

Ascent Solar Technologies, Inc.
Form 424B3
October 16, 2014
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Registration No. 333-199214

PROSPECTUS

ASCENT SOLAR TECHNOLOGIES, INC.

UP TO \$25,000,000

COMMON STOCK
PREFERRED STOCK
WARRANTS

We may sell from time to time the securities offered by this prospectus at prices and on terms to be determined at or prior to the time of each sale. We will describe the specific terms and amounts of the securities offered in a prospectus supplement for each sale. You should carefully read this prospectus and any prospectus supplement before you invest. This prospectus may not be used to sell securities unless accompanied by a prospectus supplement.

Our common stock is traded on the Nasdaq Capital Market under the symbol "ASTI." On October 15, 2014, the last reported sale price of our common stock on the Nasdaq Capital Market was \$1.46 per share.

As of October 15, 2014, the aggregate market value of our outstanding common stock held by non-affiliates was approximately \$16.9 million, which was calculated based on 14,137,138 shares of outstanding common stock, of which approximately 2,561,285 shares were held by affiliates, and a price per share of \$1.46, which was the closing price of our common stock on the Nasdaq Capital Market on October 15, 2014. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities registered on this registration statement in a public primary offering with a value exceeding more than one-third of the aggregate market value of our common stock held by non-affiliates in any 12-month period so long as the aggregate market value of our outstanding common stock held by non-affiliates remains below \$75.0 million. During the 12 calendar months prior to and including the date of this prospectus, we offered and sold pursuant to General Instruction I.B.6 of Form S-3 (i) \$6,669,257 of securities on November 1, 2013 and (ii) \$7,096,757 of securities on February 7, 2014.

These are speculative securities. Investing in these securities involves significant risks. You should purchase these securities only if you can afford a complete loss of your investment. See "Risk Factors" beginning on page 4.

The securities offered by this prospectus may be sold directly by us to investors, through agents designated from time to time, or to or through underwriters or dealers, on a continuous or delayed basis. For additional information on the methods of sale, you should refer to the section entitled "Plan of Distribution" in this prospectus. If any agents or underwriters are involved in the sale of any securities with respect to which this prospectus is being delivered, the names of such agents or underwriters and any applicable fees, commissions, discounts and over-allotment options will be set forth in a prospectus supplement. The price to the public of such securities and the net proceeds that we expect to receive from such sale will also be set forth in a prospectus supplement.

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR PASSED UPON THE ADEQUACY OR ACCURACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

Our principal executive offices are located at 12300 North Grant Street, Thornton, Colorado 80241.

The date of this prospectus is October 16, 2014

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ABOUT THIS PROSPECTUS

You should rely only on the information contained or incorporated by reference in this prospectus or a prospectus supplement. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. You should not assume that the information appearing in this prospectus, any prospectus supplement or any document incorporated by reference is accurate as of any date other than its date, regardless of the time of delivery of the prospectus or prospectus supplement or any sale of securities. Our business, financial condition, results of operations and prospects may have changed since those dates.

PROSPECTUS SUMMARY

This summary highlights information contained in this prospectus. While we believe that this summary highlights some of the most important information about Ascent Solar Technologies, Inc. and this offering, you should read this entire prospectus and the documents incorporated by reference carefully, including “Risk Factors,” before deciding to invest in our securities. In this prospectus, references to “we,” “us,” “our,” “Ascent,” “Ascent Solar” or the “Company” mean Ascent Solar Technologies, Inc.

Overview

We are a development stage company formed in October 2005 to commercialize flexible photovoltaic (“PV”) modules using proprietary technology. Our technology was initially developed at ITN Energy Systems, Inc. (“ITN”) beginning in 1994 and subsequently assigned and licensed to us. Our proprietary manufacturing process deposits multiple layers of materials, including a thin film of highly efficient copper-indium-gallium-diselenide (“CIGS”) semiconductor material, on a flexible, lightweight, high tech plastic substrate using a roll-to-roll manufacturing process and then laser patterns the layers to create interconnected PV cells, or PV modules, in a process known as monolithic integration.

We believe that our technology and manufacturing process, which results in a lighter, flexible module package, provides us with unique market opportunities relative to both the crystalline silicon (“c-Si”) based PV manufacturers that currently lead the PV market, as well as other thin film PV manufacturers that use substrate materials such as glass, stainless steel or other metals that can be heavier and more rigid than plastics.

We believe that the use of CIGS on a flexible, durable, lightweight, high tech plastic substrate will allow for unique and seamless integration of our PV modules into a variety of electronic products, building materials, defense, transportation and space applications, as well as other products and applications that may emerge.

Recent Strategic Developments

Introduction of EnerPlex™ Consumer Products

In February 2012, we began to reposition our business model with an immediate focus on developing downstream consumer products. In June 2012, we launched our EnerPlex™ line of consumer products, and introduced our first product, the Surfr™, under the EnerPlex brand. The Surfr™ is a battery and solar case for the Apple® iPhone® 4/4S smart phone, featuring our ultra-light CIGS thin film technology integrated directly into the case.

The case incorporates our ultra-light and thin PV module into a sleek, protective iPhone® 4/4S case, along with a thin, life extending, battery. The charger adds minimal weight and size to an iPhone® smartphone, yet provides supplemental charging when needed. In August of 2012, we announced the launch of the second version of the Surfr™ for the Samsung® Galaxy S® III, which provides 85% additional battery life.

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In December 2012, we launched the EnerPlex Kickr™ and EnerPlex Jumpr™ product series. The Kickr IV is an extremely portable, compact and durable solar charging device, approximately seven inches by seven inches when folded, and weighs less than half a pound. The Kickr IV provides 6.5 watts of regulated power that can help charge phones, digital cameras, and other small USB enabled devices. The Kickr IV is ideal for outdoor activities such as camping, hiking and mountain climbing as well as daily city use. To complement the Kickr IV, we also released the Jumpr series of portable power banks in December of 2012. The Jumpr series provides a compact power storage solution for those who need to take the power of the sun with them while on the go.

During 2013, our EnerPlex brand rapidly expanded with the addition of two new product series as well as over fifteen new products. In the beginning of 2013, we introduced further additions to the Jumpr line of portable power banks; releasing the Jumpr Mini and Jumpr Stack in August and the Jumpr Max in September. The latest additions to the Kickr line of portable solar chargers, the Kickr I and Kickr II, were introduced in August 2013. Furthermore, in October 2013, we released our first series of solar integrated backpacks, the Packr, for consumer use. The Packr is a fashion forward and functional pack perfect for charging mobile electronic devices while on the go. Also in October 2013, we introduced the Surfr battery and solar case for the Samsung Galaxy S® 4, and in December 2013, we introduced the Surfr battery and solar case for Apple's iPhone® 5. In addition, we added an assortment of useful accessories to our product lines, all of which can be integrated into the EnerPlex ecosystem of products; such as the LED wand which can be easily plugged into a Jumpr power bank to provide hours of light, or the Travel Adaptor, which enables consumers to charge up their Jumpr power banks from a traditional outlet anywhere in the world. During 2014, we introduced the Jumpr Slate 10K and 5K, which are thin lithium polymer portable power banks. We continue to aggressively pursue new distribution channels for the EnerPlex brand. These activities have led to placement in a variety of high-traffic ecommerce venues such as www.walmart.com, www.brookstone.com, www.newegg.com as well as many others including our own e-commerce platform at www.goenerplex.com. The April 2013 placement of EnerPlex products at Fry's Electronics, a US West Coast consumer electronics retailer, represented the company's first domestic retail presence. EnerPlex products are carried in all of Fry's 34 stores across 9 states. Each store is provided with EnerPlex branded merchandising assets to highlight the uniqueness of our product lines. In addition, we currently have a total of 13 automated retail stores (kiosks) in operation. We believe this multi-faceted strategy will give the EnerPlex™ brand the broadest exposure for the amount of investment and make our products immediately available to large numbers of consumers.

We continue to design and manufacture PV integrated consumer electronics as well as portable power applications for commercial and military users. Due to the high durability of our products due to the monolithic integration employed by our technology, the capability to customize modules into different form factors and the industry leading light weight and flexibility provided by our modules, we believe that the potential applications for our products are numerous.

Suqian Joint Venture

On July 2, 2013, we entered into a framework agreement for the establishment of a joint venture (the "Joint Venture") with the Government of the Municipal City of Suqian in Jiangsu Province, China ("Suqian"). On December 28, 2013 we signed the definitive agreement with Suqian which further specified the terms and time frame of the Joint Venture. Under this definitive agreement, Suqian will provide cash of approximately \$32.5 million, as well as the five year rent-free use of approximately 331,000 square feet of factory and office space in the Suqian Economic and Industrial Development Science Park. The Joint Venture will build a 100MW factory over six years to manufacture our proprietary thin-film CIGS photovoltaic modules on flexible polyimide in addition to related consumer products. We shall purchase the factory within the first 5 years at the initial construction cost, and shall also purchase Suqian's ownership interest in the Joint Venture within 5 years at 1.5 times of Suqian's cash investment.

In the initial phase of the project, we and Suqian will form the Joint Venture in which Suqian will inject approximately \$4.8 million in cash and have majority interest of 75%. We shall contribute approximately \$1.6

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million in cash and hold a minority interest of 25%. Subsequently, Suqian will further contribute the balance of the committed \$32.5 million while we will contribute our proprietary technology and intellectual property, as well as certain equipment from our Colorado facility, thereby increasing our shareholdings progressively up to 80% ownership.

Under the definitive agreement, Suqian will also provide a package of additional incentives including:

▲ 5-year corporate tax holiday and a further 50% tax rebate over the following 5 years,

◆ Full rebate of value-added tax for the first 2 years and 50% rebate for the subsequent 3 years, and

◆ Free accommodations for up to 3 years for key scientists, engineers and management personnel of the Joint Venture.

As phase two of this program is implemented, we will have the option to purchase approximately 215,000 square feet of land zoned for commercial usage at a favorable price at 10% above the government's prevailing cost.

The implementation of the definitive agreement with Suqian, including the formation of the Joint Venture, will be subject to a number of contractual conditions and governmental approvals. Such conditions and approvals must be obtained in the future in order for the Suqian factory to be built and become operational.

Need for Additional Capital

Since inception, we have incurred significant losses. We expect to continue to incur net losses in the near term. For the year ended December 31, 2013, our cash used in operations was \$20.3 million. At December 31, 2013, we had cash and equivalents of approximately \$3.3 million. At June 30, 2014, we had cash and equivalents of \$1.3 million.

We do not expect that sales revenue and cash flows will be sufficient to support operations and cash requirements until we have fully implemented our new consumer products strategy. In 2014, we expect to incur a base level of maintenance capital expenditures and relatively minor improvements to the existing asset base. Additional projected product revenues are not anticipated to result in a positive cash flow position for the year 2014 overall. We believe we will need to raise additional capital in order to continue our current level of operations in 2015. We continue to accelerate sales and marketing efforts related to our consumer products strategy through increased hiring and expansion of our sales channel. We are exploring opportunities to secure additional financing through strategic or financial investors, but there is no assurance that we will be able to raise additional capital on acceptable terms or at all. If our revenues do not increase rapidly, and/or additional financing is not obtained, we will be required to significantly curtail operations to reduce costs and/or sell assets. Such actions would likely have an adverse impact on our future operations.

Going Concern Qualification

On March 28, 2014, we filed our Annual Report on Form 10-K with the Securities and Exchange Commission (the "SEC"), which Annual Report included our audited financial statements for the year ended December 31, 2013. The report of our independent registered public accounting firm on such financial statements contained an explanatory paragraph expressing substantial doubt regarding our ability to continue as a going concern.

The full text of the report of our independent registered public accounting firm is contained in our Annual Report on Form 10-K for the year ended December 31, 2013, which is incorporated by reference into this prospectus.

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Corporate Information

We are incorporated under the laws of Delaware. Our principal business office is located at 12300 North Grant Street, Thornton, Colorado 80241, and our telephone number is (720) 872-5000. Our website address is www.ascentsolar.com. Information contained on our website or any other website does not constitute part of this prospectus.

This Offering

Through this prospectus, we may from time to time offer and sell shares of our common stock, shares of our preferred stock, warrants, and the securities issuable upon exercise or conversion of any of those securities. We may offer and sell these securities separately or together as units, but the aggregate initial offering price will not exceed \$25,000,000 or the equivalent amount denominated in one or more foreign currencies. Each time we offer and sell the securities, a prospectus supplement will be provided that will contain specific information about the terms of the offering, including the type(s), amount(s) and price(s) of the securities being offered and the plan of distribution employed.

RISK FACTORS

An investment in our securities involves a high degree of risk and many uncertainties discussed in the section entitled “Risk Factors” in our annual report on Form 10-K for the year ended December 31, 2013, which is incorporated by reference into this prospectus. You should carefully consider the risk factors before purchasing our securities. If one or more of the possibilities described as risks actually occurs, our operating results and financial condition would likely suffer and the trading price of our securities could fall, causing you to lose some or all of your investment in the securities we are offering.

FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference into it contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”). Forward-looking statements are those that predict or describe future events or trends and that do not relate solely to historical matters. You can generally identify forward-looking statements as statements containing the words “believe,” “expect,” “may,” “will,” “could,” “would,” “anticipate,” “intend,” “estimate,” “project,” “plan,” “continue,” “assume” or other similar expressions, although not all forward-looking statements contain these identifying words. All statements contained in this prospectus regarding our plans, objectives, goals, strategies, future events, future net sales or performance, capital expenditures, projected financial position, potential future revenues, projected costs, financing needs, plans or intentions relating to acquisitions, plans for the commercialization of our products, business trends and results that might be obtained by pursuing management’s current plans and objectives are forward-looking statements. Forward-looking statements include, but are not necessarily limited to, those relating to:

- Our limited operating history and lack of profitability;
- Our ability to successfully design, manufacture and sell our EnerPlex™ line of consumer products;
- Our ability to develop demand for, and sales of, our products;
- Our ability to attract and retain qualified personnel to implement our business plan and corporate growth strategies;
- Our ability to develop sales, marketing and distribution capabilities;

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• Our ability to achieve profitability through our strategic alliance with TFG Radiant Investment Group Ltd. (“TFG Radiant”) in designing, manufacturing and selling products;

• Our ability to successfully develop and maintain strategic relationships with key partners, including original equipment manufacturers (“OEMs”), system integrators, distributors, retailers and e-commerce companies, who deal directly with end users in our target markets;

• The accuracy of our estimates and projections;

• Our ability to secure additional financing to fund our short-term and long-term financial needs;

• Our ability to maintain the listing of our common stock on the Nasdaq Capital Market;

• The commencement, or outcome, of legal proceedings against us, or by us, including ongoing litigation proceedings;

• Changes in our business plan or corporate strategies;

• The extent to which we are able to manage the growth of our operations effectively, both domestically and abroad, whether directly owned or indirectly through licenses;

• The supply, availability and price of equipment, components and raw materials, including the elements needed to produce our photovoltaic modules;

• Our ability to expand and protect the intellectual property portfolio that relates to our consumer electronics, photovoltaic modules and processes;

• General economic and business conditions, and in particular, conditions specific to consumer electronics and the solar power industry; and

• Other risks and uncertainties discussed in greater detail in the section captioned “Risk Factors.”

You should not place undue reliance on our forward-looking statements because the matters they describe are subject to known and unknown risks, uncertainties and other unpredictable factors, many of which are beyond our control. Our forward-looking statements are based on the information currently available to us and speak only as of the date on the cover of this prospectus. New risks and uncertainties arise from time to time, and it is impossible for us to predict these matters or how they may affect us. Over time, our actual results, performance or achievements will likely differ from the anticipated results, performance or achievements that are expressed or implied by our forward-looking statements, and such differences might be significant and materially adverse to our investors. We have no duty to, and do not intend to, update or revise the forward-looking statements in this prospectus after the date of this prospectus except to the extent required by the federal securities laws. You should consider all risks and uncertainties disclosed in our filings with the SEC described in the sections of this prospectus entitled “Information Incorporated by Reference” and “Where You Can Find More Information,” all of which are accessible on the SEC’s website at www.sec.gov.

USE OF PROCEEDS

Unless otherwise indicated in the applicable prospectus supplement, we intend to use the net proceeds from the sale of any securities offered under this prospectus for general corporate purposes, including repayment and refinancing of debt, working capital and capital expenditures, research and development expenses, general and administrative expenses, or investment in technologies, products or assets that complement our business. We may temporarily invest the net proceeds in investment-grade and U.S. government interest-bearing securities until they are used for their stated purpose. We have not determined the amount of net proceeds to be used specifically for such purposes. As a result, management will retain broad discretion over the allocation of net proceeds. We may set forth

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additional information on the use of net proceeds from the sale of securities we offer under this prospectus in a prospectus supplement relating to the specific offering.

DILUTION

If required by SEC rules, we will set forth in a prospectus supplement the following information regarding any material dilution of the equity interests of investors purchasing securities in an offering under this prospectus:

- the net tangible book value per share of our equity securities before and after the offering;
- the amount of the increase in such net tangible book value per share attributable to the cash payments made by purchasers in the offering; and
- the amount of the immediate dilution from the public offering price which will be absorbed by such purchasers.

PLAN OF DISTRIBUTION

We may sell the securities being offered hereby in one or more of the following ways from time to time:

- through dealers or agents to the public or to investors;
- to underwriters for resale to the public or to investors;
- directly to investors; or
- through a combination of such methods.

We may sell the securities at a fixed price or prices that may change, at prevailing market prices, at prices relating to prevailing market prices or at negotiated prices. Each time we sell securities in a particular offering, we will set forth in a prospectus supplement the terms of the offering of securities, including:

- the material terms of the distribution, including the number of shares and the consideration paid;
- the identity of any underwriters, dealers, agents or purchasers that will purchase the securities;
- the type and amount of any compensation, discounts or commissions to be received by underwriters, dealers or agents;
- the purchase price of the securities being offered and the proceeds we will receive from the sale;
- the nature of any transactions by underwriters, dealers or agents during the offering that are intended to stabilize or maintain the market price of our securities; and
- the terms of any indemnification provisions.

Underwriters, dealers and agents that participate in the distribution of the securities may be deemed to be underwriters as defined in the Securities Act and any discounts or commissions they receive from us and any profit on their resale of the securities may be treated as underwriting discounts and commissions under the Securities Act. We will identify in the applicable prospectus supplement any underwriters, dealers or agents and will describe their compensation. We may have agreements with the underwriters, dealers and agents to indemnify them against

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specified civil liabilities, including liabilities under the Securities Act. Underwriters, dealers and agents may engage in transactions with or perform services for us in the ordinary course of their businesses.

Certain persons that participate in the distribution of the securities may engage in transactions that stabilize, maintain or otherwise affect the price of the securities, including over-allotment, stabilizing and short-covering transactions in such securities, and the imposition of penalty bids, in connection with an offering. Certain persons may also engage in passive market-making transactions as permitted by Rule 103 of Regulation M. Passive market makers must comply with applicable volume and price limitations and must be identified as passive market makers. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for such security; if all independent bids are lowered below the passive market maker's bid, however, the passive market maker's bid must then be lowered when certain purchase limits are exceeded.

DESCRIPTION OF SECURITIES

Our authorized capital stock consists of 250,000,000 shares of common stock, \$0.0001 par value, and 25,000,000 shares of preferred stock, \$0.0001 par value. At a special meeting of stockholders to be held on October 22, 2014, the stockholders will be voting on an amendment to our certificate of incorporation. If the stockholders approve that amendment, our authorized shares of common stock will be reduced from 250,000,000 to 150,000,000. As of October 15, 2014, 750,000 shares have been designated as Series A Preferred Stock, 2,000 shares have been designated as Series B-1 Preferred Stock, 1,000 shares have been designated as Series B-2 Preferred Stock and 1,000 shares have been designated as Series C Preferred Stock. As of October 15, 2014, we had 14,137,138 shares of common stock (as adjusted to reflect a 1-for-10 reverse stock split of our common stock that occurred on August 26, 2014 (the "Reverse Stock Split")), 212,390 shares of Series A Preferred Stock, no shares of Series B-1 Preferred Stock, no shares of Series B-2 Preferred Stock and 70 shares of Series C Preferred Stock outstanding.

The following is a summary of the rights of our common stock, preferred stock (including our Series A Preferred Stock and Series C Preferred Stock) and certain outstanding rights to obtain our common stock. It does not purport to be complete. For more detailed information about the terms of our capital stock, please see our Amended and Restated Certificate of Incorporation, as amended (our "Certificate of Incorporation"), including the certificates of designation for each of the Series A Preferred Stock, Series B Preferred Stock and Series C Preferred Stock, and our Second Amended and Restated Bylaws, as amended (our "Bylaws").

Common Stock

Holders of our common stock are entitled to one vote for each share on all matters submitted to a stockholder vote and may not cumulate their votes. Holders of common stock are entitled to share in all dividends that our Board, in its discretion, declares from legally available funds. In the event of our liquidation, dissolution or winding up, each outstanding share entitles its holder to participate pro rata in all assets that remain after payment of liabilities and after providing for each class of stock, if any, having preference over the common stock.

Except for TFG Radiant, which holds pre-emptive rights with respect to certain equity issuances by us (on terms no less favorable than any such issuance) in order to maintain their percentage ownership in our common stock, no other holders of our common stock have any conversion, preemptive or other subscription rights, and there are no redemption provisions applicable to our common stock. The rights of the holders of common stock are subject to any rights that may be fixed for holders of preferred stock.

Preferred Stock

Our Board is authorized by our Certificate of Incorporation to establish classes or series of preferred stock and fix the designation, powers, preferences and rights of the shares of each such class or series and the qualifications, limitations or restrictions thereof without any further vote or action by our stockholders. Any shares of preferred stock so issued could have priority over our common stock with respect to dividend or liquidation rights. Any future issuance of preferred stock may have the effect of delaying, deferring or preventing a change in our control without

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further action by our stockholders and may adversely affect the voting and other rights of the holders of our common stock.

The issuance of shares of preferred stock, or the issuance of rights to purchase such shares, could be used to discourage an unsolicited acquisition proposal. For instance, the issuance of a series of preferred stock might impede a business combination by including class voting rights that would enable a holder to block such a transaction. In addition, under certain circumstances, the issuance of preferred stock could adversely affect the voting power of holders of our common stock. Although our Board is required to make any determination to issue preferred stock based on its judgment as to the best interests of our stockholders, our Board could act in a manner that would discourage an acquisition attempt or other transaction that some, or a majority, of our stockholders might believe to be in their best interests or in which such stockholders might receive a premium for their stock over the then market price of such stock.

Series A Preferred Stock

On June 17, 2013, we entered into a Securities Purchase Agreement (the “Seow Purchase Agreement”) with Seng Wei Seow (“Seow”), pursuant to which Seow agreed to purchase from us, and we agreed to sell to Seow (subject to the terms and conditions set forth therein), an aggregate of \$6,000,000 of Series A Preferred Stock at a price of \$8.00 per share of Series A Preferred Stock and warrants to purchase up to 262,500 shares of our common stock (as adjusted to reflect the Reverse Stock Split).

In connection with the Seow Purchase Agreement, we designated 750,000 shares of Series A Preferred Stock. The Series A Preferred Stock ranks senior to our common stock with respect to dividend rights, pari passu with respect to rights upon liquidation to our common stock, and junior to all existing and future indebtedness. Except as otherwise required by law (or with respect to approval of certain actions), the Series A Preferred Stock have no voting rights. Holders of Series A Preferred Stock are entitled to cumulative dividends at a rate of 8.0% per annum (subject to adjustment in certain circumstances) when and if declared by the Board. We are obligated to pay certain make-whole amounts to the holders of Series A Preferred Stock, if the stock is redeemed or converted (as described below) prior to the fourth anniversary of its issuance date, in lieu of dividends that the stockholders would have otherwise received. The dividends and make-whole amounts (if any) may be paid in cash or in the form of common stock at the discretion of the Board.

We have the right to redeem all or a portion of the Series A Preferred Stock at any time at a redemption price of \$8.00 per share, plus any accrued and unpaid dividends and plus the make-whole amount (if any).

The Series A Preferred Stock may be converted into shares of our common stock at any time at the option of the holder. In the event of a conversion by the holder, the price per share is equal to (a) Original Issue Price (as defined in the certificate of designation for the Series A Preferred Stock) multiplied by (b) the number of shares of Series A Preferred Stock shares being converted, divided by (c) the conversion price of \$8.00 (as adjusted to reflect the Reverse Stock Split).

A conversion by us may be effected if certain Equity Conditions (as defined in the certificate of designation for the Series A Preferred Stock) are met and in the event that the closing price of our common stock exceeds 200% of the conversion price for any 20 consecutive trading days. In the event of a Company conversion, we shall issue the number of shares of common stock equal to (a) the Original Issue Price multiplied by (b) the number of shares of Series A Preferred Stock being converted, divided by (c) the conversion price of \$8.00 (as adjusted to reflect the Reverse Stock Split).

Unless we have received the approval of the holders of a majority of the Series A Preferred Stock then outstanding, we shall not (i) alter or change adversely the powers, preferences or rights given to the Series A Preferred Stock or alter or amend the certificate of designation for the Series A Preferred Stock, (ii) authorize or create any class of stock ranking as to distribution of dividends senior to the Series A Preferred Stock, (iii) amend

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our Certificate of Incorporation or other charter documents in breach of any of the provisions in the certificate of designation for the Series A Preferred Stock, (iv) increase the authorized number of shares of Series A Preferred Stock, or (v) enter into any agreement with respect to the foregoing.

Upon any liquidation, dissolution or winding up of the Company, after payment or provision for payment of our debts and other liabilities, the holders of Series A Preferred Stock shall be entitled to receive, *pari passu* with any distribution to the holders of common stock of the Company, an amount equal to \$8.00 per share of Series A Preferred Stock plus any accrued and unpaid dividends.

In January 2014, our stockholders approved all issuances of shares of common stock in connection with the securities issued pursuant to the Seow Purchase Agreement pursuant to Nasdaq Listing Rule 5635(d).

Series B Preferred Stock

On October 28, 2013, we entered into a Stock Purchase Agreement with Ironridge Technology Co., a division of Ironridge Global IV, Ltd. (“Ironridge”) to offer up to 1,000 shares of Series B-1 and Series B-2 Preferred Stock at a price of \$10,000 per share, and gross proceeds of up to \$10,000,000. We offered the Series B Preferred Stock in two tranches. The first tranche closed on November 1, 2013, with the Company selling 500 shares of Series B-1 Preferred Stock in exchange for gross proceeds of \$5,000,000. Delivery of the second tranche of \$5,000,000 in exchange for 500 shares of Series B-1 Preferred Stock occurred on February 7, 2014. All shares of Series B-1 Preferred Stock have been converted into common stock and no shares of Series B-1 Preferred Stock remain outstanding. The Company has never issued any shares of Series B-2 Preferred Stock. The Company does not intend to issue any shares of Series B-1 or B-2 Preferred Stock in the future.

Series C Preferred Stock

On April 1, 2014, we entered into a Stock Purchase Agreement (the “Ironridge Purchase Agreement”) with Ironridge pursuant to which we agreed to sell up to 600 shares of Series C Preferred Stock to Ironridge in up to two tranches. In the first tranche, on April 1, 2014, Ironridge purchased 300 shares of Series C Preferred Stock from us at a price of \$10,000.00 per share of Series C Preferred Stock, which resulted in gross proceeds to us of \$3,000,000. In the second tranche, on May 29, 2014, Ironridge purchased 300 shares of Series C Preferred Stock from us at a price of \$10,000.00 per share of Series C Preferred Stock, which resulted in gross proceeds to us of \$3,000,000.

On May 1, 2014, we issued 30 shares of our Series C Preferred Stock to Ironridge pursuant to the Registration Rights Agreement between us and Ironridge. In accordance with the Registration Rights Agreement, we filed an initial registration statement (the “Initial Registration Statement”) with the SEC registering 21,000,000 shares (2,100,000 as adjusted for the Reverse Stock Split) of our common stock which may be issued upon (i) conversion of the Series C Preferred Stock and (ii) our payment of dividends and make whole amounts (if any) on the Series C Preferred Stock. We were required to issue 30 additional shares of Series C Preferred Stock to Ironridge because the Initial Registration Statement was not declared effective by May 1, 2014.

The holders of the Series C Preferred Stock have no preemptive rights with respect to any of our stock or any securities convertible into or carrying rights or options to purchase any such stock. The Series C Preferred Stock is not subject to any sinking fund or other obligation of us to redeem or retire the Series C Preferred Stock, but we may redeem the Series C Preferred Stock as described below under “Redemption”. Unless redeemed or repurchased by us, the Series C Preferred Stock will have a perpetual term with no maturity.

The Series C Preferred Stock is not listed on any stock exchange or automated quotation system.

At no time will we issue shares of common stock in connection with the Series C Preferred Stock (whether upon conversion of Series C Preferred Stock, payment of dividends in common stock or payment of make-whole amounts in common stock) if such transaction (when aggregated with all other issuances in connection with the Series C Preferred Stock) would result in the issuance of more than 19.99% of the amount of our common stock issued and outstanding on the date of the Ironridge Purchase Agreement unless (i) the Company’s stockholders shall

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have approved the issuance of shares of common stock in excess of 20%, or (ii) Nasdaq has provided a waiver of Listing Rule 5635(d). On May 22, 2014, at the Company's 2014 Annual Meeting of Stockholders, the Company's stockholders approved such issuance of shares of common stock in excess of 20% of our outstanding common stock in connection with the Series C Preferred Stock.

Rank

The Series C Preferred Stock, with respect to dividend rights and rights upon our liquidation, dissolution or winding up, ranks: (a) senior with respect to dividends to our common stock, (b) on a parity with respect to dividends with our existing Series A Preferred Stock, (c) on a parity with respect to rights upon liquidation with our common stock and our existing Series A Preferred Stock, and (d) junior to all of our existing and future indebtedness.

Dividends

Holders of the Series C Preferred Stock are entitled to dividends in the amount of 5.75% per annum, payable when, as and if declared by the Board in its discretion. The dividend rate on the Series C Preferred Stock is indexed to our stock price and subject to adjustment in certain circumstances.

The dividend rate on the Series C Preferred Stock shall adjust upward by 98.880 basis points for each \$0.50 (as adjusted to reflect the Reverse Stock Split) that the volume weighted average price of our common stock on any trading day as of which the dividend rate is determined and calculated is below \$10.00 (as adjusted to reflect the Reverse Stock Split), subject to a maximum dividend rate of 18%. The dividend rate on the Series C Preferred Stock shall adjust downward by 98.880 basis points for each \$0.50 (as adjusted to reflect the Reverse Stock Split) that the volume weighted average price of our common stock on any trading day as of which the dividend rate is determined and calculated is above \$13.00 (as adjusted to reflect the Reverse Stock Split), subject to a minimum dividend rate of 3%.

We have the option to pay dividends on the Series C Preferred Stock in cash or in additional shares of common stock. If we elect to pay in the form of common stock, the number of shares to be issued shall be calculated by using the lesser of 92% of (i) the volume weighted average price for the common stock over a 60 day measuring period or (ii) the lowest single day closing price for the common stock occurring during such measuring period.

Conversion

The Series C Preferred Stock will be convertible into common stock at a fixed conversion price of \$11.50 (as adjusted to reflect the Reverse Stock Split) per share of common stock. The Series C Preferred Stock may be converted into shares of common stock at any time at the option of the holder. The Series C Preferred Stock may also be converted into shares of common stock at our option if the closing price of the common stock exceeds \$23.00 (as adjusted to reflect the Reverse Stock Split) for 20 consecutive trading days.

In addition to the issuance of the applicable number of conversion shares, upon any conversion of Series C Preferred Stock, we will also pay to the holder an "embedded dividend liability" amount equal to the dividends (calculated at the then applicable dividend rate) on the converted Series C Preferred Stock for a full five year period from the date of issue (less any period for which dividends have previously been paid). Such embedded dividend liability amount may be paid in cash or, at our option, additional shares of common stock. If we elect to pay the embedded dividend liability amount in the form of common stock, the number of shares to be issued shall be calculated by using the lesser of (i) 92% of the volume weighted average price for the common stock over a 60 day measuring period or (ii) 92% of the lowest single day closing price for the common stock occurring during such measuring period.

Redemption

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Upon or after the fifth anniversary of the initial issuance date of the Series C Preferred Stock, we will have the right, at our option, to redeem for cash all or a portion of the Series C Preferred Stock at a price per share equal to \$10,000 plus any accrued but unpaid dividends (the “Series C Liquidation Value”).

At any time prior to the fifth anniversary of the date of the initial issuance of Series C Preferred Stock, the Company will have the option to redeem for cash all or a portion of the Series C Preferred Stock at a price per share equal to (a) \$10,000 plus (b) the “embedded dividend liability” amount equal to the dividends on the redeemed Series C Preferred Stock for a full five year period from the date of issue (less any period for which dividends have previously been paid).

Liquidation Value

Upon our liquidation, dissolution or winding up, holders of Series C Preferred Stock will be entitled to be paid out of our assets, on a parity with holders of our common stock and our Series A Preferred Stock, an amount equal to \$10,000 per share plus any accrued but unpaid dividends thereon.

Voting Rights; Conversion; Transfer

Except as otherwise required by law (or with respect to approval of certain actions), the Series C Preferred Stock will not have voting rights.

Authorized but Unissued Shares

The authorized but unissued shares of common stock are available for future issuance without stockholder approval, unless otherwise required by law or applicable stock exchange rules. Additional authorized but unissued shares may be used for a variety of corporate purposes, including future public offerings to raise additional capital, corporate acquisitions and employee benefit plans. The existence of authorized but unissued shares could hinder or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Warrants under the Seow Purchase Agreement

Under the Seow Purchase Agreement, we agreed to sell warrants (the “Seow Warrants”) to purchase up to 262,500 shares of our common stock at an exercise price of \$9.00 per share of common stock (as adjusted to reflect the Reverse Stock Split). The Seow Warrants have a three year term until June 2016.

2005 Stock Option Plan

Our 2005 Stock Option Plan, as amended (the “Option Plan”), currently authorizes the grant of up to 370,000 shares of common stock (as adjusted to reflect the Reverse Stock Split and subject to further adjustment for stock splits and similar capital changes) in connection with incentive stock option grants and non-qualified stock option grants.

Employees and, in the case of nonqualified stock options, directors, consultants or other service providers are eligible to receive grants under our plans. According to the terms of the Option Plan, no employee may be granted, in any fiscal year, options to purchase more than 12,500 shares or 25,000 shares during the initial year of service. As of October 15, 2014, there were 183,711 options vested or expected to vest in the future under our Option Plan. As of October 15, 2014, 70,297 shares remained available for future grant under our Option Plan.

At a special meeting of the Company’s stockholders to be held on October 22, 2014, the stockholders will be voting on an amendment and restatement of the Option Plan. If the stockholders approve the amendment and restatement of the Option Plan, (i) the number of shares of common stock authorized for issuance under the Option Plan will be increased from 370,000 shares to 3,400,000 shares and (ii) employees may be granted, in any fiscal year, options to purchase up to 500,000 shares (as opposed to the current limit of 12,500 shares in any fiscal year or 25,000 shares during the initial year of service). If the stockholders do not approve the amendment and restatement of the Option Plan, the current Option Plan will remain in effect.

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2008 Restricted Stock Plan

Our 2008 Restricted Stock Plan, as amended (the “Stock Plan”), currently authorizes the grant of up to 455,000 shares of restricted common stock and restricted stock units (as adjusted to reflect the Reverse Stock Split and subject to further adjustment for stock splits and similar capital changes) to employees, directors, consultants or other service providers. According to the terms of the Stock Plan, no individual may be granted, in any fiscal year, more than 40,000 shares. Vesting of shares of restricted stock granted under the Stock Plan may occur over a specified period of time or based upon performance metrics announced at the time of grant. As of October 15, 2014, 58,891 restricted stock units were expected to vest in the future under the Stock Plan. As of October 15, 2014, 216,089 shares remained available for future grant under the Stock Plan.

At a special meeting of the Company’s stockholders to be held on October 22, 2014, the stockholders will be voting on an amendment and restatement of the Stock Plan. If the stockholders approve the amendment and restatement of the Stock Plan, (i) the number of shares of common stock authorized for issuance under the Stock Plan will be increased from 455,000 shares to 1,500,000 shares and (ii) individuals may be granted, in any fiscal year, up to 200,000 shares (as opposed to the current limit of 40,000 shares in any fiscal year). If the stockholders do not approve the amendment and restatement of the Stock Plan, the current Stock Plan will remain in effect.

Registration Rights

Pursuant to a stockholders agreement between us and TFG Radiant, TFG Radiant holds certain registration rights related to its shares. We granted Seow certain registration rights in connection with the execution of the Seow Purchase Agreement. We granted Ironridge certain registration rights in connection with the execution of the Ironridge Purchase Agreement, which rights have been satisfied.

Anti-Takeover Effects of Certain Provisions of Delaware Law and Our Certificate of Incorporation and Bylaws
Our Certificate of Incorporation and Bylaws contain a number of provisions that could make our acquisition by means of a tender or exchange offer, a proxy contest or otherwise more difficult. These provisions are summarized below.

Removal of Directors. Our Bylaws provide that our directors may only be removed by the affirmative vote of the shares entitled to vote at an election of directors, or for cause by a majority of the Board. Although our Bylaws do not give the Board the power to approve or disapprove stockholder nominations for the election of directors or of any other business stockholders desire to conduct at an annual or any other meeting, the Bylaws may have the effect of precluding a nomination for the election of directors or precluding the conduct of business at a particular annual meeting if the proper procedures are not followed, or discouraging or deterring a third party from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control, even if the conduct of that solicitation or attempt might be beneficial to our stockholders.

Staggered Board. Staggered terms tend to protect against sudden changes in management and may have the effect of delaying, deferring or preventing a change in our control without further action by our stockholders. Our Board is divided into three classes, with one class of directors elected at each year’s annual stockholders meeting.

Special Meetings. Our Bylaws provide that special meetings of stockholders can be called by the President, at the request of a majority of the Board or at the written request of holders of at least 50% of the shares outstanding and entitled to vote.

Undesignated Preferred Stock. The ability to authorize undesignated preferred stock makes it possible for our Board to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to acquire us. These and other provisions may have the effect of deferring hostile takeovers or delaying changes in control or management of our Company.

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Delaware Anti-Takeover Statute. We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging under certain circumstances in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

Prior to the date of the transaction that resulted in the stockholder becoming an interested stockholder, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder.

Upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer.

On or subsequent to the date of the transaction that resulted in the stockholder becoming an interested stockholder, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting securities. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our Board does not approve in advance. We also anticipate that Section 203 may also discourage attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

The provisions of Delaware law, our Certificate of Incorporation and our Bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Listing

Our common stock is listed on the Nasdaq Capital Market under the trading symbol "ASTI."

Transfer Agent and Registrar

The transfer agent and registrar of our common stock is Computershare Investor Services.

EXPERTS

The financial statements in our Annual Report on Form 10-K for the year ended December 31, 2013 have been audited by Hein & Associates LLP, an independent registered public accounting firm, to the extent and for the periods set forth in their report, and are incorporated in this prospectus by reference in reliance upon such report and upon the authority of such firm as experts in accounting and auditing.

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LEGAL MATTERS

The validity of the securities offered hereby will be passed on by Faegre Baker Daniels LLP, Boulder, Colorado.

INFORMATION INCORPORATED BY REFERENCE

This prospectus is part of a registration statement on Form S-3. The SEC allows this filing to “incorporate by reference” information that we previously have filed with the SEC. This means we can disclose important information to you by referring you to other documents that we have filed with the SEC. The information that is incorporated by reference is considered part of this prospectus, and information that we file later will automatically update and may supersede this information. For further information about us and the securities being offered, you should refer to the registration statement and the following documents that are incorporated by reference:

• Our annual report on Form 10-K filed on March 28, 2014, which contains audited financial statements for the fiscal year ended December 31, 2013;

• Our definitive proxy statements on Schedule 14A filed on April 25, 2014 and September 26, 2014;

• Our quarterly report on Form 10-Q filed on May 7, 2014 for the quarter ended March 31, 2014;

• Our quarterly report on Form 10-Q filed on August 13, 2014 for the quarter ended June 30, 2014;

• Our current reports on Form 8-K filed on January 2, 2014, January 24, 2014, February 11, 2014, March 21, 2014, March 27, 2014, April 2, 2014, April 9, 2014, April 22, 2014, May 29, 2014, July 21, 2014, July 31, 2014, September 2, 2014, September 4, 2014 and September 16, 2014;

• All other reports filed by us pursuant to Section 13(a) or 15(d) of the Exchange Act since the end of the fiscal year covered by the annual report referred to above; and

• The description of our common stock contained in Forms 8-A filed on June 19, 2006 and August 8, 2006 and any amendments or reports filed for the purpose of updating such description.

All documents filed by the Company subsequent to those listed above with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, prior to the termination of the offering, shall be deemed to be incorporated by reference into this prospectus and to be a part hereof from the date of filing of such documents. Any statement contained in a document incorporated by reference herein shall be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

Our filings with the SEC, including our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports, are available free of charge on our website at <http://www.ascentsolar.com> as soon as reasonably practicable after they are filed with, or furnished to, the SEC. You may request a copy of all documents that are incorporated by reference in this prospectus by writing or telephoning us at the following address and telephone number: Ascent Solar Technologies, Inc., Attention: Corporate Secretary, 12300 North Grant Street, Thornton, Colorado 80241, telephone (720) 872-5000. We will provide copies of all documents requested (not including exhibits to those documents, unless the exhibits are specifically incorporated by reference into those documents or this prospectus) without charge.

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WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement on Form S-3 filed with the SEC under the Securities Act. This prospectus does not contain all the information set forth in the registration statement because certain information has been incorporated into the registration statement by reference in accordance with the rules and regulations of the SEC. Please review the documents incorporated by reference for a more complete description of the matters to which such documents relate.

We are subject to the information reporting requirements of the Exchange Act. In accordance with the Exchange Act, we file reports, proxy statements, and other information with the SEC. You can inspect and copy these reports, proxy statements, and other information at the Public Reference Room of the SEC, 100 F Street, N.E., Washington, D.C. 20549, at prescribed rates. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference rooms. Our SEC filings are also available on the SEC's web site. The address of this site is <http://www.sec.gov>.

INDEMNIFICATION

Our Certificate of Incorporation contains provisions that limit the liability of our directors for monetary damages to the fullest extent permitted by Delaware law. Consequently, our directors will not be personally liable to stockholders for monetary damages for any breach of fiduciary duties as directors, except liability for the following:

- Any breach of their duty of loyalty to our Company or our stockholders;
- Acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law;
- Unlawful payments of dividends or unlawful stock repurchases or redemptions as provided in Section 174 of the Delaware General Corporation Law; and
- Any transaction from which the director derived an improper personal benefit.

Our Bylaws provide that we are required to indemnify our directors and officers and may indemnify our employees and other agents to the fullest extent permitted by Delaware law. Our Bylaws also provide that we shall advance expenses incurred by a director or officer before the final disposition of any action or proceeding upon receipt of an undertaking from or on behalf of that director or officer to repay the advance if it is ultimately determined that he or she is not entitled to be indemnified. We have entered and expect to continue to enter into agreements to indemnify our directors, executive officers and other employees as determined by the Board. These agreements provide for indemnification for related expenses including attorneys' fees, judgments, fines and settlement amounts incurred by any of these individuals in any action or proceeding. We believe that these provisions and indemnification agreements are necessary to attract and retain qualified persons as directors and officers. We also maintain directors' and officers' liability insurance.

The limitation of liability and indemnification provisions in our Certificate of Incorporation and Bylaws may discourage stockholders from bringing a lawsuit against our directors for breach of their fiduciary duty. They may also reduce the likelihood of derivative litigation against our directors and officers, even though an action, if successful, might benefit us and other stockholders. Furthermore, a stockholder's investment may be adversely affected to the extent that we pay the costs of settlement and damage awards against directors and officers as required by these indemnification provisions. At present, there is no pending litigation or proceeding involving any of our directors, officers or employees for which indemnification is sought, and we are not aware of any threatened litigation that may result in claims for indemnification.

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DISCLOSURE OF COMMISSION POSITION ON INDEMNIFICATION OF SECURITIES ACT LIABILITIES

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers or persons controlling us pursuant to the foregoing provisions, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.