

Ascent Solar Technologies, Inc.
Form 424B5
November 12, 2010
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Filed Pursuant to Rule 424(b)(5)
Registration No. 333-156665

PROSPECTUS SUPPLEMENT

(To the Prospectus Dated January 16, 2009)

5,250,000 Shares

Ascent Solar Technologies, Inc.

Common Stock

We are offering 5,250,000 shares of our common stock pursuant to this prospectus supplement and the accompanying prospectus.

Our common stock is quoted on the NASDAQ Global Market under the symbol ASTI. The last reported sale price of our common stock on November 10, 2010 was \$4.56 per share.

Our business and an investment in our common stock include significant risks. See Risk Factors beginning on page S-4 of this prospectus supplement and in our Annual Report on Form 10-K for the year ended December 31, 2009, which has been filed with the Securities and Exchange Commission and is incorporated by reference in this prospectus supplement and the accompanying prospectus.

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 supplement or the accompanying prospectus. Any representation to the contrary is a criminal offense.

	<i>Per Share</i>	<i>Total</i>
Public offering price	\$ 4.15	\$ 21,787,500
Underwriting discount	0.25	1,307,250
Proceeds, before expenses, to us	3.90	20,480,250

The underwriters may also purchase up to an additional 787,500 shares from us at the public offering price, less the underwriting discount, within 30 days from the date of this prospectus supplement to cover overallocments, if any. If the underwriters exercise the option in full, the

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total discount and commission will be \$1,503,338 and the total net proceeds, before expenses, to us will be \$23,552,288.

The underwriters expect to deliver the shares against payment on or about November 16, 2010.

Cowen and Company

Rodman & Renshaw, LLC

November 12, 2010

ThinkEquity LLC

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of the offering and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement and the accompanying prospectus. The second part, the accompanying prospectus dated January 16, 2009, including the documents incorporated by reference, provides more general information. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or in any document incorporated by reference that was filed with the Securities and Exchange Commission, or SEC, before the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date, the statement in the document having the later date modifies or supersedes the earlier statement. You should read this prospectus supplement and the accompanying prospectus, including the information incorporated by reference and any free writing prospectus that we may provide to you in connection with this offering, in their entirety before making an investment decision.

You should rely only on the information contained or incorporated by reference in this prospectus supplement and the accompanying prospectus, along with the information contained in any free writing prospectus that we may provide to you in connection with this offering. We have not authorized anyone to provide you with different or additional information. You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus, and in any free writing prospectus that we may provide to you in connection with this offering is accurate only as of the respective dates of those documents. Our business, financial condition, results of operations and prospects may have changed since those dates.

As used in this prospectus supplement, the terms Ascent, we, us and our refer to Ascent Solar Technologies, Inc.

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PROSPECTUS SUPPLEMENT SUMMARY

The following summary highlights selected information contained elsewhere in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference in this prospectus supplement and the accompanying prospectus. It does not contain all the information you will need in making your investment decision. You should carefully read this entire prospectus supplement, the accompanying prospectus and the documents that they incorporate by reference. You should pay special attention to the Risk Factors section of this prospectus supplement beginning on page S-4 and our Annual Report on Form 10-K for the year ended December 31, 2009. Unless otherwise expressly stated or the context otherwise requires, all information in this prospectus supplement assumes that the option granted to the underwriter to purchase additional shares of our common stock as described herein has not been exercised.

About 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) by our founder and core scientific team 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, plastic substrate 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 provide us with significant advantages over both the crystalline silicon based PV manufacturers that currently dominate the PV market, as well as other thin-film PV manufacturers that use rigid and/or heavier substrate materials such as glass, stainless steel or other metals. Our target markets include the building integrated PV (BIPV) market, the electronic integrated PV (EIPV) market, the military and governmental portable power markets and the space and near-space markets.

We began production in FAB1 in the first quarter of 2009. We began installation of production equipment in FAB2 in Thornton, Colorado in the first quarter of 2009 and started commercial production at FAB2 in 2010. The FAB2 facility encompasses approximately 138,000 square-feet of office and manufacturing space. Approximately 75% of the total equipment planned for delivery into FAB2 had been delivered as of September 30, 2010. Our current plan is to reach an annual run rate of approximately 6MW to 8MW of capacity in FAB2 by the end of 2010. We expect that non-BIPV markets will constitute the majority of our product shipments in 2010.

In October 2010, Intertek Testing Services, an independent laboratory, completed environmental testing and certification of our two meter BIPV product under the requirements of IEC 61646 standards. We believe we are the first manufacturer of flexible CIGS PV modules to obtain this certification. We have submitted modules to Underwriters Laboratory (UL) for testing under UL 1703.

Corporate Information

We are incorporated under the laws of Delaware. Our principal business office is located at 12300 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 supplement.

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This Offering

Common stock offered by us	5,250,000 shares of common stock.
Common stock to be outstanding after this offering	32,225,826 shares of common stock.
Use of proceeds	We estimate that the net proceeds from this offering, after deducting underwriting discounts and commissions and before offering expenses payable by us, will be approximately \$20.5 million. We intend to use the net proceeds from this offering for the completion of our FAB2 production plant and for general corporate purposes. See Use of Proceeds beginning on page S-8 of this prospectus supplement.
Listing	Our common stock is quoted on the Nasdaq Global Market under the symbol ASTI.
Risk factors	Investing in our common stock involves a high degree of risk. See Risk Factors beginning on page S-4 of this prospectus supplement and other information included or incorporated by reference in this prospectus supplement and the accompanying prospectus.
We have granted the underwriters an option exercisable up to 30 days after the date of this prospectus supplement to purchase up to 787,500 additional shares of our common stock, on the same terms and conditions as the shares offered hereby.	
The number of shares of common stock to be outstanding immediately after this offering as shown above is based on 26,975,826 shares of common stock outstanding as of the close of business on November 9, 2010. This number excludes, as of the close of business on November 9, 2010:	
10,502,583 outstanding Class B warrants;	
112,500 outstanding warrants issued to the representative of the underwriters of our initial public offering and 112,500 Class A warrants (which upon issuance will be immediately subject to a call for redemption by us) and 225,000 Class B warrants underlying those outstanding warrants;	
1,536,001 shares of common stock reserved for issuance upon exercise of outstanding options under our 2005 Stock Option Plan, as amended;	
200,000 options issued to our President and Chief Executive Officer outside our 2005 Stock Option Plan, as amended, as an inducement grant; and	

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282,011 shares of common stock reserved for issuance upon vesting of unvested restricted stock units under our 2008 Restricted Stock Plan, as amended.

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RISK FACTORS

Investing in our common stock involves a high degree of risk. Before making an investment in our common stock, you should carefully consider the risk factors set forth below and discussed under the section captioned "Risk Factors" contained in our Annual Report on Form 10-K for the year ended December 31, 2009, which are incorporated by reference in this prospectus supplement and the accompanying prospectus in their entirety, together with the other information contained in this prospectus supplement, the accompanying prospectus and the documents we have incorporated by reference. If one or more of the possibilities described below or in the "Risk Factors" section of our Annual Report on Form 10-K for the year ended December 31, 2009 actually occur, our operating results and financial condition would likely suffer and the trading price of our common stock could fall, causing you to lose some or all of your investment in the securities we are offering.

Risks Relating to an Investment in Our Common Stock

The price of our common stock may continue to be volatile.

Our common stock is currently traded on the Nasdaq Global Market. The trading price of our common stock from time to time has fluctuated widely and may be subject to similar volatility in the future. For example, in the nine months ended September 30, 2010, our common stock traded as low as \$2.00 and as high as \$6.19, and in 2009, traded as low as \$2.19 and as high as \$8.83. The trading price of our common stock in the future may be affected by a number of factors, including events described in these "Risk Factors." In recent years, broad stock market indices, in general, and smaller capitalization and PV companies, in particular, have experienced substantial price fluctuations. In a volatile market, we may experience wide fluctuations in the market price of our common stock. These fluctuations may have a negative effect on the market price of our common stock regardless of our operating performance. In the past, following periods of volatility in the market price of a company's securities, securities class action litigation has often been instituted. A securities class action suit against us could result in substantial costs, potential liabilities and the diversion of management's attention and resources, and could have a material adverse effect on our financial condition.

Future sales or the potential for future sales of our securities may cause the trading price of our common stock to decline and could impair our ability to raise capital through subsequent equity offerings.

Sales of a substantial number of shares of our common stock or other securities in the public markets, or the perception that these sales may occur, could cause the market price of our common stock or other securities to decline and could materially impair our ability to raise capital through the sale of additional securities. A large number of our outstanding shares are not registered under the Securities Act of 1933, as amended (the "Securities Act"). If and when these shares are registered or become eligible for sale to the public market, the market price of our common stock could decline.

While any of our warrants are outstanding, it may be more difficult to raise additional equity capital.

There currently are warrants outstanding to purchase our securities. These warrants include Class B warrants and warrants issued to the representative of the underwriters in our initial public offering. During the term that any of our warrants are outstanding, the holders of those warrants are given the opportunity to profit from a rise in the market price of our common stock. The Class B warrants are not redeemable by us. We may find it more difficult to raise additional equity capital while these warrants are outstanding. At any time during which these warrants are likely to be exercised, we may be unable to obtain additional equity capital on more favorable terms from other sources.

If you purchase the securities sold in this offering, you may experience dilution if we issue additional equity securities in future fundraising transactions.

If we issue additional common stock, or securities convertible into or exchangeable or exercisable for common stock, our stockholders, including investors who purchase shares in this offering, will experience dilution, and any such issuances may result in downward pressure on the price of our common stock.

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Management will have broad discretion as to the use of the proceeds from this offering, and we may not use the proceeds effectively.

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. Our failure to apply these funds effectively could have a material adverse effect on our business, delay the production and sale of our PV modules and cause the price of our common stock to decline.

Some provisions of our charter documents and Delaware law may have anti-takeover effects that could discourage an acquisition of us by others, even if an acquisition would be beneficial to our stockholders, and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our Certificate of Incorporation and Bylaws, as well as provisions of Delaware law, could make it more difficult for a third party to acquire us, or for a change in the composition of our Board of Directors (our Board) or management to occur, even if doing so would benefit our stockholders. These provisions include:

authorizing the issuance of blank check preferred stock, the terms of which may be established and shares of which may be issued without stockholder approval;

dividing our Board into three classes;

limiting the removal of directors by the stockholders; and

limiting the ability of stockholders to call a special meeting of stockholders.

In addition, we are subject to Section 203 of the Delaware General Corporation Law, which generally prohibits a Delaware corporation from engaging in any of a broad range of business combinations with an interested stockholder for a period of three years following the date on which the stockholder became an interested stockholder, unless such transactions are approved by our Board. This provision could have the effect of delaying or preventing a change of control, whether or not it is desired by or beneficial to our stockholders. See Description of Securities Anti-Takeover Effects of Certain Provisions of Delaware Law and Our Certificate of Incorporation and Bylaws in the accompanying prospectus.

Norsk Hydro, our largest stockholder, is exempt from the general prohibitions of Section 203 because the transaction by which it became an interested stockholder in March 2007 was approved by our Board. Because Norsk Hydro has one representative on our Board, it is less likely that a third party could become an interested stockholder without the consent of Norsk Hydro.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement includes forward-looking statements that involve risks and uncertainties. Forward-looking statements include statements concerning our plans, objectives, goals, strategies, future events, future net sales or performance, capital expenditures, financing needs, plans or intentions relating to acquisitions, business trends and other information that is not historical information and, in particular, appear under headings including Summary and Business. When used in this prospectus supplement, the words estimates, expects, anticipates, projects, plans, intends, believes, forecasts, foresees, likely, may, should, goal, target and variations of such words or similar are intended to identify forward-looking statements. All forward-looking statements are based upon information available to us on the date of this prospectus supplement.

These forward-looking statements are subject to risks, uncertainties and other factors, many of which are outside of our control, that could cause actual results to differ materially from the results discussed in the forward-looking statements, including, among other things, the matters discussed in this prospectus supplement in the section captioned Risk Factors and in the Risk Factors section of our Annual Report on Form 10-K for the year ended December 31, 2009. Factors you should consider that could cause these differences include, but are not limited to:

Our limited operating history and lack of profitability;

Our ability to secure equity or debt or other financing necessary to fund our operations and the acquisition of additional operating capacity;

Our ability to meet the cost and performance metrics and to implement the production capacity that we have forecasted;

Our ability to develop demand for, and sales of, our photovoltaic modules and establish strategic relationships with key distribution partners, including original equipment manufacturers, system integrators and distributors;

Pricing pressure in the photovoltaic module market, which may result from overcapacity in the market or reductions in manufacturing costs of our competitors;

Our ability to obtain necessary or desired certifications for our photovoltaic modules;

Whether we receive timely delivery of production tools from our equipment suppliers;

Our ability to design, purchase, install, qualify and operate production tools pursuant to our business plan and within budgeted amounts;

The extent to which we are able to reduce the per watt manufacturing costs of our photovoltaic modules, and the extent to which our competitors are able to do the same with their photovoltaic modules;

Global demand for electricity and the market for renewable energy, including solar energy;

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The cost-effectiveness of photovoltaic-generated energy relative not only to that generated from conventional sources such as fossil fuels, but also to that generated from other renewable sources which include wind, biomass, geothermal and tidal power;

The availability of, or changes to, government policies, subsidies and incentives that affect the use or cost of renewable energy;

The emergence of disruptive or competing technologies in the energy industry;

Our competitive position and that of our photovoltaic modules relative to others in the photovoltaic and thin-film markets;

The extent to which our interests align with or deviate from that of Norsk Hydro Produksjon AS, our largest stockholder, and its affiliates;

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Foreign currency exchange fluctuations, political instability in certain foreign markets or the general state of geopolitical affairs;

The supply and price of equipment, components and raw materials;

The status of our relationship with ITN Energy Systems, Inc.;

Our ability to attract and retain key executives and employees;

Our continued investment in research and development, and our ability to remain competitive through development of new technologies;

The extent to which we are able to manage the expansion of our operations effectively, both domestically and abroad;

Commencement of legal proceedings against us or by us, including proceedings relating to environmental matters or intellectual property rights;

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

The extent to which we qualify to perform research and development under the federal government's Small Business Innovation Research program; and

General economic and business conditions.

There may be other factors that could cause our actual results to differ materially from the results referred to in the forward-looking statements. We undertake no obligation to publicly update or revise forward-looking statements to reflect subsequent events or circumstances after the date made or to reflect the occurrence of unanticipated events, except as required by law.

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USE OF PROCEEDS

Based upon an offering price of \$4.15 per share, we estimate that the net proceeds we will receive from this offering will be approximately \$20.3 million, or approximately \$23.3 million if the underwriters exercise in full their option to purchase up to 787,500 additional shares of our common stock, after deducting underwriting discounts and commissions and estimated expenses payable by us. We intend to use the net proceeds from this offering for completion of our FAB2 production plant and for general corporate purposes.

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We and the underwriters for the offering named below have entered into an underwriting agreement with respect to the common stock being offered. Subject to the terms and conditions of the underwriting agreement, each underwriter has severally agreed to purchase from us the number of shares of our common stock set forth opposite its name below. Cowen and Company, LLC is the representative of the underwriters.

Underwriter	Number of Shares
Cowen and Company, LLC	4,200,000
Rodman & Renshaw, LLC	525,000
ThinkEquity LLC	525,000
Total	5,250,000

The underwriting agreement provides that the obligations of the underwriters are subject to certain conditions precedent and that the underwriters have agreed, severally and not jointly, to purchase all of the shares sold under the underwriting agreement if any of these shares are purchased, other than those shares covered by the overallotment option described below. If an underwriter defaults, the underwriting agreement provides that the purchase commitments of the non-defaulting underwriters may be increased or the underwriting agreement may be terminated.

We have agreed to indemnify the underwriters against specified liabilities, including liabilities under the Securities Act, and to contribute to payments the underwriters may be required to make in respect thereof.

The underwriters are offering the shares, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by their counsel and other conditions specified in the underwriting agreement. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Overallotment Option to Purchase Additional Shares. We have granted to the underwriters an option to purchase up to 787,500 additional shares of common stock at the public offering price, less the underwriting discount. This option is exercisable for a period of 30 days. The underwriters may exercise this option solely for the purpose of covering overallotments, if any, made in connection with the sale of common stock offered hereby. To the extent that the underwriters exercise this option, the underwriters will purchase additional shares from us in approximately the same proportion as shown in the table above.

Discounts and Commissions. The following table shows the public offering price, underwriting discount and proceeds, before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

We estimate that the total expenses of the offering, excluding underwriting discount, will be approximately \$225,000 and are payable by us. Pursuant to FINRA interpretations, total underwriter compensation shall not exceed 8% of the gross proceeds of this offering.

	Per Share	Without Over-Allotment	Total With Over Allotment
Public offering price	4.15	21,787,500	25,055,625
Underwriting discount	0.25	1,307,250	1,503,338
Proceeds, before expenses, to us	3.90	20,480,250	23,552,288

The underwriters propose to offer the shares of common stock to the public at the public offering price set forth on the cover of this prospectus supplement. The underwriters may offer the shares of common stock to securities dealers at the public offering price less a concession not in excess of \$0.13 per share. If all of the shares are not sold at the public offering price, the underwriters may change the offering price and other selling terms.

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Discretionary Accounts. The underwriters do not intend to confirm sales of the shares to any accounts over which they have discretionary authority.

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Stabilization. In connection with this offering, the underwriters may engage in stabilizing transactions, overallotment transactions, syndicate covering transactions, penalty bids and purchases to cover positions created by short sales.

Stabilizing transactions permit bids to purchase shares of common stock so long as the stabilizing bids do not exceed a specified maximum, and are engaged in for the purpose of preventing or retarding a decline in the market price of the common stock while the offering is in progress.

Overallotment transactions involve sales by the underwriters of shares of common stock in excess of the number of shares the underwriters are obligated to purchase. This creates a syndicate short position which may be either a covered short position or a naked short position. In a covered short position, the number of shares over-allotted by the underwriters is not greater than the number of shares that they may purchase in the overallotment option. In a naked short position, the number of shares involved is greater than the number of shares in the overallotment option. The underwriters may close out any short position by exercising their overallotment option and/or purchasing shares in the open market.

Syndicate covering transactions involve purchases of common stock in the open market after the distribution has been completed in order to cover syndicate short positions. In determining the source of shares to close out the short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared with the price at which they may purchase shares through exercise of the overallotment option. If the underwriters sell more shares than could be covered by exercise of the overallotment option and, therefore, have a naked short position, the position can be closed out only by buying shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that after pricing there could be downward pressure on the price of the shares in the open market that could adversely affect investors who purchase in the offering.

Penalty bids permit the representative to reclaim a selling concession from a syndicate member when the common stock originally sold by that syndicate member is purchased in stabilizing or syndicate covering transactions to cover syndicate short positions. These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock. As a result, the price of our common stock in the open market may be higher than it would otherwise be in the absence of these transactions. Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of our common stock. These transactions may be effected on the Nasdaq Global Market, in the over-the-counter market or otherwise and, if commenced, may be discontinued at any time.

Passive Market Making. In connection with this offering, underwriters and selling group members may engage in passive market making transactions in our common stock on the Nasdaq Global Market in accordance with Rule 103 of Regulation M under the Securities Exchange Act of 1934, as amended (the Exchange Act), during a period before the commencement of offers or sales of common stock and extending through the completion of the distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

Lock-Up Agreements. Pursuant to certain lock-up agreements, we and our executive officers, directors and certain stockholders, have agreed, subject to certain exceptions, not to offer, sell, assign, transfer, pledge, contract to sell, or otherwise dispose of or announce the intention to otherwise dispose of, or enter into any swap, hedge or similar agreement or arrangement that transfers, in whole or in part, the economic consequence of ownership of, directly or indirectly, or make any demand or request or exercise any right with respect to the registration of, or file with the SEC a registration statement under the Securities Act relating to, any common stock or securities convertible into or exchangeable or exercisable for any common stock without the prior written consent of Cowen and Company, LLC, for a period of 90 days after the date of the pricing of the offering. The 90-day restricted period will be automatically extended if (i) during the last 17 days of the 90-day restricted

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period we issue an earnings release or material news or a material event relating to us occurs or (ii) prior to the expiration of the 90-day restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the 90-day restricted period, in either of which case the restrictions described above will continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the public announcement of the material news or the occurrence of the material event, as applicable, unless Cowen and Company, LLC waives, in writing, such extension.

This lock-up provision applies to common stock and to securities convertible into or exchangeable or exercisable for common stock. It also applies to common stock owned now or acquired later by the person executing the agreement or for which the person executing the agreement later acquires the power of disposition. The exceptions permit, among other things and subject to restrictions, (1) the exercise of stock options granted pursuant to the Company's equity incentive plan; (2) sales pursuant to any contract, instruction or plan that satisfies all of the requirements of Rule 10b5-1(c)(1)(i)(B) under the Exchange Act, that was in place as of the date of the pricing of the offering, (iii) the establishment (following the date of the pricing of the offering) of any contract, instruction or plan that satisfies all of the requirements of Rule 10b5-1(c)(1)(i)(B) under the Exchange Act; provided that no sales shall be made pursuant to such a plan prior to the expiration of the restricted period, (4) if the holder is a natural person, certain transfers made as bona fide gifts, to a trust, or by will or intestate succession upon the death of the holder, or (5) if the holder is a corporation, partnership, limited liability company or other business entity (a) transfers to any shareholder, partner or member of, or owner of a similar equity interest in, the holder if such transfer is not for value, and (b) transfers in connection with the sale of all or substantially all of the holder's capital stock, partnership interests, membership interests or other similar equity interests, or all or substantially all of the holder's assets, in any such case not undertaken for the purpose of avoiding the restrictions imposed by the lock-up agreement or (c) to another corporation, partnership, limited liability company or other business entity affiliated with the holder if such transfer is not for value.

Electronic Offer, Sale and Distribution of Shares. A prospectus in electronic format may be made available on the websites maintained by one or more of the underwriters or selling group members, if any, participating in this offering and one or more of the underwriters participating in this offering may distribute prospectuses electronically. The representatives may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the underwriters and selling group members that will make internet distributions on the same basis as other allocations. Other than the prospectus in electronic format, the information on these websites is not part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved or endorsed by us or any underwriter in its capacity as underwriter, and should not be relied upon by investors.

Other Relationships. Certain of the underwriters and their affiliates have provided, and may in the future provide, various investment banking, commercial banking and other financial services for us and our affiliates for which they have received, and may in the future receive, customary fees.

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EXPERTS

The financial statements and the effectiveness of internal control over financial reporting in our Annual Report on Form 10-K for the year ended December 31, 2009 have been audited by Hein & Associates LLP, an independent registered public accounting firm, to the extent and for the periods set forth in their reports, and are incorporated in this prospectus supplement by reference in reliance upon such reports and upon the authority of such firm as experts in accounting and auditing.

LEGAL MATTERS

Certain legal matters with respect to the common stock will be passed upon for us by Faegre & Benson LLP, Boulder, Colorado. Goodwin Procter LLP, New York, New York will pass upon certain legal matters for the underwriters in connection with this offering.

INFORMATION INCORPORATED BY REFERENCE

This prospectus supplement and the accompanying prospectus are part of a registration statement on Form S-3. The SEC allows this filing to incorporate by reference information that the Company previously 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 supplement, and information that the Company files 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 for the fiscal year ended December 31, 2009, filed on March 16, 2010;

Our quarterly reports on Form 10-Q filed on May 6, 2010, August 5, 2010 and November 2, 2010;

Our current reports on Form 8-K filed on February 12, 2010, June 17, 2010 and September 1, 2010, to the extent filed and not furnished;

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 and, prior to the termination of the offering, shall be deemed to be incorporated by reference into this prospectus supplement 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 supplement 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 supplement.

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 number: Ascent Solar Technologies, Inc., Attention: Corporate Secretary, 12300 Grant Street, Thornton, Colorado 80241, (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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We file annual, quarterly and special reports, proxy statements and other information with the SEC. You may read and copy any document we file at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for more information about the operation of the Public Reference Room. The SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including Ascent Solar Technologies, Inc. The SEC's Internet site can be found at www.sec.gov.

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PROSPECTUS

ASCENT SOLAR TECHNOLOGIES, INC.

Up to \$150,000,000

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 Global Market under the symbol ASTI. On January 8, 2009, the last reported sale price of our common stock on the Nasdaq Global Market was \$4.04 per share.

Our principal executive offices are located at 8120 Shaffer Parkway, Littleton, Colorado 80127.

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 P-4.

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.

The date of this prospectus is January 16, 2009

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In this prospectus, references to we, us, our, Ascent, Ascent Solar or the Company mean Ascent Solar Technologies, Inc.

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About This Prospectus

This prospectus is part of a Registration Statement on Form S-3 that we filed with the Securities and Exchange Commission (SEC) using a shelf registration process. Under this shelf process, we may sell any combination of securities described in this prospectus in one or more offerings, up to the total dollar amounts appearing on the cover of this prospectus. This prospectus provides you with a general description of the securities we may offer. Each time we offer 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. The prospectus supplement for a particular offering may also add, update or change information contained in this prospectus. In addition, any prospectus supplement relating to a particular offering may be updated or supplemented. You should read carefully both this prospectus and any applicable prospectus supplement together with the additional information about us to which we refer you in the section of this prospectus entitled Where You Can Find More Information.

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.

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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.

Business 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) by our founder and core scientific team 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, plastic substrate 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 provides us with significant advantages over both the crystalline silicon (c-Si) based PV manufacturers that currently dominate the PV market, as well as other thin-film PV manufacturers that use rigid and/or heavier substrate materials such as glass, stainless steel or other metals.

Our target markets include the building integrated PV (BIPV) market, in which solar modules are incorporated directly into building and construction materials, the electronic integrated PV (EIPV) market, in which solar modules are incorporated directly into portable electronic devices, and the commodity solar panel market. In the BIPV and EIPV markets, we intend to be the supplier of choice by offering high-performance, flexible PV modules that can be integrated directly into products such as roofing shingles, siding and facades, metal and composite panels and roofing membranes in the BIPV market, and electronic packages, casings, battery packs and portable power systems in the EIPV market. In the commodity solar panel market, we intend to leverage our low-cost manufacturing process to compete primarily on the basis of price.

We are incorporated under the laws of Delaware, our principal business office is located at 8120 Shaffer Parkway, Littleton, Colorado, and our telephone number is (303) 285-9885. 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 (including, without limitation, our Class B 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 to exceed \$150,000,000 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.

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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, 2007, 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 includes forward-looking statements that involve risks and uncertainties. Forward-looking statements include statements concerning our plans, objectives, goals, strategies, future events, future net sales or performance, capital expenditures, financing needs, plans or intentions relating to acquisitions, business trends and other information that is not historical information and, in particular, appear under headings including "Prospectus Summary." When used in this prospectus, the words estimates, expects, anticipates, projects, plans, intends, believes, forecasts, foresees, likely, may, should, goal, target and variations of such words or similar expressions are intended to identify forward-looking statements. All forward-looking statements are based upon information available to us on the date of this prospectus.

These forward-looking statements are subject to risks, uncertainties and other factors, many of which are outside of our control, that could cause actual results to differ materially from the results discussed in the forward-looking statements, including, among other things, the matters discussed in this prospectus in the section captioned "Risk Factors." Factors you should consider that could cause these differences are:

Our limited operating history and lack of profitability;

Our ability to meet the cost and performance metrics that we have forecasted;

Our ability to develop demand for, and sales of, our PV modules and establish strategic relationships with key partners, including original equipment manufacturers (OEMs), system integrators and distributors;

Our ability to obtain necessary or desired certifications for our PV modules;

Whether we receive timely delivery of production tools from our equipment suppliers;

Our ability to design, purchase, install, qualify and operate production tools pursuant to our business plan and within budgeted amounts;

The extent to which we are able to reduce the per watt manufacturing costs of our PV modules, and the extent to which our competitors are able to do the same with their PV modules;

Global demand for electricity and the market for renewable energy, including solar energy;

The cost-effectiveness of PV-generated energy relative not only to that generated from conventional sources such as fossil fuels, but also to that generated from other renewable sources such as wind, geothermal and tidal power;

The availability of, or changes to, government policies, subsidies and incentives that affect the use or cost of renewable energy; The emergence of disruptive or competing technologies in the energy industry;