

## End of 2012 Newsletter

January 2013

Dear CPV Consortium Members,

It is hard to believe that another year has passed and we are already weeks into 2013. As we begin a new year, I'd like to take a moment to say a few words on 2012. While at a time when the solar industry as a whole, our CPV market segment not exempted, went through challenging times, I do believe that the CPV Consortium as an organization achieved more than in any prior year. It is always easy to look back at what isn't accomplished, but with a reasonably small membership, we were able to reach out to developers, utilities, financiers and government officials on numerous occasions, on multiple continents, and do our best to keep a positive and progressive posture. I would like to thank all of you for your work at the CPV Consortium, and encourage you to continue with those efforts as we move into 2013. Please allow me to share with you in this end of 2012 Newsletter, the CPV Consortium's recent activities and accomplishments. This newsletter gives an overview of the fourth quarter activities and a look ahead to 2013.

---

### 4<sup>th</sup> Quarter in Review

---

#### CPV San Jose Working Group Meeting

In conjunction with the **CPV USA 2012 Summit** in San Jose, California, the CPV Consortium hosted a working group meeting to follow up on the activities discussed at our previous membership meeting at Solar Power International. The meeting focused on the CPV Market Forecast, bankability/certifications, GTM CPV Cost Study, and future workshops and outreach. As part of the bankability/certifications initiative, the group decided to focus on encouraging the IEC to ratify the draft UL standard for CPV test conditions in order to help standardize certifications similar to PV. A discussion on the cost roadmap was also undertaken to provide additional information to GTM Research for that report.



*For more details on the content of the working group meeting, Claire van Zuiden sent out the meeting minutes. Please email her if you would like her to resend a copy.*

#### IEC Adopts Standard Test Conditions for CPV (IEC 62670-1)

One of the very early initiatives which the CPV Consortium undertook (I believe we began in 2011) was the adoption of standard test conditions for CPV similar to PV. While we had already implemented this as an industry, it was very exciting to have IEC approve these test conditions. What follows is an article which was prepared for publication in a trade magazine, written to provide clarity as to the specific

standard test conditions. With the approval of the authors, we have printed that article here in its entirety to assure that the CPV Consortium membership has clarity on the test conditions.

## **CPV Industry Converges on Standard Rating Conditions**

### ***The IEC has just voted to adopt standard test conditions for CPV (IEC 62670-1)***

December 10, 2012

Authors: Sarah Kurtz, Sandheep Surendran, Hansjörg Lerchenmueller

*The DC rating of flat-plate PV installations has traditionally been calculated by multiplying the number of PV modules by the peak watt rating for each module. This rating reflects performance at “Standard Test Conditions (STC)” (1000 W/m<sup>2</sup> and cell temperature of 25°C) [IEC 61215] and is seldom observed in normal operation because typical module operating temperatures are closer to 45°C. To better understand typical performance, modules are also characterized under a Standard Reference Environment (800 W/m<sup>2</sup> and ambient temperature of 20° C) [IEC 61215], which gives a better estimate of observed performance.*

*Over the years, concentrator photovoltaic (CPV) performance has been quantified based on widely varying conditions. In the past CPV companies chose between 25°C cell temperature or 20°C ambient temperature, and between 850 W/m<sup>2</sup>, 900 W/m<sup>2</sup>, and 1000 W/m<sup>2</sup> direct-normal irradiance (DNI) to determine the power rating(s). The meaning of a CPV module’s peak watt rating has been, therefore, difficult to compare, creating confusion, especially when a company neglected to mention the chosen rating conditions.*

*In order to provide clarity, the IEC [through IEC-62670-1] has adopted two sets of conditions that parallel the approach used for flat-plate products (see Table 1). The standard test conditions are the same as for flat plate (1000 W/m<sup>2</sup> and cell temperature of 25°C) with the exception that the spectrum is adjusted to be representative of the spectrum that more typically reaches the CPV cells. The CPV standard operating conditions are similar to the PV standard reference environment, except that they have a direct-normal irradiance that is representative of typical conditions in CPV target markets.*

*With this consistency between the approaches used for flat-plate and CPV ratings, confusion can be avoided. Nevertheless, to take advantage of the new clarity in the ratings, be sure to check that the manufacturer has switched to the new rating system. It shouldn’t be long before all manufacturers have made the switch, converging on standard conditions that facilitate the comparison of all CPV and flat-plate products.*

*Byline (identifying the affiliations of the authors, etc.) will depend on PHOTON’s preference, but should acknowledge contributions of 84 IEC Working group 7 members from 18 countries.*

**Table 1. Comparison of reference conditions used for characterizing flat-plate modules and now being adopted for CPV modules.**

Parameter	Flat-plate PV		CPV	
	Standard Test Condition	Standard Reference Environment	Concentrator Standard Test Condition	Concentrator Standard Operating Condition
<b>Irradiance</b>	1000 W/m <sup>2</sup>	800 W/m <sup>2</sup>	1000 W/m <sup>2</sup> DNI	900 W/m <sup>2</sup> DNI
<b>Temperature</b>	25 °C (cell)	20 °C (ambient)	25 °C (cell)	20 °C (ambient)
<b>Wind speed</b>	-	1 m/s	-	2 m/s
<b>Spectrum</b>	Per IEC 60904-3 reference solar spectral irradiance distribution (global)		Per IEC 60904-3 reference solar spectral irradiance distribution (direct)	

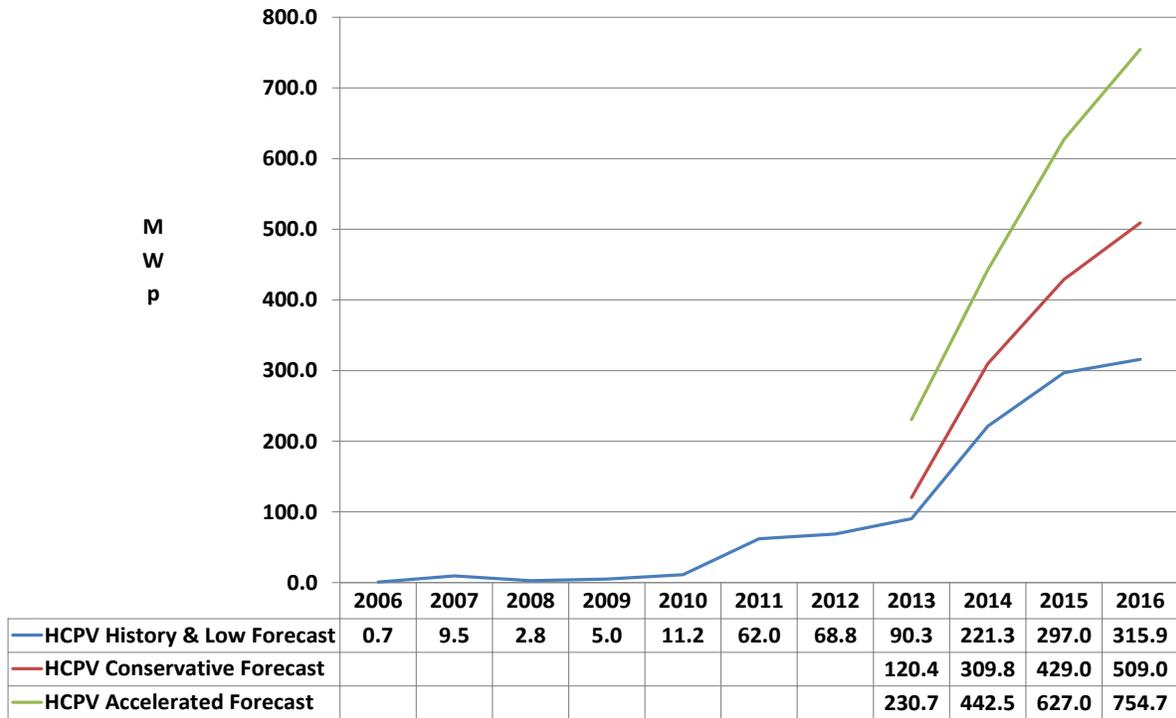
**Board of Director Election: Four seats to be filled for 2013-2014**

In November 2012 the CPV Consortium sent out ballots to the General Membership for the election to fill four (4) Board of Directors seats. In accordance to our bylaws, the newly elected board members will serve a two year term from January 2013-December 2014. The four board seats up for election were held by Martha Symko-Davies (NREL), Vahan Garboushain (Amonix), Russ Jones (Spectrolab), and Andreas Bett (Fraunhofer). Continuing board members serving until the end 2013 are Hansjörg Lerchenmüller (Soitec), Nancy Hartsoch (SolFocus), Vicente Diaz (Isofoton), and Steve Scott (Reflexite). Based on membership votes, Andreas Bett (Fraunhofer), Francesco Fraisopi (CESI), and Gerhard Strobl (AZUR SPACE) were elected the CPV Consortium Board of Directors. One additional individual was elected, but has since indicated that he is unable to serve. The remaining Board of Directors seat will be discussed at the January Board of Directors meeting.

**CPV Market Forecast**

As an initiative for 2012, the CPV Consortium worked with Navigant Consulting to prepare a market forecast for CPV through 2016. Paula Mints, who researched and prepared the forecast, left Navigant and completed the report through her new firm “Solar PV Market Research.” You should have received the full report earlier this week, released by Claire van Zuiden. Shown here is the summary forecast, showing that in 2012 an estimated 68.8 MW of high concentration CPV systems were installed and ready for grid connect in 2012. The full report defines the criteria for low, conservative, high, etc. and provides additional information on geographic breakouts and assumptions.

CPV Market Forecast through 2016; prepared by Solar PV Market Research



Please contact Claire van Zuiden directly if you did not receive a complete forecast document.

**Upcoming Events in 2013**

**CPV-9**

The upcoming CPV-9 conference will be held on April 15-17, 2013 in Miyazaki, Japan. This will be the inauguration of the CPV Consortium’s direct involvement as the Conference Facilitator. As Conference Facilitator, the CPV Consortium has been supporting the Conference Chair in all organization issues around the conference including facility selection and negotiation, conference identity and promotion, financial and legal matters for the conference. The CPV Consortium will likely have a membership meeting at the conference. We look forward to seeing all of you there.



---

## In Conclusion

---

**In conclusion**, thank you for your help in continuing the success of the CPV Consortium in 2012. It has been a pleasure to serve as your Chairman during this time, and I look forward to working with all of you in the upcoming year.

Thank you and best wishes for a healthy and prosperous New Year.

A handwritten signature in black ink that reads 'Nancy Hartsch'.

Nancy Hartsch

CPV Consortium, Chairman