# OREGON DEPARTMENT OF ENERGY SOLAR INCOME CALCULATION INSTRUCTIONS

# GENERAL INFORMATION

These instructions are to be used only in conjunction with the Business Energy Tax Credit Form (BETC). Follow appropriate instructions, print out completed form and attach it to the Application for Preliminary Certification.

This form and calculation are property of the State of Oregon and shall only be used in conjunction with application of the Business Energy Tax Credit.

All spaces in **yellow** require inputs. **Shaded** spaces are calculated by the spreadsheet.

## **REQUIRED INPUTS**

## **STEP 1: List Proposed Building:**

| L date | ncrosort Excel - OUE Example - Ecotrust.xis                       |                |                     |          |             |           |             |                   |   |                   |                         |        |
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| 2      |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 3      | Building Solar Energy Budget Inputs                               |                |                     |          |             |           | _           |                   | Building Energy Use Inp   | uts               |                         |        |
| 4      |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 5      | Proposed Building   | Eco            | trust               |          |             |           | Annual S    | olar Budget       | Electricity Annual Usage  | 0                 | kWh                     | _      |
| 6      |   |                | <u>l</u>            |          |             |           |             |                   | Natural Gas Energy Usage  | 0                 | therms                  |        |
| 7      | City (Select most applicable)                                     | Ast            | oria –              |          |             |           |             | Solar Energy      | #2 Fuel Oil Energy Usage  | 0                 | gallons                 |        |
| 8      | Weather Data Used (Selected From Chart Above                      | As             | toria               |          |             |           |             | MWH               | Other Energy Source   | 0                 | kBtu                    | _      |
| 9      |   | Total Area     | Clearing Area       |          | Shading     |           | lanuaru     | 0.0               | Total Building Floor Area   | 0                 | sqft                    |        |
| 11     | Roof Area   | Tutal Area     | Glazing Area        | sa ft    | rencentage  |           | February    | 0.0               | Building Energy Lise Index (EUI)  | #DIV/01           | kBtu/Sg Et /vear        |        |
| 12     | N Wall Area   |                |                     | sqft     |             |           | March       | 0.0               | Editality Energy Coo Index (EOI)  | indition.         | nota ogn tri jour       |        |
| 13     | NW Wall Area  |                |                     | sqft     |             |           | April       | 0.0               | Building Energy Use   | #DIV/0!           | kWh                     |        |
| 14     | W Wall Area   |                |                     | sqft     |             |           | May         | 0.0               |   | #DIV/01           | therms                  | _      |
| 15     | SW Wall Area  |                |                     | sq ft    |             |           | June        | 0.0               |   | #DIV/UI           | kBtu/year               |        |
| 17     | SE Wall Area  |                |                     | saft     |             |           | August      | 0.0               | Total annual incoming solar   | #DIV/01           |                         |        |
| 18     | E Wall Area   |                |                     | sqft     |             |           | September   | 0.0               | as a % of building energy usage   |                   |                         |        |
| 19     | NE Wall Area  |                |                     | sqft     |             |           | October     | 0.0               | Converted solar energy as a %   | #DIV/01           |                         |        |
| 20     |   | Our all Ohee   | in a Development of |          |             |           | November    | 0.0               | of building energy usage  | 400.000           |                         | _      |
| 21     |   | Overall Shad   | ing Percentag       | e        |             |           | December    | 0.0               | of building electricity usage   | #DIV/0!           |                         |        |
| 23     | Notes:  |                |                     |          |             |           | Total       | 0.0               | Converted roof solar energy   | #DIV/0!           |                         |        |
| 24     | 1. Provide percentage of blockage of surrounding of               | bstructions ca | lculated on th      | e sun ch | art.        |           |             |                   | as a % of building energy usage   |                   |                         |        |
| 25     | <ol><li>Provide Attached Solar Percentage Calculation S</li></ol> | Sheet          |                     |          |             |           |             |                   | Converted roof solar energy   | #DIV/0!           |                         | _      |
| 20     | Annual Incoming Color Energy                                      | 0              | 1.0006              |          |             |           |             |                   | as a % of building electricity usag   | 6                 |                         |        |
| 28     | Annual Incoming Solar Energy                                      | n n            | therms              |          |             |           |             |                   | Footpotes:  |                   |                         |        |
| 29     |   | 0              | kBtu                |          |             |           |             |                   | 1. When the percentage of conve   | rted solar ex     | ceeds a hundred perce   | ent,   |
| 30     |   |                |                     |          |             |           |             |                   | the building is a net producer  | of energy and     | d may be able to sell b | ack    |
| 31     | PV System Efficiency  |                | Efficiency          |          |             |           |             |                   | excess energy.  | dializa e en e en |                         | _      |
| 33     | Annual Converted Energy by PV System                              |                | kWh                 |          |             |           |             |                   | <ol> <li>building Energy Use is total bi<br/>forms of common energy unit</li> </ol> | uiding energ      | y use converted to thre | 38     |
| 34     | Annual Converted Energy by 1 V covered room                       | 0              | RTTH                |          |             |           |             |                   | ionna or common energy unit   | ».                |                         |        |
| 35     | Water   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 36     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 37     | Annual amount of Water that falls on the roof:                    | Ō              | gallons             |          |             |           |             |                   |   |                   |                         | -+     |
| 30     |   |                |                     |          |             |           | -           |                   |   |                   |                         |        |
| 40     |   |                |                     |          |             |           |             |                   |   |                   | -                       | _      |
| 41     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 42     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 43     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 44     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 46     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 47     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 48     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
| 49     |   |                |                     |          |             |           |             |                   |   |                   |                         |        |
|        | Sheet1 / Sheet2 /   |                |                     |          |             |           |             | 1                 |   |                   |                         |        |
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1. List the building name in the proposed building cell.

# **STEP 2: Select City:**

1. Select one of the nine cities from the pull down menu on the spreadsheet. Select the city closest to the project location or the most similar in climate (for example a building being built in Burns would select Pendleton, a project in Bandon would select North Bend).

| <b>1</b> | Microsoft Excel - OOE Example - Ecotrust.xls        |               |                  |            |                  |               |                   |   |               |                       | _ 8 ×    |
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| 1        |   |               |                  | Solar      | and Water F      | Budget Spr    | eadsheet          |   |               |                       | - î      |
| 2        |   |               |                  | colui      | and Prater E     | auget opr     | cuasheet          |   |               |                       |          |
| 2        | Building Solar Energy Budget Inputs                 |               |                  |            |                  |               |                   | Building Energy Lise Inn                            | ute           |                       |          |
| 3        | Dullung Solar Energy Budget inputs                  |               |                  | -          |                  |               |                   | Building Energy Ose inp                             |               |                       | _        |
| 4        | Proposed Building                                   | Ec            | otruct           | -          |                  | Annual S      | alar Budgat       | Electricity Appual Lleage                           | 0             | LAN/6                 |          |
| 6        | Proposed Daliality                                  |               | ouusi            | -          |                  | Annuar 3      | olai buuget       | Natural Gas Energy Usage                            | 0             | therms                |          |
| 7        | City (Salast most applicable)                       | As            | toria 🛛          |            |                  |               | Selex Energy      | #3 Eucl Oil Enormy Llooms                           | 0             | aollono               |          |
| 8        | Weather Data Used (Selected From Chart Above        | A             | storia           |            |                  |               | MWH               | Other Energy Source                                 | 0             | kBtu                  |          |
| 9        |   | E             | Jurns            | 1          | Shading          |               |                   | Total Building Floor Area                           | 0             | sqft                  |          |
| 10       | D. ( )  | E             | ugene            |            | Percentage       | January       | 0.0               |   | 100 11 1101   |                       |          |
| 11       | N Woll Area   | No            | th Rend          | sqft       |                  | Hebruary      | 0.0               | Building Energy Use Index (EUI)                     | #DIV/UI       | kBtu/Sq.Ft./year      |          |
| 13       | NW Wall Area  | Pe            | ndleton          | saft       |                  | April         | 0.0               | Building Energy Use                                 | #DIV/0!       | kWh                   |          |
| 14       | W Wall Area   | P             | ortland          | sqft       |                  | May           | 0.0               |   | #DIV/0!       | therms                |          |
| 15       | SW Wall Area  | Re            | dmond            | sqft       |                  | June          | 0.0               |   | #DIV/0!       | kBtu/year             |          |
| 16       | S Wall Area   |               |                  | sqft       |                  | July          | 0.0               | Total appual incoming solar                         | #DIV/0        |                       |          |
| 18       | E Wall Area   |               |                  | saft       |                  | September     | 0.0               | as a % of building energy usage                     | #D1770:       |                       |          |
| 19       | NE Wall Area  |               |                  | sq ft      |                  | October       | 0.0               | Converted solar energy as a %                       | #DIV/0!       |                       |          |
| 20       |   | Our all Ohe   | dia a Deservate  |            |                  | November      | 0.0               | of building energy usage                            | 400.001       | -                     |          |
| 21       |   | Overall Sha   | ding Percenta    | ge         |                  | December      | 0.0               | of building electricity usage                       | #UIV/UI       |                       |          |
| 23       | Notes:  |               |                  |            |                  | Total         | 0.0               | Converted roof solar energy                         | #DIV/0!       |                       |          |
| 24       | 1. Provide percentage of blockage of surrounding ob | ostructions o | alculated on t   | he sun c   | hart.            |               |                   | as a % of building energy usage                     |               |                       |          |
| 25       | 2. Provide Attached Solar Percentage Calculation S  | Sheet         |                  |            |                  |               |                   | Converted roof solar energy                         | #DIV/0!       | 4                     |          |
| 20       | Annual Incoming Solar Energy                        | 0             | kWh              |            |                  |               |                   | as a % of building electricity usag                 | e             | -                     |          |
| 28       | ,   | Ū             | therms           |            |                  |               |                   | Footnotes:  |               |                       |          |
| 29       |   | 0             | kBtu             |            |                  |               |                   | <ol> <li>When the percentage of conve</li> </ol>    | rted solar ex | ceeds a hundred per   | rcent,   |
| 30       | PV System Efficiency                                |               | Efficiency       |            |                  |               |                   | the building is a net producer i                    | of energy and | d may be able to sell | раск     |
| 32       | Annual Converted Energy by PV System                | 0             | kWh              |            |                  |               |                   | <ol> <li>Building Energy Use is total bi</li> </ol> | uilding energ | y use converted to th | hree     |
| 33       | Annual Converted Energy by PV covered Roof          | 0             | kWh              |            |                  |               |                   | forms of common energy unit                         | з.            | 1                     |          |
| 34       | 147 ·   |               |                  | -          |                  |               |                   |   |               |                       |          |
| 35       | vvater  |               |                  | _          |                  |               |                   |   |               |                       |          |
| 37       | Annual amount of Water that falls on the roof:      | 0             | gallons          |            |                  |               |                   |   |               |                       |          |
| 38       |   |               | J                |            |                  |               |                   |   |               |                       |          |
| 39       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 40       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 42       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 43       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 44       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 45       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 47       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 48       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 49       |   |               |                  |            |                  |               |                   |   |               |                       |          |
| 14       | Sheet1 Sheet2 /                                     |               |                  |            |                  |               | •                 |   |               |                       |          |
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# **STEP 3:** Input Building Areas

1. Input the buildings roof, gross facade (including glazing), and glazing areas. All dimensions should be given in Square Feet. For uniquely shaped buildings or roofs and walls with slopes or unique angles, average out facades and input average wall area. Roofs with a slope greater than 30 degrees shall be input as a tilt up wall. Roofs with a slope of 30 degrees or less shall be input as a flat roof.

|     | 1icrosoft Excel - OOE Example - Ecotrust.xls                         |                       |                     |              |              |              |                    |   |                  |                         | _ 8 ×         |
|-----|--|-----------------------|---------------------|--------------|--------------|--------------|--------------------|---|------------------|-------------------------|---------------|
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| 1   |  |                       |                     | ooiai        | and vvaler   | Budget Spi   | eausneet           |   |                  |                         |               |
| 2   |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 3   | Building Solar Energy Budget Inputs                                  |                       |                     |              |              |              |                    | Building Energy Use Inp                                   | uts              |                         | _             |
| 4   |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 5   | Proposed Building  | Eco                   | otrust              |              |              | Annual S     | Solar Budget       | Electricity Annual Usage                                  | 0                | kWh                     |               |
| ь   |  |                       |                     |              |              |              |                    | Natural Gas Energy Usage                                  | 0                | therms                  |               |
| 7   | City (Select most applicable)  | Port                  | land -              |              |              |              | Solar Energy       | #2 Fuel Oil Energy Usage                                  | 0                | gallons                 |               |
| 8   | Weather Data Used (Selected From Chart Above                         | Por                   | tland               |              | 01 1         |              | MWH                | Other Energy Source                                       | 0                | kBtu                    |               |
| 9   |  | Total Area            | Glazing Area        |              | Percentage   | lanuary      | 151.1              | Total Building Floor Area                                 | 0                | sqπ                     |               |
| 11  | Roof Area  | 21.280                |                     | sa ft        | reicentage   | February     | 207.0              | Building Energy Use Index (EUI)                           | #DIV/0!          | kBtu/Sq.Ft./vear        |               |
| 12  | N Wall Area  | 6,270                 | 946                 | sqft         |              | March        | 345.5              |   |                  |                         |               |
| 13  | NW Wall Area   |                       |                     | sqft         |              | April        | 450.0              | Building Energy Use                                       | #DIV/0!          | kWh                     |               |
| 14  | W Wall Area  | 11,260                | 1,300               | sqft         |              | May          | 565.9              |   | #DIV/01          | therms                  |               |
| 16  | S Wall Area  | 6 270                 | 1.018               | saft         |              | July         | 677.2              |   | more/or          | KDIWyear                |               |
| 17  | SE Wall Area   | -,                    |                     | sqft         |              | August       | 592.4              | Total annual incoming solar                               | #DIV/0!          |                         |               |
| 18  | E Wall Area  | 11,260                | 1,930               | sqft         |              | September    | 455.7              | as a % of building energy usage                           |                  |                         |               |
| 19  | NE Wall Area   |                       |                     | lsq ft       |              | October      | 307.5              | Converted solar energy as a %                             | #DIV/0I          |                         |               |
| 20  |  | Overall Shar          | ling Percentac      | Ŕ            |              | December     | 129.6              | Converted solar energy usage                              | #DIV/N           |                         |               |
| 22  |  |                       |                     | Ĭ            |              |              |                    | of building electricity usage                             |                  |                         |               |
| 23  | Notes:   |                       |                     |              |              | Total        | 4664.3             | Converted roof solar energy                               | #DIV/0!          |                         |               |
| 24  | <ol> <li>Provide percentage of blockage of surrounding of</li> </ol> | bstructions ca        | alculated on th     | e sun c      | hart.        |              |                    | as a % of building energy usage                           | 1000 1001        |                         |               |
| 25  | 2. Provide Attached Solar Percentage Calculation 5                   | sheet                 |                     |              |              |              |                    | Converted root solar energy                               |                  |                         |               |
| 27  | Annual Incoming Solar Energy   | 4.664.281             | kWh                 |              |              |              |                    | as a 70 of ballang electricity asag                       | 0                |                         |               |
| 28  | 3,   | 159,145               | therms              |              |              |              |                    | Footnotes:  |                  |                         |               |
| 29  |  | 15,914,526            | kBtu                |              |              |              |                    | <ol> <li>When the percentage of conve</li> </ol>          | rted solar ex    | ceeds a hundred pe      | rcent,        |
| 30  | DV System Efficiency   |                       | Efficiency          |              |              |              |                    | the building is a net producer of                         | of energy and    | d may be able to sel    | Dack          |
| 32  | Annual Converted Energy by PV System                                 | 0                     | kWh                 |              |              |              |                    | <ol> <li>Building Energy Use is total building</li> </ol> | uldina enera     | v use converted to the  | hree          |
| 33  | Annual Converted Energy by PV covered Roof                           | 0                     | kWh                 |              |              |              |                    | forms of common energy units                              | з.               | 1                       |               |
| 34  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 35  | Water  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 30  | Annual amount of Water that falls on the roof                        | 642,829               | gallone             |              |              |              |                    |   |                  |                         |               |
| 38  | Annual anount of Water that fails on the root.                       | 342,023               | ganons              |              |              |              |                    |   |                  |                         |               |
| 39  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 40  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 41  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 42  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 44  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 45  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
| 46  |  |                       |                     |              |              |              |                    |   |                  |                         |               |
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### **STEP 4: Input Building Shading Percentage.**

1. Either of the following options can be used to calculate the amount of shading for the proposed building. Select either Option 1 or Option 2

Option 1: Use a building modeling or load software program to calculate the total amount of shading for each façade or a total overall building shading percentage. Provide sufficient backup from the software program for shading inputs.

- a. Input the shading percentage for each wall and facade into the wall's corresponding Shading Percentage Cell or input the overall shading for the entire building.
- b. If the overall shading is input make sure the individual façade inputs are blank or 0. If individual facades are input make sure the overall shading is 0.
- c. For example, a DOE2 building model can be modeled with shading from objects surrounding the building and modeled without. The shading percentage is found by comparing the solar gain difference between the two models. This can be found in the "building cooling load from wall conduction" hourly report in DOE2. This percentage difference can be input into the shading percentage cell.
- d. Skip ahead to Step 5.

#### Software Façade Shading Input:

| 221      | nicrosoft Excel - OUE Example - Ecotrust.xis          |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
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|          |   | - 199 ~ .      | /* Z+ A+   E    | <b>.</b> •••   | · · · · ·   |           |           |                   | ^              | Σ = = = E Ψ % )   | .00 +.0 =;             | <u></u> <u></u>      | •••••    |
| _        |   | D              | C.              | D              | F           |           | 0         |                   |                | 1   | 17                     | 1                    | -        |
|          | ~   | U              |                 |                |             | <u> </u>  |           |                   | 1              | J   | n                      | L .                  | <u> </u> |
| 1        |   |                | 2               | solar a        | and vvate   | er Buo    | aget Spre | eadsneet          |                |   |                        |                      |          |
| 2        |   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 3        | Building Solar Energy Budget Inputs                   |                |                 |                |             |           |           |                   | F              | Building Energy Use Inp   | uts                    |                      |          |
| ٨        |   |                |                 |                |             |           |           |                   | Т              |   |                        |                      |          |
| 5        | Proposed Building                                     | Ecc            | truet           |                |             |           | Annual S  | olar Budget       | F              | Electricity Annual Lleage   | 0                      | LAA/h                |          |
| 6        | i repecce banang                                      | 200            |                 | -              |             |           | , and a c | olar Daugot       | 1              | Natural Gas Energy Usage  | Ő                      | therms               |          |
| -        | on (0.1.)   | Port           | land –          |                |             |           |           | 0. F              | T,             |   | 0                      |                      |          |
|          | Uity (Select most applicable)                         | Des            | tland           |                |             |           | -         | Solar Energy      | - 7            | #2 Fuel OII Energy Usage  | 0                      | gallons              |          |
| 9        | weather bata used (Selected From Chart Above          | Fur            | tianu           |                | Shading     |           |           | IAIAALI           | $-\frac{1}{1}$ | Intel Building Floor Area   | 0                      | saft                 |          |
| 10       |   | Total Area     | Glazing Area    |                | Percentage  |           | January   | 151.1             |                | fotal Balang Floor Faca   |                        | 001                  |          |
| 11       | Roof Area   | 21,280         | 0               | sqft           | 0.0%        |           | February  | 207.0             | E              | Building Energy Use Index (EUI)   | #DIV/0!                | kBtu/Sq.Ft./year     |          |
| 12       | N Wall Area   | 6,270          | 946             | sqft           | 0.0%        |           | March     | 345.5             |                |   |                        |                      |          |
| 13       | NW Wall Area  |                |                 | sqft           |             |           | April     | 450.0             | E              | Building Energy Use   | #DIV/0!                | kWh                  |          |
| 14       | W Wall Area   | 11,260         | 1,300           | sqft           | 0.0%        |           | May       | 565.9             | +              |   | #DIV/01                | therms               |          |
| 15       | S Woll Area   | 6 270          | 1 010           | sqπ            | 0.0%        |           | June      | 612.8             | +              |   | #UIV/U!                | _kotu/year           |          |
| 17       | SE Wall Area  | 0,270          | 1,010           | sq it<br>sq ft | 0.0 %       |           | August    | 592.4             | - T            | Total annual incoming solar   | #∩i∨/ni                |                      |          |
| 18       | E Wall Area   | 11.260         | 1.930           | saft           | 0.0%        |           | September | 455.7             | - 8            | as a % of building energy usage   | 101470                 | -                    |          |
| 19       | NE Wall Area  |                | 1               | sqft           |             | l         | October   | 307.5             | - 0            | Converted solar energy as a %   | #DIV/01                | 1                    |          |
| 20       |   |                |                 |                |             |           | November  | 169.5             | 0              | of building energy usage  |                        |                      |          |
| 21       |   | Overall Shac   | ling Percentag  | e              | 7.3%        |           | December  | 129.6             |                | Converted solar energy as a %   | #DIV/0!                |                      |          |
| -22      | Nataa   |                |                 |                |             |           | Tatal     | 400.4.0           | -0             | of building electricity usage   | 405701                 |                      |          |
| 23       | 1 Provide nercentage of blockage of surrounding o     | hetructions cs | louisted on th  | e sun ch       | hart        |           | TUTAL     | 4004.3            | $-\frac{1}{2}$ | sonverted root solar energy   | #DIV/U                 |                      |          |
| 25       | 2. Provide Attached Solar Percentage Calculation :    | Sheet          | alcoluted on th | ic surrer      | iun.        |           |           |                   |                | Converted roof solar energy   | #DIV/0!                |                      |          |
| 26       |   |                |                 |                |             |           |           |                   | 8              | as a % of building electricity usag   | e                      |                      |          |
| 27       | Annual Incoming Solar Energy                          | 4,323,788      | kWh             |                |             |           |           |                   |                |   |                        |                      |          |
| 28       |   | 147,528        | therms          |                |             |           |           |                   | F              | ootnotes:   |                        |                      |          |
| 29       |   | 14,752,766     | kBtu            |                |             |           |           |                   | _11            | <ol> <li>When the percentage of converting of converting the second se<br/>second second sec</li></ol> | ited solar ex          | ceeds a hundred p    | ercent,  |
| 30       | DV System Efficiency                                  |                | Efficiency      |                |             |           |           |                   | -              | the building is a net producer o  | r energy and           | d may be able to se  | л васк   |
| 32       | Annual Converted Energy by PV System                  | 0              | k\0/h           |                |             |           | -         |                   | - 2            | <ol> <li>Building Energy Use is total hu</li> </ol>   | ulding energ           | w use converted to 1 | three    |
| 33       | Annual Converted Energy by PV covered Roof            | Ō              | kWh             |                |             |           |           |                   |                | forms of common energy units  | 3.                     | 1                    |          |
| 34       |   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 35       | Water   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 36       |   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 37       | Annual amount of Water that falls on the roof:        | 542,829        | gallons         |                |             |           |           |                   | -              |   |                        |                      |          |
| 30       |   |                |                 |                |             |           |           |                   | _              |   |                        |                      |          |
| 40       |   |                |                 | -              |             |           |           |                   | +              |   |                        |                      |          |
| 40       |   |                |                 |                |             |           |           |                   | -              |   |                        |                      |          |
| 42       |   |                |                 |                |             |           |           |                   | +              |   |                        |                      |          |
| 43       |   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 44       |   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| 45       |   |                |                 |                |             |           |           |                   | +              |   |                        |                      |          |
| 40       |   |                |                 |                |             |           | -         |                   | -              |   |                        |                      |          |
| 48       |   |                |                 |                |             |           | -         |                   | +              |   |                        | -                    |          |
| 49       |   |                |                 |                |             |           |           |                   | +              |   |                        |                      |          |
| 1        | b b) Sheet1 / Sheet2 /                                | -              |                 | -              |             |           | -         | 1.1               |                |   |                        | 1                    |          |
| Re       | adv   |                |                 |                |             |           |           |                   |                |   |                        |                      |          |
| ~0       |   | la.            |                 | 1              |             |           |           |                   |                |   | A real real            |                      |          |
| <b>9</b> | Start   j 🛄 💌 🖏 💟 🍪   💆 Inbox - Microsoft Ou          |                | chanical        |                | Example Cal | c.doc - M |           | crosoft Excel - C | OE E           | mejbolar Graph Shading Exa  |                        |                      | 11:52 AM |

Software Overall Shading Input:

| R        | Microsoft Excel - OOE Example - Ecotrust.xls                                       |                |                 |          |              |            |                     |                   |       |  |                    |                    | _ 8 ×    |
|----------|--|----------------|-----------------|----------|--------------|------------|---------------------|-------------------|-------|--|--------------------|--------------------|----------|
|          | ] Eile Edit Yiew Insert Format Iools Data Window He                                | lp             |                 |          |              |            |                     |                   |       |  |                    |                    | _ 8 ×    |
|          |  |                | ) > • • •       | ecurity  | - 者 🛠 🔛      | <b>%</b> . |                     |                   |       |  |                    |                    |          |
|          | ) 😅 🖬 🔒 🎒 🖪 🖤 🐰 🗈 🛍 🖪 🝼 🗠 - 🔿  | - 🤹 Σ          |                 | 1 🚯 🤋    | 5% • 🛛 •     | Arial      |                     | ▼ 10 ▼ B          | I     | <b>⊻</b> ≡ ≡ ≡ ⊠ \$ %,                 | •.0 .00 €          | ≓ ∰ 🔛 • 🦄 •        | <u>A</u> |
|          | E19 =  |                |                 |          |              | -          |                     |                   |       | 1 1                                    |                    |                    |          |
|          | A  | В              | C               | D        | E            | F          | G                   | Н                 | 1     | J                                      | К                  | L                  |          |
| 1        |  |                |                 | Solar    | and Water    | r Bud      | get Spre            | eadsheet          |       |  |                    |                    |          |
| 2        |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 3        | Building Solar Energy Budget Inputs  |                |                 |          |              |            |                     |                   | E     | Building Energy Use Inpu               | uts                |                    |          |
| 4        |  |                |                 |          |              |            |                     |                   |       | <u> </u>                               |                    |                    |          |
| 5        | Proposed Building  | Eco            | trust           |          |              |            | Annual S            | olar Budget       | E     | Electricity Annual Usage               | 0                  | kWh                |          |
| 6        |  |                |                 |          |              |            |                     |                   | Þ     | latural Gas Energy Usage               | 0                  | therms             |          |
| 7        | City (Select most applicable)  | Port           | land -          |          |              |            |                     | Solar Energy      | #     | 2 Fuel Oil Energy Usage                | 0                  | gallons            |          |
| 8        | Weather Data Used (Selected From Chart Above                                       | Por            | tland           |          |              |            |                     | MWH               | C     | Other Energy Source                    | 0                  | KBtu               |          |
| 9        |  | T-t-L 0        |                 | -        | Shading      |            | la su cana          | 454.4             | Т     | otal Building Floor Area               | 0                  | sqft               |          |
| 11       | Roof Area  | 21 280         | Giazing Area    | sa ft    | Percentage   |            | January<br>Fehruary | 207.0             | E     | Building Energy Use Index (EUI)        | #DIV/DI            | kBtu/Sg Et /vear   |          |
| 12       | N Wall Area  | 6,270          | 946             | sqft     | 0.0%         |            | March               | 345.5             |       | containing Entropy of the matter (201) |                    | inere equility ear |          |
| 13       | NW Wall Area   |                |                 | sqft     |              |            | April               | 450.0             | E     | Building Energy Use                    | #DIV/0!            | kWh                |          |
| 14       | W Wall Area  | 11,260         | 1,300           | sq ft    | 0.0%         |            | May                 | 565.9<br>612.8    | _     |  | #DIV/UI<br>#DIV/DI | therms             |          |
| 16       | S Wall Area  | 6,270          | 1.018           | saft     | 0.0%         |            | July                | 677.2             |       |  | WD1970!            | KDturyean          |          |
| 17       | SE Wall Area   |                | [               | sqft     |              |            | August              | 592.4             | Т     | otal annual incoming solar             | #DIV/0!            |                    |          |
| 18       | E Wall Area  | 11,260         | 1,930           | sqft     | 0.0%         |            | September           | 455.7             | a     | is a % of building energy usage        | 400.001            |                    |          |
| 20       | INE YVall Area   |                |                 | sqπ      | L            |            | November            | 169.5             |       | f huilding energy usage                | #UIV/UI            |                    |          |
| 21       |  | Overall Shac   | ling Percentag  | e        | 7.3%         |            | December            | 129.6             | Č     | Converted solar energy as a %          | #DIV/0!            |                    |          |
| 22       | 1<br>0 M A   |                |                 |          |              |            | <b>T</b>            | 100.1.0           | 0     | f building electricity usage           | 100.001            |                    |          |
| 23       | Notes:<br>1. Provide nercentage of blockage of surrounding of                      | hetructione co | alculated on th | e eun c  | hart         |            | Total               | 4664.3            |       | converted root solar energy            | #UIV/UI            | -                  |          |
| 25       | 2. Provide Attached Solar Percentage Calculation 5                                 | Sheet          | alculated on ti | ie sun c | inant.       |            |                     |                   | C     | Converted roof solar energy            | #DIV/01            |                    |          |
| 26       |  |                |                 |          |              |            |                     |                   | a     | is a % of building electricity usage   | e                  |                    |          |
| 27       | Annual Incoming Solar Energy   | 4,323,788      | kWh<br>thorms   |          |              |            |                     |                   | F     | ootnotoo:                              |                    |                    |          |
| 29       |  | 14.752.766     | kBtu            |          |              |            |                     |                   | 1     | . When the percentage of conver        | ted solar ex       | ceeds a hundred r  | percent. |
| 30       |  |                |                 |          |              |            |                     |                   |       | the building is a net producer o       | f energy and       | d may be able to s | ell back |
| 31       | PV System Efficiency   | -              | Efficiency      |          |              |            |                     |                   |       | excess energy.                         |                    |                    | three    |
| 33       | Annual Converted Energy by PV System<br>Annual Converted Energy by PV covered Roof |                | kWh             |          |              |            |                     |                   | 2     | forms of common energy units           | ading energ        | y use converted to | ruiee    |
| 34       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 35       | Water  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 36       | Annual annual af 18/atau that falls an the seaf                                    | E 40 000       |                 |          |              |            |                     |                   | _     |  |                    |                    |          |
| 38       | Annual amount of water that fails on the root.                                     | 042,029        | galions         |          |              |            |                     |                   |       |  |                    |                    | +        |
| 39       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 40       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 41       | C  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 43       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 44       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 45       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 40       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 48       |  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| 49       | l  |                |                 |          |              |            |                     |                   |       |  |                    |                    |          |
| <b> </b> | Sheet1 / Sheet2 /  |                |                 |          |              |            |                     | •                 |       |  |                    |                    |          |
| Re       | ady  |                |                 |          |              |            |                     |                   |       |  |                    | NUM                |          |
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# Option 2: Input the building shading percentage by using a solar graph. a. Refer to instructions for Option 2: Solar Graph Shading.

| Image: Bill get kilder       Start with an and the second of the second o   |  |
|---|--|
| Sourty  |  |
| D       D       D       D       E       F       G       H       J       K       L       T         E19       A       B       C       D       E       F       G       H       J       K       L       T         Solar and Water Budget Spreadsheet         Building Solar Energy Budget Inputs         Building Colar Energy Use Inputs         Building Colar Energy Use Inputs         Building Colar Energy Use Inputs         Building Floor Area       O       K <th colspa<="" td=""></th>  |  |
| Eig       A       B       C       D       E       F       G       H       J       K       L         1       Solar and Water Budget Spreadsheet       Solar and Water Budget Spreadsheet       Building Energy Use Inputs       Image: Solar Spreadsheet   |  |
| A       B       C       D       E       F       G       H       I       J       K       L         1       Solar and Water Budget Spreadsheet       Solar and Water Budget Spreadsheet       Building Solar Energy Use Inputs         3       Building Solar Energy Budget Inputs       Building Colar Energy Budget Inputs       Building Energy Use Inputs         4       Proposed Building       Ecotrust       Annual Solar Budget       Electricity Annual Usage       0         5       Proposed Building       Portland       Solar Energy       MWH       Natural Gas Energy Usage       0       galons         9       Weather Data Used (Selected From Chart Above       Portland       Solar Energy       MWH       Hatural Gas Energy Usage       0       sq ft         10       Total Area Glazing Area       Percentage       January       138.5       Building Energy Use Index (EUI)       #DIVX01       kBlu/Sq FL/year         11       ROf Area       11,260       300       sq ft       6.0%       Marril       418.7       Building Energy Use Index (EUI)       #DIVX01       kBlu/Sq FL/year         12       N wall Area       11,260       1,300       sq ft       6.0%       Marril       418.7       Building Energy Use Index (EUI)       #DIVX01       kWh  |  |
| Solar and Water Budget Spreadsheet         2       Building Solar Energy Budget Inputs         4       Building Solar Energy Budget Inputs         4       Building Solar Energy Budget Inputs         4       Building Energy Use Inputs         6       Forposed Building       Ecotrust       Annual Solar Budget         6       Proposed Building       Ecotrust       Annual Solar Budget         7       City (Select most applicable)       Portland       Solar Energy       Building Floor Area       0       kBuilding Floor Area         10       Total Area       Gizing Area         11       Roof Area       Solar Energy       Building Energy Use Index (EUI)       #DIVID         12       NVall Area       Solar Energy       January       1362         11       Roof Area       Solar Energy       January       1362         12       NVall Area       Solar Energy       January       1362         13       NV Wall Area <td co<="" td=""></td>   |  |
| Protect of and wrate budget opredustret       Building Energy Use Inputs         Building Solar Energy Budget Inputs       Annual Solar Budget       Electricity Annual Usage       0         Proposed Building       Ecotust       Annual Solar Budget       Electricity Annual Usage       0         Weather Data Used (Selected From Chart Above       Portland       Solar Energy       # Zruel Oil Energy Usage       0         Internet of Area       12,200       0       spt       Assisting Area       Shading         Internet of Area       6,270       945       spt       Amnual Solar Budget       Electricity Area       spt         IN Wvall Area       6,270       946       spt       April       418.7       Building Energy Use Index (EU)       #0/0001         IN Wvall Area       6,270       946       spt       April       418.7       Building Energy Use Index (EU)       #0/001         IN Wvall Area       6,270       946       spt       April       418.7       Building Energy Use Index (EU)       #0/001         IS Wvall Area       11,260       1,300       spt       6.0%       May       525       Total annual incoming solar       #0/001         IS Wvall Area       11,260       1,300       spt       Asgt       6225       Total an   |  |
| 2       3       Building Solar Energy Budget Inputs       Building Energy Use Inputs         4  |  |
| Building Solar Energy Budget inputs       Building Solar Energy Use inputs         4       Proposed Building       Ecotrust       Annual Solar Budget       KWh         6       Proposed Building       Ecotrust       Solar Energy       Building Energy Usage       0         7       City (Select most applicable)       Portland       Solar Energy       KWh       Building Floor Area       0       galons         9       Total Area       Glazing Area       Percentage       January       136.2       February       Building Energy Usage       0       kBru Sq.1         10       Total Area       Glazing Area       Percentage       January       136.2       Building Energy Use Index (EUI)       #D/VOI       kBru Sq.1         11       Rof Area       12,200       0       sq.1       4.8%       February       188.5       Building Energy Use Index (EUI)       #D/VOI       kBru Sq.1         12       NVall Area       5,270       94.5       sq.1       Agril       4.8%       Building Energy Use Index (EUI)       #D/VOI       kBru/Sq.1       Building Area       9       SO/VGI       kWh       MH       SOlar Energy       Solar Energy       MU/VOI       kBru/Sq.1       HU/VOI       kBru/Sq.1       HU/VOI       kBru/Sq.1       HU/VOI  |  |
| 4       Annual Salar Budget       Electricity Annual Usage       0       Wh         6       Portland       Solar Budget       Electricity Annual Usage       0       Wh         7       City (Select most applicable)       Portland       Solar Budget       # Zivel Oil Energy Usage       0       galons         9       Total Area       Shading       January       136.2       Herms       0       sq ft         10       Total Area       Glazing Area       Dotweet as the Side Side Side Side Side Side Side Sid   |  |
| 5     Proposed Building     Ectoriust     Annual Solar Budget     Electricity Annual Usage     0     W/M       7     City (Select most applicable)     Portland     Natural Gas Energy Usage     0     galons       8     Weather Data Used (Selected From Chart Above     Portland     M/MH     Zanuary     192     104     Total Area     Claring Area     Percentage     January     193.2     104     Solar Energy     Used (Selected From Chart Above     galons     KBu       10     Total Area     Claring Area     Percentage     January     193.2     Total Building Energy Use Index (EU)     #DI/MOI     KBu/Sq.Ft./year       11     Nov Vail Area     6,270     946     sq.ft     Agril     418.7     Building Energy Use Index (EU)     #DI/MOI     KBu/Sq.Ft./year       12     Nov Vail Area     6,270     946     sq.ft     Agril     418.7     Building Energy Use Index (EU)     #DI/MOI     KBu/year       13     Nov Vail Area     6,270     1,018     sq.ft     Agril     418.7     Building Energy Use     #DI/MOI     KBu/year       14     W Vail Area     1,260     1,300     sq.ft     Agrit     418.7     Building Energy Use     #DI/MOI     KBu/year       15     SWall Area     1,260     1,300   |  |
| b       Potland       <   |  |
| Image: Constraint of the second se                               |  |
| B         Weather Data Used (Selected From Chart Above         Portland         MWH         Other Energy Source         0         kBu           10         Total Area         Glazing Area         Percentage         January         136.2         Total Building Flor Area         0         sq ft           11         Roof Area         21.200         0         sq ft         4.8%         February         186.5         Building Energy Use Index (EU)         #DI/V/01         KBu/Sq Ft /year           12         NV Wall Area         6.270         946         sq ft         April         418.7         Building Energy Use Index (EU)         #DI/V/01         KWh           13         NV Wall Area         11,260         1,300         sq ft         6.0%         May         529.5         #DI/V/01         #DI/V/01         KWh           15         SW Wall Area         6.270         1,018         sq ft         June         575.2         #DI/V/01         KU/V/01  |  |
| Stadung         January         January <t< td=""></t<>   |  |
| 11         Roof Area         21,280         0         sq ft         A8%         February         188.5         Building Energy Use Index (EUI)         #DI/VOI         kBtu/Sq Ft./year           13         NVW Wall Area         6,270         946         sq ft         0.0%         April         418.7         Building Energy Use Index (EUI)         #DI/VOI         kBtu/Sq Ft./year           13         NVW Wall Area         11,260         1,300         sq ft         6.0%         May         575.2         Building Energy Use         #DI/VOI         kBtu/Sq Ft./year           16         S Wall Area         6,270         1,018         sq ft         36.0%         July         635.3         #DI/VOI         kBtu/Sq Ft./year           16         S Wall Area         1,260         1,930         sq ft         Aggust         552.5         Total annual incoming solar         #DI/VOI         kBtu/Sq Ft./year           18         E Vail Area         1,260         1,930         sq ft         1.0%         Segtember         420.8         sa % of Duilding energy usage         Ft./year           19         NE Wall Area         11,260         1,930         sq ft         1.0%         Segtember         420.8         sa % of Duilding energy usage         #DI/VOI   |  |
| 12         Nv Wall Area         6,270         946         sq ft         0.0%         March         318.3         #DIV/OI           13         NV Wall Area         sq ft         0.0%         March         318.3         #UN/OI         #UN/OI         #Wh           14         W Wall Area         11,260         1,300         sq ft         6.0%         May         529.5         #DIV/OI         #DIV/OI         #UN/OI  |  |
| 13         INV Wall Area         12         ost ft         April         418.7         Building Energy Use         #DI/X01         kWh           15         WW Wall Area         11,20         1,300         sq ft         6,0%         May         5,23.5         #DI/X01         kHmms           15         SW Wall Area         6,270         1,018         sq ft         June         575.2         #DI/X01         kEu/year           16         SW Ji Area         6,270         1,018         sq ft         June         575.2         Fotal annual incoming solar         #DI/X01         kEu/year           17         SE Wall Area         11,260         1,930         sq ft         August         552.5         Total annual incoming solar         #DI/X01           18         EWall Area         11,260         1,930         sq ft         October         202.2         Converted solar energy as a %         #DI/X01           20         Verall Shading Percentage         December         116.5         Converted solar energy as a %         #DI/X01           21         Overall Shading Percentage         December         116.5         Converted solar energy as a %         #DI/X01           22         Notes:         Total         4325.0         Conve   |  |
| Image: Construction   |  |
| Is     Swall Area     6,270     1,018     91 h     36,0%     July     635.3       17     SE Wall Area     6,270     1,018     91 h     August     655.3     Total annual incoming solar     #DI/V01       18     E Wall Area     11,260     1,930     91 h     0%     September     42.08     as a % of building energy usage       19     INE Wall Area     11,260     1,930     91 h     October     280.2     Converted solar energy as a %       20     Verall Shading Percentage     December     116.5     Converted solar energy as a %     #DI/V01       21     Overall Shading Percentage     December     116.5     Converted solar energy as a %     #DI/V01       23     Notes:     Total     4325.0     Converted solar energy as a %     #DI/V01       23     Notes:     Total     4325.0     Converted solar energy as a %     #DI/V01       24     1. Provide percentage of blockage of surrounding obstructions calculated on the sun chart.     Total     4325.0     Converted solar energy as a %       25     2. Provide Attached Solar Percentage Calculation Sheet     Converted roor solar energy     #DI/V01  |  |
| 17     SE Wall Area     and the set wall Area     August     552.5     Total annual incoming solar     #0/V/01       18     EWall Area     11,260     1,930     sq ft     10%     September     20.2     Converted solar energy as a %     #D/V/01       19     NE Wall Area     0     sq ft     0     October     20.2     Converted solar energy as a %     #D/V/01       20     0     verall Shading Percentage     December     116.5     Converted solar energy as a %     #D/V/01       21     0     verall Shading Percentage     December     116.5     Converted solar energy as a %     #D/V/01       22     0     verall Shading Percentage     December     116.5     Converted solar energy as a %     #D/V/01       23     Notes:     Total     4325.0     Converted solar energy as a %     #D/V/01       24     1. Provide Artached Solar Percentage Calculation Sheet     4325.0     Converted or solar energy as a %     #D/V/01  |  |
| 18     E Vail Area     11,260     1,930     sq ft     10%     September     420.8     as a % of building energy usage       19     NE Wall Area     of building energy usage     October     280.2     Converted solar energy as a %     #DIV/01       20     Overall Shading Percentage     December     116.5     Converted solar energy as a %     #DIV/01       21     Overall Shading Percentage     December     116.5     Converted solar energy as a %     #DIV/01       23     Notes:     Total     4325.0     Converted solar energy as #     #DIV/01       24     1. Provide percentage of blockage of surrounding obstructions calculated on the sun chart.     as a % of building electricitor solar energy     #DIV/01       25     2. Provide Attached Solar Percentage Calculation Sheet     E     Converted solar solar energy     #DIV/01   |  |
| Total     Converted     Solar energy     Solar     HU/V/U       20     Converted     Converted     Solar energy     Solar       21     Overall Shading Percentage     December     115.5     Converted solar energy as a %       22     Overall Shading Percentage     December     115.5     Converted solar energy as a %       23     Norwide percentage of blockage of surrounding obstructions calculated on the sun chart.     Total     4325.0     Converted roof solar energy       24     1. Provide Percentage of blockage of surrounding obstructions calculated on the sun chart.     Total     4325.0     Converted roof solar energy       25     2. Provide Attached Solar Percentage Calculation Sheet     Converted roof solar energy     #DIV/01  |  |
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| 22     Votes:     Total     4325.0     Converted roof solar energy     #0/V/01       24     1. Provide percentage of blockage of surrounding obstructions calculated on the sun chart.     I as a % of building energy usage     I as a % of building energy usage       25     2. Provide Attached Solar Percentage Calculation Sheet     I converted roof solar energy     #0/V/01  |  |
| 23 Notes:     Total     4325.0     Converted roof solar energy     #DIV/01       24 1. Provide percentage of blockage of surrounding obstructions calculated on the sun chart.     as a % of building energy usage     #Z       25 2. Provide Attached Solar Percentage Calculation Sheet     Converted roof solar energy     #DIV/01   |  |
| 24     1. Provide percentage of blockage of surrounding obstructions calculated on the sun chart.     as a % of bluiding energy usage       25     2. Provide Attached Solar Percentage Calculation Sheet     Converted roof solar energy   |  |
| 23 2. Flowide Attached Solar Percentage Calculation Sheet   |  |
| 26 as a % of huilding electricity usage   |  |
| 27 Annual Incoming Solar Energy 4,325,000 kWh   |  |
| 28 147,569 thems Footnotes:   |  |
| 129 1. When the percentage of converted solar exceeds a hundred percent, the building is a net method to all back |  |
| The building is a net producer or energy and may be able to sen back  |  |
| 32 Annual Converted Energy by PV System 0 kWh 2. Building Energy Use is total building energy use converted to three  |  |
| 33 Annual Converted Energy by PV covered Roof 0 kWh forms of common energy units.   |  |
| 34  |  |
| 35 Water  |  |
| 37 Annual amount of Water that falls on the mof 542 829 gallons   |  |
| 38  |  |
| 39  |  |
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STEP 5: Input PV Efficiency
1. Input the overall efficiency of the building photovoltaic system. If you are unsure what this efficiency is, input 10%.

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| B31 <b>-</b> = 10%                                     |                |                      |               |                 |             |                 |   |               |                    |                |
| Α  | В              | C                    | D             | E               | F G         | Н               | I J   | K             | L                  |                |
| 1  |                |                      | Solar         | and Water       | Budget Spre | eadsheet        |   |               |                    |                |
| 2  |                |                      |               |                 |             |                 |   |               |                    |                |
| 3 Building Solar Energy Budget Inputs                  |                |                      |               |                 |             |                 | Building Energy Use Inp                                   | uts           |                    |                |
| 4  |                |                      |               |                 |             |                 |   |               |                    |                |
| 5 Proposed Building                                    | Eco            | trust                |               |                 | Annual S    | olar Budget     | Electricity Annual Usage                                  | 0             | kWh                |                |
| 6  | _              |                      |               |                 |             |                 | Natural Gas Energy Usage                                  | 0             | therms             |                |
| 7 City (Select most applicable)                        | Port           | and -                |               |                 |             | Solar Energy    | #2 Fuel Oil Energy Usage                                  | 0             | gallons            |                |
| 8 Weather Data Used (Selected From Chart Above         | Por            | tland                |               | 0               |             | MWH             | Other Energy Source                                       | 0             | kBtu               |                |
| 10   | Total Area     | Glazing Area         | _             | Percentage      | January     | 136.2           | Total Building Floor Area                                 | 0             | sqπ                |                |
| 11 Roof Area   | 21,280         | 0                    | sqft          | 4.8%            | February    | 188.5           | Building Energy Use Index (EUI)                           | #DIV/0!       | kBtu/Sq.Ft./year   | r              |
| 12 N Wall Area   | 6,270          | 946                  | sqft          | 0.0%            | March       | 318.3           |   | 1050 (151     |                    |                |
| 13 NW Wall Area<br>14 W Wall Area                      | 11 260         | 1 300                | sq ft         | 6.0%            | April       | 418.7           | Building Energy Use                                       | #DIV/0!       | kWh<br>therme      |                |
| 15 SW Wall Area  | 11,200         | 1,000                | saft          | 0.070           | June        | 575.2           |   | #DIV/0!       | kBtu/vear          |                |
| 16 S Wall Area   | 6,270          | 1,018                | sqft          | 35.0%           | July        | 635.3           |   |               | ĺ.                 |                |
| 17 SE Wall Area  | 44.000         | 4.000                | sqft          | 4.0%            | August      | 552.5           | Total annual incoming solar                               | #DIV/0!       |                    |                |
| 19 NE Wall Area  | 11,260         | 1,930                | sq π<br>sq ft | 1.0%            | October     | 420.8           | Converted solar energy usage                              | #DIV/DI       |                    |                |
| 20   |                |                      | oq n          |                 | November    | 153.2           | of building energy usage                                  | individi      |                    |                |
| 21   | Overall Shad   | ing Percentag        | le            | 0.0%            | December    | 116.5           | Converted solar energy as a %                             | #DIV/0!       |                    |                |
| 22<br>23 Notes:  |                |                      |               |                 | Total       | 4325.0          | Converted roof solar energy                               | #01\//01      |                    |                |
| 24 1. Provide percentage of blockage of surrounding of | bstructions ca | lculated on th       | ne sun c      | hart.           | - Cruit     | 4020.0          | as a % of building energy usage                           | indition.     |                    |                |
| 25 2. Provide Attached Solar Percentage Calculation S  | Sheet          |                      |               |                 |             |                 | Converted roof solar energy                               | #DIV/0!       |                    |                |
| 26<br>27 Annual Incoming Color Energy                  | 4 205 000      | 140.05               |               |                 |             |                 | as a % of building electricity usag                       | e             |                    |                |
| 28   | 147.569        | therms               |               |                 |             |                 | Footnotes:  |               |                    |                |
| 29   | 14,756,901     | kBtu                 |               |                 |             |                 | 1. When the percentage of conve                           | rted solar e> | ceeds a hundred    | percent,       |
| 30<br>34 DV Custom Efficiency                          | 10.0%          | IC#-:                |               |                 |             |                 | the building is a net producer of                         | of energy an  | d may be able to : | sell back      |
| 32 Annual Converted Energy by PV System                | 432,500        | kWh                  |               |                 |             |                 | <ol> <li>Building Energy Use is total building</li> </ol> | ulding energ  | v use converted to | o three        |
| 33 Annual Converted Energy by PV covered Roof          | 253,139        | kWh                  |               |                 |             |                 | forms of common energy units                              | 3.<br>3.      |                    |                |
| 34   |                |                      |               |                 |             |                 |   |               |                    |                |
| 35 Water   |                |                      |               |                 |             |                 |   |               |                    |                |
| 37 Annual amount of Water that falls on the roof.      | 542,829        | gallons              |               |                 |             |                 |   |               |                    |                |
| 38   |                | J                    |               |                 |             |                 |   |               |                    |                |
| 39   |                |                      |               |                 |             |                 |   |               |                    |                |
| 4U<br>A1   |                |                      |               |                 |             |                 |   |               |                    |                |
| 42   |                |                      |               |                 |             |                 |   |               |                    |                |
| 43   |                |                      |               |                 |             |                 |   |               |                    |                |
| 44   |                |                      | -             |                 |             |                 |   |               |                    |                |
| 46   |                |                      |               |                 |             |                 |   |               |                    |                |
| 47   |                |                      |               |                 |             |                 |   |               |                    |                |
| 48   |                |                      |               |                 |             |                 |   |               |                    |                |
| 40   | -              |                      | -             | I               |             |                 |   |               |                    |                |
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# BUILDING ENERGY USE INPUTS

# **STEP 7:** Input building energy use.

- 1. Input the buildings annual energy usage index. To obtain this follow the steps below.
  - a. Input the total annual energy usage of the building, in kWh, therms, gallons of fuel oil, or other form of energy in kBtu. If the building is an existing building, derive energy usage from current utility bills. If the building is a proposed building and has not been built yet, the energy usage can be provided from an energy model (DOE2, etc.).

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|     | K7 = 0   | _              | -               |                | _            | -             |                  |                   |                                     |                  |                       |              |  |
|     | A  | В              | C               | D              | E            | F             | G                | H                 | J                                   | К                | L L                   | <u> </u>     |  |
| 1   |  |                |                 | Solar          | and Wate     | r Budg        | jet Spre         | eadsheet          |                                     |                  |                       |              |  |
| 2   |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 3   | Building Solar Energy Budget Inputs  |                |                 |                |              |               |                  |                   | Building Energy Use Inp             | uts              |                       |              |  |
| 4   |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 5   | Proposed Building  | Eco            | trust           |                |              |               | Annual S         | olar Budget       | Electricity Annual Usage            | 985,539          | kWh                   |              |  |
| 6   |  |                |                 |                |              |               |                  |                   | Natural Gas Energy Usage            | 8,674            | therms                |              |  |
| 7   | City (Select most applicable)  | Port           | land –          |                |              |               |                  | Solar Energy      | #2 Fuel Oil Energy Usage            | 0                | gallons               |              |  |
| 8   | Weather Data Used (Selected From Chart Above   | Por            | tland           | 1              |              |               |                  | MWH               | Other Energy Source                 | 0                | kBtu                  |              |  |
| 9   |  |                | Las             |                | Shading      |               |                  |                   | Total Building Floor Area           | 0                | sqft                  |              |  |
| 10  | Deaf Area  | Total Area     | Glazing Area    | A              | Percentage   | Ja            | anuary           | 136.2             | Building Engenu Ling Jaday (EUI)    | 400.001          | LOW C - Ft have       |              |  |
| 12  | N Wall Area  | 6 270          | 946             | sqii           | 4.0 %        | r<br>M        | eoruary<br>Aarch | 318.3             | Building Energy Ose Index (EOI)     | #DIV/U           | KDIU/Sq.FI./year      |              |  |
| 13  | NW Wall Area   | 0,210          | 1 040           | sqft           | 0.070        | Ă             | spril            | 418.7             | Building Energy Use                 | #DIV/0!          | kWh                   |              |  |
| 14  | W Wall Area  | 11,260         | 1,300           | sqft           | 6.0%         | N             | Íay              | 529.5             |                                     | #DIV/01          | therms                |              |  |
| 15  | SW Wall Area   | 0.070          | 4.040           | sqft           | 25.004       | Ju            | une              | 575.2             |                                     | #DIV/0!          | kBtu/year             |              |  |
| 10  | S Wall Area  | 6,270          | 1,018           | sqft           | 35.0%        | JI            | uly<br>huguet    | 635.3             | Total appual incoming color         | #0157/01         |                       |              |  |
| 18  | E Wall Area  | 11.260         | 1.930           | saft           | 1.0%         | ŝ             | September        | 420.8             | as a % of building energy usage     | mD1970!          |                       |              |  |
| 19  | NE Wall Area   |                |                 | sqft           |              | ō             | October          | 280.2             | Converted solar energy as a %       | #DIV/01          |                       |              |  |
| 20  |  |                |                 |                | 0.0%         | N             | lovember         | 153.2             | of building energy usage            |                  |                       |              |  |
| 21  |  | Overall Shac   | ling Percentag  | 6              | 0.0%         | U             | ecember          | 116.5             | of building electricity upage       | 44%              |                       |              |  |
| 23  | Notes:   |                |                 |                |              | T             | otal             | 4325.0            | Converted roof solar energy         | #DIV/0!          |                       |              |  |
| 24  | 1. Provide percentage of blockage of surrounding of  | bstructions ca | alculated on th | ie sun c       | hart.        |               |                  |                   | as a % of building energy usage     |                  |                       |              |  |
| 25  | <ol> <li>Provide Attached Solar Percentage Calculation S</li> </ol>  | Sheet          |                 |                |              |               |                  |                   | Converted roof solar energy         | 26%              |                       |              |  |
| 26  | Annual Incoming Color Energy   | 4 225 000      | 1486            |                |              |               |                  |                   | as a % of building electricity usag | e                |                       |              |  |
| 28  | Annual incoming Solar Energy   | 147 569        | therms          |                |              |               |                  |                   | Footpotes:                          |                  |                       |              |  |
| 29  |  | 14,756,901     | kBtu            |                |              |               |                  |                   | 1. When the percentage of conve     | rted solar ex    | ceeds a hundred pe    | rcent,       |  |
| 30  |  |                |                 |                |              |               |                  |                   | the building is a net producer of   | if energy and    | i may be able to sel  | ll back      |  |
| 31  | PV System Efficiency<br>Annual Converted Energy by DV System   | 10.0%          | Efficiency      |                |              |               |                  |                   | excess energy.                      | ulding operation | u use conunited to t  | hran         |  |
| 33  | Annual Converted Energy by PV System   | 253 139        | kWh             |                |              |               |                  |                   | forms of common energy units        | nung energy      | y use convented to th | lilee        |  |
| 34  | 3, ,   |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 35  | Water  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 36  |  | E 10 000       |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 3/  | Annual amount of water that fails on the root.   | 542,829        | galions         |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 39  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 40  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 41  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 42  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 43  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 45  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 46  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 47  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
| 48  |  |                |                 |                |              |               |                  |                   |                                     |                  |                       |              |  |
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# **STEP 8: Input Building Floor Area**

- 1. Input the total building floor area. Dimensions should be given in Square Feet.
- 2. Once this has been input, the spreadsheet will calculate the buildings Energy Use Index (EUI) as well as total energy usage in kWh, therms and kBtu/year. The spreadsheet will then calculate the amount of the building's energy usage that can be provided by the sun with and without a PV system.

| 2   | Microsoft Excel - OOE Example - Ecotrust.xls       |                |                 |               |                   |              |                          |  |               | _ 5                        | J ×         |
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| 1   |  |                |                 | solar         | and vvater        | Budget Sp    | readsheet                |  |               |                            |             |
| 2   |  |                |                 |               |                   |              |                          |  |               |                            |             |
| 3   | Building Solar Energy Budget Inputs                |                |                 |               |                   |              |                          | Building Energy Use Inp                            | uts           |                            |             |
| 4   |  |                |                 |               |                   |              |                          |  |               |                            | 1           |
| 5   | Proposed Building                                  | Eco            | trust           | 1             |                   | Annual       | Solar Budget             | Electricity Annual Usage                           | 985,539       | kWh                        | t I         |
| 6   |  |                |                 |               |                   |              | _                        | Natural Gas Energy Usage                           | 8,674         | therms                     |             |
| 7   | City (Select most applicable)                      | Port           | land –          |               |                   |              | Solar Energy             | #2 Fuel Oil Energy Usage                           | 0             | gallons                    |             |
| 8   | Weather Data Used (Selected From Chart Above       | Por            | tland           |               |                   |              | MWH                      | Other Energy Source                                | 0             | ЌВtu                       | 1           |
| 9   |  |                |                 |               | Shading           |              |                          | Total Building Floor Area                          | 64,964        | sqft                       | Ŧ.          |
| 10  | Deaf fore  | Total Area     | Glazing Area    |               | Percentage        | January      | 136.2                    | Duilding Engenue Ling Index (EUI)                  |               | LDaulCa Da lucas           | +           |
| 12  | N Wall Area  | E 270          | 946             | sqii          | 4.0%              | March        | 318.3                    | Building Energy Ose Index (EOI)                    | 60            | KDLU/SQ.FL/year            | ÷.          |
| 13  | NW Wall Area                                       | 0,270          |                 | saft          | 0.070             | April        | 418.7                    | Building Energy Use                                | 1.239.759     | kWh                        | ÷ .         |
| 14  | W Wall Area  | 11,260         | 1,300           | sqft          | 6.0%              | May          | 529.5                    |  | 42,301        | therms                     | t I         |
| 15  | SW Wall Area                                       |                |                 | sqft          |                   | June         | 575.2                    |  | 4,230,059     | kBtu/year                  |             |
| 16  | S Wall Area  | 6,270          | 1,018           | sqft          | 35.0%             | July         | 635.3                    | Tetal annual incoming color                        | 2409/         |                            | + -         |
| 1/  | E Wall Area  | 11 260         | 1 930           | sq π<br>sq ft | 1.0%              | Sentemb      | 552.5<br>ar <u>420.8</u> | as a % of building energy usage                    | 549%          |                            | ÷ .         |
| 19  | NE Wall Area                                       | 11,200         | 1,000           | saft          | 1.070             | October      | 280.2                    | Converted solar energy as a %                      | 35%           |                            | ÷ .         |
| 20  |  |                |                 |               |                   | Novembe      | 153.2                    | of building energy usage                           |               |                            | Τ.          |
| 21  |  | Overall Shac   | ling Percentag  | е             | 0.0%              | Decembe      | r 116.5                  | Converted solar energy as a %                      | 44%           |                            | 1.          |
| 22  | Notoe  |                |                 |               |                   | Total        | 4325.0                   | of building electricity usage                      | 20%           |                            | ÷.          |
| 20  | 1 Provide nercentage of blockage of surrounding of | hstructions ca | alculated on th | esunc         | hart              | TULAI        | 4323.0                   | as a % of building energy usage                    | 2070          |                            | + -         |
| 25  | 2. Provide Attached Solar Percentage Calculation S | Sheet          |                 |               |                   |              |                          | Converted roof solar energy                        | 26%           |                            | t I         |
| 26  | -  |                |                 |               |                   |              |                          | as a % of building electricity usag                | je            |                            |             |
| 27  | Annual Incoming Solar Energy                       | 4,325,000      | kWh             |               |                   |              |                          | -  |               |                            | + -         |
| 20  |  | 147,569        | therms          |               |                   |              |                          | 1 When the percentage of convo                     | rted color ov | coode a hundred nercent    | + -         |
| 30  |  | 14,700,001     | KDIG            |               |                   |              |                          | the building is a net producer i                   | of energy and | i may be able to sell back | t I         |
| 31  | PV System Efficiency                               | 10.0%          | Efficiency      |               |                   |              |                          | excess energy.                                     |               |                            | +           |
| 32  | Annual Converted Energy by PV System               | 432,500        | kWh             |               |                   |              |                          | <ol><li>Building Energy Use is total bit</li></ol> | uilding energ | y use converted to three   | T.          |
| 33  | Annual Converted Energy by PV covered Roof         | 253,139        | kWh             |               |                   |              |                          | forms of common energy unit                        | s.            |                            | +           |
| 34  | )A(otor  |                |                 |               |                   |              |                          |  |               |                            | +           |
| 30  | vvalei   |                |                 |               |                   |              |                          |  |               |                            | ÷ .         |
| 37  | Annual amount of Water that falls on the roof:     | 542,829        | gallons         |               |                   |              |                          |  |               |                            | t I         |
| 38  |  |                |                 |               |                   |              |                          |  |               |                            | t l         |
| 39  |  |                |                 |               |                   |              |                          |  |               |                            |             |
| 40  |  |                |                 |               |                   |              |                          |  |               |                            |             |
| 41  |  |                |                 |               |                   |              |                          |  |               |                            | + 1         |
| 43  |  |                |                 |               |                   |              |                          |  |               |                            | -           |
| 44  |  |                |                 |               |                   |              |                          |  |               |                            |             |
| 45  |  |                |                 |               |                   |              |                          |  |               |                            |             |
| 46  |  |                |                 |               |                   |              |                          |  |               |                            | + 1         |
| 48  |  |                |                 |               |                   |              | -                        |  | -             |                            | +           |
| 49  |  |                |                 |               |                   |              |                          |  |               |                            |             |
| I.  | > > > Sheet1 / Sheet2 /                            |                | · · · · · ·     |               |                   |              | 1                        |  |               | •                          | ۰IC         |
| Re  | ady  |                |                 |               |                   |              |                          |  |               | NUM                        | <u> </u>    |
| -   | Start 🛛 🔁 🕥 🚳 🖉 🖉 🕅 Inhor - Microsoft Out          | tlook 🛛 🔂 Me   | chanical        | 1             | Fxample Celo      | doc - Micros | Microsoft Evcal          | DOF F  |               | n 🗏 🔊 🔊 🔊 📑 🛛 11.54 /      | 0M          |
| 194 |  |                | circi lical     |               | - Local Calc.     |              | incrosore excel-t        | SOL CALL Polar Graph Shading EX8                   |               |                            | HCI.        |

# **STEP 9:** Attach the completed calculation to your **BETC** Application