Energy Trust Shade Effect Evaluation Form	70° ⊢															
	-	(c) Univ. of (	)regon SRMI						12h				Esti	mated	annija	l AC outpu
Job Name:	_	Sponsor: Ene	rgy Trust			11h	3.	5			19h					per year
Contractor:	-	Lat: 46.15; Lo (Solar) time				11h					7 <sup>13</sup> h	,				
Date:	60°	Tilt: 22.5; Ası										8				
Array Tilt:	00	Astoria, OR		10h		3/6	/ :	3.3	3.	2 /	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	9	14 h			
Array Orientation:	_			101	$\langle A \rangle$	104 m				/	, 6	$\langle \ / \ \rangle$	V <sup>4</sup> n			
Zip Code of Site:	-				X	3.1				1	2.9	$\top X$				
	500			2.7/	$' \setminus  $	18	5				P		2.4			
The sun path chart to the right is for a solar electric	50°		9h	//		KQ.		2.9	2.9		2000			\15h		
system located in Astoria, Oregon tilted 22.5			911	<b>/</b> /	.7 🔏	20	, \					X 2	.4 \			
degrees with a 120 degree azimuthal orientation.	-			X		~	'				2.7		+			
The annual AC output for a system with these	nc 1		k.3/	/ \	/					1	/	\		1.6		
characteristics is about 0.9 kWh/Watt DC per year.	£ 40° ⊢			$\overline{}$	2.5		(SP)	0.0		100		2.0	$\bigvee$	+		
	Elevation 004		814 / 2	2.2	~.0	$\chi_{\phi_0}$		2.2	1.9		Les X	۵.0	/  1	.6	\16h	
For comparison, annual production capacity per			$-/\lambda$			$\overline{}$	2.2			1.		$\leftarrow$	$\wedge$	$+$ $\times$	$\forall$	
Watt of an optimally oriented system (34 degree tilt and 191 degree azimuth) is 1.03 kWh/Watt DC per					$\setminus / \mid$	\	2			Pocx.		$  \setminus   $	'	$\langle   / \rangle$	\1.A	
year.	Solar -		- / · / · \	1.9	$\rightarrow$	.9		4 8		1		$\downarrow \chi$	1.0	$\bigvee$		
year.	νχ	71	n / / 1.6 /	\	/\ [			1.7	1.5		$M_{1}$	· \		3.0	3 \ \ \ 17	h
Local Production Capacity = 1.03 kWh/Watt DC per year.			/X		$\rightarrow$	-/+	1.8			1.2	+	+/-		+	+X-	
			$^{\prime}/\backslash$	\	. \	/ \	1975	1.3	1.0	No.			$ \cdot $		$\sqrt{\ }$	
	20°  -		.9 / 1.1	$X^{-1}$	.4	1.4	1.2			0.9	0.6	X 0	·4 X	0.3	$\sqrt{\frac{1}{2}}$	\
At Astoria, a system oriented as in the sun path	-	6h /	∕ <sub>0.6</sub>	$  / \setminus  $	/\		1						$\parallel / \setminus$		$\bigwedge$ $_{0.1}$ $\setminus$	\\18h
chart to the right will produce 87% of the annual	_	-	J.J .	/-	/-	6.8	Voe _			1.63.V	0.3	$\longrightarrow$	$+\!\!\!/-$	$\setminus$	-	$\bigvee$
electricity produced by an optimally oriented			$ \cdot $	0.8	0.8	$X \neq  $					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		$\mathbb{V}$	$\Lambda$	$ \cdot $	$\langle   \rangle$
system.	10°	9.3/	\		/	V					$\perp \vee$	<u> </u>	$\Lambda$	_X_	$+ \setminus /$	+ + + +
	-	5h //	$X \mid 1 / 1$	/	\	/					\	$\langle \ \rangle$	/  \	//	X	$\left  \begin{array}{c} \\ \\ \end{array} \right _{19h}$
		- $$ $$	/ \   / \	/	VA							$\Lambda \lambda$	$\perp$	/	$\perp / \setminus$	$\bot$
Draw the hariner on the gun noth chest and chest	-		$\backslash  /$	Y ".1	$/ \lor \mid$							$  \bigvee \rangle$	$\langle   \rangle$	(  '	$\backslash  /$	$\backslash \backslash \backslash \backslash \backslash$
Draw the horizon on the sun path chart and shade obstructed areas. To calculate the percent reduction			<u>, , V , , , , , , , , , , , , , , , , ,</u>	$\triangle A$									\		Y	
due to shading, enter the percentage of system		60°	90°	120		150		180			L0°		40°	2	270°	300°
power output shown on the sun path chart for areas		East < Solar Azimuth> West														
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 14	1/1 15	15 16	16 17	17 19	19 10	Period/Hr
		May-Jun	3-0 0-7	7-8	0-9	9-10	10-11	11-12	12-13	13-14	14-13	13-10	10-17	1/-10	10-19	Jun-Jul
For example, assume the percentage of system		Apr-May														Jul-Aug
power output from 7:00 to 8:00 between September																
22 and October 21 is 0.4%, and 50% of that period		Mar-Apr														Aug-Sep
is shaded. Enter 0.2% in the column under 7-8 and		Feb-Mar														Sep-Oct
the row labeled Feb-Mar on one side and Sep-Oct		Jan-Feb														Oct-Nov
on the other. Enter zero for each box where there is		Dec-Jan														Nov-Dec

Sum of

Hourly

Shading

Sum of

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.

no shading. Note that hours are in solar time.

Percent Annual Shading: