

# Winslow Environmental News

VOLUME 10, NUMBER 2

PUBLISHED BY WINSLOW MANAGEMENT COMPANY  
A DIVISION OF ADAMS, HARKNESS & HILL

MAY 2000

FEATURED COMPANY

## From Flat Screens to Far Reaching Dreams

BY DENISE GARCIA

**CORNING, NY** – On Valentines Day, Corning Incorporated (NYSE:GLW) announced its intention to acquire NetOptix (NASDAQ: OPTX) in a \$2 billion sweetheart deal. The company not only strengthened its position as a force to be reckoned with in the fiber optics industry, it also burnished its already glowing reputation as an advocate of the environment.

In 1997, Corning was ranked third in Fortune Magazine's survey of America's Most Admired Companies for corporate and environmental responsibility. In 1999, the company was ranked number one for social responsibility.

### Taking a Chance on Optics

The acquisition of the Sturbridge, MA company formerly known as Galileo demonstrated Corning's confidence in NetOptix' new Dense Wave Division Multiplex (DWDM) filter manufacturing process-said to be the highest yielding in the industry. As part of the Corning family, NetOptix will now be in a position to become the second largest DWDM manufacturer.

DWDM filters are used by telecommunications equipment manufacturers to split a single fiber optic channel into multiple wavelengths, thus permitting a substantial increase in communications capacity. The demand for bandwidth has been growing exponentially in recent years and can be delivered most efficiently and

*Please see CORNING page 4*

## Cleaner Air: It's on the Horizon

BY ELLEN PFEIFER

TAKE A DEEP BREATH. INHALE SOME OF THAT GOOD FRESH AIR. BUT JUST HOW FRESH, HOW CLEAN IS IT? WELL, DEPENDING WHERE YOU LIVE, IT MAY BE CLEANER, LESS POLLUTED THAN IT USED TO BE. THE ENVIRONMENTAL PROTECTION AGENCY (EPA) REPORTS THAT TOTAL EMISSIONS OF ALL THE POLLUTANTS THAT CAUSE SMOG HAVE DECLINED SUBSTANTIALLY (FROM 1.2 POUNDS PER PERSON TO 0.68 POUNDS) SINCE CLEAN AIR ACT REGULATIONS WERE PROMULGATED IN THE 1970'S. LEAD EMISSIONS DECLINED DRAMATICALLY TOO, SINCE THE INTRODUCTION OF UNLEADED GASOLINE.

The downside, however, is that the air we breathe is still too dirty. And our health, global ecology and economic well-being are suffering for it.

Consider the following:

- Air pollution contributes to and exacerbates lung disease. According to the American Lung Association, the death rate for lung disease over the last decade has risen faster than any of the top five causes of death and is now the third

leading cause of death in the United States.

- Asthma has become epidemic. The prevalence of disabling asthma in children has risen 232% since 1969, according to a report in the March issue of the Archives of Pediatric and Adolescent Medicine.

- According to US Surgeon General Dr. David Satcher, the cost of treating pollution-related

*Please see CLEANER AIR page 3*



The new Honda Insight, a gasoline/electric hybrid car

# If You Are Reading the Winslow Environmental News, You Are Most Likely a “Cultural Creative.”

BY JACKSON W. ROBINSON

The term was coined by sociologist Paul H. Ray and is the title of his soon to be published and well researched book. As identified by the author, Cultural Creatives are a growing subculture of some 50 million American adults-about 26% of the population. They are well-informed and proactive with distinctive lifestyles and values. They are leading edge thinkers and principled consumers, socially concerned, environmentally sensitive, and respectful of authenticity. Somewhat antiestablishment in outlook, they are often critical of big corporations, government, and institutions. Interestingly, although Cultural Creatives represent a broad cross section of American adults, most of them -60%-are women. But whatever their gender, they share

the same ideals, rejecting materialism, conspicuous consumption, hedonism, and cynicism.

Ray contrasts these mind, body, and spirit people with what he sees as two other declining subcultures of American adults, the “Traditionals” and the “Moderns.” Generally older in age and representing 29% of Americans, the Traditionals seek a simpler, moral, and religious world. The Moderns, at 46%, desire financial success and economic growth at almost any price.

Of Ray’s three American subgroups, the Cultural Creatives are increasing in number as

the Traditionals die off and the Moderns become disenchanting with their current lifestyles. As a result, there is a large, under-served, and growing market for the sustainable products and services that fit the Creatives’ lifestyles and values.

According to Ray’s research, the Cultural Creatives are currently spending \$230 billion annually in five large market segments (see table).

While these current figures are impressive and important, we are most intrigued by the three-to five-year revenue growth rates predicted for each segment. With estimates ranging from a low of 10% to a high of 25%, the Cultural Creatives’ markets should increase by 15.3% annually, a number that exceeds expected gross domestic product rates by a factor of 3X. For example, the “sustainable economy” segment that includes emerging energy, conservation, recycling and green investing now totals \$75 billion and is estimated to grow by 25% annually.

Clearly, this new burgeoning market is sure to offer an ever-expanding list of attractive, environmentally responsible investment prospects. 🐣

## Cultural Creatives Markets

Market Segments	Description/Examples	Estimated Annual Revenues (U.S.)	Estimated Growth Rates
Alternative Healthcare	Health & Wellness: Information, products, services, solutions Examples: air/water filtration, acupuncture/acupressure, massage	\$ 31 Billion	12-15%
Ecological Lifestyles	Natural and Eco-Information, products, and services. Examples: Ecotourism and environmentally friendly automotive, gardening, household and building products	\$ 81 Billion	12-15%
Healthy Lifestyles	Natural Consumable Products Examples: Organic foods, personal bodycare, vitamins, minerals and supplements	\$ 32 Billion	15-18%
Personal Development	Mind, body and spirit education, information, products and services Examples: Yoga, jogging, continuing education, health clubs, exercise equipment, books, tapes	\$ 11 Billion	10-12%
Sustainable Economy	Environmental Management products, services, and solutions Examples: Alternative energy, conservation, recycling, sustainability, green investing	\$ 75 Billion	25%
		<b>Total: \$230 Billion</b>	<b>Average 15.3%</b>

Sources: Gatam, “LOHAS Journal”, Paul Ray, Adams, Harkness & Hill, Winslow

## Winslow Environmental News

Published by Winslow Management Co.  
Sixty State St., Boston, MA 02109, 617-788-1600  
Web address: [www.winslowgreen.com](http://www.winslowgreen.com)  
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**Designed and Produced by**  
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**Printed on 100% Post-Consumer Recycled Paper from Domtar Corp.**

illness has reached \$40 billion.

- Crude oil imports to the U.S. now exceed 50% of U.S. total oil consumption and could reach 70% in the next decade. This dependence on foreign oil accounts for half of the country's continuing \$100+ billion per year trade deficit.
- As a result of increasing atmospheric concentrations of CO<sub>2</sub>, the earth is warming up, with average atmospheric temperatures rising 0.44 Celsius between 1969 and 1998. If the trend continues, says the Worldwatch Institute, sea levels will rise between 17 centimeters and 1 meter by 2100, coral reefs will be imperiled, and ice caps and glaciers will continue to melt.

Clearly more needs to be done to clean up the air. Government has continued to raise the bar on allowable emissions while the private sector has responded more or less willingly to the increasingly stringent regulations. It is the most forward thinking and innovative businesses, however, that are getting serious about going green. They are developing technological solutions that enhance both the environment and the bottom line. Of particular interest to potential investors are companies that manufacture fuel cells, fuel reformers, hydrogen storage, wind power, and photovoltaic cells. Also, clean-burning gas plants, a few automotive manufacturers, and clean fuel producers.

### The EPA Gets Tough

On the legislative/regulatory front, the EPA has recently taken several steps targeting the worst polluters. In December, it announced new tougher tailpipe emissions limits that will subject both cars and light-duty trucks and SUVs to the same national standard. The new limits for nitrogen oxides will represent a 77% reduction for cars and a 95% reduction for SUVs. Vehicles under 6000 pounds must meet the new standards beginning in 2004. Those between 6000 and 10,000 pounds will have until 2009 to comply.

Further, the EPA ordered nine major urban areas with the most severe pollution problems to clean up their act with more

aggressive strategies.

What's more, in November, the Justice Department, acting on behalf of the EPA, filed an unprecedented lawsuit against seven electric utility companies in the Midwest and South. The suit charges that 17 of the companies' power plants were overhauled without installation of up-to-date equipment to control smog, acid rain, and soot. In an administrative order, the EPA cited the Tennessee Valley Authority and seven of its plants for similar violations. The agency maintains that the companies' lack of oversight has increased air pol-

lution not only near the facilities but also downwind of the plants along the Eastern Seaboard.

### Strategies in the Private Sector

With transportation accounting for 49% of the toxic emissions that cause smog, the automotive and gasoline industries are confronting some of the biggest challenges in fighting pollution.

We are "facing a major, major change in the way vehicles will be powered," says Stan Stephenson, a former journalist for Motor Age Magazine, head of the Philadelphia-based consulting firm, Aftermarket Research Institute, and a frequent lecturer on emerging technology. In the near term, he predicts wide acceptance of gasoline/electric hybrid cars and the adoption of low sulfur gasoline which will "instantly" make every car run cleaner.

### New Lean, Mean Machines

Two of the new hybrid cars are already on the market or soon will be. The Honda Insight is available now — although there is a waiting list. A 2000-pound, two-seater, the Insight has an aluminum, aerodynamically designed body

that meets stringent crash tests. An Ultra Low Emissions Vehicle (ULEV), it will shortly qualify as a Super ULEV. The Toyota Prius, a more traditional four-passenger, steel-body version, is already a SULEV. It will be available for sale in July.

The beauty of these hybrids is that they are practical. "People don't realize that you don't

have to plug them in to get recharged," says Craig Van Batenberg, a Honda technician and environmentalist whose Worcester, MA business was awarded a prize for ecological excellence in 1999 by the

Audubon Society. The hybrid cars make their own electricity on board through devices such as regenerative braking, he explained. Easy to drive, they are quiet, smooth, peppy, and astonishingly energy efficient.

Von Batenberg knows firsthand. When he drove to York, PA in March to display his Insight at the Enviro Car Alliance's Emerging Technology Evening, he averaged 54 miles per gallon and still had a quarter tank of gas left on arrival. He predicts that "everyone will be driving" these hybrids in the "next two to three years."

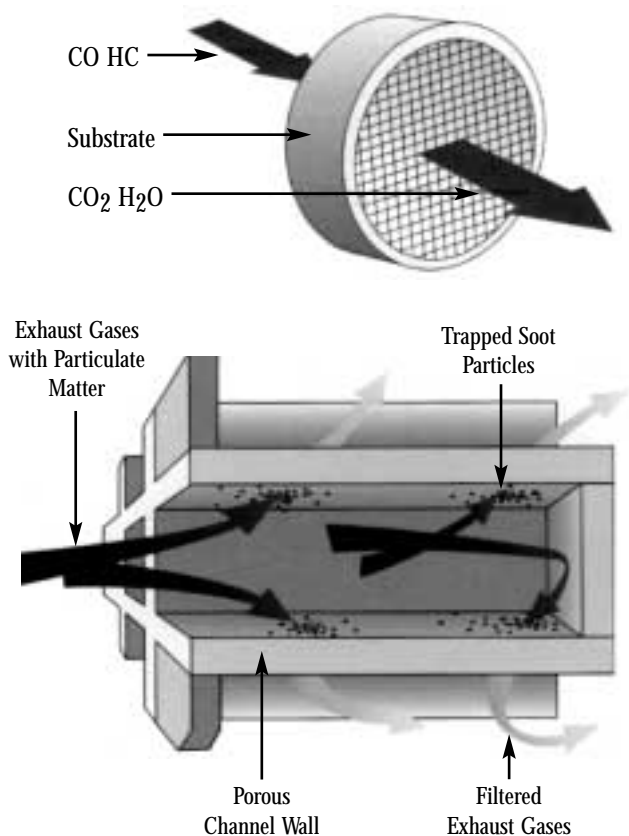
### Low Sulfur Gas Gets the Yellow Out

The EPA has ordered gasoline refiners and importers to begin reducing sulfur levels in gasoline with the goal of 30 to 80 parts per million by 2007. The introduction of low sulfur gasoline will also make a big difference in air quality. "Sulfur is what kills the delicate components of catalytic converters," Stephenson explained. All model cars will benefit, but in cars manufactured after 2004, unsulfured gasoline will allow "the catalytic converter to last

*Please see CLEANER AIR page 5*

*CORNING Continued from page 1*

economically through optical networks. Because DWDM filters can be retrofitted to existing cable, they allow greater bandwidth without the necessity of tearing up roads to install new cable. They also encourage more telecommuting, thus cutting down on automobile travel and air pollution.



**Corning substrates are used to reduce emissions in both gasoline and diesel powered vehicles**

Although NetOptix only switched its corporate focus to the DWDM technology last year and received its first commercial orders in Fall '99 (see WEN, Oct. '99), it has experienced meteoric growth. According to Lawrence Harris of Josephthal & Co., NetOptix' success should have a positive impact on Corning which should experience good growth over the next several years. Based on first quarter results, he expects the photonics business to grow at 90-100% and fiber at 35%. He estimates

Corning's earnings per share at \$2.75 in 2000 and \$3.30 in 2001.

#### **Flattening PCs and TVs**

Although Corning's corporate breadth includes advanced life sciences, semiconductor materials, and photonics, it has evolved into one of the world's largest suppliers of information display products. One of the exciting new

products to come out of this division is the sheet of flat glass used for liquid crystal display (LCD). In 1999, the company's LCD business grew by 50%. Today, Corning's customers can find LCD screens on desktops, in television sets, and rapidly increasing in mobile and automotive applications. Corning's revenues in 1999 were \$4.7 billion and on April 30, 2000, the company announced plans to invest \$130 million towards increased manufacturing capacity for LCD glass.

#### **Clearing the air**

Since the early 1970s, Corning has worked to reduce air pollution by developing more than 200 patents for emission control processes used in gasoline, diesel and alternative-fuel vehicles, along with others for stationary applications. Today, cars run 98% cleaner than they did a few decades ago, an achievement attributable in part to automotive catalytic converters manufactured with Corning's high-performance cellular ceramic substrate, the standard for converters worldwide.

A substrate is a honeycomb-like structure housed at the end of a muffler pipe on which a

catalyst such as platinum or palladium is coated. As engine exhaust, composed of hydrocarbons, carbon monoxide and nitrogen oxides, is forced through the substrate, the catalyst helps convert these poisonous compounds into more harmless substances like nitrogen, carbon dioxide and water. Substrates are used for both gasoline engines and, in a mechanical variant, for diesel engines.

Corning's substrates, including their new thin-wall and ultra-thin-wall models, have proven superior because of their generous surface area. According to Corning's Environmental Products Division, their alumina-based washcoat improves the bonding of precious metal catalysts so that a substrate the size of a soda can provides the surface area of a football field.

Another feature Corning substrates offer is rapid light-off. Most engine pollutants are emitted during cold starts while the catalytic converter is heating up. "Light-off" is the temperature at which the noxious gases start to be converted into harmless substances. Corning's thin-wall 600/4 substrate offers faster light-off due to its 4-mil cell walls and 26% greater geometric surface area.

#### **Diesel: The New Challenge**

Although diesel cars, trucks, and buses are inherently more fuel-efficient than gasoline vehicles, they are not pollution free. If the engines are not properly maintained, diesel cars can be loud, smelly, and smoky. While they do not produce as much carbon monoxide as gasoline vehicles, diesel engines emit nitrogen oxides (NOx), particulate matter (PM) and other toxic airborne contaminants (TACs). When the EPA's new Tier 2 environmental regulations take effect, diesel engines will have to conform to the same standards as gasoline-burning vehicles. This presents a major engineering challenge.

#### **Knocking the NOx out of emissions**

Getting the NOx out of diesel will be the thorniest problem. When NOx and volatile

*Please see CORNING page 5*


organic compounds react with heat and sunlight, the brown haze known as smog is formed. For now, Corning's advanced ceramic substrates are being used to help many diesel engines meet current emission standards. Corning is working with automakers to find a better solution for the NOx problem, and to meet future regulations.

### **Particulate Filters: Parting the Waves of Pollution**

Particulate Matter (PM), the black soot most commonly associated with diesel vehicles, may actually pose a greater health hazard than NOx. Composed of dust, hydrocarbons, acid droplets and other airborne materials, PM's microscopic size, generally smaller than 1 micron, enables it to easily penetrate the human respiratory system. Corning's Diesel Particulate Filters (DPFs) are dense structures with thousands of parallel channels made up of square cells. Every other cell is plugged, forcing gas through porous ceramic walls. Soot is captured on the cell walls. The EX-80 ceramic composition of the filters provides average particulate trapping efficiency of approximately 90%. In addition to PM, airborne TACs can also be reduced with the filters when used in conjunction with low sulfur fuel.

Although diesel emissions will continue to challenge researchers trying to meet new clean air standards, Corning's diesel technology is among the greenest available.

### **Can Corning drive itself into the future?**

As we strive to clean up the air, Corning will almost certainly be at the forefront of emerging antipollution technology. Already Corning emissions products are found in 95% of automobiles and the company's advanced ceramics materials may provide the foundation for a broad range of future emissions devices. Conversely, GLW's burgeoning photonics business may ultimately reduce the number of vehicles on the road. More telecommuters means fewer commuters. That would really generate some fresh air. 

the lifetime of the vehicle." Low sulfur gas combined with some of the high performance ceramic substrates being produced by companies like Corning should make for extremely clean machines.

Stephenson predicted that diesel fuel will also be formulated with less sulfur. He pointed to one company, Syntroleum Inc. of Tulsa, OK, which has patented a process for converting natural gas to sulfur-free diesel fuel.

### **Fuel Cells in the Future**

Farther down the road, automobiles will most likely be powered by fuel cells, Stephenson says. "The technology is not new. We have understood the concept since the early 19th Century." Indeed, fuel cells produced by Ballard Power Systems have been used to power the space shuttle and the submersible vehicle that explored the sunken Titanic. The problem is that fuel cells are currently too cumbersome, too costly, and require too much warm-up time to be practical in automobiles. However, Stephenson pointed to a company like Epyx that is developing liquid fuel reformers that could reduce warm-up time from 30 minutes to 30 seconds. In addition, some of the big automobile companies such as Daimler Chrysler, Ford, and General Motors are experimenting with vehicles in which fuel cells operate in tandem with an onboard battery pack.

### **Some Alternative Fuels**

Several other fuels also show promise as alternatives to gasoline: Methanol/Ethanol-Alcohols derived from corn, Natural Gas (CNG or LNG), Biodiesel (made from transesterified vegetable oils and animal fats), and Hydrogen. Although all demonstrate certain green advantages, practical considerations still hinder our ability to utilize these fuels.

### **Natural Gas: The Short Term Fuel of Choice**

Transportation is, of course, not the only source of polluting emissions. Electricity gen-


eration and fuel combustion also produce some of the worst pollutants, including nitrogen oxides (NOx), sulfur dioxides (SO2), ozone (O3), and particulate matter. According to the Worldwatch Institute's State of the World 2000 report, any long term solution to such pollution will mean "shifting from a fossil fuel or carbon-based energy economy" to a "hydrogen/solar-based economy." It predicts an increasing dependence on wind and photovoltaic power-two energy sources that are already growing at a rate of 22% and 16% annually. Here companies like Vestas Wind Systems A/S and Astropower are surging to the forefront.

But, for the short term at least, natural gas is becoming the clear alternative to coal-fired and nuclear generated electricity as well as an increasingly attractive means to heat buildings and water. It's cleaner and more efficient than coal, safer than nuclear power, and cheaper than electric heat. Indeed, heating an average size house with gas in a moderate climate costs 5% less than with oil and 33% less than with an electric heat pump, says the Department of Energy.


The U.S. Energy Information Administration forecasts that gas consumption at central-station electricity generating plants will triple by 2020. If that is true, it will certainly help balance the US trade deficit as approximately 85% of our current annual supply of natural gas is produced domestically. Among interesting companies in this segment is Calpine which builds high-tech, fuel efficient industrial gas plants.

### **Investment Opportunities**

What all this means for green investors is plenty of intriguing opportunities to increase their worth while helping the environment.

No one knows exactly which technologies and products will ultimately prove the most practical and beneficial. But the urgent necessity of cleaning the air will stimulate inventive minds and ingenious solutions. Savvy investors will be able to reap the benefits. 

# PORTFOLIO UPDATE

**Uniroyal Technologies** (NASDAQ: UTCI)   
SARASOTA, FL—Market demand is so strong for high brightness light emitting diodes (HB-LEDs) that Uniroyal will be doubling its production capacity this Spring. Two new D180 Emcore reactors will go on line in June at the company's state-of-the-art, 77,000 square foot facility in Tampa.


In addition, the company agreed earlier this month to acquire Sterling Semiconductor, a leading developer of silicon carbide products that are used in wireless communications, industrial process controls and optoelectronics. The silicon carbide substrates made by Sterling are used in the manufacture of blue LEDs.

Light emitting diodes are low-power, solid-state devices that give off colored light when current is applied. They are typically packaged in a clear or tinted epoxy dome or lens that contains both an LED semi-conductor chip and a reflector cap. High brightness LEDs have a variety of uses from traffic signals to indoor and outdoor signs to automotive lighting. What makes them particularly attractive to environmentalists is that they use only 10% of the energy of an incandescent light and boast a life span 25 times longer. As a result, even though LEDs may cost more to produce on per unit basis, they are actually less expensive over their lifetime than conventional lighting. What's more, because of their brightness and quick ignition, they offer a significant safety boost in applications such as traffic lights.

UTCi will be increasing production of its blue and green LEDs. It also manufactures red, orange and yellow colors.


UTCi has three business segments: Optoelectronics, Coated Fabrics, and Specialty Adhesives. It recently spun off a fourth divi-

sion, High Performance Plastics, to Spartech Corporation. The move will allow the company to expand its high technology base.

**AstroPower Inc.** (NASDAQ:APWR)   
NEWARK, DE—Coming off the third consecutive year in which it has increased product revenues by more than 50% and pre-tax earnings by more than 100%, Astropower is on a roll. After completing equity financing of \$30 million in Q499, the company expects rapid growth during 2000 in its residential rooftop solar power systems as well as dramatic expansion of its new portable, solar powered battery chargers.

Company President and CEO Dr. Allen M. Barnett is particularly enthusiastic about the latter product. "We have realigned management responsibilities within the Company in order to focus appropriate resources on the portable battery charger product while maintaining the high growth rates in the core solar power business," he says. The solar battery charger could be used in "any application requiring a battery." He sees the biggest opportunity in the cell phone industry with a potential market of "350 million units this year." APWR has developed battery prototypes for demonstrations to phone manufacturers and is creating versions for other uses.

AstroPower makes and sells photovoltaic (PV) solar cells, modules, and panels for generating electric power either on- or off-grid. It is the largest US-owned PV manufacturer.

**United Natural Foods** (NASDAQ:UNFI)   
DAYVILLE, CT—Although still feeling the repercussions from the consolidation problems in its Eastern Region, UNFI has turned the corner. Outside analysts are predicting continued recovery with good growth in 2001. As of April 22, the consensus of five Wall St. professionals was that the company was worthy of a

"Buy/Hold" recommendation with an Average Qualitative Opinion (AQO) ranking of 0.88. By comparison, the current AQO for the S & P 500 was 0.83, suggesting that UNFI's performance may be more attractive than the general market.

"They have fixed all the problems and it's just a matter of ramping back to historical levels of profitability," says Laura Huskins of Adams, Harkness & Hill.

Current earnings projections show a decline in 2000 to \$0.14 per share, but the estimates look far healthier with a hike to \$0.93 per share in 2001 (figures are based on a July 1 fiscal year). The overall forecast in earnings growth is 27.4% over the two year period.

The company, reported a 7.2% increase in sales during the second quarter of F2000, or \$231.4 million compared to \$215.7 million during the same period a year ago.

## **York Research Corporation**

(NASDAQ:YORK)

BROOKLYN, NY—North American Energy Conservation, Inc. (NAEC), an 85% subsidiary of York Research Corp., filed for Chapter 11 bankruptcy on March 2. The filing was the culmination of a downward spiral that began in the summer of 1998 when "several vendors in NAEC's original wholesale electricity business defaulted on long-term electric supply contracts," York reported.

As a consequence of the bankruptcy filing, Standard and Poor's on March 10 placed York Power Funding (Cayman) Ltd's \$150 million senior secured bonds due 2007 on CreditWatch with negative implications.

York is a national leader in the production of renewable/alternative energy, primarily gas cogeneration and wind power. One year ago, the company opened its Big Spring WindPower Project in Big Spring, TX. In partnership with the Texas Utilities Renew program, the wind farm employs the largest wind turbines (manufactured by Vestas Wind Systems A/S) in the United States.

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