INVESTING IN ALTERNATIVE ENERGY EQUIPMENT AND PROJECTS

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December 2007

INTRODUCTION

Historically, participants in the equipment leasing and finance industry have adapted their skills and capabilities to new technologies and industries. Indeed, the modern equipment leasing industry originated in response to the need of businesses to acquire the newest technology of the age – digital computers. Users of mainframe computers seeking imaginative and cost effective ways of deploying these increasingly important (and at that time extraordinarily expensive) tools in their businesses first turned to the equipment manufacturers themselves, but to no avail. Commercial banks, too, were then reluctant to advance significant funding for the acquisition of large mainframe computer systems.

Into this void stepped creative entrepreneurs with new ideas about how the use of such equipment could be acquired without the concomitant current expense of an outright purchase, and the equipment leasing industry was born. New technology spurred new financing concepts, which in turn have been adapted to many other areas of business over the past 40 years.

Likewise, where rising energy costs along with energy security and climate concerns have increased national interest in and attention to renewable electricity generation (as an alternative to the burning of fossil fuels), there has been nationwide growth in the development and deployment of alternative energy generating projects and systems. And, as in years past, the equipment financing industry is actively seeking ways to provide developers, utility companies, equipment manufacturers, and end users with cost effective and efficient means for financing and acquiring these assets.

Entering into or expanding activities within the alternative energy financing sector, however, requires a certain base of knowledge and understanding of the area. The field is changing and developing quickly, and participants must be familiar with the current state of the marketplace and with the fundamental elements of financing in this important sector. The following pages present an overview of the alternative energy industry, describe the issues and activities that are of the greatest interest to participants in the equipment and financing sector, and offer a view of the future of financing in the area. In particular, this presentation:

- Briefly describes the most prevalent alternative energy technologies in use today.
- Presents various financing concepts and economic issues underlying the leasing and financing of alternative energy projects and equipment.
- Describes the overall market for alternative energy financing, both in the U.S. and internationally.
- Analyzes various current technical aspects of alternative energy financing, including accounting and income tax treatment.
- Offers a view of the future of financing for alternative energy equipment and projects.

OVERVIEW OF ALTERNATIVE ENERGY GENERATION

In general, alternative energy generation may be thought of as the conversion of natural renewable energy resources into electrical energy for use in business and residential applications. Sources of natural renewable energy are many, but here we focus on the specific conversion technologies that are most advanced and most prevalent today – electricity generated from biomass, geothermal resources, solar power, and wind power.

BIOMASS. Waste materials produced from agricultural and natural biological processes are abundant throughout the world. These include agricultural waste materials, such as corn husks and stalks, bagasse (sugar cane or sugar beet refuse), leaf and grass cuttings, grain chaff and stalks, timber and sawmill refuse, and other crop residue, and they include biological waste materials, such as municipal solid waste, sewage sludge, animal or livestock waste and byproducts, and organic industrial waste. Although not technically "renewable" resources, these materials are important alternatives to fossil fuels in the generation of electricity and are generally referred to as renewables. In fact, biomass is currently the largest source of renewable electricity generation among non-hydropower fuels.[1] Often used in blends with fossil-based or petroleum fuels, biomass and products derived from biomass are nevertheless growing in usage throughout the world as independent sources of energy generation.

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1 U.S. Department of Energy Annual Energy Outlook 2007, Report #DOE/EIA-0383 (2007).

Unloading wood chips – biomass power plant (Tracy, CA)

Biomass is typically used in the generation of electricity in one of two ways. It may be used, either directly or through a conversion process (*e.g.*, through the rendering and refining of tallow from animal byproducts), as a combustion feedstock for powering boilers which then drive steam turbines and steam generators. Sophisticated industrial drying, filtering, refining, and rendering techniques are increasingly used to convert biomass waste materials into highly efficient, clean burning combustion fuels.

As an alternative to direct combustion, certain biological and animal waste materials may be "digested" through anaerobic processes that release methane gas, which is then used as a power plant fuel, either alone or blended with natural (petroleum) gas. Rather than burning the biomass material itself, these systems depend upon the natural bacterial and biological characteristics of the waste products to produce flammable and relatively clean burning methane gas. As either a direct fuel or through conversion to a fuel gas, the biomass material serves as a source of combustion energy that can be harnessed for the generation of electricity.

One of the principal benefits of biomass energy generation is its portability; it may be used almost anywhere in the world, since there are feedstocks available in virtually every environment, and it is readily accessible from every major population center or concentration of energy users. The energy generated from biomass is also highly dispatchable,[2] and biomass fueled plants may be scaled to suit specific power applications.

The size and overall costs of biomass energy facilities is quite variable. Many such projects, which use ag waste or industrial waste or byproducts as feedstock, are built around standard turbine generators which have been modified to operate on alternative fuels. Accordingly, the equipment pricing for such projects is similar to that for natural gas or other fossil fueled projects of comparable size and operational characteristics; only the pricing and availability of feedstock are significantly different. Few large scale generating plants using biomass have yet been brought on line, [3] although a number of projects of several Megawatts in nameplate capacity are in development throughout the U.S.

GEOTHERMAL RESOURCE. The use of geothermal energy from the earth to generate electricity dates from 1904, in Tuscany, Italy,[4] and its use for that purpose continues to this day. As of 2003, geothermal energy accounted for approximately 0.4% of the world's total primary energy supply.[5] However, it is estimated that accessible engineered geothermal system (EGS) resource in the U.S. (at depths of 3Km to 10Km) could provide as much as 15% to 20% of total national generating capacity.[6]

Geothermal energy is found in the form of heat stored beneath the surface of the earth, usually as extremely hot liquids or hard rock formations, which may be used directly to power steam turbine generators or indirectly to heat secondary, closed-loop liquid media that in turn power steam turbines. In the U.S., geothermal resources are found primarily along the Pacific coast "ring of fire" fault line, in areas of frequent volcanic activity, and in other regions where tectonic plate activity is the highest. These include California, which has 33 geothermal power plants (producing almost 90 percent of the nation's geothermal electricity), Nevada, with 15 geothermal power plants, and Hawaii and Utah, which have one geothermal plant each.[7]

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2 In the field of electrical energy management, "dispatchability" refers to the extent to which a resource is available to a system operator or utility grid when necessary for effective load balancing.

3 Not including plants using combinations of biomass or ethanol blended with fossil fuels.

4 National Energy Education Development Project, *Energy Infobook* (2006).

5 GLOBE Foundation of Canada, www.globe-net.ca/news/index.cfm?type=1&newsID=2991.

6 Alexander Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy, U.S. DOE, *The Future of Geothermal Energy*, DOE/MIT Workshop (June 7, 2007), as quoted by Reuters news agency (September 6, 2007) ("Karsner").

7 U.S. Energy Information Administration, *Electric Power Annual 2005* (2005).

As an area of financial investment, geothermal energy generation is somewhat more limited than other technologies, primarily due to its geographical restrictions, which dictate its limited accessibility from population centers and interconnectibility with existing energy transmission facilities. Unlike wind and solar, geothermal does not suffer from intermittency problems and so does not require back-up energy sources to ensure dispatch reliability. Geothermal investment in the U.S., much like investments in other renewable energy resources, is also currently limited by the unpredictability of certain income tax and other policy incentives.[8] Such policy issues are discussed further elsewhere in this report.

SOLAR POWER. Every truly renewable energy source ultimately derives its power from the sun, and the purest means of harnessing that power is through solar energy systems. The commercial collection and use of energy directly from the sun falls generally into two categories. In a "solar thermal" energy generation system, the sun's radiant energy is used to heat a transfer medium (either water or a specialized liquid with greater thermal efficiency) which is used in turn to power a turbine generator.[9] The energy from the sun is collected using mirrors, parabolic reflectors, reflective dishes, or other such structures to concentrate it, and this concentrated energy is then directed toward a thermal transfer device, where it heats the selected transfer medium and so powers steam turbine generators. Large scale systems of this kind, known as converting solar power (CSP) plants, have been installed in the Mojave Desert of southern California (notably at the SEGS facility near Barstow, now in its ninth phase and generating more than 300Mw of solar thermal electricity[10]) and other locations with unimpeded and year-round access to direct sunlight.

The other primary means of transforming solar power into electrical energy is through photovoltaic conversion (often referred to a "solar PV" to differentiate it from solar thermal), using large arrays of photodiodes (solar cells) to convert sunlight directly into electrical energy without the need for a transfer medium such as hot water. While historically more expensive than solar thermal systems (per Kwh of energy produced), solar PV technology is continuing to advance in efficiency and cost effectiveness. As of 2005, it is estimated that approximately 479Mw of energy was generated in the U.S. using solar PV technology.[11]

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8 Karsner, *op cit.*

9 In smaller applications, including many residential systems, solar heat may be provided directly to an end use such as heating an interior space or heating potable water.

10 *See* www.fplenergy.com/portfolio/solar/index.shtml ("FPL SEGS Website").

11 International Energy Agency, Photovoltaic Power Systems Programme (www.iea-pvps.org/countries/usa/index.htm).

Parabolic collector field (Kramer Junction, CA)

Whether as solar thermal or as solar PV, one important issue in solar energy systems is their geographical limitation to areas having unimpeded and long-term exposure to direct sunlight. Dispatchability is also a consideration with solar generation, as energy must either be stored for use during nighttime and dark periods or it must be provided from other sources.[12] Thus, most solar energy activity in the U.S. is in the desert southwest, and the economics of solar energy projects require analysis of these factors in addition to more traditional considerations inherent in equipment financing.

WIND POWER. The generation of motive power from the movement of the wind spans millennia of human history, with windmills providing energy for pumping water, grinding grain, and many other purposes. In 1888, however, a large windmill was used for the first time to generate electricity by directly turning an electric generator, or dynamo, and producing 12Kw of electric power.[13] The modern wind energy industry has continued to develop wind turbine generators of increasingly large scale, capacity, and cost effectiveness. In the past 20 years alone, the capacity of single

12 As an example, the SEGS solar installation in southern California includes a supplementary natural gas boiler for use during cloudy or overcast weather (FPL SEGS Website).

13 Danish Wind Industry Association (www.windpower.org).

wind turbine generators has increased from an average rating of around 25Kw to more than 1,600Kw (1.6Mw)[14], making the installation of large "wind farms" both feasible and economically viable.

Whitewater Hill wind farm (San Gorgonio, CA)

In the U.S., such large wind farms have been developed (and continue to be built) primarily in areas that feature naturally high wind velocities, such as western Texas or eastern Iowa, or that experience large temperature and pressure gradients, such as California's Tehachapi Mountains or San Gorgonio pass. It is estimated that installed windpower generating capacity in the U.S. is currently more than 12,000Mw,[15] and that figure is expected to increase as wind turbine generator efficiencies continue to improve.

Although the U.S. has lagged Europe in the overall development of wind energy facilities, in 2005 and 2006 the U.S. led the world in wind capacity additions, adding 2,454Mw of wind energy generating capacity, or roughly 16% of worldwide capacity additions, in 2006 alone.[16] Over the past seven years, wind power capacity has grown on average by 24% per year in the U.S. and 27% per year worldwide.[17]

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14 American Wind Energy Association (www.powerofwind.com).

15 American Wind Energy Association (www.awea.org).

16 *Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2006*, U.S. DOE Energy Efficiency and Renewable Energy (May 2007).

17 *Ibid.*

The wind, like the sun and the geothermal resource described above, can only be used to generate commercial volumes of electrical energy in selected geographical regions; wind cannot be transported to where the end user needs electricity, as biomass (or fossil fuel) can be. And wind power is not only not dispatchable, like solar energy, it is also unpredictable; even with modern forecasting and long-term wind studies, no one can be sure just when the wind will blow or at what speed. Of course, these factors must be considered in any wind energy investment or financing opportunity.

FORCES IMPACTING THE GROWTH OF RENEWABLE ENERGY INVESTMENT

Investment in renewable energy capital for electricity production has grown dramatically in the past fifteen years. A number of factors suggest that this growth will continue over the next decade and that the prognosis for private investment is quite bright.

ENERGY PRICES. Energy prices are significantly higher today than they have been since the early 1980s, when prices hit record highs.

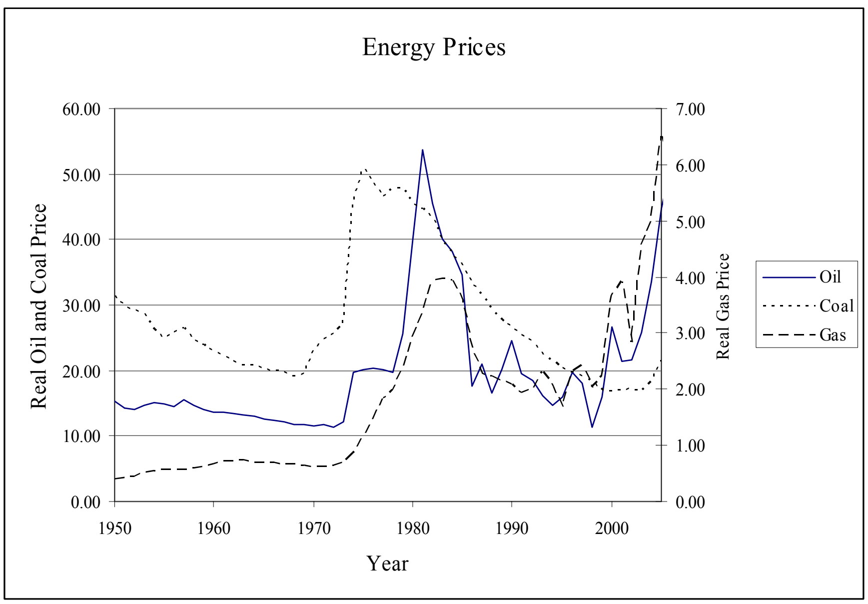

Figure 1.

Figure 1 shows the prices for oil, coal, and natural gas in real (year 2000) dollars since 1950. The spike in oil prices with the first oil shock in 1973 also drove up the price of crude oil and natural gas, the latter due to the deregulation of gas following the first oil shock.[18] While oil is not a significant fuel source for electricity generation, it nevertheless impacted electricity fuel prices.[19]

Current prices for natural gas and coal are near historic highs when adjusted for inflation. Figure 2 shows the monthly price for natural gas delivered to electric utilities in the past five years. Prices spiked in late 2005 and have since then fallen to levels slightly higher than in 2002 through 2004.

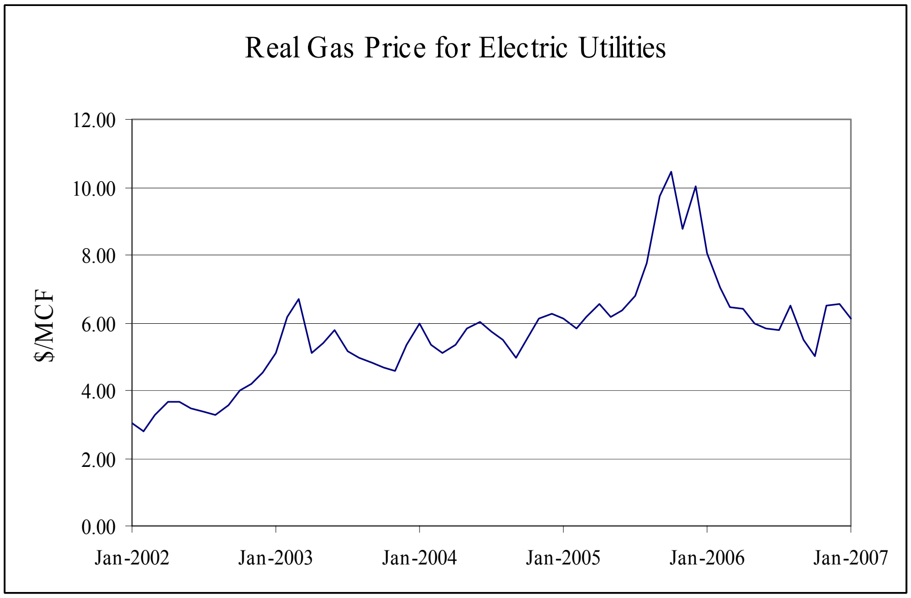

Figure 2.

Whether prices will remain at these levels, go even higher, or return to historic average levels cannot be predicted with certainty. As one example of a possible price path, it is helpful to use the numbers from the Energy Information Administration's Annual Energy Outlook 2007. They project natural gas prices for electric utilities to fall by one percent in real terms annually between 2005 and 2030, while coal prices, in contrast, are projected to rise by 0.4% annually (in real terms) over that time period.[20]

Higher energy prices for fossil fuel-based electricity will make renewable energy sources more attractive, provided that investors believe the price increases are not simply temporary spikes that will decline in the next few years. Given the long lead

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18 The spike in gas prices is also due in part to the fact that contract gas prices are often tied to oil prices.

19 Oil accounts for 3% of fuel (in BTUs) used for electricity. In contrast, coal accounts for 52% and natural gas accounts for 15% of fuel for electricity. Energy Information Administration, "Annual Energy Review 2005," Washington, DC (2006) ("EIA 2005 Review").

20 Energy Information Administration, "Annual Energy Outlook 2007," Washington, DC, Table 3 (2007) ("EIA 2007 Outlook").

time for planning, permitting, and construction of power plants, as well as the anticipated lifespan of plants, investors are not likely to respond to price increases unless they feel the increases are both substantial and long-lasting.

INTEREST RATES. Another factor favoring capital investments in the energy industry is the decline in real prevailing interest rates. Figure 6 shows the ten year Treasury rate less inflation during that year.[21] After a period of negative real interest rates during the high-inflation period of the late 1970s, real rates rose sharply as a result of the Volker disinflation, and they have slowly declined ever since. Rates peaked at about 8% p.a. and have fallen to a current rate between one and two percent. Lower interest rates make financing for all electricity generation projects more attractive by reducing the cost of funds to the investor. Recent increases in the ten-year Treasury rate to above 5%, should they persist and reflect an inflationary trend in the economy, will likely dampen the demand for investing in renewable capital.

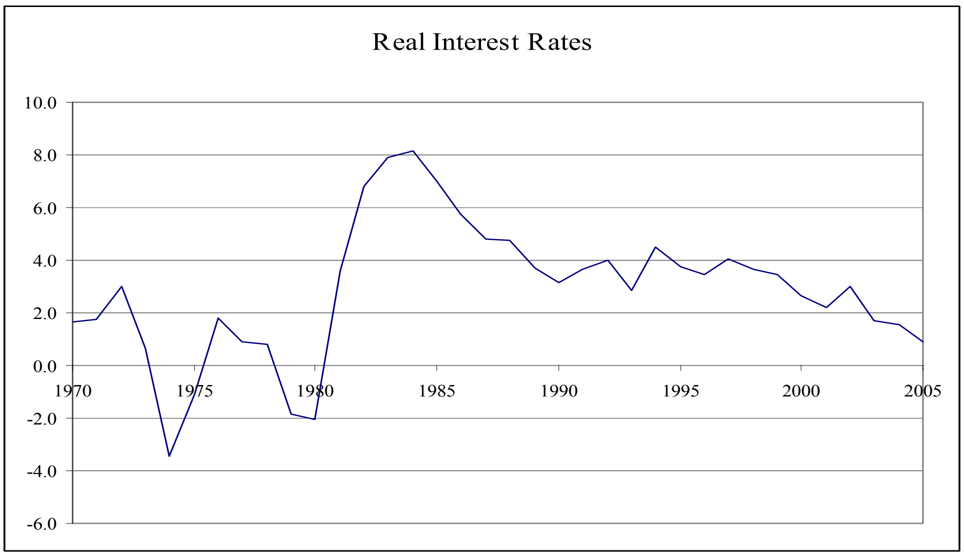

Figure 6.

ENERGY SECURITY. Energy security is an increasingly important driver for government policy. In the United States, energy security issues focus primarily on oil imports. While oil is not particularly important in electricity generation, shocks to oil prices tend to affect gas and coal prices, as noted above. Moreover, as discussed in greater detail below, policy responses generally include provisions that affect electricity generation.

[21] In general real interest rates should be constructed as the nominal rate less a measure of expected inflation. Using the actual inflation rate provides a rough measure of the expected real rate.

Renewable energy is a key component of any policy to improve U.S. energy security. In addition to avoiding reliance on fuel sources from other parts of the world, renewable energy generally is implemented at a relatively small scale, thereby reducing the risks of major terrorist attacks that could cripple the nation's energy supply infrastructure. An additional area in which energy security directly affects the renewable electricity industry is in its encouraging of a heightened awareness of coal as a domestic energy source in plentiful supply.

GLOBAL WARMING CONCERNS. Much of the policy analysis that supports renewable electricity investment in Europe has been driven by concerns over global warming. This is also true in the United States, although in this country energy security and a desire to reduce dependence on foreign oil have historically played a larger role. While the Bush Administration has opted out of the Kyoto Protocol and avoided explicit limits on greenhouse gas emissions, it has called for an 18% reduction in carbon intensity (carbon emissions per dollar of GDP) by the end of the current decade. Increases in energy prices and income over this decade, along with autonomous trends in intensity improvements, will mean that the Administration's goal will likely be achieved with little if any need for additional policies.[22]

FINANCING OF ALTERNATIVE ENERGY ASSETS

In many ways, the financing of alternative energy equipment and projects is quite similar to the financing of equipment and facilities in other industries. Lessors and lenders analyze and evaluate the specific criteria that are most likely to affect their ability to recover the funds advanced together with their intended rate of return, they determine the pricing and structure that must be achieved for their return on investment to be commensurate with the risks of the transaction, and they make a leasing or lending decision that reflects those analyses and determinations. Among the typical criteria considered are:

- The overall creditworthiness of the borrower or lessee.
- Other indications of the borrower's or lessee's likelihood of paying rent or repaying the advance, such as years in business, company size, industry, and credit history.
- The anticipated source of cash flow or other funding available to service the transaction.
- The income tax and accounting treatment of the transaction.
- The current and future (residual) values of the underlying equipment or assets.
- The length of the financing term.

[22] By the end of 2005, carbon intensity has fallen by 9.3% relative to 2000. EIA 2005 Review, o*p. cit.*

- The yield or return requirement (hurdle rate) of the lessor or lender.

These criteria are relied upon in evaluating and financing alternative energy equipment and projects, as well. However, among these overall issues are a number of important differences in detail that must be considered in providing financing for energy projects.

CREDIT OF THE OFFTAKER OR ENERGY PURCHASER. In many energy project financings, the ultimate credit support for the repayment of funds advanced is provided by an offtaker or buyer of the energy produced by the project, rather than by the borrower or lessee itself, usually under a long-term power purchase agreement (PPA) between the owner, lessee, or project operator and the energy offtaker. The purchaser of the energy from a project or power plant may be:

- A dedicated offtaker or energy purchaser committed by contract to pay a fixed amount for all of the generating capacity and energy from the plant under a "take-or-pay" or similar output agreement. Under this form of agreement the offtaker is required to pay a stated amount whether or not the energy is actually delivered, thus purchasing the capacity of the project in addition to the energy generated. Such an offtaker may be a public utility, an industrial facility, or an end user willing to pay for the availability of a dedicated and readily dispatchable source of energy for its own needs. Although they provide the best assurance of coverage for a financial investor, particularly with a creditworthy offtaker, take-or-pay agreements of this kind are unusual; they are typically found only in special situations requiring the dedicated availability of all of the output of a plant, and for plants utilizing highly dispatchable technologies such as ag or biowaste feedstocks.

- A dedicated purchaser of the energy produced by the project on an "as-delivered" basis, with pricing determined by contract or by market conditions. Such an offtaker may be an end user or may be a public utility company or other distributor or reseller of energy, in any case interconnected directly to the project and committed to buy the energy produced by the project, but only as and when it is actually delivered. Projects operating under this kind of PPA are quite common, and they may include base load plants or peaking plants,[23] with energy pricing determined according to a predetermined formula or by reference to

[23] A "base load" power plant or project delivers energy at a defined level and on a continuous basis, without regard to the demand placed on it by the energy purchaser or the public power grid. A "peaking" or "peak load" power plant delivers energy only as called upon by the energy purchaser or the public power grid to meet peak or excess demand for energy.

market prices.

Under certain kinds of as-delivered offtake contracts or PPAs, the purchase pricing may include both a base payment, which entitles the offtaker to a certain level or portion of the plant's capacity, and an additional payment for the energy actually delivered by the project. Typically the capacity payment is a fixed amount, similar to the payment under a take-or-pay arrangement,[24] and the energy payment is based upon market pricing or the use of a contract formula to calculate the purchase price per Kwh of energy delivered.

- An end user which is not dedicated to the project and which purchases energy only as required and as delivered through the public power grid. Such an offtaker may be an industrial user, a public utility company, a private energy reseller, an energy trader, or even an end user of the electricity produced, purchasing energy on the open market at the best pricing available from time to time. Projects which sell energy into the open market, operating without firm offtake agreements of some kind, are often referred to as "merchant" plants because they rely solely upon the marketplace to assure long-term revenues. Projects such as this must depend upon both market demand and market pricing for the sale of the energy they produce; there is no long-term contract in place for the delivery or purchase of energy and, in the case of a biofuel project, there is typically no long-term agreement for the purchase of fuel or feedstock for the plant.

The evaluation of credit support for the financing of each of these kinds of offtakers and for each specific type of project contractual structure varies greatly from a typical equipment lease or financing. In the case of a dedicated project, whether under a take-or-pay contract or a more customary as-delivered PPA, the credit of the underlying energy offtaker is usually much more important than that of the actual lessee or borrower, who may be the operator or developer of the project but is usually not the ultimate source of cash flow for the project. Only in the case of a merchant plant, from which there may be multiple energy purchasers and no predetermined energy pricing, is the creditworthiness of the lessee (the actual operator of the project) as important as that of the ultimate power purchaser, since the ability of the project to generate cash flows sufficient to pay rent or repay the lender's advance cannot be determined in advance solely by a typical credit evaluation of the end user. Rather, it

[24] A capacity payment may often be adjustable based upon long-term energy pricing forecasts, economic inflation rates, or other extrinsic factors, but it is typically not subject to change due to normal fluctuations in market energy pricing.

must be supported by the additional creditworthiness of the project operator or developer.

As in leasing and financing of assets in any industry, a thorough and positive assessment of the obligor's ability and intention to repay the amounts advanced remains key, even when (or perhaps because) the credit evaluation is made more complicated by the underlying project structure. However, in project financings[25] it is important to distinguish between the creditworthiness of the lessee or borrower, who is a party to the lease or financing itself, and the credit of the party who is ultimately responsible for the payment of cash flows to the transaction – the energy user or offtaker – which is often not a party to the financing but only to the offtake agreement or PPA.

SOURCE OF CASH FLOW. As a corollary to the uniqueness of credit evaluation in energy projects, the lessor or lender must also consider the source of cash flow available to service an energy project financing. Unlike a more traditional long-term equipment lease or financing, a power plant financing often does not depend upon the ability of the lessee or borrower to generate cash flow through its own business or operations, independently of the utilization of the leased or collateralized equipment. Instead, the cash required for the repayment of a power plant financing is usually derived solely from the utilization and sale of energy from the power plant itself, not through independent business operations. The continuing availability and use of the lessor's or lender's primary collateral is in reality the sole source of funding for the repayment of the financing.

Therefore, the on-going maintenance, repair, management, and operation of the project take on much greater significance than they might in a conventional long-term equipment lease or other secured financing. Compared with the evaluation of a traditional lease or secured loan of equivalent size and financing structure, in an energy project financing much more attention must be paid to the qualifications, experience, and creditworthiness of the plant operator; the warranty, insurance, and other risk management elements of the equipment and the project; the environmental and public policy issues associated with the project; and other such factors that might normally not play such a prominent role in transaction evaluation.

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[25] The term "project financing" is used here to denote a transaction (sometimes called a "non-credit based financing") in which the lessor or lender looks through the actual lessee or operating company, which may be only a thinly capitalized special purpose entity, to the credit of the energy offtaker or ultimate provider of the cash flow for the transaction.

In this context, it is also interesting to note the role of the unconditional obligation or "hell or high water" provision of a customary equipment lease agreement. While most, if not all, long-term lease agreements used to provide financing for alternative energy projects or equipment will include this important language, it is also the case that its usefulness may be tempered significantly by the underlying ability of the project to produce revenue from the sale of electricity. In many project financings, as described above, the recourse of a lessor or long-term lender is more to the cash flow generated by the sale of energy, and the resulting payments from the contracted offtakers, than to the balance sheet credit of the actual lessee or borrower. Accordingly, even though the lessor may have the usual protections provided by standard lease documentation, special attention must be paid to the project facilities, their condition, maintenance and repair, and other operational factors that may dramatically affect their on-going ability to generate cash flows and thus provide rental payments.

CURRENT AND RESIDUAL VALUES. As in any long-term equipment lease or financing, the actual market value of an energy project and its related assets, whether at inception, throughout the term, or at lease expiration, is essential to a comprehensive assessment of the transaction. However, the nature of the assets securing an energy project financing may make such valuations more difficult, and the usefulness of traditional valuation methods may depend heavily upon the type of project being financed, the type of offtake agreement it relies upon, and (in the case of biofuel projects) the availability and pricing of feedstock.

For the valuation of ancillary or add-on equipment such as energy efficiency systems,[26] or of standalone energy-related components such as turbines, generators, or boilers, there are various established industry sources and valuation services available to lessors and lenders; such equipment is regularly bought and sold, and equipment values are established through customary market mechanisms. However, for the valuation of entire alternative energy plants, particularly long-term projects having unique technological characteristics or energy pricing structures, lessors and lenders must rely upon industry experts, appraisers, and engineering firms to determine project values, both at project inception and in forecasting residual values.

In particular, merchant plants require careful consideration of current and forecast energy pricing, anticipated market demand, and assessment of both historic and potential future cash flows, all of which may affect the ultimate market value and

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26 *See* Appendix A. There are additional income tax benefits and other economic incentives both to end users and to manufacturers in this area. (*See, e.g.*, information regarding the U.S. Government's "Energy Star" program at www.energystar.gov/index.cfm?c=products.pr_tax_credits.)

residual value of the project. With limited or no underlying credit support and no assurance of offtake demand or pricing, merchant energy plants present significant issues and risks to project financiers in the areas of equipment valuation and disposition.

With regard to residual evaluation, one other factor making financing of alternative energy projects quite different from financing of other equipment and assets is the economic consideration that must be given to the value of the offtake agreement or PPA supporting the transaction. As discussed above, the lessor or lender in a project financing transaction must often look through the direct lessee or borrower and consider the creditworthiness of the underlying energy offtaker. In such transactions, the real value of the project may lie as much or more in the forecast project cash flows as in the value of the collateral assets themselves. Consequently, the residual value analysis must be undertaken in combination with a careful review of the terms and conditions of the PPA supporting the project.

YIELD OR RATE OF RETURN. Of course, a key element in the evaluation of any long-term lease or loan is the forecast rate of return anticipated by the lessor or other funding source to be earned on its investment in the transaction. Historically, yields on energy projects have reflected not only the underlying credit of the transaction, in the form of the applicable PPA terms and the creditworthiness of the offtaker, but also the nature and risk of the project technology and technical details. For example, fossil fueled projects utilizing advanced or relatively unproven technologies, such as coal liquification or extraction of hydrocarbons from oil sands, have carried a premium in yield over more traditional projects using proven equipment such as gas turbines.

In alternative energy projects, rates of return must be adjusted to account not only for the risk and uncertainty of various advanced technologies (*e.g.*, next generation solar PV systems) but for the unpredictability of the resources supporting the project. In wind power projects, for example, the assurance of project cash flows may be greatly affected not only by the efficiency and reliability of the wind turbine generators but also by the presence, velocity, and constancy of the wind itself – the “fuel” for the project. Such factors are taken into account in alternative energy financings through adjustments in pricing that are calculated to reflect uncertainties in resource availability, environmental impact, and anticipated levels of conformity with forecast returns.

Yield in alternative energy projects may also be greatly affected by the application of various income tax and other benefits available to investors in such transactions, as described above. Because alternative energy transactions are often priced on an after-tax basis,[27] the existence and usefulness of income tax benefits may play a significant role in calculating transaction yield and pricing, and they may ultimately determine whether or not a lessor or lender will invest in a specific transaction.

CURRENT FINANCING ACTIVITY. A recent survey of equipment leasing and financing activity found equity funders are currently active in the financing of wind, solar, biofuels, and biowaste/ag waste projects in about equal numbers.[28] In addition, some participants are active in the financing of geothermal equipment and, to a lesser extent, hydroelectric projects.[29] Given the pace of growth in renewable energy projects and the related demand for related equipment, indications are that a growing number of lessors and equipment financing companies are actively engaged in pursuing opportunities in the alternative energy sector.

INCOME TAX AND ACCOUNTING TREATMENT

The U.S. Internal Revenue Code (I.R.C.) is used regularly by the federal government both to stimulate the economy and to further social programs and policies through the provision of various income tax incentives. Typical incentives include accelerated depreciation, tax credits, tax rate reductions, and enterprise zones. The alternative energy sector provides a classic example of the use of this practice, as the government has enacted various income tax provisions to spur investment in what otherwise may be economically less attractive ventures.

In general, the income tax incentives for alternative energy investments are a combination of depreciation, investment tax credits, and production credits. The broad composition of these current incentives includes:

- *Accelerated Depreciation.* Renewable electricity property, such as wind, solar, and others as described in subparagraph (B)(vi) of I.R.C. §168(e)(3), is considered to be five-year MACRS class life property for depreciation purposes, providing a shorter recovery period (and more rapid depreciation) than would otherwise be the case.

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27 *See* the details and discussions of income tax incentives elsewhere in this report.

28 The survey included ethanol and biodiesel technologies within the overall category of biofuels. Equipment Leasing & Finance Foundation, *The Future of FinancingAlternative Energy Equipment* (2007).

29 However, when those respondents who are not actively participating in these areas of energy financing were asked whether they have plans to become involved within the next 5 years, 63% of them answered no.

- *Production Tax Credits (PTCs).* Qualified energy resources, as defined in I.R.C. §45, including wind, closed-loop biomass, open-loop biomass, geothermal deposits, and solar projects, are allowed a 1.9¢ per Kwh production tax credit. The production tax credit is subject to a price-based phase-out and is reduced by any grants, tax-exempt bond proceeds, and subsidized energy financing amounts. This credit is subject to biennial reauthorization, with the current credit scheduled to expire at the end of 2008.[30]

- *Investment Tax Credits*. Certain investments in alternative energy projects are allowed investment tax credits under I.R.C. §48. Solar powered electricity installations are allowed a 30% investment tax credit, while geothermal facilities can claim a 10% credit. Restrictions governing interaction between the production and investment tax credits preclude taxpayers from doubling up on these income tax benefits, however.

Tax incentives are a key component of driving investment in alternate energy projects, particularly in achieving cost parity with conventional energy resources. As a comparative example of the impact of tax incentives on energy prices, Table 1 reports levelized costs[31] of electricity in cents per Kwh (measured in 2004 dollars) for a plant placed in service after January 1, 2006, so that solar power is eligible for the 30% investment tax credit under I.R.C. §48.

TABLE 1. LEVELIZED COST COMPARISON (¢/Kwh)

	(1)	(2)	(3)	(4)	(5)
	Current Policy	No Tax	Level Playing Field	No PTC or ITC	No 5-year depreciation
Natural Gas	5.47	5.29	5.61	5.47	5.47
Biomass	5.34	4.96	5.95	5.56	5.34
Wind	5.04	4.95	6.64	5.25	5.70
Solar Thermal	10.89	13.84	18.82	14.73	12.25
Solar PV	19.93	26.64	37.39	28.22	22.99

Column 1 shows the levelized costs for various renewable generation resources under current policy. Under existing income tax policy, wind and biomass are cost

30 The Senate Finance Committee has proposed a five-year extension as part of deliberations over the current (2007) energy legislation in Congress.

31 A levelized cost analysis measures what price must be received for electricity sold by a generator to cover fixed and variable costs of providing the electricity, including the required return on equity for the owners. Natural gas is included in the comparison, as renewables are often viewed as a potential substitute for gas.

competitive with natural gas, while the two forms of solar powered electricity generation are considerably more expensive.[32] Column 2 shows the levelized cost assuming no income tax system. Not surprisingly, the cost for gas, biomass, and wind in this case are lower; but in the absence of taxes the cost for solar energy goes up, indicating that these energy resources receive a net subsidy from the income tax system.

The figures in Column 3 compare the relative taxation of these generating resources, showing the levelized cost for each technology assuming neutral treatment of all capital types. All of the production and investment tax credits are removed, and capital is depreciated on a straight-line basis over the life of the asset. The results make clear that current income tax policy favors renewables, with a particular benefit to solar power (through the substantial investment tax credit). Compared to this level playing field scenario, it can be seen that the cost of natural gas falls by 2% under current income tax policy. In contrast, the cost of energy from biomass falls by 10%, from wind power by 24%, and from solar power by more than 40%.

The last two columns decompose existing income tax policy to illustrate which parts of current policy are actually lowering the levelized cost. For wind energy, five-year MACRS depreciation is shown to be more valuable than the electricity PTC. For solar energy, in contrast, the investment tax credit is more valuable than five-year MACRS depreciation.

One difficulty with using income tax incentives as a policy option is that many start-up firms may not be able to take advantage of the tax benefits being offered. This inability to utilize tax benefits is a function of a taxpayer's being subject to the Alternative Minimum Tax (AMT) or being in a cumulative net operating loss (NOL) position. One result of this situation, however, is the opportunity for more partnering between project sponsors or developers and outside investors, such as lessors, who have the income tax appetite for the benefits available on investments in projects such as these.

Although income tax incentives such as those discussed above provide the primary motivation for investing in alternative energy projects, the financial reporting aspects of such transactions are also very important to most equity investors. Not surprisingly, the income tax attributes are closely linked with the accounting ramifications of alternative energy transactions.

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32 If solar power is installed as distributed capacity, then the appropriate comparison rate is the retail rate. Residential customers pay the highest rates at an average of 9.45¢ in 2005, according to the Energy Information Administration. Even with this higher comparison rate, solar generated electricity is not cost competitive absent further incentives.

The concerns currently being raised relative to the financial reporting of alternative energy projects relate to accounting for leveraged leases, accounting for projects (including projects incorporating leveraged leases), determining whether a financing arrangement contains a lease, and the application of FASB Interpretation No. 46 (FIN 46). While not all of these issues are exclusively related to investments in alternative energy projects, they are affecting the financing decisions of many investors in such projects.

The leveraged lease concerns, which also are affecting other segments of the leasing and finance industry, center around the prospective changes to FAS 13 and Financial Staff Position 13-2. These two factors have made lessors wary of entering into leveraged leases due to the potential of having to redial the income allocations under a leveraged lease. This reluctance to invest in transactions using leveraged leasing has negatively affected the amount of funding available for alternative energy projects.

The combination of significant income tax credits, start-up or dedicated project companies, the application of AMT, and the impact of NOLs on sponsor or developer income tax appetites is also creating unique financial reporting issues, particularly as they relate to production tax credits. Equipment leasing and finance companies (and their auditors) are having to come to grips with the income allocation issues surrounding the disproportionate allocation of tax benefits and economic income between time periods under a hypothetical liquidation of book value concept. While not a permanent impediment, financial reporting issues such as these represent roadblocks to growth in the alternative energy financing segment.

THE FUTURE OF ALTERNATIVE ENERGY FINANCING

As technological advances, together with governmental subsidies and economic support, reduce the generation cost of renewable and alternative energy relative to the cost of fossil fuel and other traditional energy generation technologies, the opportunity for financing alternative energy projects is expected to increase. As shown in Table 5 above, and as discussed in the context of income tax issues, the costs of generating electricity from wind, biomass, and even geothermal resources are currently quite competitive with the costs of fossil fuel generation.

Given the expanding development of renewable energy projects in the U.S. and internationally, particularly in wind power and biomass fuels, the current outlook for opportunities in long-term leasing and financing of equipment and projects is strong. However, whether this growth in investment will continue at its current pace may depend to a great extent upon the continuation of governmental support for renewables, so that energy produced from renewable resources will remain price competitive with energy from traditional power resources. The cost of petroleum exploration, drilling equipment, steam turbines, and other requirements for traditional energy generation will continue to rise, and it is expected that the cost per Kilowatt of renewable energy capacity will continue to fall, or at least rise at a lower relative rate, due to continuing advances in engineering, design, and technology. These trends would appear to indicate that alternative and renewable energy generating projects and equipment will continue to provide financing opportunities for the foreseeable future.

This optimistic view of the growth opportunities in renewable energy is not to minimize some impediments to continued rapid growth, however. As in many areas of business, positive and rapid growth brings its own unique difficulties. Demand for wind turbine generators (WTGs), for example, has increased worldwide, and supplies are scarce. WTGs of ever increasing capacity require much larger blades, more sophisticated control systems, more massive towers, and more complex technology. Lead times for delivery of large capacity WTGs often exceed two years, making project planning and financing commitments more difficult to assess and confirm.

In addition, as discussed in the overview section above, some of the best and most reliable renewable energy resources, including solar power, wind power, and geothermal resources, are typically not found near the population centers where large amounts of green energy are most needed. Thus, a major investment in long-haul transmission capacity will be required for the delivery of electricity from alternative energy generating facilities to public power grids serving metropolitan areas; and the cost of such high voltage transmission lines is extraordinarily high.[33] Although an increasing number of proposals are being offered for the construction of merchant transmission facilities,[34] the implementation of adequate long-haul transmission capacity for the transportation of energy from the growing number of wind, solar, and other remote renewable energy generation projects remains an expensive and elusive goal.

Finally, there is the matter of tax and other incentives to developing renewable energy generation capacity in the U.S. While it is clear that government subsidies in the form of income tax benefits and other direct incentives have contributed significantly to

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33 For example, a new 700 mile extra-high voltage electric transmission network has recently been proposed for the upper Michigan peninsula at a cost of approximately $3.7 million per mile. ("AEP, ITC Complete Extra-High Voltage Transmission Study," AEP press release, September 14, 2007).

34 Like a merchant power plant, a merchant transmission line is built by private developers on spec, and capacity on the line is sold at market rates to generators, distributors, and resellers who interconnect with the line. The only operating merchant transmission project in the U.S. at present is the Cross Sound Cable from Long Island, New York, to New Haven, Connecticut (www.crosssoundcable.com).

the competitiveness of renewable energy pricing and therefore to the growth and development of renewable energy projects throughout the country, it not so clear what incentives or subsidies, if any, will be most effective in spurring long-term growth in the alternative energy sector and its related financing opportunities. As discussed above, there are alternatives to income tax benefits, including RPS programs, tradable RECs, and buy-side subsidies such as feed-in tariffs, that are shown to be quite effective in allocating the risk and cost of new alternative energy developments and have demonstrated their effectiveness in Europe and in specific programs and projects throughout the U.S. Ultimately, the implementation of such programs will depend upon the political will of those responsible for establishing them and upon their acceptance by the stakeholders involved, including project developers, equipment manufacturers, utility companies, offtakers and energy end users, and, of course, leasing and finance companies who will provide the long-term funding necessary to bring them to fruition.

Taken all together, the signals indicate that opportunities in leasing and financing of alternative energy equipment and projects will continue to grow with the expansion of the renewable energy marketplace. The U.S. and other countries will increasingly demand environmentally sound solutions to the insatiable worldwide appetite for electrical energy. Over the long term, fossil fuel resources will become scarcer and more expensive to extract, refine, and deliver, while renewable energy science and technology will continue to advance; and the cost of generating and delivering a Kilowatt-hour of electricity from natural renewable resources will continue to decline. Meanwhile, developers and sponsors of renewable energy projects will continue to require creative and cost effective financing solutions for the construction of state-of-the-art generating plants.

There will of course be obstacles and competitive pressures to overcome as opportunities present themselves in this financing sector, notably the near term price competition from fossil fuels, including natural gas and coal. Historically, these resources have proven to be the most efficient and reliable sources of power for the generation of electricity; and in the near term they will continue to force the development of renewable energy generation, still in its infancy, to be financially supported and subsidized until it becomes price competitive on its own. During this period of renewables technology growth and advancement, the industry will rely on such support from government and other sources; and during this period the equipment leasing and finance opportunities will also depend, directly (through such mechanisms as the electricity PTC) or indirectly (through an RPS or feed-in tariff structure) on such support.

The opportunities are available to invest in renewable energy generation equipment and projects and to do so at a competitive rate of return, both in the near term and the long term. The specific details and structuring of such opportunities may change significantly in the near future, but the long term outlook appears bright.

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