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FEATURED COMPANY

Wave Systems: Turning On-line Security Inside Out

BY ELLEN PFEIFER

LEE, MA and SAN JOSE, CA – If you want to buy a sweater online, you call up the L.L. Bean or Land's End web site and make your selection. Then you're transported to the merchant's secure site where you punch in your address and credit card number. The company promises to keep your personal information confidential. And you hope that it will, despite the Internet's vulnerability to security breaches.

But what if you controlled the security

from your own PC? What if there were a fool-proof, hacker-proof method to ensure that your personal information could be used only by those parties you approve and for only a limited period of time? And, on the other hand, what if merchants could confidently control the sale or licensing of audio, video, software, and any other intellectual property?

That's the concept behind Wave Systems' promising EMBASSY technology.

Founded in 1988, Wave Systems (Nasdaq:WAVX) has pioneered the EMBedded

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Wave System's EMBASSY allows secure internet transactions from your PC

Going Green: Shareholders Benefit Too

BY RALPH EARLE III

If a company is an environmental star, does it follow that its shareholders will see greater returns?

A small but consistent body of evidence suggests they might.

In a recent study, the Assabet Group reviewed the body of academic research comparing green and non-green portfolios. We also examined the track records of several funds that invest in green stocks to see what effect superior environmental citizenship had on investors' returns. Despite weaknesses in the data, we found a positive relationship between environmental performance and shareholder value.

Two Theories on Green Investing

After a generation of experience with environmental regulations, compliance efforts, and, in some cases, legal penalties, an active debate has emerged over whether a company's green initiatives add or destroy value. The Cost Center view argues that meeting environmental standards results in increased costs for a company with a negative impact on profits and a corresponding effect on shareholder value. Conversely, the Value Creation theory – a new

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Advantage: Green

JACKSON W. ROBINSON

Green begets green.

That's the conclusion that the Assabet Group reached in its cautiously positive study, "The Emerging Relationship Between Environmental Performance and Shareholder Value" (see Ralph Earle's article in this issue). Crunching our own numbers, we at Winslow have found reason to be even more rationally exuberant. The most recent data for pure "green" companies offer truly compelling evidence that superior environmental performance pays off.

Consider the Winslow Green Index (WGI). The brainchild of Sally Boldt from MIT's Sloan School of Management, the WGI is an equally-weighted index of 100 public, environmentally

pro-active and environmentally responsible companies selected from the Winslow universe of 300 green stocks. (Since its inception, the initial index has been diminished by one business failure and 11 takeovers, so the list now totals 88 stocks.) Over the past five years, the performance of the unmanaged WGI was both large and statistically significant (see chart). As of January 31, 2001, the WGI was up +147% versus the +56% increase of its small-capitalization benchmark, the Russell 2000. During the same period 1996-2001, the much larger capitalization indexes, the S&P 500 and the NASDAQ Composite, were up +113% and +152%, respectively, with the latter outperforming the WGI by five percentage points.

But the really stunning growth of the index took place in the last 14 months. Not including the large premiums paid for acquisitions since November 30, 1999, the diluted WGI jumped +38% compared to the Russell 2000's increase of 12%. During this same period, the S&P 500 declined -2% while the NASDAQ Composite dropped -17%.

Why is the universe of green stocks outperforming all other public company indexes?

We believe "green" companies frequently enjoy important and competitive advantages:

1. Minimal environmental risks: companies that generate fewer, smaller, or no toxic waste streams diminish or avoid the cost of clean-ups.
2. Comparatively low operating costs: companies that reduce the amount of raw materials used in operating processes or choose less expensive recycled materials also lower their costs.
3. Enticing growth markets: some of the strongest growth rates are occurring in industries whose products and processes

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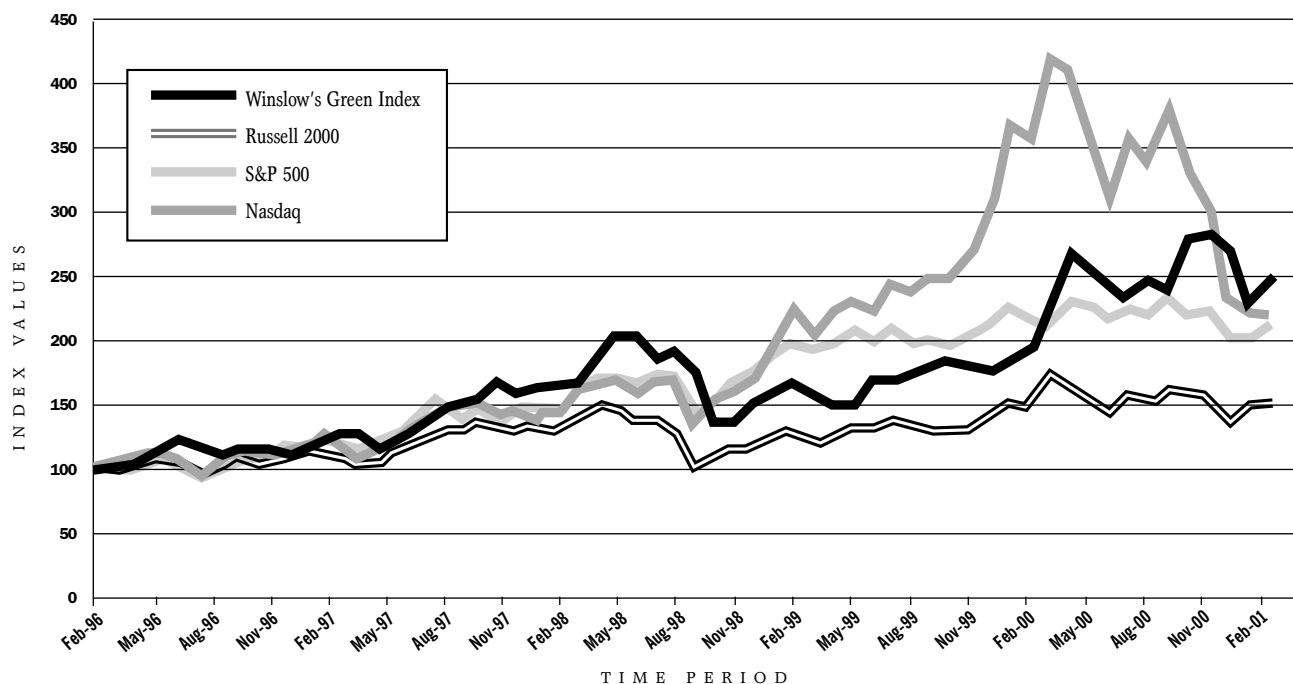
Winslow Green Index: Top Five Winners

Ticker	Company	Industry Sector	% Change
FCEL	FuelCell Energy	Fuel cells	1789%
BLDP	Ballard Power	Fuel cells	1407%
TBL	Timberland Company	Footwear and apparel	1317%
AES	AES Corporation	Electric utility	891%
HAIN	Hain Food Group	Natural, organic, specialty and snack food products	829%

Winslow Green Index: Bottom Five Losers

Ticker	Company	Industry Sector	% Change
GBUR	Gardenburger	Meatless food products	-93%
EECN	Ecogen	Environmentally effective pest control	-98%
HAUS	Hauser	Herbal and botanical extracts	-98%
WWTR	Western Water Company	Water utility	-99%
ICF	ICF Kaiser International	Environmental services	-99%

Cumulative Performance



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have positive environmental implications.

4. High employee morale: companies that make positive social contributions, have strong potential for growth, and encourage innovation also benefit from enthusiastic employees.
5. Quality management teams with value driven, sustainable business goals: companies that incorporate environmental considerations into their business models often have greater insight and foresight regarding other strategic business issues.

It is no wonder that many green companies make such attractive acquisition candidates for larger companies seeking growth through new products, services and markets. It would not surprise us to see more WGI companies acquired in the near future. Fortunately, there is a growing list of attractive new green investment candidates for the index. Investors should find such stocks increasingly desirable as they recognize the opportunities created by environmentally effective business strategies. 🐢

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Application Security SYstem or EMBASSY Trusted Client platform. This hardware and software system moves core security and e-commerce functions into the user's device. Whether that device is a PC or a digital set-top box (like your cable television box), EMBASSY incorporates a hardware chipset as an internal subsystem. The chipset contains a microprocessor, on-board ROM and RAM, a cryptographic module (to allow coding and decoding of information), an elapsed-time counter, and a host system interface. EMBASSY can now be used with personal computers or digital television, but in the future it will have applications in cable and DSL modems, personal digital assistants, and cell phones.

What EMBASSY Could Do for You

The technology is difficult to understand if you're not a computer geek. However anyone can appreciate EMBASSY's capabilities. John Callahan, Wave's corporate spokesman, offers

several examples.

"Suppose Blockbuster Video downloads 'Gladiator' to you. What's to stop you from making 600 copies? With EMBASSY, Blockbuster could not only download the movie and arrange for payment of the rental fee, but it could prevent piracy by stipulating the number of plays you are allowed before the movie dies. Or you could order some software from Microsoft on a rent-to-buy arrangement. You could rent it for \$2 a day, for example, and then when you got to \$40, you would own it. Or suppose you needed to transmit X-rays to the orthopedic surgeon. Instead of hand-carrying them, you could send them, limiting the length of time that the doctor would have access to them."

What's more, with EMBASSY, a consumer could establish and authenticate his identity with such undeniable legitimacy that any transaction he entered into would be "recognized in a court of law," Callahan said.

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direction in investment thinking — suggests that forward-looking, proactive companies can realize new sources of competitive advantage and improved financial returns through greener operations. The idea is that environmental initiatives can stimulate innovation, productivity and better management that will produce market-beating returns.

Both sides muster persuasive arguments. Those who believe that environmental performance takes a heavy toll on the bottom line point to the fact that compliance with environmental regulations now represents over 2% of US GDP.

Certain economic sectors have been particularly hard hit. For example, during the late 1980's, environmental costs for a segment of the oil and gas industry rose at almost five times the growth rate of its direct labor costs.

Capital expenses have soared along with operating costs. In some industries, as much as 20% of capital investment goes into air-pollution control equipment, wastewater treatment plants and waste disposal sites. That doesn't include what some companies pay in clean-up costs under Superfund and other federal programs: these expenditures are expected to total over \$300 billion by the time all designated sites have been remediated.

On the other hand, those looking through the Value Creation lens see environmental stan-

dards as generating new opportunities. Pollution and waste are examples of production inefficiency, they observe, so environmental planning can yield entirely new areas of revenue and profit creation. In one study we encountered, 29 chemical plants introduced 181 waste prevention initiatives in their processes, 68 of which resulted in increased product yields and only one of which resulted in a cost increase.

The Evidence

In our study, we wanted to see if current research supported one or the other of these investment hypotheses. Our

search yielded over 70 articles, papers, and books discussing the link between companies' environmental behavior and their financial returns. In addition, we examined the performance data of nine funds from around the world that actually use environmental behavior as a primary criterion in security selection.

With few exceptions, both the academic studies and the actual investment performance showed a positive connection between superior environmental performance and shareholder return. That being said, all the studies displayed one or more flaws, including:

1. Overly short time frames.
2. Out-of-date environmental metrics.
3. Financial measures that are not particularly good predictors of future shareholder value.

4. Failure to distinguish between overall market trends and the specific effects of environmental performance on value.

Highlights of the Academic Studies

The studies we reviewed generally supported the Value Creation theory. Despite our efforts to locate studies that support the Cost Center view, we were unable to find evidence that superior environmental performance destroys shareholder value. Either these studies have not yet been done or the parallel evidence does not exist. Among the most compelling research was the following:

1. Stuart Hart and G. Ahuja from the University of Michigan School of Business Administration published "Does it Pay to be Green?" in 1994. In this study the authors examined 127 companies from the Standard and Poors' 500 Index and found a statistically positive relationship between emission reductions and standard measures of financial performance.
2. Richard R. Clough of the Duke University School of the Environment published "The Impact of Environmental Screen on Portfolio Performance: A Comparative Analysis of S&P 500 Stock Returns" in 1997. The study identified environmentally sensitive and insensitive companies, and found that the sensitive stocks outperformed the others by 2.9% annually over three years; by 4% annually over five years; by 1.9% annually over 10 years; and by 2.4% over 15 years.
3. Jonathan V. Snyder and Charles H. Collins wrote "The Performance Impact of an Environmental Screen" in 1994. This study tracked its green stocks over the longest period — 22 years. The performance of the portfolio mirrored that of the entire S&P 500 and *Please see GOING GREEN page 5*

... [Green] funds are enjoying superior returns, buttressing the research that shows that companies with stronger environmental performance generally offer shareholders greater returns.

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was 0.7% higher than those non-green S&P stocks that were excluded. While these results were not statistically significant, they demonstrated that there was no penalty to environmental investing.

Conclusions

The field of environmental investment is young, particularly in the United States where few funds are being managed according to environmental criteria. Nonetheless these funds are enjoying superior returns, buttressing the research that shows that companies with stronger environmental performance generally offer shareholders greater returns. This means that mission-related investors don't have to sacrifice value when putting their money where their hearts are. It also means that non-mission-related investors might find an untapped opportunity in choosing green. However, green investors of all stripes will need to do even more homework in studying which companies offer the best opportunities. And, finally, much more work needs to be done by analysts and academics to ascertain the long-term value of this investing strategy. 🐢



Ralph Earle III is the founder of The Assabet Group, located in Concord, Massachusetts. The consulting firm helps leading companies look at

sustainability as a source of competitive advantage and advises them on ways to integrate environmental considerations into their business decisions. For a complete copy of the report, call 978-287-4853.

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Partnerships with the Big Boys

For its potential to be unlocked, EMBASSY technology must be adopted almost as universally as, say, Windows, Callahan concedes. Wave is pushing for global adoption by forging alliances with many of the heavy-hitters in the computer industry. It has joined with the Trusted Computing Platform Alliance (TCPA) which is formulating industry-wide standards for PC security. Not only will EMBASSY conform to TCPA standards but will offer even more advanced e-commerce, authentication, and privacy features. Wave's individual partners include:

- Electronic Data Systems (EDS), which has signed a 10-year agreement with Wave and Biz Interactive Zone to market their joint Secure Service Provider suite for the exchange of authenticated financial and intellectual information over the Internet.
- Advanced Micro Devices (AMD), which is incorporating EMBASSY technology into its PC Motherboard Reference Design.
- National Semiconductor, which will utilize Wave's cryptographic technology in the company's planned security co-processor.
- BiZ Interactive Zone's "Secure Service Provider" suite, which will incorporate EMBASSY in 5 million digital set-top boxes and integrated gateway products.
- Cyber-COMM, which, while representing a consortium of French banks and financial institutions, smart card manufacturers and telecom operators, is offering secure payment opportunities on the Internet using EMBASSY technology.
- Sarnoff Corporation's joint venture, known as Wavexpress, which has begun tests with broadcasters for DTV datacasting

Wave's Future Plans

Wave's long-term strategy, according to

Callahan, is to produce the EMBASSY security chipsets long enough to "prove the concept." Once other manufacturers "take over" that function, the company will move into "licensing intellectual property".

The big question, of course, is whether Wave can pull off its ambitious scheme. Callahan admits that the technology earns "an A-plus as a science project," but "can we become a commercially viable service?" he asked. "It's a chicken and egg question."

Some analysts are betting that the company may indeed accomplish its goals. Brian Alger of Pacific Growth Equities issued a "strong buy" recommendation in January based on Wave's impressive lineup of industry partners, most particularly EDS. "We believe EDS could be positioning a large amount of its 'Information Assurance' initiative around the SSP technology," Alger wrote. "As a truly global company, EDS is about as good a partner as Wave Systems" could desire. 🐢

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ratcheted expectations for 2000 to an unrealistically high level, company officials said. UNFI was also hit by the closing of several customers, including MotherNature.com and a number of the Wild Oats Markets.

America's desire for a "quick fix" continues to weaken vitamin, mineral and supplement sales in the food, drug and mass channel markets. We expect these declines to continue at an accelerating rate, hurting companies within the Healthy Living sector, such as United Natural Foods. Consumer confidence can turn around with positive media coverage or clinical data supporting the benefits of nutritional supplements.

UNFI is the largest US distributor of natural foods and health care products. It supplies more than 7000 stores nationwide. 🐢

PORTFOLIO UPDATE

AstroPower (NASDAQ: APWR)

NEWARK, DE - With the current energy crisis priming the market for alternative sources of electricity, AstroPower is hoping to seize the moment. Its partnership with Elkem, the world's largest producer of silicon metal, offers great potential. Elkem will supply AstroPower with low-cost solar-grade raw material used in making solar cells.

AstroPower pre-announced fourth quarter earnings of \$0.06, in-line with consensus. Revenues of \$14.1 million represent a 38.5% year-over-year growth rate. The increase is due in part to the expanded manufacturing capacity that the company installed during the year. Also, demand for solar cells continues to exceed supply in the international marketplace. In addition, the company instituted some price increases on its products. What's more, incremental revenue has been coming in from the company's new product line - a solar cell phone battery charger.

On the other hand, gross margins came under pressure as the company brought new capacity on-line. The Company reported a gross margin of 29.5%.

OSI Pharmaceuticals (NASDAQ: OSIP)

UNIONDALE, NY - One of the most exciting products coming down the OSI pipeline is OSI-774, an inhibitor of epidermal growth factor receptor (EGFR). OSI-774 could be an important new therapy for acute and chronic cancers. It is currently in Phase II clinical studies for non-small cell lung, head and neck, and ovarian cancers. The EGF inhibitor will be co-devel-

oped and marketed by Genentech in the US; Roche will co-develop and market overseas. OSIP, Genentech and Roche will share equally in the development costs.

OSI is a pharmaceutical research and development company working on novel, small-molecule drugs, with a special focus on cancer, diabetes, cosmeceuticals and G-protein couple receptor (GPCR) formulations. For the quarter ending December 31, 2000, the company generated revenues of \$5.6 million, compared to \$9.9 million for the previous year. The company reported a net loss of \$5.6 million (or \$0.18 per shares) compared to a net income of \$3.5 million in the prior year. The company also completed a major public offering of its stock at \$70 per share with gross proceeds totaling \$431 million.

Company officials attributed the apparent decreases to a one-time bubble in the prior year—that is, the sale of company diagnostic assets to The Bayer Corporation (for a \$3.7 million gain) and payment of a \$3.5 million technology access fee by a Japanese pharmaceutical company.

TOMRA Systems (Oslo: TOM)

ASKER, NORWAY - TOMRA Systems, a Norwegian company, produces machines that accept bottles and cans for recycling while repaying consumers their deposit on each item. TOMRA is active in countries and states where governments mandate recycling deposits on aluminum beverage cans and bottles.

Shares in TOMRA Systems slumped on news that its FY 2000 results would be nega-

tively affected by a crisis at the Wise Metals Group (WMG), TOMRA's principal customer for discarded aluminum containers. TOMRA had agreed to sell its 50% ownership in Wise Recycling LLC (WR) to Wise Metals. But after WMG suffered losses at its recycling mill in Alabama, it was necessary to refinance the deal. TOMRA offered to take a secured note on the \$12 million purchase price plus a note of \$15 million on receivables from WR. When WMG decided not to accept the notes, TOMRA had to reduce its \$45 million total financial exposure.

While any write-off will affect FY 2000 results, the crisis is not expected to lower 2001 earnings, company officials said.

Good news for TOMRA came from Germany's Environment Ministry which announced that it will impose a compulsory deposit on bottles and cans starting in 2002. The German government estimated it would need about 80,000 recycling machines to meet demand — a total investment exceeding \$957.7 million.

United Natural Foods (NASDAQ: UNFI)

DAYVILLE, CT - United Natural Foods' recovery from its troubled 1999 computer conversion continues to be rocky. Shares of the company, which had risen 72% over the last year, fell precipitously (-25 %) in February on the news that its second-quarter profits and sales rose less than expected. It is estimated that profits will fall between 14-15 cents a share, one-third less than expected. Sales rose 5.5% to \$244 million, but analysts had predicted a 12% increase.

In explaining the disappointing results, the company pointed to unusually high sales figures in late 1999 that resulted from customers buying extra inventory in anticipation of Y2K supply disruptions. Those figures

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