

**CHAPTER 1**

# Clean Energy Investments and Performance

*The Show Has Just Begun*

There are many different ways to profit from the clean energy sector. These profit opportunities, broadly defined, range from starting a business to investing in private or public companies to trading in the clean energy markets. The decision on how to participate depends in part on one's investment goals and experience. For example, an individual investor with little experience and little time to spare may opt to invest in a green mutual fund or an exchange-traded fund, thus taking a broad and diversified investment approach to the sector. A more experienced investor may decide to pick some particular stocks in the sector to add to his or her portfolio. An experienced trader may approach the sector from the standpoint of going long or short clean energy stocks or trading the biofuel or carbon credit markets. This chapter covers the various ways in which it is possible to profit from the clean energy sector.

## **CLEAN ENERGY BUSINESS STARTUP**

There are many entrepreneurial opportunities in the clean energy industry. An entrepreneur can start a business from scratch, launch a startup business with licensed technology acquired in the U.S. or overseas, or buy an established business.

There are a variety of ways to investigate specific ideas for a clean energy business startup. For example, Shell Springboard offers an interesting program that sponsors research and grants prize money for contests

involving the best business ideas for tackling climate change. On their Web site at [www.shellspringboard.com](http://www.shellspringboard.com), Shell Springboard has a report, "Opportunities for Innovation: The Business Opportunities for SMEs [small- and medium-sized enterprises] in Tackling the Causes of Climate Change."<sup>1</sup> This report makes interesting reading for anyone thinking about starting up a business related to the environment and climate change. The report is written for the market in the United Kingdom, but is equally applicable to the U.S. market. The report concludes that the biggest markets for small- and medium-sized enterprises in the climate change sector in the United Kingdom in 2010 will be very substantial and fall in the following primary categories:

- Building regulations for commercial and industrial use (£950 million British pounds or about U.S. \$1.9 million)
- Renewable electricity (£800 million or about U.S. \$1.6 billion)
- Renewable road transport fuels (£500 million or about U.S. \$1.0 billion)
- Domestic energy efficiency (£400 million or about U.S. \$800 million)
- Building regulations for domestic use (£275 million or about U.S. \$550 million)

The clean energy industry is a new high-growth industry in which the business opportunities are restricted only by one's imagination. The best advice is for an entrepreneur thinking about getting into the clean energy industry is to leverage one's personal strengths and existing knowledge base. For example, an electrical contractor that specializes in servicing residential and commercial customers could add a wind or solar distributorship to his or her product offering, thus offering customers wind and solar power solutions as well as existing services. A swimming pool company could add solar thermal heating systems for its customers, perhaps partnering with a local contractor. A building contractor might add a range of "green building" services to his or her product offerings.

A finance company or bank could add a financing program for residential solar, wind, geothermal, or efficiency projects. Farmers or land speculators could watch for opportunities to buy farmland at attractive prices, particularly marginal land that is not good for growing high-value crops such as corn or wheat, but that will still be able to grow biofuel crops of the future such as switchgrass. Entrepreneurs who live in rural areas could look for new products and services to sell to the booming U.S. agriculture industry. People who specialize in sales and marketing can partner with existing product or service providers to roll out large marketing programs for clean energy products and services.

The U.S. National Renewable Energy Laboratory (NREL) has a program designed to "move NREL-developed technologies and expertise

into commercially viable products and businesses” (see [www.nrel.gov/technologytransfer/](http://www.nrel.gov/technologytransfer/)). The NREL is looking for companies that want to license and commercialize NREL-developed technologies. There are similar technology licensing opportunities in government and academia that an entrepreneur can tap for business startup ideas.

There is also an expanding range of new employment or consulting opportunities in the fast-growing clean energy space. There is a list of employment opportunities available in the clean energy industry, for example, at <http://www.sustainablebusiness.com/jobs/>, or simply do your own Web search on the phrase “clean energy jobs,” “clean energy consulting,” or a similar set of keywords. The solar power industry is currently hiring aggressively in the United States and one solar job listing site is at the American Solar Energy Society (see [www.ases.org/jobs.htm](http://www.ases.org/jobs.htm)). This book’s companion Web site at [www.ProfittingFromCleanEnergy.com](http://www.ProfittingFromCleanEnergy.com) has a more complete listing of clean energy employment Web sites.

## **ANGEL INVESTING**

In “angel investing,” an individual investor invests his or her cash directly in an early-stage company run by other people. Angel investing is certainly not for the faint of heart and it is difficult to find reliable companies in which to invest. However, there are angel networks and clubs that can help an interested person learn how to do angel investing and how to find good investments. Industry associations can also be a good place for finding early-stage companies that need seed money. For example, someone interested in investing directly in an ethanol plant can check on the Renewable Fuels Association Web site, which has a page listing companies involved in the design and construction of ethanol plants that may have projects open to investment.<sup>2</sup>

## **VENTURE CAPITAL**

A venture capital (VC) fund pools money from institutional and high-net-worth investors, invests that money in startup or early stage companies, takes an active role in helping to build the company, and then finds an exit strategy such as a sale to a larger company or going public through an initial public offering (IPO). Venture capital funds try to target annual returns of 20 percent or more.

Venture capital investment is pouring into the clean energy and cleantech industries. According to Cleantech Network, North American and

European venture capital investment in the cleantech industry in 2006 rose +45% yr/yr to \$3.6 billion, after more than doubling in 2005 to \$1.7 billion.<sup>3</sup> The Cleantech Network is a venture capital investment network with over 8,000 investors, 6,000 companies, and 3,500 professional services organizations that specialize in cleantech, according to the company's Web site. The Web site provides a wealth of information on venture capital investment in the cleantech industry. The group also holds conferences to discuss cleantech investing and to bring together investors and companies.

There are several advantages to investing in a VC fund as opposed to trying to invest one's money directly in a company as an angel investor. First, VC funds are highly knowledgeable in the industries in which they specialize and they are constantly scouring the industry at the ground level for attractive investment opportunities with their extensive networking capabilities. Second, VC funds know how to structure investments so that there are attractive risk-reward parameters and incentives for the project. Third, VC funds provide key expertise in building a business and providing it with ongoing support. Fourth, a VC fund knows how to exit a portfolio company by selling the firm or doing an IPO, thus capturing the returns for their investors.

Unfortunately, it is difficult for the average individual investor to get into the venture capital game. Venture capital funds typically only take investment funds from institutions and high-net-worth investors that can qualify for the SEC's definition of an "accredited" investor. For an individual investor, the securities law currently requires an "accredited investor" to have a net worth of at least \$1 million or have an annual income of at least \$200,000 for the last two years. In addition, an investor in a VC fund is typically required to put up a large minimum investment that can go as high as six figures and the investment is then typically locked up for a period of years.

## **PUBLICLY TRADED STOCKS**

The easiest way to invest in the clean energy sector is simply to buy publicly traded stocks. The advantage is that an investor can scale the size of the investment, spread the money around in various companies, and easily enter and exit positions (assuming there is trading liquidity in the stock). Disadvantages include (1) the stock market is fairly efficient and it is not easy to pick stocks that will have long-term appreciation; and (2) an investor's portfolio is not diversified unless a variety of stocks are chosen to spread out the risk.

There is a perception that publicly traded clean energy companies are all small companies that are burning large amounts of cash and depend on government grant support for their survival. This was true back in the late 1990s, but there are now numerous publicly traded clean energy companies operating on a global scale that are highly profitable, that are producing earnings growth rates exceeding 20 percent, and that have market capitalizations of over \$2.5 billion. There have recently been a large number of IPOs in the sector, which has added depth to the clean energy stock sector and even encouraged institutional investors to dip their toes into the water.

The global solar industry, for example, is particularly well developed and has a wide range of publicly traded stocks from which to choose. The combined market capitalization of the 12 largest U.S.-listed pure-play solar companies was a hefty \$20 billion as of mid-2007. The combined market cap of the top 11 *non-U.S.* pure-play solar cell and polysilicon manufacturers was even larger at \$58 billion, producing a global solar company market cap of nearly \$80 billion.<sup>4</sup> Moreover, the majority of these solar companies are profitable and the average industry earnings growth rate is about 30 percent. These figures illustrate that the solar industry has clearly established itself as a solid investment arena, even for institutional investors.

In total, there are more than 60 companies listed on U.S. exchanges with market caps over \$75 million that can be considered pure-play clean energy companies. The median market cap for these companies is \$500 million. About one-half of these companies are profitable.

In addition, there are many micro-cap companies that are popping up with market caps of under about \$100 million. Most of these companies are traded over-the-counter on the OTC Bulletin Board ([www.otcbb.com](http://www.otcbb.com)) or the Pink Sheets ([www.pinksheets.com](http://www.pinksheets.com)). Investors need to be careful about investing in these stocks because these companies typically have limited financial reporting, less SEC scrutiny, low liquidity, and high volatility. In addition, there are outright pump-and-dump scams that are occasionally run with OTC stocks.

Yet, the flipside is that it is easier to find an “undiscovered gem” among OTCBB stocks precisely because information is scarce and because Wall Street does not follow the stocks. The best advice for an investor is to think of an OTCBB or Pink Sheet stock as more of a “lottery ticket” than a stock investment. There is a very real chance you may lose a substantial portion of your investment, but there is also the chance that you will sometimes hit the jackpot with a micro-cap stock that ends up hitting it big by being bought out by a larger company or by moving up to trade on the Nasdaq (National Association of Securities Dealers Automated Quotations) or New York Stock Exchange (NYSE).

## **CLEAN ENERGY STOCKS LISTED OUTSIDE THE UNITED STATES**

The United States is accustomed to being the leader in a variety of fields. However, when it comes to clean energy, the United States is far behind the curve. Europe and Japan have a big head start against the United States in most areas of clean energy. This is particularly the case, for example, in the solar power sector, where virtually all the major global solar companies are based in Europe or Asia.

This book mainly focuses on U.S.-listed investments, but will still point out some of the investment opportunities in clean energy available outside the United States. Investing in companies that are based outside the United States is easy if the company has an American Depositary Receipt (ADR) that is listed on a U.S. exchange. An ADR is a certificate representing ownership in the company's common stock. For example, several Chinese-based solar companies have their ADRs listed on U.S. exchanges, thus making it easy for U.S. investors to buy the stock. These companies include, for example, Suntech Power Holdings (NYSE: STP), LDK Solar (NYSE: LDK), Yingli Green Energy (NYSE: YGE), and others (Chapter 5 covers the solar industry in detail).

The situation becomes a bit more complicated when an investor wants to buy a stock that trades on an exchange outside the United States. The investor has to make sure his or her trading account will allow the purchase of non-U.S. stocks and many brokerage firms will charge higher brokerage commissions for trading in foreign stocks. Moreover, an investor takes on currency exchange rate risk when buying an overseas stock since the investor is essentially long the currency needed to buy the overseas stock. For example, Renewable Energy Corp. (Oslo: REC NO) is the world's largest pure-play solar company based on current market cap rankings. In order to buy that stock, a U.S.-based investor needs to first convert dollars into Norwegian kroner in order to buy the stock. The investor will then be long, not only the stock, but also the Norwegian krone. The Norwegian krone has a fairly high degree of correlation with the euro but still trades on its own Norwegian-based fundamentals.

Investing in foreign stocks and being long foreign currencies can actually be a good idea for many U.S. investors since globalization is expanding and is reducing the importance of the dollar's role as a reserve currency in the global financial system. The U.S. dollar also remains vulnerable to the massive U.S. trade deficit, which shows little sign of abating in coming years and is causing the daily outflow of more than \$2 billion a day in dollars to foreign recipients. Moreover, Asian central banks are looking to reduce the rate at which their dollar reserves are growing.

In the clean energy sector in particular, investors need to consider investing in non-U.S. stocks since the majority of the world's clean energy stocks are traded outside the United States. While investing in non-U.S. stocks involves some information difficulties and exchange rate risk, the rewards can be large for venturing outside the United States in the field of clean energy. Web sites that have good information on globally traded stocks include [www.bloomberg.com](http://www.bloomberg.com) and [finance.google.com](http://finance.google.com), among others.

## **LARGE-CAP STOCKS**

The clean energy revolution is touching companies of all sizes. Many large-cap companies are actively trying to take advantage of clean energy trends. Investors should consider how clean energy trends affect any large-cap stocks that they may own.

A large-cap company cannot be considered a pure play on clean energy trends since the revenue and earnings that a large-cap company may derive from clean energy is probably miniscule compared with its overall revenue. An investor is therefore not gaining any significant exposure to clean energy by investing in a large-cap company, unless the clean energy component at that company promises to have a very significant impact on earnings down the road. Investors interested in investing in clean energy trends should therefore focus on the small and mid-cap companies that derive a significant portion of their revenue from clean energy.

While large-cap companies cannot be considered a pure-play on clean energy, there are some large-cap companies that will benefit more than others from clean energy trends. General Electric (NYSE: GE), for example, is the U.S. large-cap company that is the most heavily involved in the clean energy industry. GE has collected its clean energy products under the brand name of "Ecomagination" and has devoted an entire Web site to the product line (see [ge.ecomagination.com](http://ge.ecomagination.com)).

GE's Ecomagination brand includes a wide variety of products including wind power systems, lighting, cleaner locomotives, clean coal plants, CO<sub>2</sub> sequestration technologies, clean water technologies, water desalination plants, and others. GE is expanding its R&D in cleaner technologies from \$700 million in 2005 to \$1.5 billion by 2010. GE originally targeted its Ecomagination product sales at \$20 billion by 2010, but GE Chairman and CEO Jeffrey Immelt said in May 2007 that GE will "blow away" that \$20 billion target.<sup>5</sup> GE is aggressively pursuing clean technology as one of the main drivers of its overall growth. Yet GE's stock price is driven by

much more than its Ecomagination product line, which means there is no guarantee that success in the Ecomagination product line will necessarily drive the stock price higher. For example, GE's financial results for Q2-2007 were good but were undercut by disappointing performance in healthcare and its subprime mortgage lending unit (which it now wants to sell), areas that have nothing to do with clean energy.

In addition to the Ecomagination product line, GE also has an investment division called "GE Energy Financial Services" that is actively investing in clean energy projects and companies around the world (see [www.geenergyfinancialservices.com](http://www.geenergyfinancialservices.com)). GE Energy Financial Services has \$14 billion in assets and invests "more than \$5 billion annually in two of the world's most capital-intensive industries, energy and water."<sup>6</sup> Much of this investment is in traditional energy projects, but GE Energy Financial Services is making a big push into clean energy. GE Energy Financial Services plans to expand its investment in renewable energy to \$3 billion by the end of 2008 from \$1.8 billion at the end of 2006.<sup>7</sup> Kevin Walsh, managing director of GE Energy Financial Services, said that the growth opportunity in clean energy "is so apparent" that "we're going after it."<sup>8</sup> Regarding solar power financing, Mr. Walsh said his company is doing its due diligence on financing large-utility-scale solar projects and said, "We truly believe utility-scale solar will be an incredible opportunity."<sup>9</sup>

## GLOBAL PETROLEUM COMPANIES

The positive mention of petroleum companies in a book on clean energy investing may be heresy. However, from an investment standpoint, the forward-looking integrated petroleum companies are not likely to lose out from the clean energy revolution, and may even thrive as they continue to milk profits out of the petroleum industry (which will last for decades) and use that huge petroleum cash flow to leverage themselves into new clean energy opportunities.

The large integrated petroleum companies can afford to wait and invest in whatever areas of the clean energy industry that turn out to be lucrative, thus ensuring their survival and profits for coming decades, even if the petroleum business slowly dies out. There is an old business lesson about letting the pioneers in a new industry get shot in the back with arrows, and then moving in safely to buy the ones that ultimately become successful.

Some of the global-petroleum companies have already become significant players in the clean energy industry. Marathon Oil (NYSE: MRO), for example, has partnered with Andersons (Nasdaq: ANDE), a modest-sized

agri-business company, to build and run ethanol plants. If that partnership works out, Marathon Oil could easily afford some of its pocket change to buy Andersons at some point in the future, thus taking complete control of those ethanol plants and distribution channels. Through such partnerships, which are growing, a major company can get a good look at a small company and decide later whether that small company might be a good acquisition target down the road.

BP PLC (NYSE: BP), formerly British Petroleum, is taking a very aggressive approach in developing its own clean energy business. BP is actually carrying out its “Beyond Petroleum” advertising slogan. This book will not discuss the alternative energy initiatives for all the global petroleum companies, but BP illustrates what legacy petroleum companies can do to make sure they are not rendered obsolete by clean energy trends. Here is a quick overview of BP’s alternative energy initiatives.

#### **BP’s Alternative Energy Efforts**

- *Solar.* BP Solar was a Top 10 global producer of solar cells in 2006 and is targeting 600 megawatts of solar cell production by 2008 (see [www.bp.com/solar](http://www.bp.com/solar)).
- *Wind.* BP Wind is expanding aggressively and has begun wind projects in the U.S. that will produce a combined operating capacity of 550 megawatts. BP Wind has partnered with Clipper Windpower (London: CWP LN) to supply up to 2.3 gigawatts of wind power projects, which is enough electricity to power about 630,000 homes.<sup>10</sup>
- *Hydrogen power.* BP is working with GE on carbon gasification and carbon capture programs that allow coal and petroleum to be used to produce hydrogen for power generation, while allowing CO<sub>2</sub> to be captured. BP is also working with Edison International (NYSE: EIX) to build a \$1 billion 500-megawatt hydrogen-fueled power plant that will use petroleum coke as the feedstock and capture and store up to 90 percent of the CO<sub>2</sub> generated by the process.
- *Natural gas power.* BP helps build and supply efficient natural gas-fired power plants that have lower greenhouse gas emissions than legacy natural gas plants. For example, BP, in a joint venture with SK Corporation, built a large 1.1-gigawatt combined-cycle gas turbine power plant in South Korea, which is the most efficient power plant of its kind in the country. BP is constructing a 250-megawatt steam turbine power generating plant at its Texas City refinery and has approval for a 520-megawatt cogeneration facility in Cherry Point, Washington.
- *Biofuels.* BP plans to spend \$500 million over the next 10 years to find better biofuel solutions. BP and DuPont (NYSE: DD) have partnered to develop biobutanol from renewable sources. The companies expect initial commercial-scale production to begin in 2007 with feedstock

from British Sugar (which is a division of Associated British Foods that trades in London under the symbol of ABF LN) in the form of sugar beets. BP is working with auto manufacturers to prove the attractiveness of biobutanol as a gasoline additive. Biobutanol is an alcohol, like ethanol, but BP believes that biobutanol has superior performance attributes for use as a gasoline blending agent as compared with ethanol (see [www.bp.com/biofuels](http://www.bp.com/biofuels)).

### **CLEAN ENERGY EXCHANGE-TRADED FUNDS (ETFs)**

There are only a handful of clean energy exchange-traded funds (ETFs) and mutual funds, most of which have been launched in the past two years. However, more clean energy ETFs and mutual funds will be launched in coming months and years due to strong investor interest in the sector and due to the expanding pool of stocks available to buy in the sector. The reader can find the latest list of clean energy ETFs and mutual funds on this book's companion Web site at [www.ProfitFromCleanEnergy.com](http://www.ProfitFromCleanEnergy.com).

A clean energy exchange-traded fund (ETF) seeks to track an underlying index that is comprised of a list of clean energy stocks. An ETF is not trying to pick good and bad stocks—it is just trying to track the index, for better or for worse. The main advantage of a clean energy ETF is that the investor can invest in the whole clean energy sector at a relatively low cost, as compared with trying to choose a diversified portfolio of individual clean energy stocks. However, investing in an ETF means that both good and bad stocks are averaged together, meaning that performance may only be average. In addition, investors should recognize that the clean energy ETFs hold mainly small, growth stocks, and that the performance of these ETFs can be volatile and even erratic. An investor would be well advised not to use one's core portfolio assets to buy a clean energy ETF and instead use a smaller portion of one's portfolio that is earmarked for taking a swing at one of the more aggressive and speculative areas of the stock market.

Before investing in an ETF, an investor should always examine the list of stocks held by the ETF since an investor is really just buying a basket of these stocks. If the investor does not like most or all of the stocks that the ETF holds, then the investor should not buy the ETF. For example, the PowerShares WilderHill Clean Energy Portfolio as of June 2007 held 40 stocks broadly spread across the subsectors of ethanol, fuel cells, solar, power storage and management, power efficiency, and clean utilities. Top holdings included Echelon Corp. (Nasdaq: ELON), Cree Inc. (Nasdaq: CREE), Color Kinetics (Nasdaq: CLRK), First Solar Inc. (Nasdaq: FSLR),

SunPower Corp. (Nasdaq: SPWR), OM Group Inc. (NYSE: OMG), Cypress Semiconductor Corp. (NYSE: CY), Zoltek Cos (Nasdaq: ZOLT), American Superconductor Corp. (Nasdaq: AMSC), and Itron Inc. (Nasdaq: ITRI).

A list of clean energy ETFs is shown in Table 1.1. Of the six clean energy ETFs shown, the PowerShares WilderHill Clean Energy Portfolio had the largest amount of assets under management at about \$950 million, in part because it is the oldest clean energy ETF (started in March 2005). The other ETFs had assets of about \$20 million or less.

Advantages of the PowerShares WilderHill Clean Energy Portfolio include its liquidity and the sensible choice of the clean energy stocks in its portfolio, but it also had the highest expense ratio of 0.71 percent versus 0.50 percent or less for the other ETFs that hold U.S.-listed stocks. The PowerShares Cleantech Portfolio has a broader mix of stocks due to its “cleantech” mandate rather than just “clean energy,” which is a plus for diversification purposes. The PowerShares WilderHill Progressive Energy Portfolio is not really a clean energy ETF but is more of a progressive fossil fuel fund since it owns companies involved in nuclear power and uranium, coal-to-fuel, and other companies involved with fossil fuels. The First Trust Nasdaq Clean Edge U.S. Liquid Series Index Fund is slanted more towards electronics and power solution companies than the more traditional clean energy mix.

Regarding global clean energy ETFs, the PowerShares Global Clean Energy Portfolio holds a broad range of 76 global clean energy stocks. That ETF is anchored by some large-cap stocks (Sharp and Sanyo) and a 27 percent contingent of clean utilities, which should keep the volatility down but may also limit the upside potential. The Market Vectors Global Alternative Energy ETF, by contrast, holds only 30 stocks, although those stocks are well-chosen as the big global players in the clean energy industry.

## **GREEN MUTUAL FUNDS**

Clean energy ETFs, because of their low expenses, can make attractive investment vehicles for short-term traders and for investors with a relatively short investment horizon. However, the clean energy business is a new and volatile industry and there are a number of companies that are not going to thrive over the long haul and that will drag down the performance of the ETF funds. Therefore, it can make sense for an investor with a longer-term horizon to consider one of the actively-managed clean energy mutual funds, even though the expenses on a mutual are typically higher at 1.50 percent to 2.00 percent of assets and front-end load expenses can be as high as 4.75 percent. Only an investor with an investment horizon of at

**TABLE 1.1** Clean Energy Exchange-Traded Fund (ETF)

ETF Name	ETF Ticker	Exch	Index Ticker	Assets (in millions)	Expense Ratio	Fund Inception	Geographic	Comments	Web site
PowerShares WilderHill Clean Energy Portfolio	PBW	AMEX	ECO	\$950	0.70%	3-Mar-05	U.S.-listed	Good mix of U.S.-listed Clean Energy stocks	www.powershares.com
PowerShares Cleantech Portfolio	PZD	AMEX	CTIUS	\$22	0.65%	24-Oct-06	U.S.-listed	Broader stock mix due to Cleantech mandate	www.powershares.com
PowerShares WilderHill Progressive Energy Portfolio	PUW	AMEX	WHPRO	\$23	0.70%	24-Oct-06	Global	Slanted toward nuclear and cleaner fossil fuels; 15% large-cap	www.powershares.com

PowerShares Global Clean Energy Portfolio	PBD	AMEX	NEX	na	0.75%	13-Jun-07	Global	Broad, diversified list of 76 global stocks.	www.powershares.com
First Trust Nasdaq Clean Edge U.S. Liquid Series Index Fund	QCLN	XNMS	CELS	\$18	0.60%	8-Feb-06	U.S.-listed	Slanted toward power stocks	www.ftportfolios.com
Market Vectors-Global Alternative Energy ETF	GEX	NYSE	AGIXL	\$16	0.65%	3-Mar-07	Global	Good global list but only 30 stocks; strong on wind (19%) and solar (39%); 40% in U.S.	www.vaneck.com/etf

Source: Company Web sites and Bloomberg.  
 Note: Please check fund Web site for the latest information.

least several years should even think about getting in a fund with a 4.75 percent front-end load expense.

The clean energy sector lends itself to stock-picking by professional investment managers who closely watch the industries and who are equipped (in theory at least) to separate the wheat from the chaff. Paying a front-end load expense and an annual expense to hire a professional manager can make sense in an industry such as clean energy that has such strong potential and such a wide range of stocks with disparate potential.

There are four clean energy or “green” mutual funds listed in Table 1.2. There are other green or environmental funds that are not listed here that are managed by global banks and brokerage firms

The two largest funds in the green mutual fund group are the Winslow Green Growth Fund and the New Alternatives Fund. However, the new Calvert Global Clean Energy Fund, which was started in March 2007, promises to be a formidable challenger. A brief profile of each fund follows.

- *Winslow Green Growth Fund* (WGGFX). The Winslow Green Growth Fund pursues environmentally responsible investing. The fund was launched in 1994 and now has about \$237 million in assets under management. The fund interprets its “green” mandate liberally and invests in a number of food companies such as Whole Foods Markets and Green Mountain Coffee, with lower overall exposure to clean energy and cleantech companies than the clean energy ETFs, for example. The fund at the end of 2006 held 50 companies with top holdings including Isis Pharmaceuticals (Nasdaq: ISIS), SurModics (Nasdaq: SRDX), Green Mountain Coffee Roasters (Nasdaq: GMCR), Fuel Tech (Nasdaq: FTEK), ThermoGenesis (Nasdaq: KOOL), aQuantive (Nasdaq: AQNT), NutriSystem (Nasdaq: NTRI), SourceForge (Nasdaq: LNUX), WFI Industries Ltd (Toronto: WFI CN), Whole Foods Market (Nasdaq: WFMI). The fund has an impressive 10-year annual return record of 18.25 percent. See [www.wggf.com](http://www.wggf.com).
- *New Alternatives Fund* (NALFX). The New Alternatives Fund was the first environmental mutual fund, launched in 1982. The fund focuses on alternative energy investments on a global basis. The fund has about \$200 million in assets under management. The fund’s top holdings include Acciona SA (Madrid: ANA SM), Abengoa (Madrid: ABG SM), Gamesa Corporation Technologica (Madrid: GAM SM), Ormat Technologies (NYSE: ORA), Schneider Electric (Paris: SU FP), Brookfield Asset management (Toronto: BAM/A CN), and Conergy (German Xetra: CGY GR). The fund posted a large gain of 33.8 percent in 2006 and its five-year average annual return is 15.86 percent. See [www.newalternativesfund.com](http://www.newalternativesfund.com).

**TABLE 1.2** Clean Energy Mutual Fund List

Fund Name	Ticker	Assets	Front Load	Back Load	Expense Ratio	Inception	Web site
Winslow Green Growth Fund	WGGFX	\$237 mln	none	none	1.45%	3-May-94	www.winslowgreen.com
New Alternatives Fund	NALFX	\$201 mln	4.75%	none	1.25%	3-Sep-82	www.newalternativesfund.com
Guinness Atkinson Alternative Energy Fund	GAAEX	\$80 mln	none	none	1.98%	31-Mar-06	www.gafunds.com
Calvert Global Alternative Energy Fund	CGAEX	na	4.75%	none	1.85%	31-Mar-07	www.calvert.com/ alternativeenergy/

Source: Company information and Bloomberg.

- *Guinness Atkinson Alternative Energy Fund (GAAEX)*. This fund invests in global alternative energy stocks. The fund was launched in March 2006 and has \$80 million under management. As of December 31, 2006, the fund held 55 stocks and the top holdings were Q-Cells (German Xetra: QCE GR), Nordex AG (German Xetra: NDX1 GR), Biopetrol Industries AG (German Xetra: B2I GR), Iberdrola SA (Madrid SMCE: IBE SM), Environmental Power Corp. (AMEX: EPG), Vestas Wind Systems (Copenhagen: VWS DC), Clipper Windpower PLC (London: CWP LN), REpower Systems (German Xetra: RPW GR), Climate Exchange PLC (London: CLE LN), and Fuel Systems Solutions (Nasdaq: FSYS). For more information, see [www.gafunds.com](http://www.gafunds.com).
- *Calvert Global Clean Energy Fund (CAEIX)*. Calvert recently launched its Global Clean Energy Fund in March 2007. Calvert has been a pioneer for 30 years in the area of socially responsible investing. The fund intends to invest in about 150 companies, mostly from the United States, Europe, China, and Japan. The fund intends to invest 80 percent in pure plays and about 20 percent in “market leaders” such as GE and BP, according to the fund manager. See [www.calvert.com/alternativeenergy/](http://www.calvert.com/alternativeenergy/).

In addition to mutual funds that focus on buying green stocks, there are “socially responsible” funds that invest in traditional areas of the stock market but exclude stocks that do not meet certain social or environmental criteria. Environmentally screened mutual funds are operated by the Sierra Club ([www.sierraclubfunds.com](http://www.sierraclubfunds.com)), Spectra,<sup>11</sup> Portfolio 21 ([www.portfolio21.com](http://www.portfolio21.com)), and others. Socially responsible investing has grown rapidly in the past few years and assets under management are now as high as \$2 trillion. An excellent source of information on socially responsible investing can be found at the Social Investment Forum’s Web site at [www.SocialInvest.org](http://www.SocialInvest.org).

### **GLOBAL ETFs AND GREEN MUTUAL FUNDS**

Investors should seriously consider the clean energy ETF and green mutual funds that are global in scope. As mentioned before, there are only about 60 pure-play U.S.-based clean energy companies, whereas there are many more stocks globally. Mutual funds that invest in global clean energy stocks include the New Alternatives Fund, Guinness Atkinson Alternative Energy Fund, and Calvert Global Alternative Energy. Clean energy ETFs that invest in global stocks include the PowerShares WilderHill Progressive Energy Portfolio, the PowerShares Global Clean Energy Portfolio and the Market Vectors-Global Alternative.

## FUTURES AND OPTIONS

There are a variety of futures and options contracts that are tied to the clean energy industry. In the biofuels market, for example, the Chicago Board of Trade has an ethanol trading complex with futures and swaps. There are various futures and options contracts on ethanol feedstock products such as corn and sugar (for ethanol) and palm oil (for biodiesel) at various exchanges around the world. There are carbon allowance futures contracts at the International Commodity Exchange (ICE). Trading opportunities in these areas will be discussed in more depth later in the book.

## INVESTMENT CRITERIA FOR PUBLICLY TRADED STOCKS

This book focuses on identifying the clean energy companies that have publicly traded stock and that have market caps at least \$75 million. However, not all of the companies listed in this book as participants in the clean energy industry will represent a good investment. In setting out the criteria for choosing attractive clean energy stocks, we start with some standard investment criteria:

- Industry with an attractive and scaleable profit model.
- Company has a protected niche or a unique strategic advantage.
- Company has a current or strong promise of accelerated earnings growth.
- Company has a strong and proven management that can deliver results.

With the clean energy industry, we are mainly operating in the investment style known as *small- and mid-cap growth*. In other words, we are mainly looking at small- and mid-cap companies that are in a high growth mode. This raises some additional investment challenges, as compared with investing in more stable, large-cap stocks. Small- and mid-cap growth companies operate in fast-growing industries where there are a myriad of problems including disruptive technology change, difficulty in commercializing even promising technologies, difficulty in gaining sales traction, unclear paths to profitability, a shortage of capital, volatile financial results, among many others. Quite simply, we need to be very careful about choosing clean energy stocks. We cannot simply invest in a company that tells a good story or that has a technology that looks promising. We need to assess whether there is actually large-scale demand for that company's product

and whether that company is capable of commercializing and selling that product or service in a profitable manner.

Here are some additional criteria that a small- to mid-cap clean energy company should satisfy:

- Proprietary technology or a sustainable niche that will allow the company to compete against larger companies that have much greater resources.
- Ability to commercialize a product or service and quickly scale up that product or service to serve a mass market.
- World-class sales and marketing capabilities to ensure sales traction.
- Sufficient financial and human resources to take a product all the way to the commercialized stage.
- Management focus on creating profits and value for public shareholders and not on simply burning cash indefinitely or granting themselves big pay packages.

The stock market graveyard is littered with small companies that thought they had a business but failed due to the following causes:

1. Insufficient financing.
2. An inability to translate a promising technology into a commercially attractive product or service.
3. An inability to execute on sales and marketing.
4. An inability to compete against competitors or a large company, among many other reasons.

Less-experienced investors would be well advised to take a lower-risk strategy of choosing companies that are already profitable and that have proven that they have a product or service that is already succeeding in the marketplace. The potential upside for the stock may be lower than an earlier stage company, but the risks are also significantly lower, meaning the risk-return profile may still be very attractive. Investors that have more experience in analyzing and selecting small-cap companies, on the other hand, will find that the clean energy industry can offer them a host of opportunities.

## VALUATION AND BUBBLES

A cautionary word is in order about excess valuation and speculative bubbles. As with any new, hot industry, the clean energy industry is subject to speculative excess, bubbles and overvaluation. Certain subsectors of the

clean energy industry have already gone through speculative bubbles and busts. The fuel cell industry, for example, has seen periodic stock run-ups and sell-offs since 2000, and fuel cell stocks on average were very weak from mid-2006 through mid-2007 and traded down to five-year lows. Ethanol stocks soared in early 2006 but then fell sharply later in 2006 and in early 2007. This volatility creates trading opportunities (long and short) for traders with short time horizons, but makes it difficult for the long-term investor to enter a long-term, profitable position.

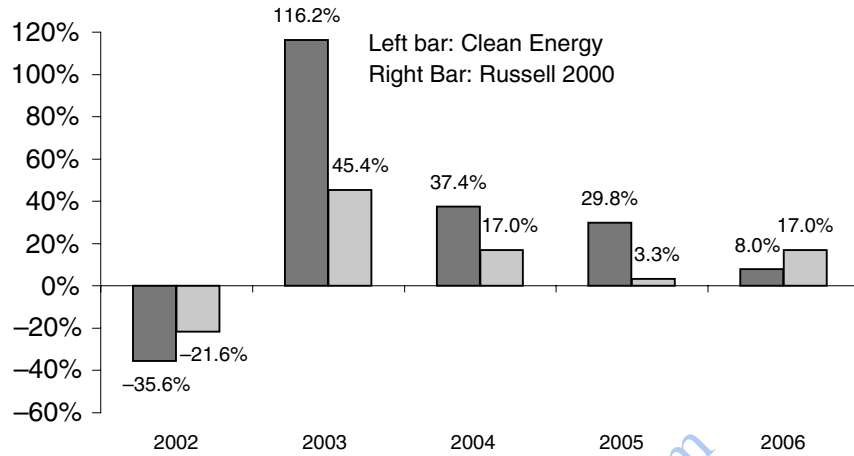
A long-term investor in the clean energy sector would be well advised to patiently wait for buying opportunities in strategically attractive stocks, put in a good-till-canceled stop for safety well below the entry price, and then just forget about the stock and plan to hold it for three to five years or more. Having a long-term investment horizon means not worrying about the week-to-week fluctuations in the stock, but instead investing in an industry that is likely to do very well in coming decades, knowing there will be various bumps and corrections along the way.

## **CLEAN ENERGY STOCK PERFORMANCE**

In order to look at the stock performance of the clean energy sector, we will use clean energy indexes produced by Melvin & Company, an institutional research and trading brokerage firm based in Chicago. The Melvin Clean Energy Index™ tracks about 50 U.S.-listed clean energy companies. The graph in Figure 1.1 summarizes the annual performance seen from 2003 to 2006. The index performed very poorly in 2002 (-35.6 percent) due to the U.S. economic recession and broad stock market correction but then performed very well in 2003 (+116.2 percent), 2004 (+37.4 percent), and 2005 (+29.8 percent). In 2006, the index rose +8.0 percent, which was below the Russell 2000 gain of +17.0 percent, as clean energy stocks saw some profit-taking pressures. In the first half of 2007, the index was up +9 percent year-to-date.

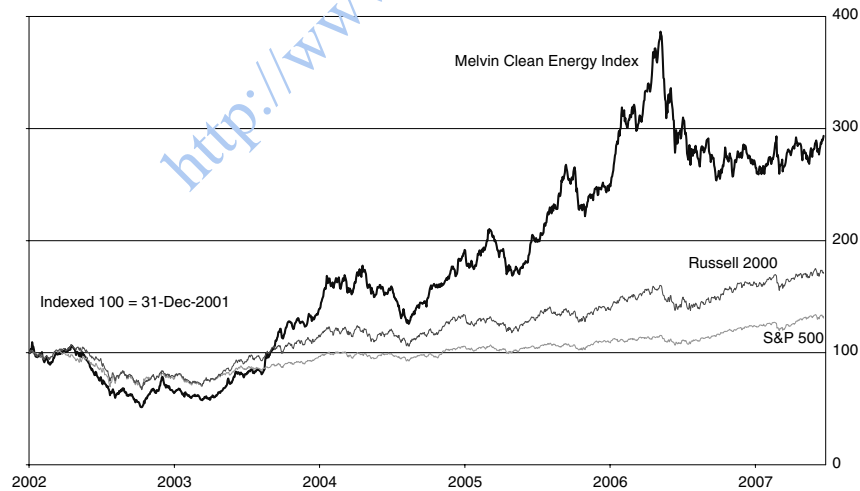
Figure 1.2 illustrates the performance of the Melvin Securities Clean Energy Index™ relative to the S&P 500 and Russell 2000 over the past five years. The chart illustrates the strength of the clean energy sector from 2003 through the first half of 2006. The clean energy sector then fell back in the second half of 2006 because of weakness in ethanol stocks (due to the rise in corn prices that started in September 2006) and due to profit taking in the other sectors.

The clean energy sector is actually a collection of about 10 completely different industries. It would be a big mistake to assume that these subsectors move together in lockstep. Indeed, Figure 1.3 tracks the Melvin Clean

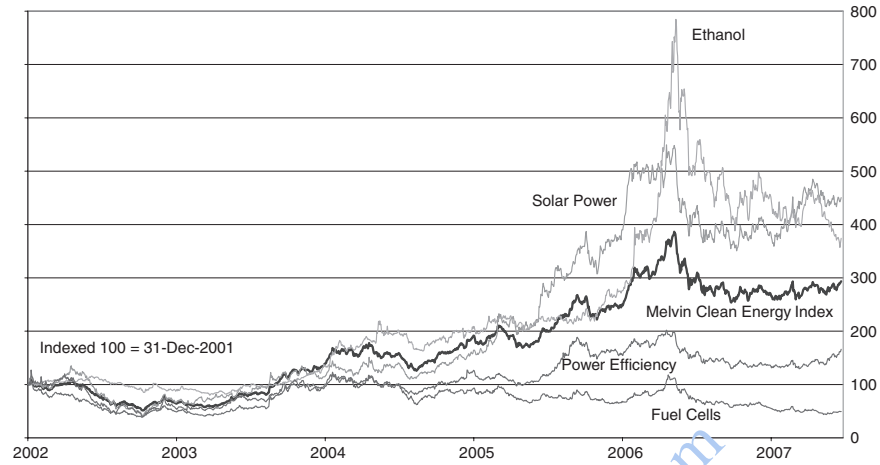


**FIGURE 1.1** Melvin Clean Energy Index™ Annual Performance versus Russell 2000 Small-Cap Index

Energy *subsector* stock indexes. The chart illustrates the disparate performance of the various clean energy subsectors. The Fuel Cell and Power Efficiency subsectors have been relatively weak over the past five years. The Ethanol sector soared in the first half of 2006 when ethanol prices surged



**FIGURE 1.2** Melvin Clean Energy Index™ vs. S&P 500 and Russell 2000



**FIGURE 1.3** Melvin Clean Energy Index™ and Subsector indexes

on the switch to ethanol from MTBE, but ethanol stocks then fell back in late 2006 and early 2007 as corn prices surged and threatened profit margins for corn-based ethanol producers. The solar sector broke out starting late 2004 and has since remained generally strong.

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