

# Assessing the Quality of Cash Flows of a Solar Power Project

Grace Drinker  
Associate  
Standard & Poor's

May 20, 2010

# Why Solar? Why Now?

---

## ***Why solar:***

- The sun provides a stable resource in the form of direct normal irradiance and global insolation
- Solar generation coincides with peak demand for power
- Concentrated solar thermal is proven on a utility scale with a successful operating history
- The modular design of an array allows solar PV to be used for both distributed generation and utility-scale power

## ***Why now:***

- Increasing government support through Renewable Portfolio Standards and the extension of the Investment Tax Credit
- Capital costs are declining due to improvements in conversion efficiency, balance of system components and design, coupled with decreasing silicon prices
- US retail electricity rates are expected to increase due to cost of carbon and, we believe, additional capital expenditures will help make PV competitive with conventional forms of generation

# **Bottom line: It's all about production**

---

## **Solar power production is a function of something greater than the shining sun**

- proper engineering
- performance and reliability of components
- availability of the plant

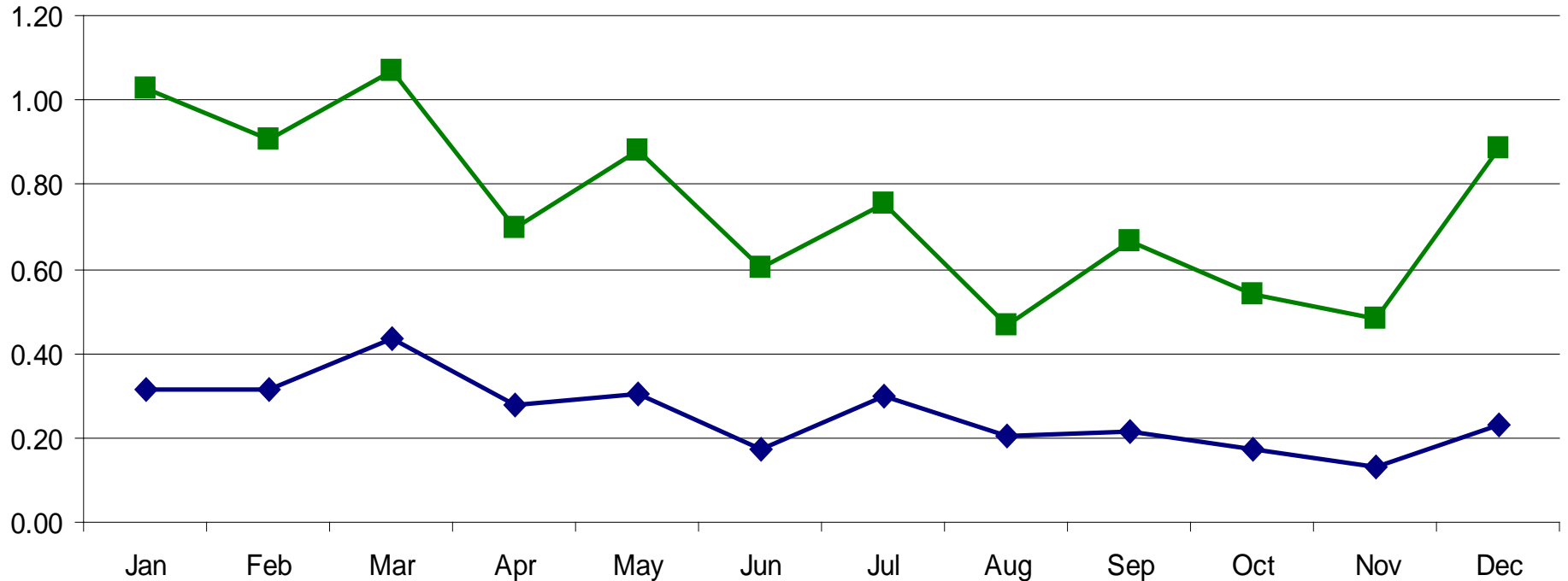
## **Operating and maintaining a plant has its price**

- less of an issue with solar
  - less moving parts than conventional power
  - CSP more exposed to O&M costs than PV

# Solar Resource Not As Risky As Wind

Inter-Year Standard Deviation, Daggett, CA 1991-2005\*

◆ Average Monthly Global Irradiation ■ Average Monthly Direct Normal Irradiance



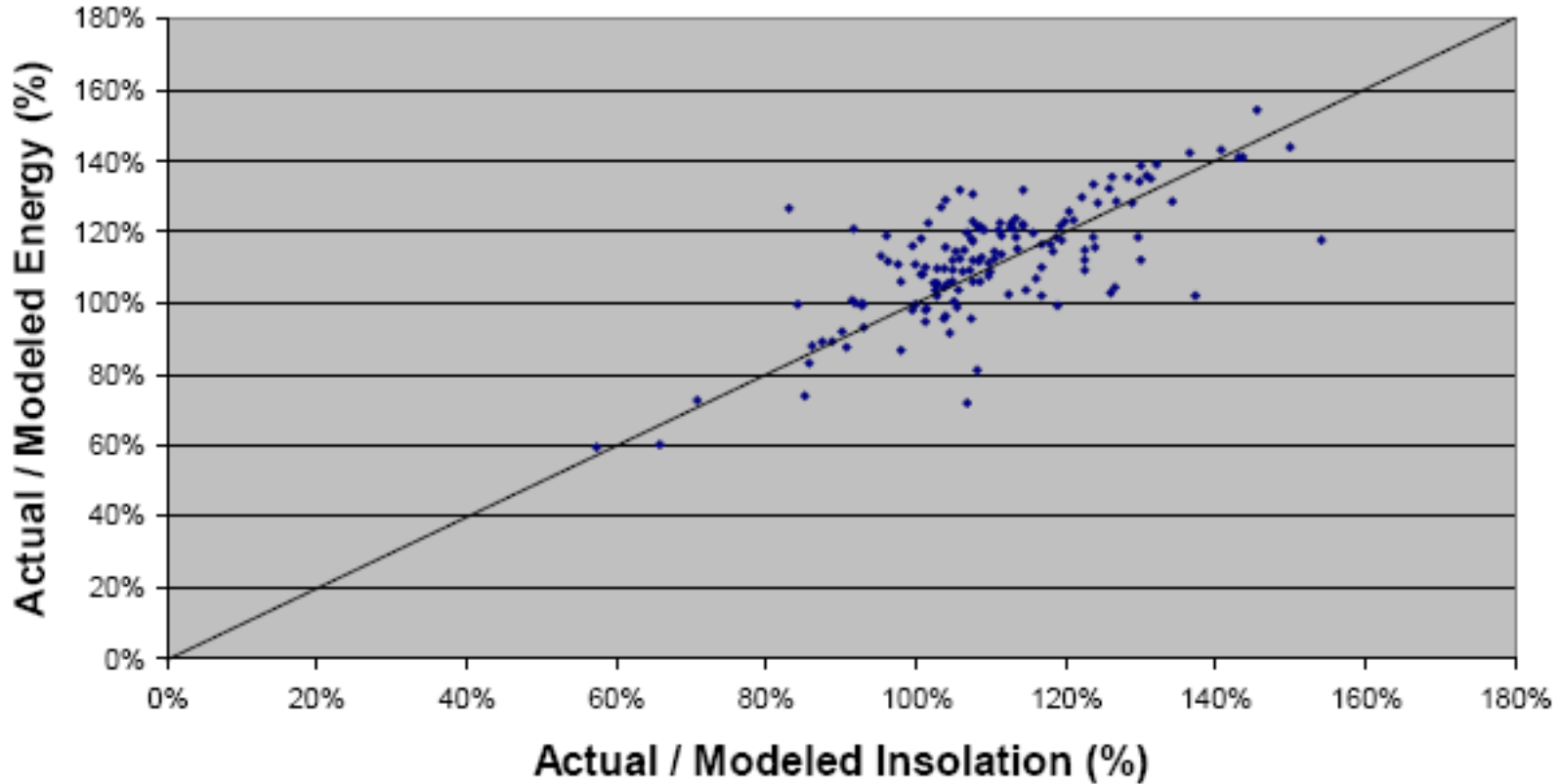
\*1991-2005. Source: National Solar Radiation Database

# Measurement of solar resource assessment important

---

- **Public data is not sufficient**
- **Solar resource assessment more important for CSP projects**
  - greater variability in DNI
  - potential for Time-Of-Use Power Purchase Agreements
- **We will look to an independent engineer and/or recognized solar resource consultant to opine on the strength of the solar resource.**
  - How much measured data is on site?
  - Is there a strong correlation between measured and modeled satellite data?
  - Do the measurements take system orientation and configuration into account?

# Variability In Sunlight Does Not Explain All Variability In Generation



Source: SunPower Corp

Permission to reprint or distribute any content from this presentation requires the prior written approval of Standard & Poor's.

# What Leads To a Decline In Production?

---

## For PV

- **Underperforming technology**
- **Poor engineering and design of system**
  - Mismatched modules, problems with an inverter, shading
- **Poor maintenance**
- **Heat degradation**
  - The hotter the temperature, the faster the degradation
- **Inverter performance**
- **Modeling**

## For CST

- **Underperforming technology**
- **Poor engineering and design of the system**
  - Inefficient scale-up, placement of receivers, flawed HTF flow design
- **Poor maintenance**
- **Tracking device problems**
- **Modeling**

# Operating and Maintenance Costs Are Important

- Costs expected to be higher for CSP than PV

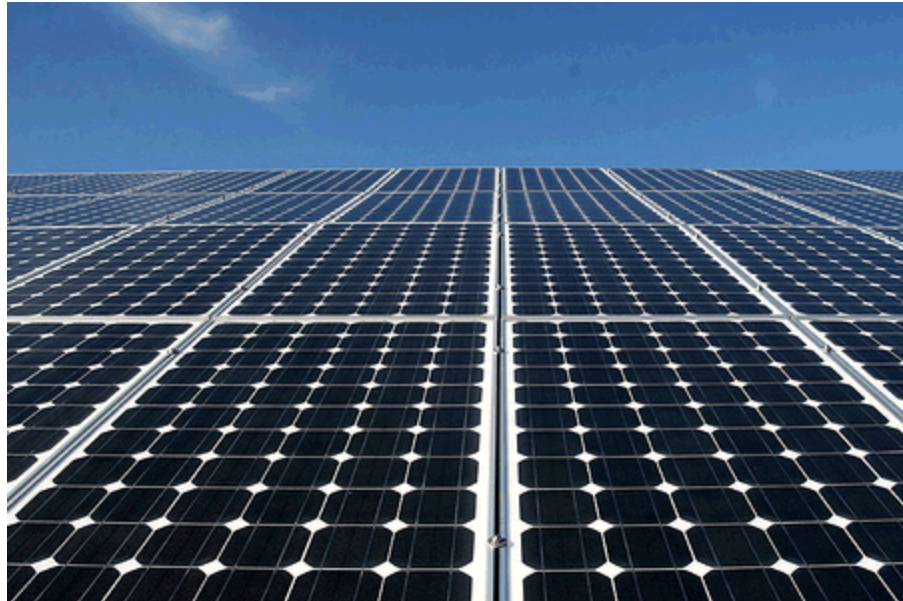




# Experience To Date

---

- **Range of credit outcomes**
- **Other credit factors**
  - Construction risk, especially for CSP
  - Offtaker risk
  - Financial structure





**EMPOWERING INVESTORS AND MARKETS FOR 150 YEARS**

**[www.standardandpoors.com](http://www.standardandpoors.com)**

---

Copyright © 2010 by Standard & Poor's Financial Services LLC (S&P), a subsidiary of The McGraw-Hill Companies, Inc. All rights reserved. No content (including ratings, credit-related analyses and data, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse engineered, reproduced or distributed in any form by any means, or stored in a database or retrieval system, without the prior written permission of S&P. The Content shall not be used for any unlawful or unauthorized purposes. S&P, its affiliates, and any third-party providers, as well as their directors, officers, shareholders, employees or agents (collectively S&P Parties) do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content, or for the security or maintenance of any data input by the user. The Content is provided on an "as is" basis. S&P PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.

Credit-related analyses, including ratings, and statements in the Content are statements of opinion as of the date they are expressed and not statements of fact or recommendations to purchase, hold, or sell any securities or to make any investment decisions. S&P assumes no obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. S&P's opinions and analyses do not address the suitability of any security. S&P does not act as a fiduciary or an investment advisor. While S&P has obtained information from sources it believes to be reliable, S&P does not perform an audit and undertakes no duty of due diligence or independent verification of any information it receives.

S&P keeps certain activities of its business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain business units of S&P may have information that is not available to other S&P business units. S&P has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

S&P may receive compensation for its ratings and certain credit-related analyses, normally from issuers or underwriters of securities or from obligors. S&P reserves the right to disseminate its opinions and analyses. S&P's public ratings and analyses are made available on its Web sites, [www.standardandpoors.com](http://www.standardandpoors.com) (free of charge), and [www.ratingsdirect.com](http://www.ratingsdirect.com) and [www.globalcreditportal.com](http://www.globalcreditportal.com) (subscription), and may be distributed through other means, including via S&P publications and third-party redistributors. Additional information about our ratings fees is available at [www.standardandpoors.com/usratingsfees](http://www.standardandpoors.com/usratingsfees).

STANDARD & POOR'S and S&P are registered trademarks of Standard & Poor's Financial Services LLC.