contracting firms to implement EMPs.

- Utility rebates and government programs may provide additional benefits for particular projects.

Table 1-12 Host's Tax Benefits for each Arrangement.

ARRANGEMENT	*Depreciation Benefits*	*Interest Payments are Tax-Deductible*	*Total Payments are Tax-Deductible*
Retained Earnings	X		
Loan	X	X	
Bond	X	X	
Sell Stock	X		
Capital Lease	X	X	
True Lease			X
Performance Contract			X

- Tax-exempt leases are available to government facilities.
- Insurance can be purchased to protect against risks relating to equipment performance, energy savings, etc.
- Some financial arrangements can be structured as non-recourse to the host. Thus, the ESCO or lessor would assume the risks of payment default. However, as mentioned before, profit sharing increases with risk sharing.

Attempting to identify the absolute best financial arrangement is a rewarding goal, unless it takes too long. As every minute passes, potential dollar savings are lost forever. When considering special grant funds, rebate programs or other unique opportunities, it is important to consider the lost savings due to delay.

"PROS" & "CONS" OF EACH FINANCIAL ARRANGEMENT

This section presents a brief summary of the "Pros" and "Cons" of each financial arrangement from the host's perspective.

Loan

"Pros":

- host keeps all savings,
- depreciation & interest payments are tax-deductible,
- host owns the equipment, and
- the arrangement is good for long-term use of equipment

"Cons":

- host takes all the risk, and must install and manage project

Bond

Has the same Pros/Cons as loan, and

"Pro":

- good for government facilities, because they can offer a tax-free rate (that is lower, but considered favorable by investors)

Sell Stock

Has the same Pros/Cons as loan, and
"Pro":

- selling stock could help the host achieve its target capital structure

"Cons":

- dividend payments (unlike interest payments) are not tax-deductible, and
- dilutes company control

Use Retained Earnings

Has the same Pros/Cons as loan, and
"Pro":

- host pays no external interest charges. However retained earnings do carry an opportunity cost, because such funds could be invested somewhere at the MARR.

"Con":

- host loses tax-deductible benefits of interest charges

Capital Lease

Has the same Pros/Cons as loan, and
"Pro":

- Greater flexibility in financing, possible lower cost of capital with third-party participation

True Lease

"Pros":

- allows use of equipment, without ownership risks,
- reduced risk of poor performance, service, equipment obsolescence, etc.,
- good for short-term use of equipment, an
- entire lease payment is tax-deductible

"Cons":

- no ownership at end of lease contract, and
- no depreciation tax benefits'

Performance Contract

"Pros":

- allows use of equipment, with reduced installment/operational risks, and
- reduced risk of poor performance, service, equipment obsolescence, etc., and
- allows host to focus on its core business objectives

"Cons":

- potentially binding contracts, legal expenses, and increased administrative costs, and
- host must share project savings

Rules of Thumb

When investigating financing options, consider the following generalities:

Loans, bonds and other host-managed arrangements should be used when a customer has the resources (experience, financial support, and time) to handle the risks. Performance contracting (ESCO assumes most of the risk) is usually best when a customer doesn't have the resources to properly manage the project. Remember that with any arrangement where the host delegates risk to another firm, the host must also share the savings.

Leases are the "middle ground" between owning and delegating risks. Leases are very popular due to their tax benefits.

True leases tend to be preferred when:

- the equipment is needed on a short-term basis;
- the equipment has unusual service problems that cannot be handled by the host;
- technological advances cause equipment to become obsolete quickly; or
- depreciation benefits are not useful to the lessee.

Capital Leases are preferred when:

- the installation and removal of equipment is costly;
- the equipment is needed for a long time; or
- the equipment user desires to secure a "bargain purchase option."

CHARACTERISTICS THAT INFLUENCE WHICH FINANCIAL ARRANGEMENT IS BEST

There are at least three types of characteristics that can influence which financial arrangement should be used for a particular EMP. These include facility characteristics, project characteristics and financial arrangement characteristics. In this section, quantitative characteristics are bulleted with this symbol: $. The qualitative characteristics are bulleted with this symbol: ☺ Note that qualitative characteristics are generally "strategic" and are not associated with an exact dollar value.

A few of the Facility Characteristics include:

☺ The long-term plans of facility. For example, is the facility trying to focus on core business objectives and outsourcing other tasks, such as EMPs?

$ The facility's current financial condition. Credit ratings and ability to obtain loans can determine whether certain financial arrangements are feasible.

☺ The experience and technical capabilities of in-house personnel. Will additional resources (personnel, consultants, technologies, etc.) be needed to successfully implement the project?

☺ The facility's ability to obtain rebates from the government, utilities, or other organizations. For example, there are Dept. of Energy subsidies available for DOE facilities.

$ The facility's ability to obtain tax benefits. For example, government facilities can offer tax-exempt interest rates on bonds.

A few of the Project Characteristics include:

$ The project's economic benefits. Net Present Value, Internal Rate of Return and Simple Payback.

☺ The project's complexity and overall risk. For example, a complex project that has never been done before has a different level of risk than a standard lighting retrofit.

☺ The project's alignment with the facility's long-term objectives. Will this project's equipment be needed for long-term goals?

☺ The project's cash flow schedule and the variance between cash flows. For example, there may be significant differences in the acceptability of a project based on when revenues are received.

A few of the Financial Arrangement Characteristics include:

$ The economic benefit of a project using a particular financial arrangement. The Net Present Value and Internal Rate of Return can be influenced by the financial arrangement selected.

☺ The impact on the corporate capital structure. For example, will additional debt be required to finance the project? Will additional liabilities appear on the firm's balance sheet and impact the image of the company to investors?

☺ The flexibility of the financial arrangement. For example, can the facility manager alter the contract and payment terms in the event of revenue shortfall or changes in operational hours?

INCORPORATING STRATEGIC ISSUES WHEN SELECTING FINANCIAL ARRANGEMENTS

Because strategic issues can be important when selecting financial arrangements, the facility manager should include them in the selection process. The following questions can help assess a facility manager's needs.

- Does the facility manager want to manage projects or outsource?
- Are net positive cash flows required?
- Will the equipment be needed for long-term needs?
- Is the facility government or private?
- If private, does the facility manager want the project's assets on or off the balance sheet?
- Will operations be changing?

From the research experience, a Strategic Issues Financing Decision

Tree was developed to guide facility managers to the financial arrangement which is most likely optimal. Figure 1-14 illustrates the decision tree, which is by no means a rule, but it embodies some general observations from the industry.

Working the tree from the top to bottom, the facility manager should assess the project and facility characteristics to decide whether it is strategic to manage the project or outsource. If outsourced, the "performance contract" would be the logical choice.* If the facility manager wants to manage the project, the next step (moving down the tree) is to evaluate whether the project's equipment will be needed for long or short-term purposes. If short-term, the "true lease" is logical. If it is a long-term project, in a government facility, the "bond" is likely to be the best option. If the facility is in the private sector, the facility manager should decide whether the project should be on or off the balance sheet. An off-balance sheet preference would lead back to the "true lease." If the facility manager wants the project's assets on the balance sheet, the Net Present Value (or other economic benefit indicator) can help determine which "host-managed" arrangement (loan, capital lease or cash) would be most lucrative.

Although the decision tree can be used as a guide, it is most important to use the financial arrangement that best meets the needs of the organization. The examples on the adjacent page demonstrate that any organization can be creative with its financial arrangement selection. All of these examples are for Performance Contracting projects, however similar financial arrangements can be structured without using a performance contract.

CHAPTER SUMMARY

It is clear that knowing the strategic needs of the facility manager is critical to selecting the best arrangement. There are practically an infinite number of financial alternatives to consider. This chapter has provided some information on the basic financial arrangements. Combining these arrangements to construct the best contract for your facility is only limited by your creativity.

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*It should be noted that a performance contract could be structured using leases and bonds.

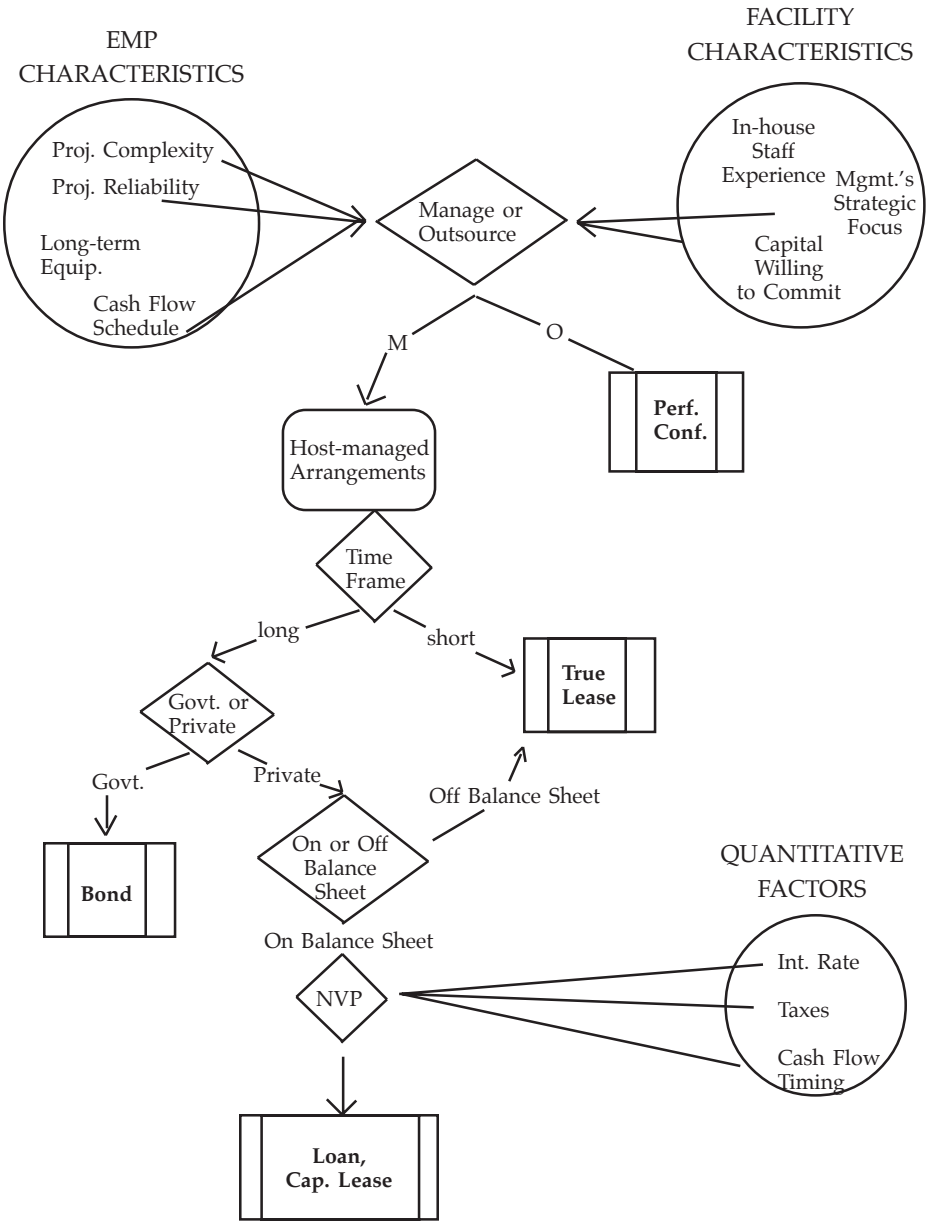

Figure 1-14 Strategic Issues Financing Decision Tree.

FEDERAL GOVERNMENT

Facility Type:
Military Installation

Location:
California

Project:
Performance Contract including over $40 million in energy efficiency equipment, which saves $7,000,000/year

Financial Arrangement: Capital Lease with a 20-year term

STATE AND LOCAL GOVERNMENT

Facility Type:
Local Government-Airport

Location:
Tulsa, OK

Project:
Performance Contract including over $4 million in energy efficiency equipment, which saves $380,000/year

Financial Arrangement: Municipal Bond with a 20-year term

Facility Type:
Local Government- Convention Center

Location:
Kansas City, MO

Project:
Performance Contract including over $8 million in energy efficiency equipment, which saves over $1 million/year

Financial Arrangement: Municipal Lease with a 10-year term

Education
Facility Type:
University

Location:
New Orleans, LA

Project:
$8 million in energy-related upgrades

Financial Arrangement: Operating Lease (Synthetic) with a 20-year term

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HEALTH CARE

Facility Type:
Hospital

Location:
Memphis, TN

Project:
$15 million in energy-related upgrades

Financial Arrangement: Operating Lease (Synthetic) with a 20-year term

GLOSSARY

Capitalize

To convert a schedule of cash flows into a principal amount, called capitalized value, by dividing by a rate of interest. In other words, to set aside an amount large enough to generate (via interest) the desired cash flows forever.

Capital or Financial Lease

Lease that under Statement 13 of the Financial Accounting Standards Board must be reflected on a company's balance sheet as an asset and corresponding liability. Generally, this applies to leases where the lessee acquires essentially all of the economic benefits and risks or the leased property.

Depreciation

The amortization of fixed assets, such as plant and equipment, so as to allocate the cost over their depreciable life. Depreciation reduces taxable income, but is not an actual cash flow.

Energy Service Company (ESCO)

Company that provides energy services (and possibly financial services) to an energy consumer.

Host

The building owner or facility that uses the equipment.

Lender

Individual or firm that extends money to a borrower with the expectation of being repaid, usually with interest. Lenders create debt in the form of loans or bonds. If the borrower is liquidated, the lender is paid off before stockholders receive distributions.

Lessee

The renter. The party that buys the right to use equipment by making lease payments to the lessor.

Lessor

The owner of the leased equipment.

Line of Credit

An informal agreement between a bank and a borrower indicating the maximum credit the bank will extend. A line of credit is popular because it allows numerous borrowing transactions to be approved without the re-application paperwork.

Liquidity

Ability of a company to convert assets into cash or cash equivalents without significant loss. For example, investments in money market funds are much more liquid than investments in real estate.

Leveraged Lease

Lease that involves a lender in addition to the lessor and lessee. The lender, usually a bank or insurance company, puts up a percentage of the cash required to purchase the asset, usually more than half. The balance is put up by the lessor, who is both the equity participant and the borrower. With the cash the lessor acquires the asset, giving the lender (1) a mortgage on the asset and (2) an assignment of the lease and lease payments. The lessee then makes periodic payments to the lessor, who in turn pays the lender. As owner of the asset, the lessor is entitled to tax deductions for depreciation on the asset and interest on the loan.

MARR (Minimum Attractive Rate of Return)

MARR is the "hurdle rate" for projects within a company. MARR is used to determine the NPV; the annual after-tax cash flow is discounted at MARR (which represents the rate the company could have received with a different project).

Net Present Value (NPV)

As the saying goes, "a dollar received next year is not worth as much as a dollar today." The NPV converts the worth of that future dollar into what is worth today. NPV converts future cash flows by using a given discount rate. For example, at 10%, $1,000 dollars received one year from now is worth only $909.09 dollars today. In other words, if you invested $909.09 dollars today at 10%, in one year it would be worth $1,000.

NPV is useful because you can convert future savings cash flows back to "time zero" (present), and then compare to the cost of a project. If the NPV is positive, the investment is acceptable. In capital budgeting, the discount rate used is called the hurdle rate and is usually equal to

the incremental cost of capital.

"Off-Balance Sheet" Financing

Typically refers to a True Lease, because the assets are not listed on the balance sheet. Because the liability is not on the balance sheet, the Host appears to be financially stronger. However, most large leases must be listed in the footnotes of financial statements, which reveals the "hidden assets."

Par Value or Face Value

Equals the value of the bond at maturity. For example, a bond with a $1,000 dollar par value will pay $1,000 to the issuer at the maturity date.

Preferred Stock

A hybrid type of stock that pays dividends at a specified rate (like a bond), and has preference over common stock in the payment of dividends and liquidation of assets. However, if the firm is financially strained, it can avoid paying the preferred dividend as it would the common stock dividends. Preferred stock doesn't ordinarily carry voting rights.

Project Financing

A type of arrangement, typically meaning that a Single Purpose Entity (SPE) is constructed. The SPE serves as a special bank account. All funds are sent to the SPE, from which all construction costs are paid. Then all savings cash flows are also distributed from the SPE. The SPE is essentially a mini-company, with the sole purpose of funding a project.

Secured Loan

Loan that pledges assets as collateral. Thus, in the event that the borrower defaults on payments, the lender has the legal right to seize the collateral and sell it to pay off the loan.

True Lease or Operating Lease or Tax-Oriented Lease

Type of lease, normally involving equipment, whereby the contract is written for considerably less time than the equipment's life and the lessor handles all maintenance and servicing; also called service lease. Operating leases are the opposite of capital leases, where the lessee ac-

quires essentially all the economic benefits and risks of ownership. Common examples of equipment financed with operating leases are office copiers, computers, automobiles and trucks. Most operating leases are cancelable.

WACC (Weighted Average Cost of Capital)

The firm's average cost of capital, as a function of the proportion of different sources of capital: Equity, Debt, Preferred Stock, etc. *For example, a firm's target capital structure is:*

Capital Source	Weight (w_i)
Debt	30%
Common Equity	60%
Preferred Stock	10%

and the firm's costs of capital are:

before tax cost of debt = k_d = 10%
cost of common equity = k_s = 15%
cost of preferred stock = k_{ps} = 12%

Then the weighted average cost of capital will be:

$$WACC = w_d k_d(1-T) + w_s k_s + w_{ps} k_{ps}$$

where w_i = *weight of Capital Source*$_i$
T = *tax rate = 34%*
After-tax cost of debt = $k_d(1-T)$

Thus,

$$WACC = (.3)(.1)(1-.34) + (.6)(.15) + (.1)(.12)$$
$$WACC = 12.18\%$$

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