



UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

Mail Stop 3030

July 31, 2009

Via U.S. Mail and Fax (720) 872-5077

Gary Gatchell  
Chief Financial Officer  
Ascent Solar Technologies, Inc.  
8120 Shaffer Parkway  
Littleton, Colorado 80127

**Re: Ascent Solar Technologies, Inc.  
Form 10-K for the fiscal year ended December 31, 2008  
Filed March 12, 2009  
Form 10-Q for the period ended March 31, 2009  
File No. 001-32919**

Dear Mr. Gatchell:

We have reviewed your filings and have the following comments. Where indicated, we think you should revise your future filings in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or on any other aspects of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Form 10-K for the fiscal year ended December 31, 2008

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations, page 29

1. Please tell us where you have disclosed information regarding your contractual obligations in accordance with Item 303(a)(5) of Regulation S-K.

Liquidity and Capital Resources, page 39

2. In light of your commercialization and manufacturing expansion plans, please revise future filings to discuss your funding requirements and whether you will be able to satisfy working capital requirements for the next twelve months with liquidity on hand. If not, please expand your disclosures to discuss your plans to raise additional capital and other actions that you are taking to address your liquidity needs.

Item 11. Executive Compensation, page 50

3. Please note that Regulation S-K Item 402 requires all compensation information to be reported pursuant to that item, even if called for by another item. See Regulation S-K Item 402(a)(2) and (m)(1). In this regard, we note that you have described on page 59 under Item 13 the employment agreements with your executive officers. In future filings, as applicable, please ensure that you disclose the material terms of employment agreements with your named executive officers under the appropriate item of Form 10-K.

Financial Statements

Note 4. Fair Value Measurements, page F-14

4. Please tell us and revise future filings to describe the nature of your U.S. government securities and corporate securities. Please clarify why \$22.8M of U.S. government securities and all corporate securities are classified under the Level 2 category. Please also discuss the significant inputs and estimates that are used in your Level 2 fair value calculation.

Item 15. Exhibits, Financial Statement Schedules, page 62

5. Your exhibit list indicates that exhibit 10.27 is incorporated by reference from your Form 8-K filed November 29, 2007. However, no such report appears to have been filed by you. Please tell us from which report you intended to

incorporate this exhibit by reference. In addition, you indicate that exhibits 10.47 – 10.51 are all incorporated by reference from exhibit 10.47 to your Form 10-Q filed November 10, 2008. However, exhibit 10.47 to that quarterly report appears to only be a restricted stock plan, rather than the agreements mentioned in exhibits 10.48 – 10.51. In future filings, please ensure that your exhibit list refers to the correct location of the exhibits you have incorporated by reference.

Signatures, page 66

6. Please tell us which individual signed in the capacity of principal accounting officer or controller below the second paragraph of text as required on the signatures page. In this regard, we note that according to page 45 of this report, it appears that Janet Casteel is your chief accounting officer but she did not sign this filing. If Ms. Casteel is your principal accounting officer or controller, please amend your annual report on Form 10-K and ensure that Ms. Casteel signs the document in that capacity.

Exhibits 31.1 and 31.2

7. We note that the identification of the certifying individuals at the beginning of the certifications required by Exchange Act Rule 13a-14(a) also includes the title of the certifying individual. In future filings, the identification of the certifying individual at the beginning of each certification should be revised so as not to include such individual's title.

Form 10-Q for the period ended March 31, 2009

8. We note that exhibits 31.1 and 31.2 to your Form 10-Q for the period ended March 31, 2009 refer to an incorrect report in the paragraphs numbered 1. Please file a complete amendment to that report including all required certifications.

Item 2. Management's Discussion and Analysis . . . page 21

9. Please tell us how you calculated your public float as of the last business day of your fiscal quarter completed June 30, 2008, as it appears you are not eligible to rely on Regulation S-K Item 10(f). If you are not eligible to rely on Item 10(f), please ensure your future applicable filings includes all disclosure required of entities that are not smaller reporting companies. We note, for example, that your Form 10-Q for the period ended March 31, 2009 does not include the disclosure required by Regulation S-K Item 303(a)(5).

10. Please clarify whether you expect to begin production using equipment with a full 30 MW of annual rated production capacity by the middle of 2010 as disclosed on page 28 or by the end of 2010 as you disclose on page 11. If your previously disclosed plans have changed, please ensure your disclosure in applicable future filings describes the reasons for the change. For example, we note that according to pages 41 and F-13 of your annual report on Form 10-K that you expected to begin production with a full 30 MW of annual rated production capacity by the middle of 2010. Your disclosure on page 11 of your Form 10-Q for the period ended March 31, 2009 indicates that you do not expect to begin production with the full 30 MW capacity until the end of 2010.

As appropriate, please respond to these comments within 10 business days or tell us when you will provide us with a response. Please furnish a cover letter with your response that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your responses to our comments.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes all information required under the Securities Exchange Act of 1934 and that they have provided all information investors require for an informed investment decision. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In connection with responding to our comments, please provide, in writing, a statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filing or in response to our comments on your filing.

Gary Gatchell  
Ascent Solar Technologies, Inc.  
July 31, 2009  
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You may contact Praveen Kartholy at (202) 551-3778 or me at (202) 551-3605 if you have questions regarding comments on the financial statements and related matters. Please contact Geoffrey Kruczek at (202) 551-3641 or Jay Mumford at (202) 551-3637 with any other questions. You may also contact Martin F. James, Senior Assistant Chief Accountant, at (202) 551-3671.

Sincerely,

Brian R. Cascio  
Accounting Branch Chief