| Energy Trust Shade Effect Evaluation Form | 70° ₋ | | | | | | | 1111 | 2 <u>1 12</u> h | | | | | | | | |
|---|------------------|--------------------------------|-------------------|--------------------|--|---|---|--|-----------------|-------|-------|------------|------------------------|-------------------------|---|---------------------------------------|--------------------------|
| T. 1. N. | | (c) Univ. of | Oregon | SRML | | 1 | 1h | 1.1 | | | 1.4 | 133 | h | | | | l AC outpu |
| Job Name: | | Sponsor: Ene Lat: 43.58; Lo | | | | | | May | 21 | | | | \leftarrow | +0.7 | kWh/W | att DC | per year |
| Contractor: | | (Solar) time | zone: - | -8 | | /11 | | JX-2 | 1 | 1 | .4 | | 26 | | | | |
| Date: | 60° | _ Tilt: 90; Aspe Burns, OR | ect: 270 | | 10h | / / | $\overline{}$ | | | | . 4 | | 7 | 14h | | | |
| Array Tilt: | | Burns, on | | | 1011 | | 1.0 | \ | r 22 | | L 1 | / 2.6 | 2 | 1411 | | | |
| Array Orientation: | | | | | -/- | \leftarrow | 1.0 | TA T |), r | | 1 | ۵.۵ | | (E | | | |
| Zip Code of Site: | | | | | /1.0/ | | | | 1.1 | 1.2 | | | | 3.5 | | | |
| The game moth about to the might is for a galar electric | 50° | | | / | + | $\rightarrow \downarrow$ | | - | 1.1 | 1.4 | + | - | \bigvee | 1,53 | 1.51 | | |
| The sun path chart to the right is for a solar electric system located in Burns, Oregon tilted 90 degrees | | | | 9h | / 0.9 | | 0.9 | | | | | 2.6 | | 34~\ | λ^{15h} | | |
| with a 270 degree azimuthal orientation. The | | | | -/X | <u> </u> | $/\!$ | | | ar 22 | | | | 1 2 | | A | | |
| annual AC output for a system with these | g | | | 6.8 | $\setminus X$ | | \ | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | | | 1 | / " | | 3.8 | | |
| characteristics is about 0.7 kWh/Watt DC per year. | ио ;; 40° | | | [] | \longrightarrow | 0.8 | \backslash / \mid | | 0.8 | 1.4 | | | 3.3 | <u> </u> | $+$ \ | | |
| 1 3 | ದ ⊦ | | 8h / | $\int 0.7$ | | | Λ | 0.7 | - 21 | | | 2.6 | | | 3.6 | \16h | |
| For comparison, annual production capacity per | Elev | - | /) | | $/\!$ | | - | | Feb 21 | | ~ | | <u> </u> | | $\langle - \rangle$ | <u> </u> | |
| Watt of an optimally oriented system (34 degree tilt | | | /// | | \ | $\langle / $ | \ | | | | | | 123/ | / | V | /]/ | |
| and 175 degree azimuth) is 1.39 kWh/Watt DC per | Solar 000 | | ₽.₩ | $-\bigvee$ | 0.5 | X d. | .5 | | 0.8 | 1.2 | | Va: | 3 1 X | 3.2 | - | 13.8 | |
| year. | SS | . 71 | . / / 0.3 | $_{3}$ \bigwedge | / | | A | 0.7 | Jan 21 | | 1.8 | No. | | | Д 3 | 6 \ \ \ 17 | 71h |
| Local Production Capacity = 1.39 kWh/Watt DC | | | | | $-/\!$ | \rightarrow | $/\!$ | | 0.7 | 1.1 | | 1 8 | | \bot | $/\!\!\!/\!\!\!\perp$ | - $$ | 11 |
| per year. | | | / /\ . | / ` | \ | 2 V | 0.4 | 0.6 | | | 1.6 | 1 21 | N a | 3.2 V | ´ | $ / \rangle $ | |
| per year. | 200 | / | / | 0.2 | $\lambda \perp$ | A | X | | Dec SI | | 1.6 | 2.1 | A | Ĩ Å | 3.0 | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | R |
| At Burns, a system oriented as in the sun path chart | | // | / X | | $' \setminus $ | / \ | 6. | | | | | 8 | / \ | \parallel / \parallel | | X _{3.0} \ | \ |
| to the right will produce 50% of the annual | | 6h // | /_\ | \/_ | $-$ \/ | | V | | | | | 21.7 | A | \ / | \perp | 10.0 | λ 18h |
| electricity produced by an optimally oriented | | · / X | / | | Х | X | \/ | | | | | 23/ | 1.7 | X 2. | $_{4}$ | | $\Lambda \setminus \Box$ |
| system. | 10° | | ackslash | X | $\bot \bot \bot$ | | <u> </u> | | | | | , / | | | <u> </u> | 2.1 \ / | 188 |
| | 10 | . / / . | X | | / \ | \ | | | | | | | 1.1 | $' \setminus$ | | X | |
| | | . 5h // | $\triangle \perp$ | | | X/\bot | | | | | | | $\perp \setminus \chi$ | 0.7 | | $\perp \triangle$ | 1.7 \ \ 191 |
| Duran the hearing on the arm with about and also de | | · /X / | | X | (/ | ' Y | | | | | | | / Y | | $\left\langle \left \right _{0.5} \right\rangle$ | \ / ' | / X / |
| Draw the horizon on the sun path chart and shade obstructed areas. To calculate the percent reduction | | | <u>, , y</u> | | $\Lambda_{\perp}\Lambda_{\perp}$ | | | | | | | | | <u>0 Jv - 7</u> | \ | Y Lala | £.p/ \ \ |
| due to shading, enter the percentage of system | | 60° | 90° | | 120 | | 150 | | 180 | | | 10° | | 40° | 2 | :70° | 300 |
| power output shown on the sun path chart for areas | | | | | | Ea | st <- | - So | lar Az | zimu | th - | -> W | est | | | | |
| shaded by obstructions into the table on the right. | | Period/Hr | 5-6 | 6-7 | 7-8 | 8-9 | 0_10 | 10-11 | 11-12 | 12_13 | 13_1/ | 1/-15 | 15_16 | 16-17 | 17_18 | 18_10 | Period/Hr |
| | | May-Jun | 3 0 | 0 / | 7 0 | 0) | 7 10 | 10 11 | 11 12 | 12 13 | 13 11 | 1113 | 13 10 | 10 17 | 17 10 | 10 17 | Jun-Jul |
| For example, assume the percentage of system | | Apr-May | | | | | | | | | | | | | | | Jul-Aug |
| power output from 7:00 to 8:00 between September | | Mar-Apr | | | | | | | | | | | | | | | Aug-Sep |
| 22 and October 21 is 0.4%, and 50% of that period | | Feb-Mar | | | | | | | | | | | | | | | Sep-Oct |
| is shaded. Enter 0.2% in the column under 7-8 and the row labeled Esh Mar on one side and Sen Oct. | | Jan-Feb | | | | | | | | | | | | | | | Oct-Nov |
| the row labeled Feb-Mar on one side and Sep-Oct on the other. Enter zero for each box where there is | | Dec-Jan | | | | | | | | | | | | | | | Nov-Dec |
| no shading. Note that hours are in solar time. | | | | | | | | | | | | | | | | | |
| | | Sum of | | | | | | 1 | 1 | | | | | | 1 | | Sum of |

Hourly

Shading

Hourly

Shading

Sum the shading values in each column and enter

the total in the bottom row. Sum the bottom row to determine the percent annual shading.

Percent Annual Shading: