NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Figure 1. Sighten system design interface displays a rooftop solar resource heatmap and automatically calculates array-level shading assessments.

VALIDATING the Accuracy of Sighten's Automated Shading Tool

Sighten is a comprehensive software platform that supports the design, sale, financing, and installation of solar photovoltaic (PV) systems.

Solar companies—including installers, financiers, and distributors—leverage Sighten software to deliver accurate shading calculations and solar proposals. Sighten recently incorporated Google Project Sunroof data to provide automated remote shading analysis as well as solar resource imagery directly within the Sighten platform.

Sighten automatically generates a digital, array-level shading assessment as users go through their normal design workflow, enabling accuracy, speed, and efficiency.

Using the Sighten platform for design and shading analysis is simple. After creating a new sales lead and entering address, utility, and energy usage information, Sighten users proceed to system design. The Sighten application pulls shading data and displays an image showing annual rooftop solar potential. This image provides a visual heatmap of available solar resource in kilowatt hours per kilowatt, incorporating key parameters like shading values, roof pitch, and azimuth. Leveraging this

FAST FACTS

- **Sighten and NREL conducted a blind study to determine the accuracy of Sighten's remote shading tool. Sighten was compared to Solmetric's SunEye, and solar access value results were equivalent within ±1.95 SAV's over the entire data set.**
- **Leveraging Google's Project Sunroof data, Sighten has been able to automate steps within the sales and design functions to ensure fast, reliable access to detailed shading data and rooftop solar resource imagery.**
- **Sighten automates shading assessments and associated production calculations, enabling significant cost savings that benefit the solar industry.**

summary of solar potential, Sighten users can quickly identify the most promising roof areas for maximum solar production and avoid less advantageous areas.

Once a roof segment is selected, Sighten users leverage a variety of features to specify array layout parameters and generate an actual system design. The platform identifies shading values specific to the exact array location and generates shading estimates for that array. The Sighten solar production engine incorporates these shading values when generating its production estimate for the array. The automation of a project's shading analysis makes it easy for users to quickly and confidently proceed to savings analysis, proposal presentation, and contract signing.

Verifying the Accuracy of Remote Shading

The National Renewable Energy Laboratory (NREL), in partnership with Sighten, independently verified the accuracy of Sighten's remote-shading solar access values (SAVs) on an annual basis for locations in Los Angeles, California, and Denver, Colorado. Estimates of annual SAVs were calculated using the Sighten remote system design tool at 43 roof locations across four houses in the Los Angeles metro area, and at 38 roof locations across four houses in the Denver metro area. Table 1 provides an analysis of annual SAV equivalence intervals of ±3%, ±5%, and ±10%. The table uses a Yes/No designation for each equivalence interval and location to indicate whether the product was able to meet the equivalence intervals.

SAV Equivalence Interval	Los Angeles	Denver
± 3%	Yes	Yes
± 5%	Yes	Yes
± 10%	Yes	Yes

Table 1. Estimated annual solar access value equivalence interval ranges from Sighten system design

In all, 81 roof locations were assessed on houses with varying slopes, rooftop obstructions, surrounding trees, and other factors that affect rooftop SAVs. Sighten's estimated SAVs were compared with the average readings taken from two Solmetric SunEye devices at the physical roof locations. Table 1 shows the results of the two, one-sided statistical test used to evaluate the differences in Sighten's readings and the SunEye readings.[1] Readings between Sighten and the SunEye devices are statistically equivalent if the confidence intervals of their mean differences fall within a given SAV equivalence interval.

The results of the analysis show that annual SAV measurements calculated by Sighten were statistically equivalent within ±2.89 SAVs to those of on-site measurements made with SunEye devices in Los Angeles and within ±1.66 SAVs in Denver. Over the entire data set for the 81 roof locations in the two cities, the SAV measurements calculated by Sighten were statistically equivalent within ±1.95 SAVs.

Potential for Soft-Cost Savings

Leveraging the automated shading tool within Sighten's end-to-end software workflow, users can create quick, accurate, professional proposals. This improvement in process efficiency and calculation accuracy has the potential to result in significant cost savings, benefiting homeowners, installers, and investors alike.

The cost of analyzing site data and conducting an on-site assessment before a proposal is estimated to constitute 55% of the customer acquisition and engineering design costs for residential solar photovoltaic installations. Accordingly, NREL estimates that bid preparation software tied with integrated shading analysis can save $0.17 per watt on a 5-kilowatt system.[2]

Although NREL has not independently certified Sighten's soft-cost savings, the estimated savings of this type of software application deployed at market scale is generally understood to reduce soft costs to a similar degree.

Read more about Sighten's Automated Shading Tool at *www.sighten.io*.

[1] Analysis of Solar Census Remote Solar Access Value Calculation Methodology *http://www.nrel.gov/docs/fy15osti/63098.pdf*

[2] Ardani et al. 2013. Non-Hardware ("Soft") Cost-Reduction Roadmap for Residential and Small Commercial Solar Photovoltaics, 2013–2020. NREL/TP-7A40-59155. National Renewable Energy Laboratory, Golden, CO. *www.nrel.gov/docs/fy13osti/59155.pdf*

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