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A stylized sunburst logo consisting of a central circle with multiple lines radiating outwards to form a starburst shape.

**spire**

2011 Annual Report

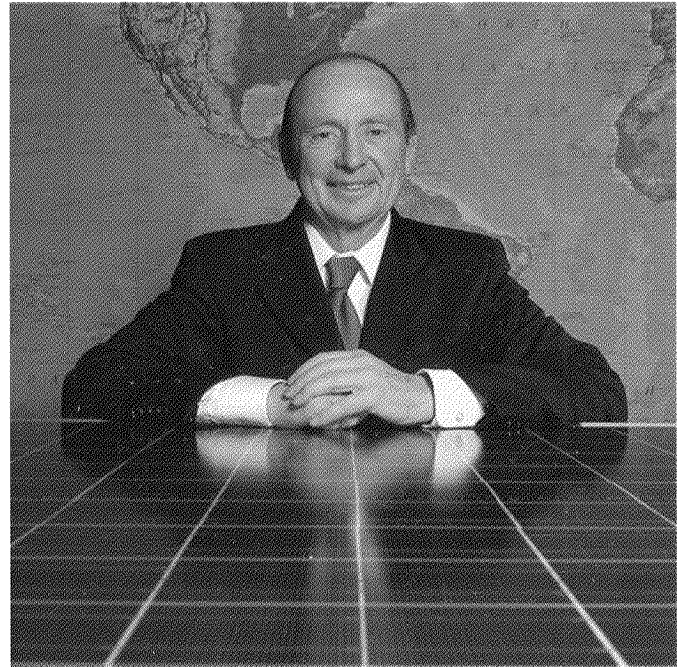
# President's Letter

## **D**ear Stockholders, Customers, and Employees:

Spire recorded another strong year of photovoltaic (PV) manufacturing equipment sales in 2011, reflecting robust market growth and increasing demand for Spire's test and metrology products. Although overall revenues were lower than 2010, this was primarily due to reduced sales in non-core business areas such as solar cell supply. PV module equipment sales were higher, and sales of individual equipment in this segment increased over 60%. Furthermore, demand for development and test services in our Advanced Technology Center (ATC) more than doubled in 2011. Spire continued to solidify its position as a leading Tier 1 global solar company providing capital equipment to manufacture PV modules. To further expand our worldwide presence and take advantage of growing market opportunities, we added representation in South Korea and established a branch office in India.

## **PV Equipment: A Focus on Metrology**

Spire has long been recognized as a leader in PV test equipment. The Company's Spi-Sun Simulator remains the industry's gold standard and is used by both large-scale module manufacturers and certification and test laboratories worldwide. Spire's simulators offer a unique long pulse-width that permits more accurate measurement of thin film and high efficiency crystalline silicon modules. In March 2011, Spire announced the installation of a Spi-Sun Simulator™ 4600SLP at the European Commission's Joint Research Centre in Ispra, Italy (JRC-ISPRA). With this installation, Spire's simulators are now used in more than thirty test laboratories around the world to qualify PV modules.



The increasingly competitive environment for module manufacturing is driving producers to more tightly control their processes and increase yield. State-of-the-art measurement systems are critical to this evolution, and Spire continues to innovate with the introduction of new equipment that improves accuracy and precision and expands measurement capabilities. For instance, in 2011 Spire launched a series of electroluminescence (EL) testers, which are used to identify microcracks and other invisible defects in modules. This new Spi-EL™ product line comprises several models that allow manufacturers to segregate problematic product and increase yield in their manufacturing lines. Spire also received Department of Energy Small Business Innovation Research (SBIR) Phase II Grants for continued development of new metrology equipment, including a photoluminescence system for evaluating cell and module quality, and an LED-based solar simulator with adjustable spectrum and scalability to accommodate demand for testing larger modules.



# spire

*"Spire continued to solidify its position as a leading Tier 1 global solar company providing capital equipment to manufacture PV modules."*

- Roger Little

## Turn-key Lines

The recent growth of the PV market has facilitated the emergence of several large Tier 1 module manufacturers who generally prefer to purchase individual equipment from an assortment of suppliers rather than acquire complete turn-key lines from a single source. This trend impacted Spire's turn-key line business in 2011. However, we did announce a number of line orders, including 12, 20, and 25 megawatt (MW) per year lines in India; a 20 MW/year line in Brazil; and a 50 MW/year back-end line in the U.S. This automated back-end line assembles laminates into completed modules and is referred to as a FAST-Line™. The demand for such products will likely grow as the U.S. market continues to expand and there are incentives for domestic manufacturing of modules utilizing local content. We also expect that the general trend away from turn-key lines will eventually reverse as Chinese manufacturers incorporate more automation into their production lines and require the integration provided by a turn-key line solution.

## Solar Systems

Spire's Solar Systems Group completed its largest project to date in 2011, a 2 MW, eight-acre solar PV system at Berkshire School in Sheffield, Massachusetts. This PV array will generate over 2,300 MW hours per year of electricity and provide 40% of the school's energy requirements. Spire Solar Systems has developed a strong reputation for quality and responsiveness in the New England area. The Group continues to cultivate relationships with Power Purchase Agreement (PPA) providers to identify new installation opportunities throughout the region, focusing on projects ranging from 250 kW to 2 MW.

## Advanced Technology Center

Spire expanded its Advanced Technology Center Lab in 2011. Our ATC Lab houses state-of-the-art solar module manufacturing equipment, including a fully functioning PV module production

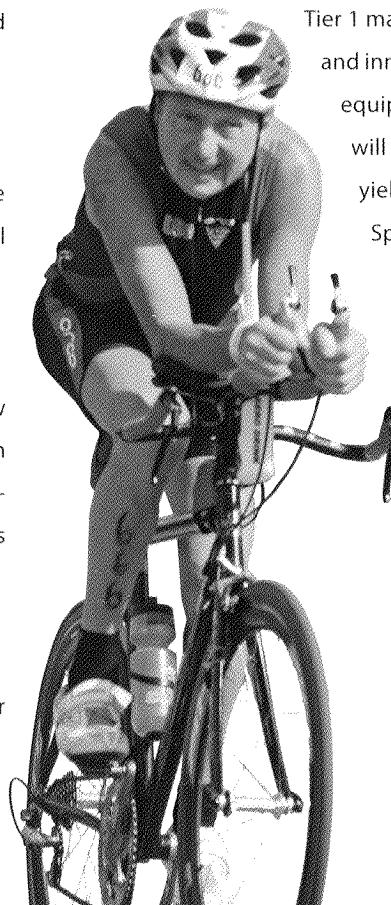
line. It is used by customers

for the development and qualification of new and advanced crystalline silicon and thin film modules as well as support for the development and qualification of new module materials and electronics. Spire also made its world-class simulation facilities and expertise available to PV system installers on a custom service basis. In February 2011, Spire received The Master Listing Mark of Underwriters Laboratories, Inc. (UL) for its PV modules, which permits our customers to receive the UL mark much faster with lower capital investment.

## Spire: A Tier 1 Equipment Supplier

As the PV industry has grown, it has become more competitive and is now dominated by a small number of Tier 1 manufacturers. The demand for new and innovative module assembly and test equipment among these companies will increase as higher efficiencies and yield become critical for their survival.

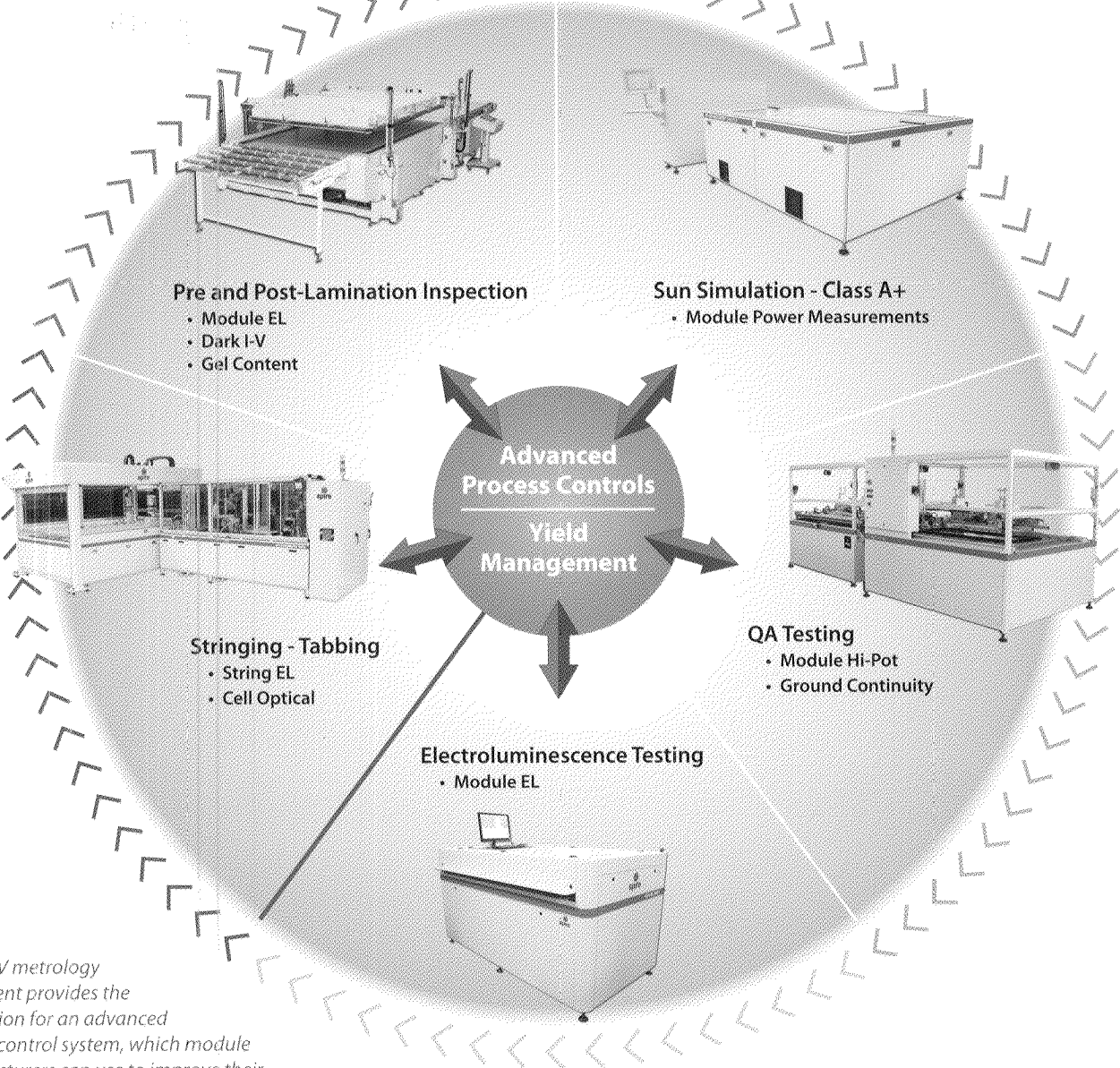
Spire's product platform is ideally positioned to satisfy this requirement, and we will continue innovating to maintain the Company's leadership position as a Tier 1 global solar equipment manufacturer.



Roger G. Little, Chairman & CEO

# Spire Solar Equipment

## Metrology in Module Factory Applications



Spire's PV metrology equipment provides the foundation for an advanced process control system, which module manufacturers can use to improve their processes and enhance factory yield.



**Spire - The World Leader in  
Module Performance Measurement**

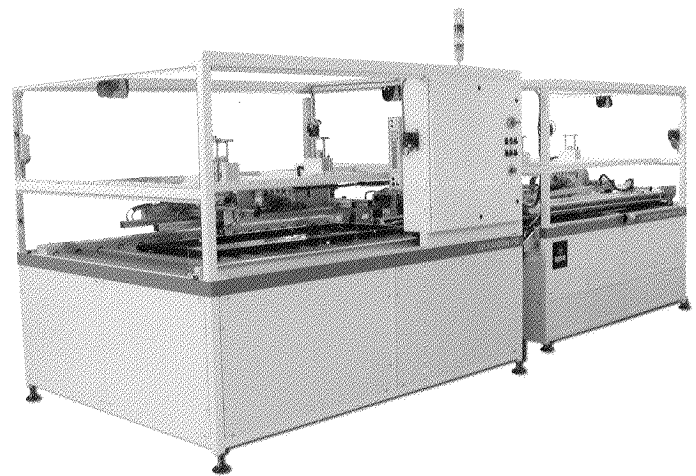
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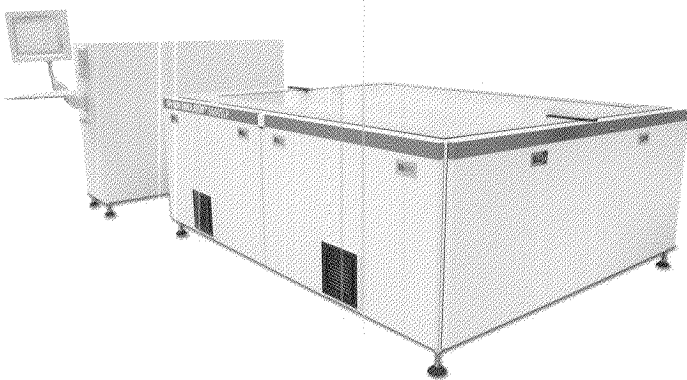
Washington DC  
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## Metrology and the PV Market

The PV industry has grown rapidly in recent years, and larger manufacturers are now exceeding gigawatt scale. At these higher production levels, even fractions of a percent difference in efficiency and yield can significantly impact profitability. While PV factories are now more widely applying statistical process controls (SPCs) at an individual processing station level, very few incorporate the type of centralized data collection and advanced control systems that are commonly used to drive yield in semiconductor processing. The combination of integrated in-line inspection with advanced process controls and associated yield management technologies provide a compelling and powerful toolset that PV manufacturers must soon embrace to remain competitive.



The foundation of an effective process control system is the availability and utilization of appropriate measurement tools. As the premier supplier of simulation and test equipment for PV module manufacturing, Spire currently offers a suite of highly accurate and repeatable metrology tools that provide manufacturers with critical process data. This test equipment is being used as the basis for an advanced process control system that integrates Spire's metrology tools into a data transmission, analysis, tracking, trending, and control platform.



# Spire Solar Systems

Spire's Solar Systems division has been designing, installing, and maintaining large-scale PV installations since 1999. The group provides turn-key engineering, procurement, and construction services for PV systems and has worked with many developers and PPA providers to support a wide range of federal and commercial projects. Spire Solar Systems has built a reputation as a knowledgeable and reliable partner that can effectively manage projects with minimal disruption to ordinary business.

In 2011, the Systems group completed its largest project to date, a 2 MW array at Berkshire School, a private high school located in Sheffield, MA. This PV array is one of the largest in the Northeast and blends efficient, attractive design with functional and reliable power generation. It is capable of generating enough energy to power the equivalent of 280 homes. As with other projects it has undertaken, Spire Solar Systems worked closely with the project developer and the school to navigate the permitting, financing, design, and implementation of the project.

## Selected Financial Data

Years Ended December 31	2011	2010	2009	2008	2007
	(in thousands, except share and per share amounts)				
<b>Condensed Consolidated Statements of Operations**</b>					
Net sales and revenues	\$61,558	\$79,842	\$69,871	\$64,964	\$37,068
Gain on termination of contracts	409	1,888	3,123	6,761	-
Gain on sale of trademarks/licenses	-	-	-	-	2,735
Income (loss) from continuing operations before income taxes and extraordinary gain	(3,745)	(3,043)	(10,905)	5,725	(4,111)
Income tax benefit (provision) - continuing operations	890	1,146	2,241	(270)	877
Net income (loss) from discontinued operations, net of tax	1,372	1,489	3,382	(680)	-
Extraordinary gain, net of tax	-	-	-	-	1,301
Net income (loss)	\$ (1,483)	\$ (408)	\$ (5,282)	\$ 4,775	\$ (1,933)
Basic income (loss) per share	\$ (0.18)	\$ (0.05)	\$ (0.63)	\$ 0.57	\$ (0.23)
Diluted income (loss) per share	\$ (0.18)	\$ (0.05)	\$ (0.63)	\$ 0.56	\$ (0.23)
Weighted average number of common and common equivalent shares outstanding - basic	8,386	8,341	8,334	8,329	8,272
Weighted average number of common and common equivalent shares outstanding - diluted	8,386	8,341	8,334	8,465	8,272
<b>Condensed Consolidated Balance Sheets</b>					
Cash and cash equivalents	\$ 4,758	\$ 6,259	\$ 8,999	\$ 5,971	\$ 2,372
Total assets	24,178	34,585	53,393	68,018	48,687
Working capital	5,700	5,166	3,718	6,835	2,587
Stockholders' equity	8,710	9,905	9,504	13,518	8,455

\*\*The Condensed Consolidated Statements of Operations for year 2007 have not been adjusted for discontinued operations.

The Company's Form 10-K for the year ended December 31, 2011 filed with the Securities and Exchange Commission, contains an audited consolidated balance sheet of Spire Corporation and subsidiaries as of December 31, 2011 and the related consolidated statements of operations, stockholders' equity and comprehensive loss and cash flows for each of the years in the two-year period ended December 31, 2011.

### STOCK EXCHANGE INFORMATION

The Company's common stock is traded on the Nasdaq Capital Market under the symbol "SPIR." On March 26, 2012, the common stock was held by 248 shareholders of record. The number of holders does not include individuals or entities who beneficially own shares but whose shares are held of record by a broker or clearing house, but does include each such broker or clearing agency as one record holder.

The Company did not pay any cash dividends during 2011 and currently does not intend to pay dividends in the foreseeable future so that it may reinvest its earnings in the development of its business.

### ANNUAL MEETING OF STOCKHOLDERS

The Special Meeting in Lieu of the 2012 Annual Meeting of Stockholders is scheduled to be held at 10:00 a.m. on Thursday, May 17, 2012 at Spire Corporation, One Patriots Park, Bedford, Massachusetts.

### INVESTOR RELATIONS

For further information about the Company or additional copies of this annual report, Form 10-K or other information, visit the Company's website at [www.spirecorp.com](http://www.spirecorp.com). The Company will provide to any person without charge, upon request, a copy of the Form 10-K. Any person wishing a copy should write to Spire Corporation, Investor Relations, One Patriots Park, Bedford, Massachusetts 01730-2396.

### TRANSFER AGENT AND REGISTRAR

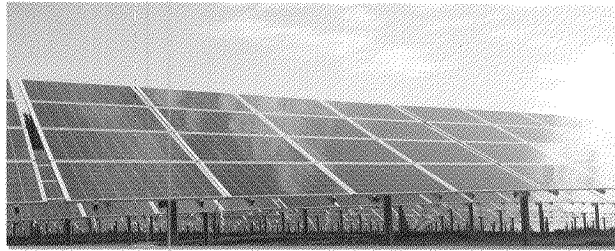
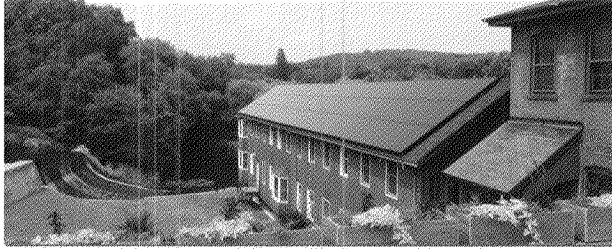
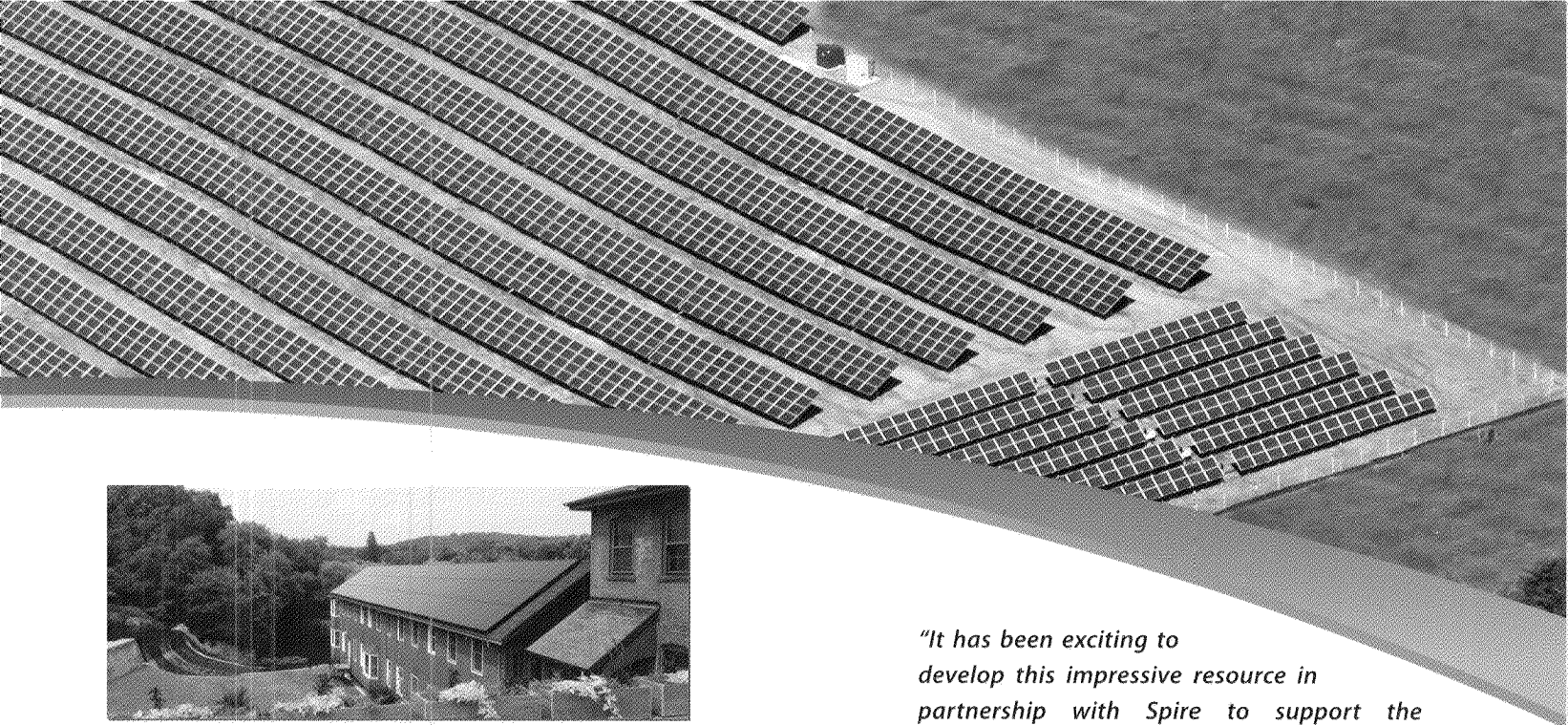
American Stock Transfer & Trust Company, LLC  
Brooklyn, New York

### INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

McGladrey & Pullen, LLP  
Boston, Massachusetts

### GENERAL COUNSEL

Greenberg Traurig, LLP  
Boston, Massachusetts



*"It has been exciting to develop this impressive resource in partnership with Spire to support the (Berkshire) School's goals. Our collective team resources and the ability to work together through all aspects of the development process have served the project well."*

- Steven Levine  
Senior Developer  
PowerPlay Solar Development

**Executive Officers**

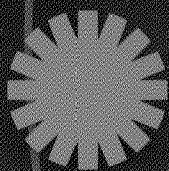
- Stephen J. Hogan**  
Executive Vice President and General Manager, Spire Solar
- Rodger W. LaFavre**  
Chief Operating Officer
- Robert S. Lieberman, CPA**  
Chief Financial Officer and Treasurer
- Mark C. Little**  
Chief Executive Officer, Spire Biomedical
- Roger G. Little**  
Chairman of the Board, Chief Executive Officer and President

**Board of Directors**

- Udo Henseler, Ph.D., CPA**  
President and proprietor Management Services International (business development services for biotechnology, life sciences and other industrial firms)
- David R. Lipinski**  
Executive Vice President and Chief Financial Officer, KMS Solutions, LLC (a defense professional services enterprise)
- Mark C. Little**  
Chief Executive Officer, Spire Biomedical Spire Corporation
- Roger G. Little**  
Chairman of the Board, Chief Executive Officer and President Spire Corporation

- Michael J. Magliochetti, Ph.D.**  
President and Chief Executive Officer Claros Diagnostics, LLC (a point-of-care diagnostic technology firm)
- Guy L. Mayer**  
Former President, Chief Executive Officer and Director Ascension Orthopedics, Inc. (implant technology for the orthopedic extremities market)
- Roger W. Redmond, CFA**  
Senior Vice President Marquette Asset Management, Inc. (investment management and trust services firm)

Certain matters described in this annual report, including those relating to Spire's prospects for growth, constitute forward-looking statements under the federal securities laws. The discussion of forward-looking information requires management of the Company to make certain estimates and assumptions regarding the Company's strategic duration and the effect of such plans on the Company's financial results. These forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those indicated in the forward-looking statements. Such risks and uncertainties include, but are not limited to, the risk of dependence on market growth, competition and dependence on government agencies and other third parties for funding contract research and services, as well as other factors described in the Company's Form 10-K and other periodic reports filed with the Securities and Exchange Commission. Forward-looking statements contained in the events or circumstances occurring after such date may render these statements incomplete or out of date. The Company undertakes no obligation and expressly disclaims any duty to update such statements.



**spire**

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