

Mail Stop 4561

March 31, 2006

Matthew Foster
Ascent Solar Technologies, Inc.
8120 Shaffer Parkway
Littleton, CO 80127

**RE: Ascent Solar Technologies, Inc.
Registration Statement on Form SB-2/A
File No. 333-131216
Amendment Filed on March 13, 2006**

Dear Mr. Foster:

We have reviewed your filing and have the following comments. Where indicated, we think you should revise your document in response to these comments.

General

1. Your response to prior comment 1 of our letter dated February 17, 2006 includes a description of a plan to add the resale of the securities underlying the “rights” held by the bridge lenders to this registration statement. You propose that the resale would be conducted by means of a second prospectus that would contain alternative cover pages and other alternative pages, which have not yet been filed. It appears that the proposed issuance of the units to the bridge lenders, commenced in reliance upon an exemption from registration, has not yet been completed. If so, Rule 152 is not available to separate the issuance and resale of the units as separate transactions. As such, the offer of the units to these bridge lenders appears to be an incomplete unregistered offering.
2. The automatic conversion scenario you focus on in your supplemental response does not appear to be the only possible outcome associated with the unregistered issuance of the “rights.” The automatic conversion of the rights into units will only take place if a public offering yielding gross proceeds of \$5 million is completed by January 18, 2007. Given this uncertainty it is unclear why you believe the offer of the units that underlie the “rights” was complete when the current registration statement on Form SB-2 was filed. What actions might the

- bridge lenders take or what discretion might any of those investors exercise that would delay the consummation of the proposed public offering? It appears that there is a current, incomplete offer of the rights and the underlying securities given that bridge lenders may exercise the “rights” commencing in January 2007, less than one year from the date the registration statement was filed. Further, the filing of the Form SB-2 constitutes a general solicitation for investors in the common stock, which appears inconsistent with your assertion that the rights and underlying securities are being offered in a transaction “not involving a public offering”. Please provide us with a detailed legal analysis setting forth the bases for any conclusion to the contrary. In your integration analysis, please analyze the impact of your plan to use part of the offering proceeds of the public offering to pay the bridge lenders’ notes, when the securities underlying the rights are being concurrently offered to the bridge lenders in an unregistered transaction.
3. Although we note that your response references the Black Box letter, it is unclear why the facts of your transaction are similar to those present in Black Box and why you believe that letter establishes that the underwritten offering of the common stock should not be integrated with the concurrent, unregistered offering of common stock underlying the rights. If you elect to provide a detailed analysis as to how Black Box applies to your facts, please address the fact that Black Box pertains to sales to Qualified Institutional Buyers and a very limited number of accredited investors. You indicate that there are 23 bridge lenders, which is not a “very limited number”. In preparing any response, please note that the concurrent transactions in Black Box were primary issuances. Explain why you believe Black Box applies to questions concerning the integration of a primary offerings and a purported secondary offering that would follow a not yet complete, unregistered issuance.
 4. We note your response to our prior comment 3 of our letter dated February 17, 2006. How will the unit securities and the underlying components be cleared and settled, both before and after the thirty day period expires? Also, please describe how the units will be permanently separated after the thirty days expires? Finally, has DTC agreed to make the unit security and the underlying components depository eligible? We may have further comment after reviewing your response.

Inside Front Cover and Outside Back Cover Pages of Prospectus

5. We reissue a part of our prior comment 4 of our letter dated February 17, 2006. Please move the text currently appearing after the table of contents to a part of the prospectus that is not subject to Rule 421(d) of Regulation C.

Prospectus Summary

6. The disclosure contained in the risk factor commencing, “[i]f we fail to clear

- certain technical hurdles . . . ,” fails to provide meaningful information concerning the known challenges you face in developing and commercializing your proposed product. Expand the risk factor so that the information obscured by the use of the word “certain” is concisely summarized. The description of the proposed product in the Business section should also be expanded to that it contains a materially complete description of the technical hurdles that you reference in the risk factors.
7. The first paragraph on page 2 is excessively detailed and focuses in part upon achievements of your parent corporation, which do not appear to warrant prominence in the summary. Please revise the lengthy paragraph so that it is concise in describing the historical background concerning ITN. We note that the detailed information in this paragraph is provided at page 17. In the text concerning ITN, the prospectus summary should provide an overview of the arrangements between your company and ITN. Summarize ongoing interaction between the related parties that is expected to take place under those agreements. Provide a cross-reference to the portion of the body of the prospectus that contains the detailed information concerning the related party arrangements.
 8. Your filing continues to contain references to “customers such as Lockheed Martin.” Please refer to page 18. We note that disclosure elsewhere in the filing is clear in indicating that you have no customers, no developed product and no developed commercial-scale production process. However, consistent with prior comment 6 of our letter dated February 17, 2006, please revise throughout to ensure that the descriptions of your business activities and products carefully distinguish between your accomplishments and your expectations and plans.
 9. We continue to review your response to our prior comment 7 of our letter dated February 17, 2006. Comments, if any, will be released under separate cover.

Risk Factors, page 5

10. The second risk factor added on page 7 indicates that you may not be eligible to perform “a majority” of the dollar amounts of the potentially assignable research and development contracts currently being performed by ITN. Disclose why there is uncertainty as to whether you will be an eligible assignee, and state the minimum dollar amount of the referenced contracts for which you are an eligible assignee. To the extent you are not eligible or are not reasonably expected to be an eligible assignee of the contracts, the referenced dollar amounts should be reduced to the contracts that can be assigned or for which you are a reasonably likely assignee.
11. In the third risk factor on page 7, you indicate that once you are a public company, you may no longer be eligible to apply for or service SBIR contracts. In your response letter, explain why becoming a public company may render you ineligible for these contracts, and explain why there is uncertainty in this respect.

12. Please expand the caption of the second risk factor on page 11 to alert investors that in some circumstances the warrants can be called when the exercise of the warrants is not possible because a current prospectus is not available. The resulting risk to investors should be concisely stated in the caption preceding the risk factor and this risk should be discussed more thoroughly in the risk factor text.
13. In the final risk factor you refer to an “exemption from registration” with respect to offers and sales of securities underlying the warrants, that you suggest might be available when a current prospectus concerning the exercise of the warrants is not available. In your response letter, identify the exemption you contemplate might be available in this circumstance. Unless an exemption is reasonably likely to be available in this circumstance, please eliminate text that suggests an exemption might be available.

Management’s Discussion and Analysis of Financial Condition and Results of Operations, page 17

14. We note the use of the phrase “monolithic integration process technology” at page 18, which is cited as a technological hurdle that must be successfully addressed in the product development/commercial production process. Please explain your reference to this term and the nature of the challenge. Provide similar explanations for your use of the phrases: “laser patterning operation,” “printing step,” “intelligent process controls,” and “closed-loop controls.” In the future, please refrain from employing specialized vocabulary that is not understandable to the ordinary investor.
15. In the second full paragraph on page 19 you refer to specific prices at which you expect to sell your undeveloped product. Further, you discuss substantial decreases in selling prices that may be achieved below the anticipated range of initial selling prices and refer to gross profit margins. Given the stage of business and product development for the company, the reasonable basis of statements of this nature is not clear. In your response letter, provide reasonably detailed support for these statements or revise to delete claims as to the specific prices at which you will be able to offer your products or that you will be able to achieve positive gross margins in producing the products.
16. On page 24, you use the terms “burn rate” and “total burn rate”. In using these terms, do you seek to convey that you will use cash of approximately \$80,000 and \$168,000 per quarter for production costs and for general and administrative costs, respectively? Indicate how the “burn rate” and “total burn rate” amounts compare to “net cash used in operating activities”, which you report in your statements of operations. What is the expected quarterly rate for the use of your cash resources?

Critical Accounting Policies and Estimates

Stock Based Compensation, page 22

17. Please refer to comment 37 in our letter dated February 17, 2006. We have reviewed your response and note that you are currently reviewing the AICPA Practice Aid “Valuation of Privately-Held-Company Equity Securities Issued as Compensation” (the “Practice Aid”) to determine whether any additional disclosure should be made. For options granted in 2005, we believe you should revise your registration statement to include the following in your MD&A section. We refer you to paragraph 182 of the Practice Aid:

- A discussion of the significant factors, assumptions and methodologies used in determining fair value;
- A discussion of each significant factor contributing to the difference between the fair value on each grant date and the estimated IPO price, if applicable; and
- The valuation alternative selected and the reason management chose not to obtain a contemporaneous valuation (as opposed to a retrospective valuation) by an unrelated valuation specialist.

Please note that we may have further disclosure comments after our review of your response to our comment below.

18. We also note in your response to prior comment 37 of our letter dated February 17, 2006 that you provided an internal memorandum addressing the fair value of your common stock. In this memorandum, you state that in connection with the bridge loan, a third party valuation of your common stock was performed. Explain why this valuation was not performed as of the November 18, 2005 grant date and provide us with a copy of this valuation that supports the fair value of your common stock on January 18, 2006.

Business, page 26

19. We acknowledge the information in the prospectus that references patent licenses (from licensors other than ITD) that you intend to obtain and your statement in response to our prior comment 27 of our letter dated February 17, 2006 that you will enter these arrangements before the effective date and that you will file the license agreements at that time. Prior to effectiveness, please advise us regarding the status of the license agreements.

Management, page 34

20. Please clarify the time period during which Ms. Casteel served as the controller and business manager of ITN. Ensure that her biographical information describes

her principal employment for a period of not less than five years. Similarly, please ensure the prior employment information for other executives, such as Mohan S. Misra Ph.D., covers a period of not less than five years.

21. We reissue a part of our prior comment 29 of our letter dated February 17, 2006. Disclose the extent to which business opportunities or other technologies which the members of the technical advisory board encounter or develop must be offered to or will be the property of Ascent.

Related Party Transactions, page 42

22. Please revise the first paragraph of this section to state the Mr. Misra's percentage ownership of Inica, Inc.

Unaudited Pro Forma Financial Statements, page F-2

23. Tell us why you have included pro forma statement of operations data for the year ended December 31, 2004 by presenting the operations as if the transfer of the Transferred Assets had taken place on January 1, 2004. In this regard, note that pro forma information, including the pro forma financial statements, should not be presented for periods other than the latest fiscal year and subsequent interim period. Refer to Rule 11-01(a)(1) of Regulation S-X.
24. Please refer to comment 33 of our letter dated February 17, 2006. We have reviewed your response and note your revisions in your registration statement by including pro forma earnings per share data. Please revise your pro forma statements of operations to also include historical earnings per share amounts for each period presented.
25. We note that the historical earnings per, as indicated in the Company's audited Statement of Operations, were calculated using weighted average common shares outstanding of 761,838. It appears that your pro forma earnings per share calculations used the same number of shares in the calculation and yet the pro forma financial statements have been adjusted for the 1,028,000 shares issued to ITN in exchange for the Transferred Assets. Please explain or revise accordingly.
26. Please refer to comment 35 of our letter dated February 17, 2006. We have reviewed your response and your revisions in your registration statement and note that you have removed the bridge loan transactions (both the 10% bridge loan interest and the bridge loan discount to reflect the value of the bridge rights) adjustments from the pro forma . We also note that you have removed the bridge loan financing adjustments from the pro forma balance sheet. We refer you to the guidance in Article 11-02(b)(6) of Regulation S-X, which indicates that pro forma adjustments to the income statement shall give effect to events that are (a) directly attributable to the transaction (b) factually supportable and (c) expected to have a

continuing impact, whereas pro forma balance sheet adjustments need only meet the first two criteria. Tell us how you considered these criteria in determining that all adjustments related to the bridge financing should be removed from your pro forma financial statements. If you determine that pro forma adjustments are not required for this transaction, then tell us what consideration you have given to including footnote disclosures to the pro forma financial statements that include a discussion of the impact of the bridge financing on your pro forma financial statements.

Ascent Solar Technologies Audited Financial Statements

Balance Sheet, page F-8

27. Your Balance Sheet indicates that there are no shares of common stock outstanding at December 31, 2005, however, we note the Company issued 972,000 shares for cash in November 2005. Please explain or revise accordingly.

Note 9. Subsequent Events

Bridge Financing, page F-18

28. Please refer to comment 39 of our letter dated February 17, 2006. We have reviewed your response and note that you allocated the 10% commission paid (\$160,000) to the placement agent to both the debt (\$80,000) and the bridge rights (\$80,000) associated with the bridge loan transaction. Tell us what accounting literature you are relying on in allocating the debt issuance costs to both the debt and the bridge rights. Additionally, confirm that the \$80,000 allocated to the bridge rights will be amortized as interest expense over the life of the loan as noted in your response.
29. We further note that the Company determined the actual value of the bridge loan and the bridge right to be \$1.6 million each. Tell us how you determined the value of the bridge rights and provide the method and specific assumptions used in your calculations.

Transferred Assets of ITN Energy Systems

Note 1. Organization and Basis of Presentation, page F-24

30. Please confirm that the carve-out financial statements were prepared for the PV business, excluding the SBIR contracts for which the Company may not be eligible. If this is the case, revise your disclosures to indicate as such with an explanation as to why certain contracts were excluded.

Closing Comments

Matthew Foster
Ascent Solar Technologies, Inc.
March 31, 2006
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As appropriate, please amend your registration statement in response to these comments. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested supplemental information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your amendment and responses to our comments.

You may contact at Patrick Gilmore at (202) 551-3406 if you have questions regarding comments on the financial statements and related matters. Questions on other disclosure issues may be directed to Jay Ingram at (202) 551-3397. If you require further assistance, please contact me at (202) 551-3462, or the Assistant Director, Barbara C. Jacobs at (202) 551-3735.

Sincerely,

Mark P. Shuman
Branch Chief

cc. Mark A. von Bergen *via telecopier*
(503) 241-8014