ENERGY MATTERS SOLAR ANALYSER
WWW.ENERGYMATTERS.COM.AU/IPHONE

Energy Matters Solar Analyser user manual

The Energy Matters Solar Analyser is designed as a pre-screening tool for determining the suitability of a site for a solar power installation, but it can also be used to estimate output of existing systems.

Although designed primarily for the iPhone 3GS, Solar Analyser will work with relative accuracy on the iPhone 3G and iPod Touch. While the compass hardware is not available in the older iPhone 3G, (and neither compass or GPS functionality are available on iPod Touch), Solar Analyser is still capable of providing useful results with these devices.

You can download the free Solar Analyser here:

http://www.energymatters.com.au/iphone/

.. or read on for instructions

Please note

- Do not make financial decisions based solely on the information from this tool.
- Do not climb on a rooftop without proper safety training and equipment.
- ***NOTE: The Solar Analyser is for Australian use only.*** Solar enthusiasts outside Australia can use the Sun Tracker App from iMeasure Systems, available here: http://www.imeasuresystems.com/

About Energy Matters: Energy Matters is one of Australia's largest companies solely dedicated to renewable energy. Our systems and components generate solar hot water and renewable power for private homes, businesses and schools around Australia and the Pacific. Visit us at www.energymatters.com.au

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About Solar Analyser

Energy Matters' Solar Analyser is an iPhone based site evaluation tool, providing full solar site analysis and is absolutely FREE to Australian users.

http://www.energymatters.com.au/iphone/

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Solar Analyser makes the most out of the iPhones 3GS's features. The compass and inclinometer functions, together with the built in GPS, has enough processing power to handle complex sun positioning algorithms.

Solar Analyser can perform shade analysis in seconds. It is simple to use, quick to deploy, and features once-only calibration and minimum site set-up time. Since it is built into your phone, it requires no extra hardware.

Using a built-in climate database, the Solar Analyser provides a realistic estimation of the solar availability (peak sun hours) at a location, taking into account the local shading. It also supports fixed, single and dual axis tracking systems.

The Energy Matters Solar Analyser includes a large database of solar panel and inverter models and will even calculate the $/month production of the proposed site under standard electricity rates or feed in tariffs.

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Data summary (site specification report)

The Solar Analyser generates a personalised PDF site survey summary including a graphical presentation of data and easy to interpret site information. The report information includes:

- yearly shade profile
- monthly AC and DC output
- monthly savings/profit generated.

Solar Analyser allows you to e-mail the report for record keeping, for analysis by Energy matters, or to request a quote for a grid connected solar system.

Support

Energy Matters welcomes enquiries relating to solar power systems, but support relating to the use of the Solar Analyser is only provided via the Energy Matters Forums

http://forums.energymatters.com.au/solar-analyser/

Performing a Site Survey with Solar Analyser

Initial Device Setup

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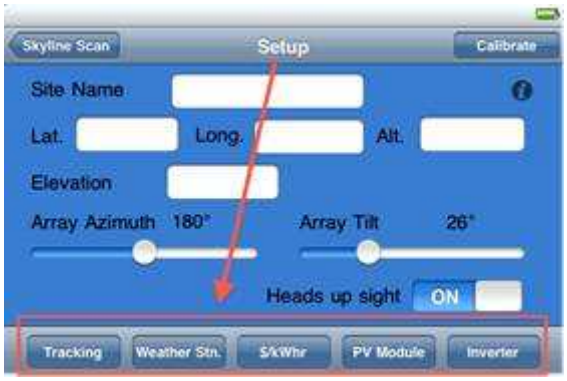
Before calculations can begin, the iPhone must be calibrated work accurately with Solar Analyser. This once-only calibration will ensure accurate measurements are made allowing accurate site data collection.

On opening the Solar Analyser application, enter the **setup** menu (top left of the home screen) and press the **calibrate** button (top right of the setup screen) and follow the on-screen instructions.

Site Setup – basic site details

When opening Solar Analyser, the application will automatically find your location using the built in iPhone GPS. iPod Touch users can fill missing values manually, using an online maps service to ascertain latitude and longitude.



- Enter the **Setup** menu and give the site a unique “Site Name” to later help identify the results.
- The altitude value is filled automatically based on your location
- The "Heads up Sight" option is available only to iPhone users (not iPod Touch users). It allows an easier method of scanning the skyline as explained below. For iPhone users, the "Across Face" sighting method used by the iPod Touch can also be selected if desired by turning off this option
- Slide the **Array Tilt** and **Array Azimuth** selectors to the aspect and angles representative of the roof space.
  o **Array Tilt** is the angle of elevation from flat ground
  o **Array Azimuth** is the angle clockwise from North of the direction that the solar panel array faces. For example, if the solar panel array will face true north, then the Array Azimuth is 0 degrees.

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Site Setup – specific details

Using the menus at the bottom of the Setup screen, fill out the following menus:

- Select framing type using the **Tracking** button – fixed array is the default. Single and dual axis tracking options can be selected by pressing this button
- Use the **Weather Station** button to locate the weather station closest to you. Data from your nearest weather station will be used to further improve solar performance estimates
- Adjust the value of energy in the **$/kWh** menu. This value can be obtained from an energy bill. If you wish to base this on feed in tariff rates, you can gain feed in tariff information here: http://www.energymatters.com.au/government-rebates/feedintariff.php
- Select the PV module from the **PV module** menu
- Select the Inverter model from the **Inverter model** menu

Site Setup – data collection

Locate yourself on the roof or area the solar array is most likely to be mounted. Solar Analyser uses the skyline from this point on the roof to establish potential shading from buildings or trees that could be detrimental to solar performance. If potential shading is expected, position the iPhone closest to the end of the array most likely to be shaded.

(NOTE: Complete these next couple of steps only if you have an iPhone 3G or iPod Touch - iPhone 3Gs users should just click the "Skyline Scan" button (top left of setup screen) then follow the steps AFTER the Skyline Scan screenshot image below)

When in position, use the iPhone 3G or iPod Touch camera to take a single image of the skyline from the solar array's perspective. If the solar aspect is wide and unimpeded, an iPhone image stitching application could be used to increase the width of the shot (this is not compulsory, but will better demonstrate the full visual skyline).

Now return to the Energy Matters Solar Analyser application and click Skyline Scan (top left of setup screen).

 Observe the solar aspect for any obvious trees or buildings blocking early morning or late afternoon sun. Using the **East/West limit** button Slide the **East** and **West** markers to approximate the beginning and end of the 'solar window' as measured in degrees.

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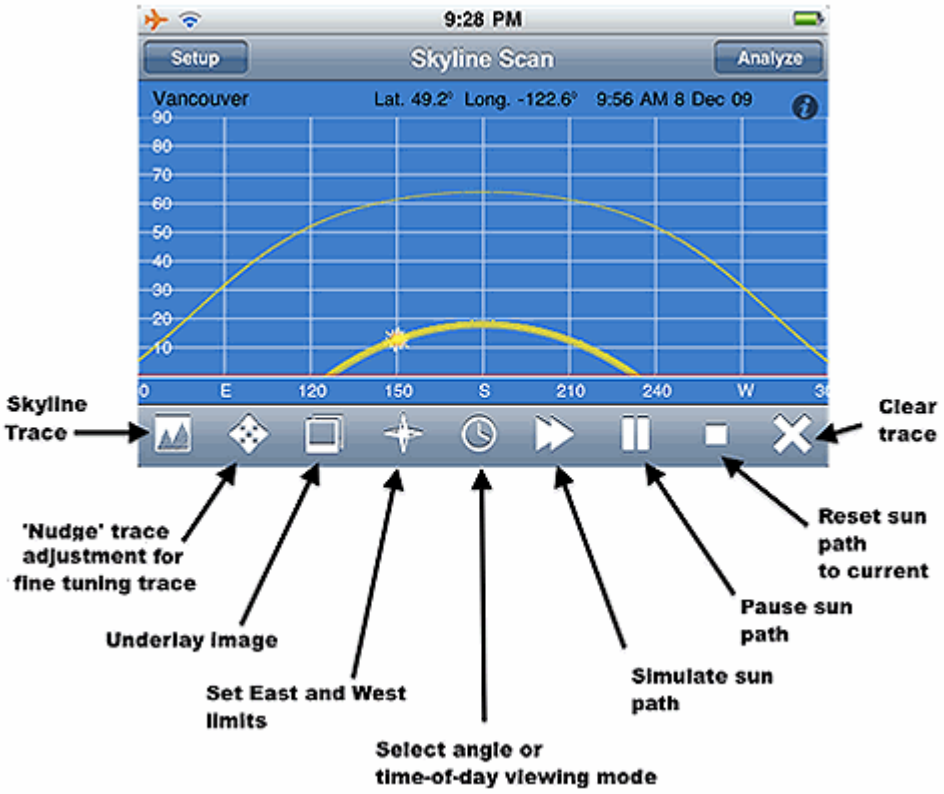

 Use the **Skyline Trace** button on the Skyline Scan screen (bottom left of screen) to begin the trace process. **Note:** If your Skyline Scan screen tool bar just contains a row of arrows, click the "Done" button on the right hand side, which will then take you to a screen similar to the above.

Starting at the “sight” screen, familiarize yourself with the crosshairs. **Note:** iPod Touch users will only have access to the "Across Face" inclinometer method of scanning, not the crosshair method. However, if iPhone users find the glare on the screen or camera is too great the "Across-Face" method can be used by entering the Setup screen and turning off the "Heads Up" sight switch.

Point the crosshairs (Heads Up method) or arrow (Across Face) at the right hand starting point of your skyline. Heads Up users will need to press Start, but for Across Face users, the scan will commence automatically.

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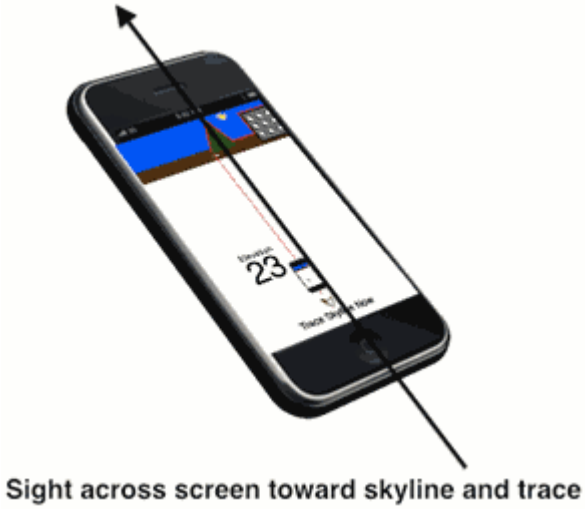
Crosshairs (Heads Up function 3G and 3Gs)



Across Face method for iPod Touch. iPhone users can also select this method in setup.

Slowly trace (keeping above 0°) from right to left the outline of buildings and trees visible in the skyline and press 'finish' when you reach the left hand limit of the solar aspect. A typical scan takes about 15 seconds

 For iPhone 3G and iPod Touch users, if required, then use the **Nudge** and **Image Underlay** buttons to adjust the Skyline Trace to match the sun's curve and position. The image will add a level of realism to the trace, further confirming the accuracy of the Skyline Trace. Please note that if using an image underlay, it will greatly increase the size of the final PDF report.

 Once the Skyline has been established, Solar Analyser will present a sun path plot, showing today's estimated solar trajectory together with an animated sun (manipulate the sun's positions using the **Simulate sun path, Pause sun path, and Reset sun path** buttons). This demonstrates the sunrise and sunset for the time of year, and the elevation achieved by the sun at midday. When in the default **Viewing Mode**, Solar Analyser also shows the sun path for the summer and winter solstice.

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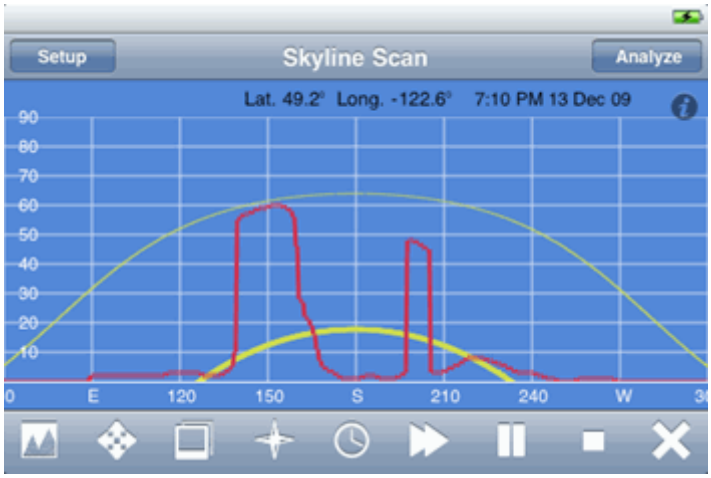
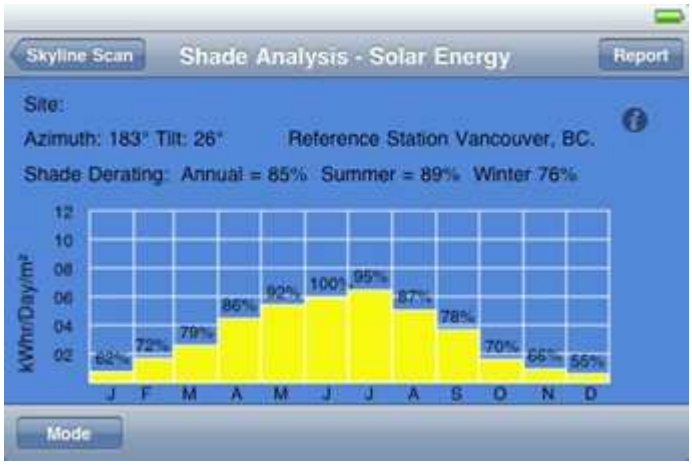


Analysis of data

Once a Skyline Scan and all other data entry is complete, press “Analyse” to start the calculation process. **Please note:** The analysis can take up to 40 seconds.

- The analysis function is calculating the sun's position for every minute of the year and comparing that to the elevation of skyline you captured.
- The analysis function is also looking up the hourly weather data to find the typical direct beam and diffused solar radiation and calculating the incidence angle of the sun on the panel to determine how much of the available energy is captured or lost through shade and climate factors including panel heating.



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Handy tip: *If you want a record of this or any other screen just press the iPhone top right button and home button together. That will execute a screen capture that will be saved in your iPhone photo album.*

Results report export

At this point you may decide try a different location or you may wish to change the panel tilt & azimuth. To summarize and save the current results press "Report" to view the full analysis.

Press "**Preview**" to preview the report on screen or "**Email Report**" to send a copy of the PDF report via e-mail. Please note that if using an image underlay, it will greatly increase the size of the final PDF report.

Importing a Photo or Panorama

The iPhone camera has a view angle of 60° by 40°. Solar Analyser works best when the user takes photos in the portrait orientation, this means that the user can cover 60° of elevation. After the photo has been imported to the trace background, the user can then use a known reference (such as a tree) to correctly align the image. In some cases (where sunlight obstacles are numerous), it is desirable to have a wider image (a panorama) that covers the full sun path from east to west.

Some applications known to capture panoramas are **AutoPan** and **AutoStitch**.

Getting an instant online quote

Once you have your site information, you can use Energy Matters' online quoting system to receive an obligation free instant estimate!

https://www.energymatters.com.au/iphone/iquote.php

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