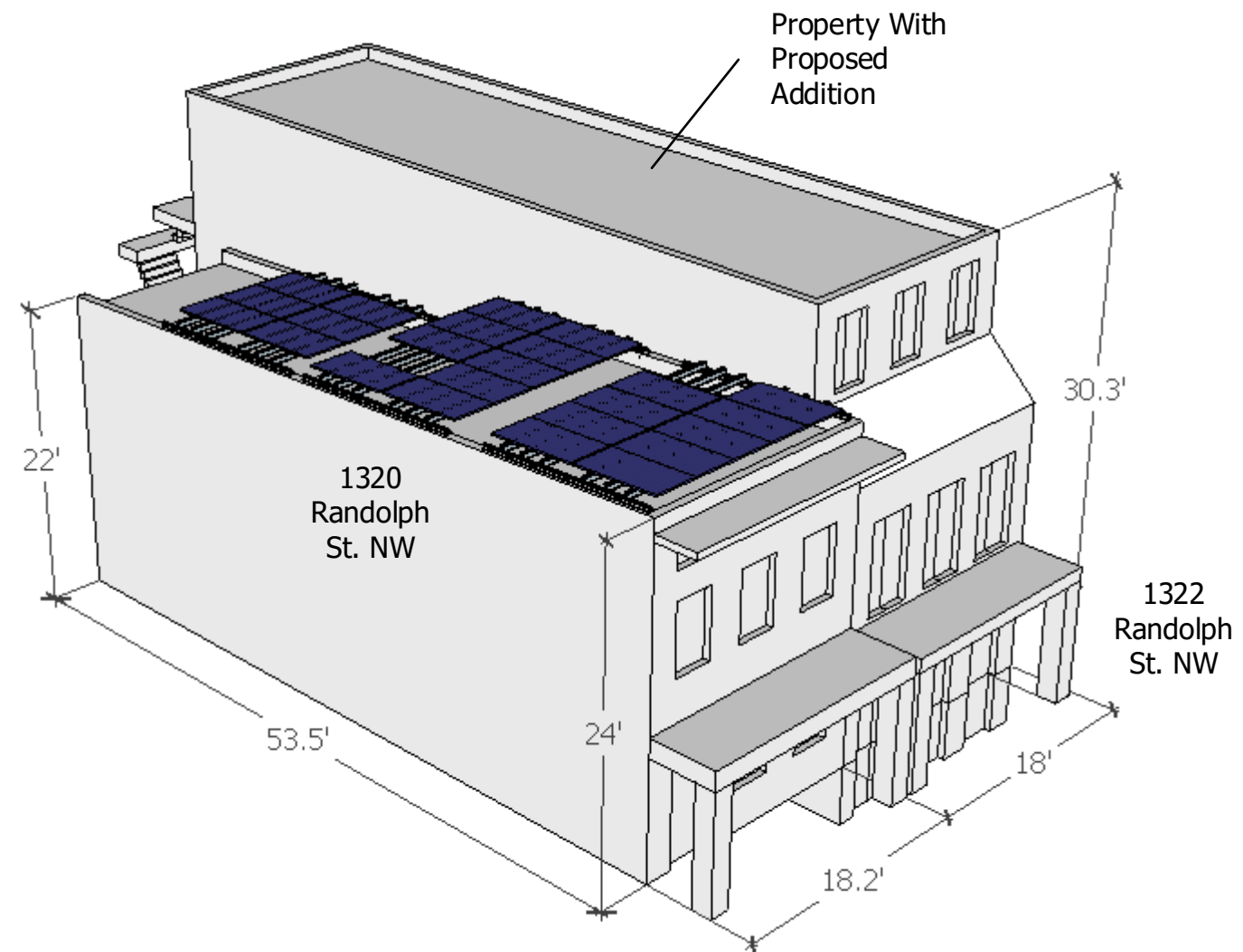


# SHADE ANALYSIS

## Scope of Work:

Solar Solution has been consulted to conduct a shading analysis for the property located at 1320 Randolph St. NW, Washington, DC 20011 in relation to the addition on neighboring property 1322 Randolph St. NW.



1320 RANDOLPH ST. NW



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Board of Zoning Adjustment  
District of Columbia  
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CASE NO. 18823  
EXHIBIT NO. 44B  
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SS-001

# SHADING DATA

## SPRING 3/20

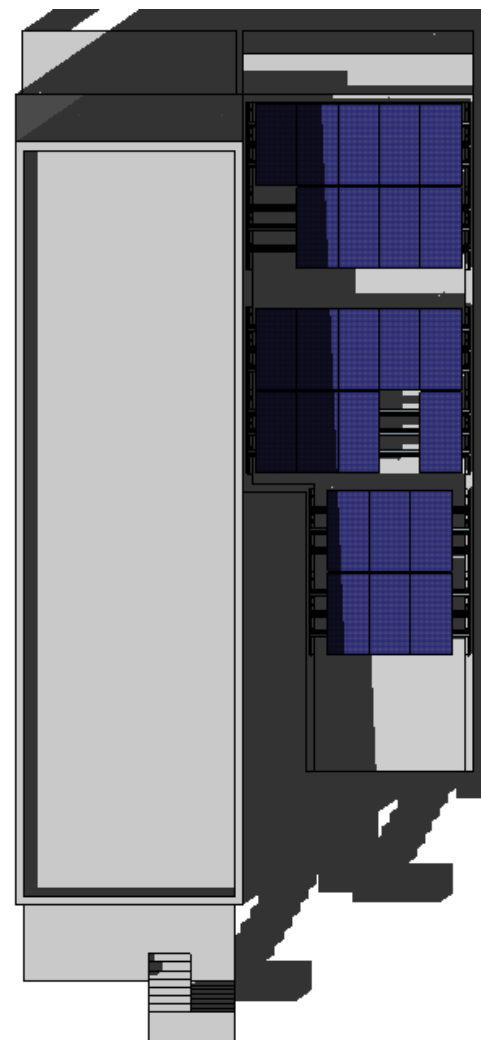
Sun irradiance and is examined with respect to four crucial dates:

1. Spring – 3/20
2. Summer – 6/21
3. Fall – 9/22
4. Winter – 12/21

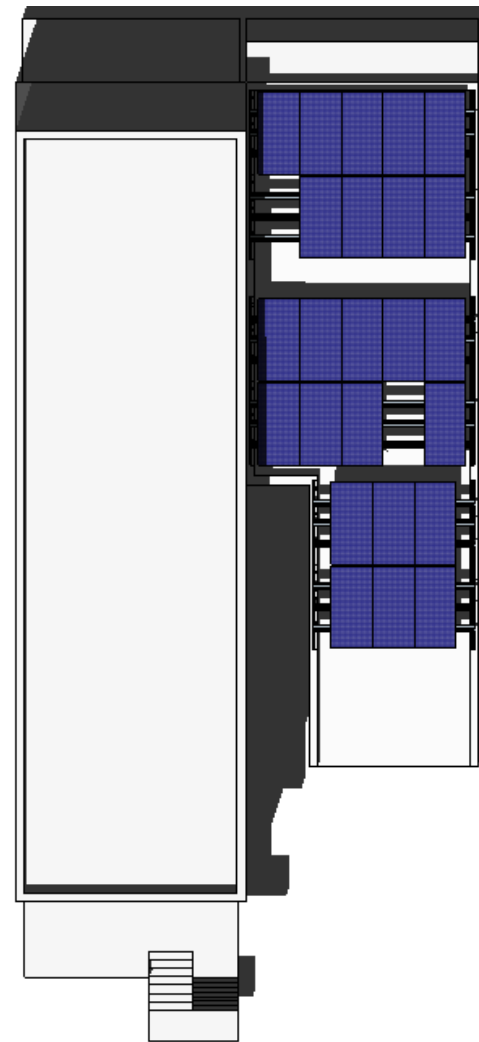
These dates represent the start of each season where the summer and winter solstices represent the longest and shortest days the sun shine in the northern hemisphere, respectively; and the spring and fall equinoxes representing the mid point of sunlight exposure. The latter two dates would generally provide the average sun exposure and shading throughout the year.

Since the property with the addition is west of the property in question, the shading time would be examined in the afternoon as the system would not be shaded in the morning.

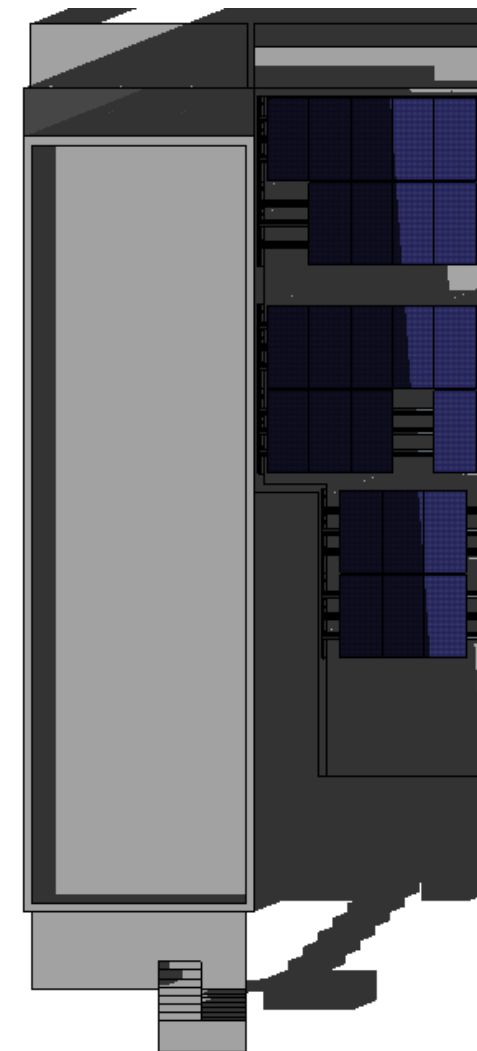
Note: the percentage shaded is solely based on sun irradiance.



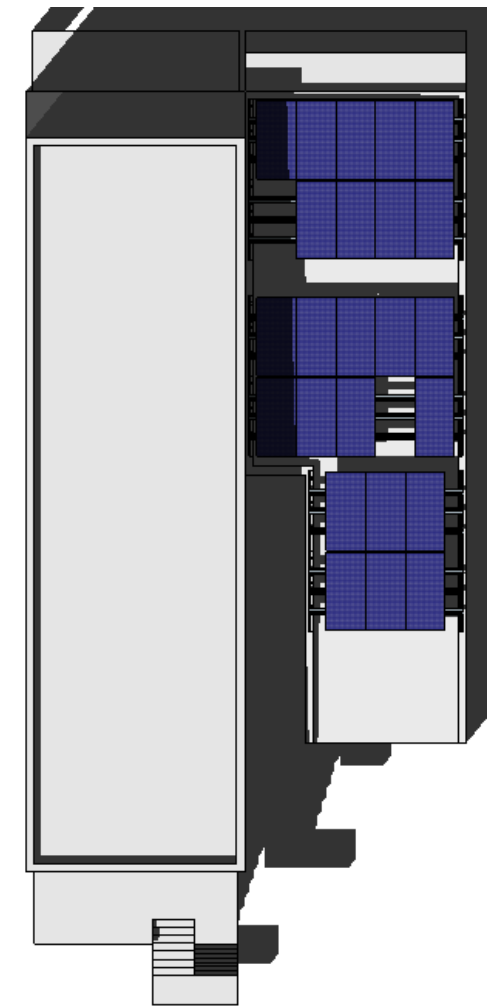
Spring – 3pm: 29% Shaded



Spring – 1pm: 0% Shaded (Last 30 minute interval with 0% shading)



Spring – 4pm: 64% Shaded

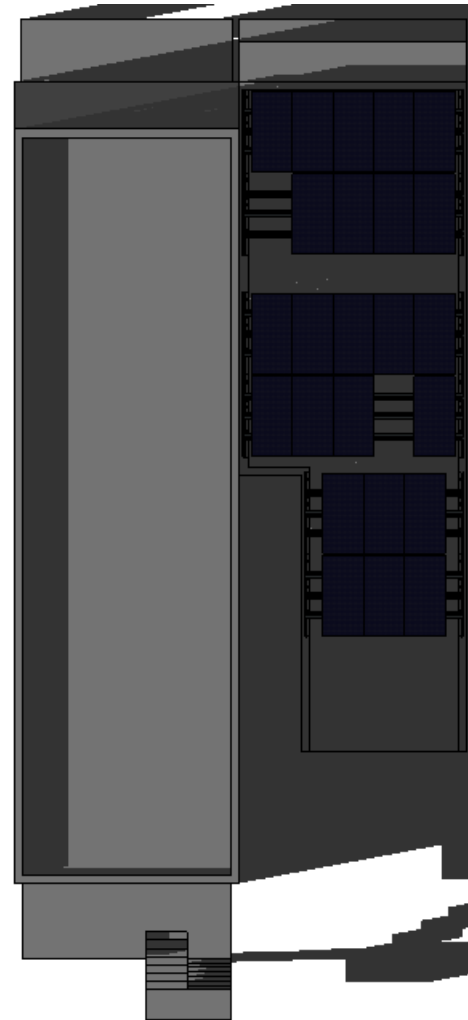


Spring – 2pm: 13% Shaded

# SPRING

## 3/20

(CONT)



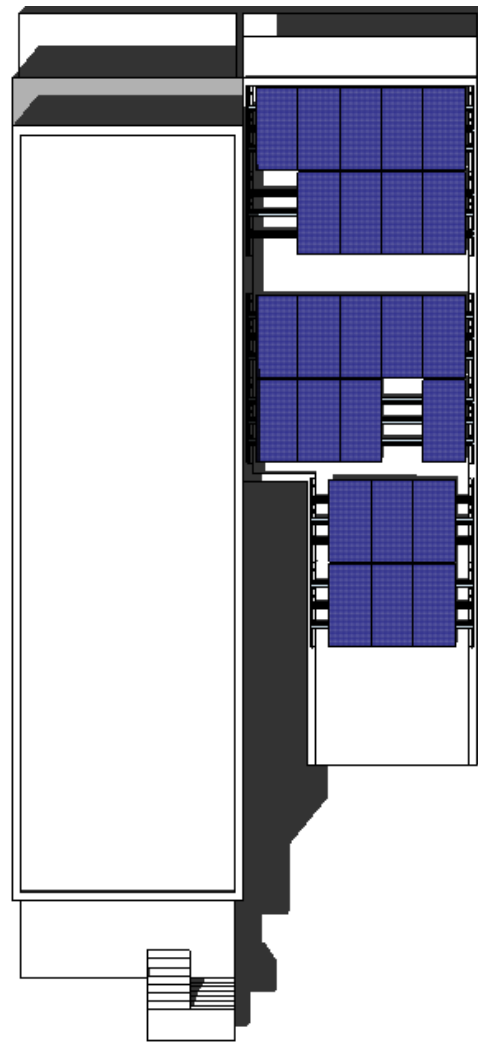
*Spring – 5pm: 100% Shaded (First 30 minute interval with 100% shading)*

1320 RANDOLPH ST. NW

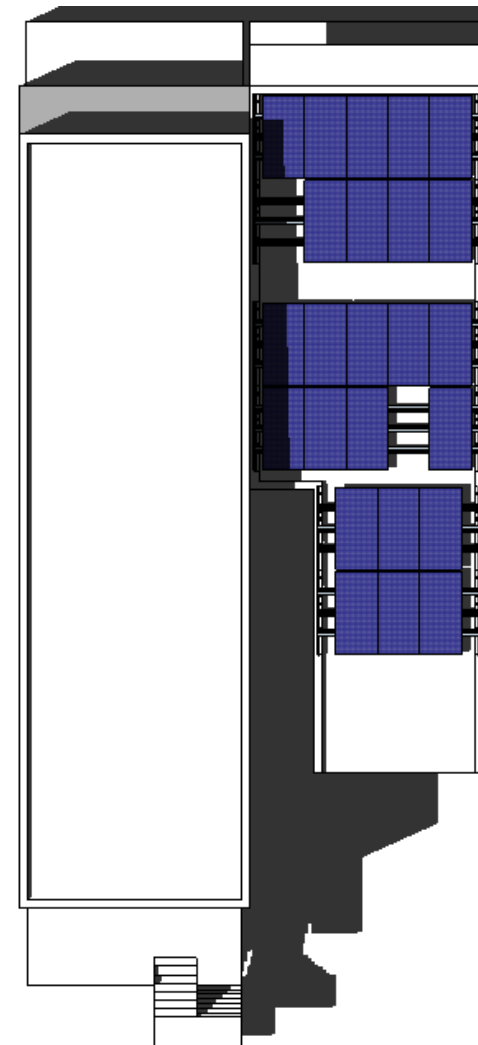


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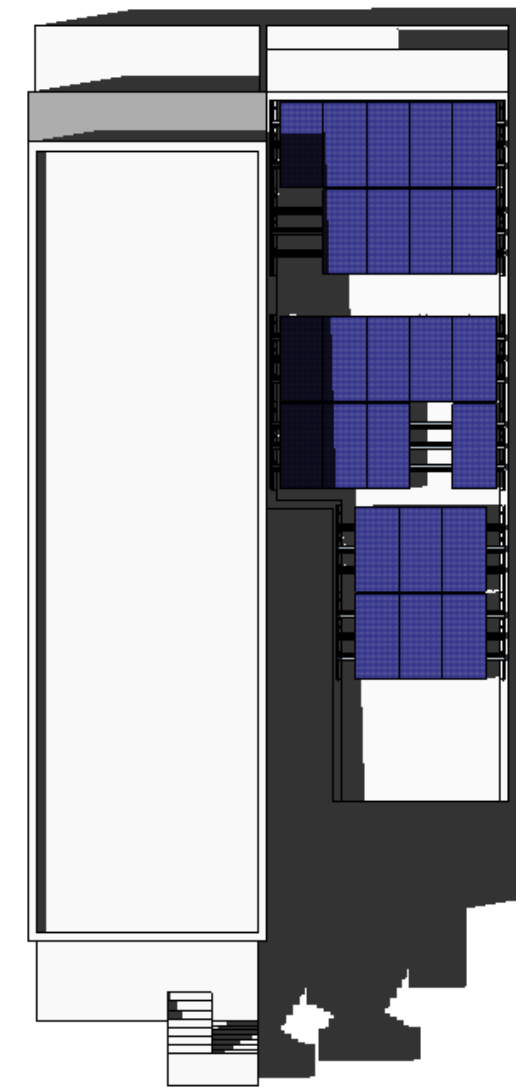
# SUMMER 6/21



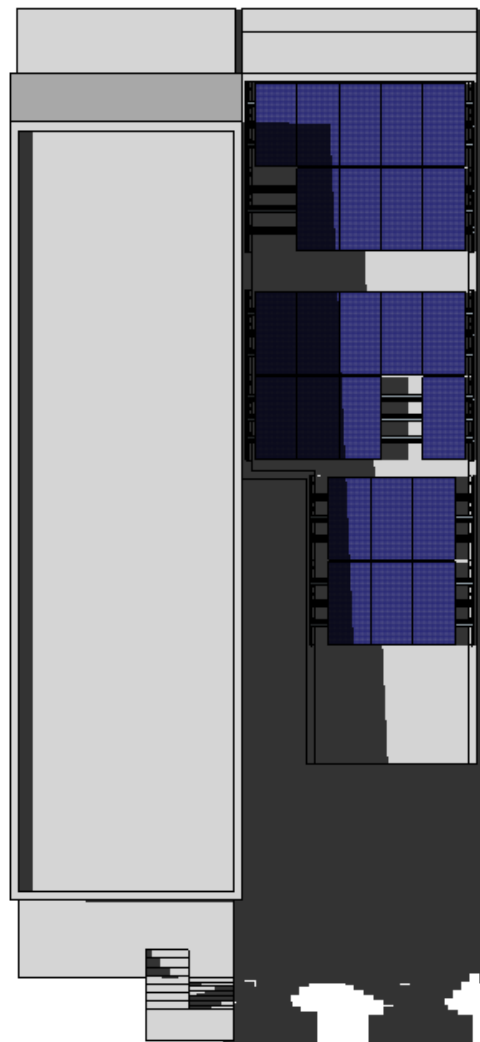
Summer – 1pm: 0% Shaded



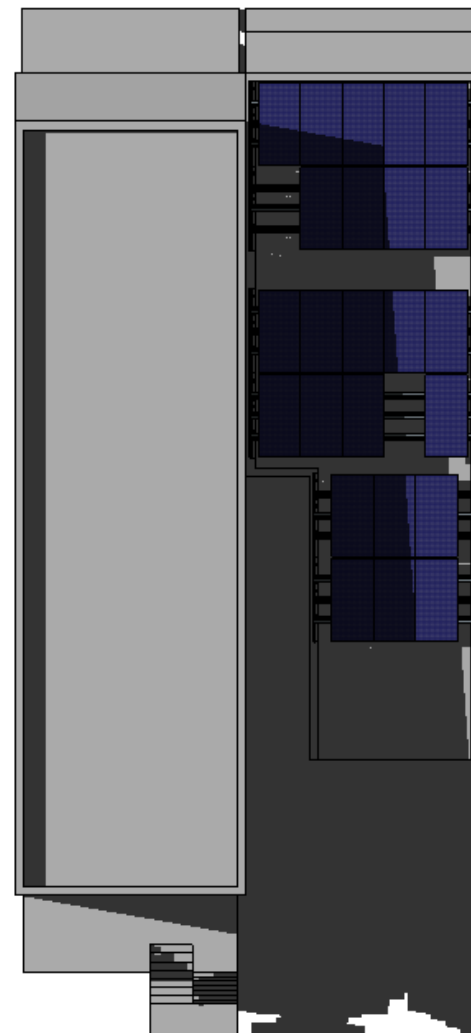
Summer – 2pm: 8% Shaded



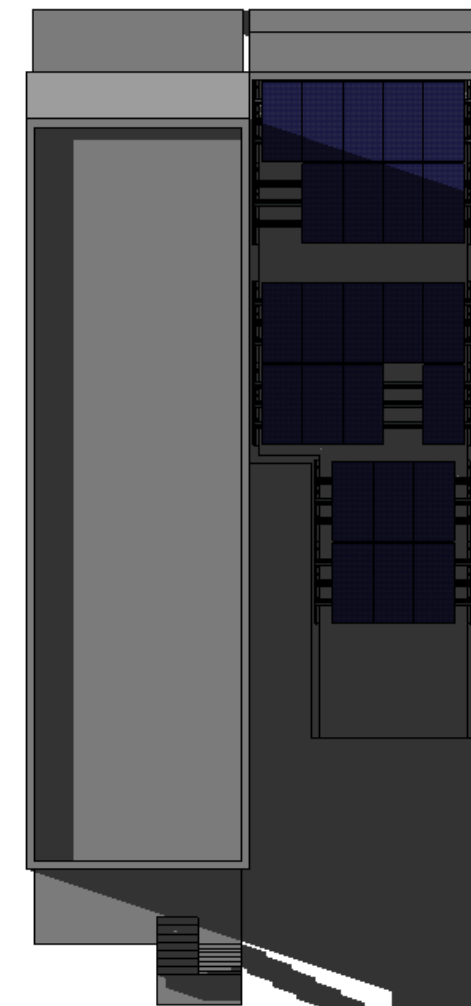
Summer – 3pm: 12% Shaded



Summer – 4pm: 29% Shaded



Summer – 5pm: 54% Shaded



Summer – 6pm: 81% Shaded

1320 RANDOLPH ST. NW

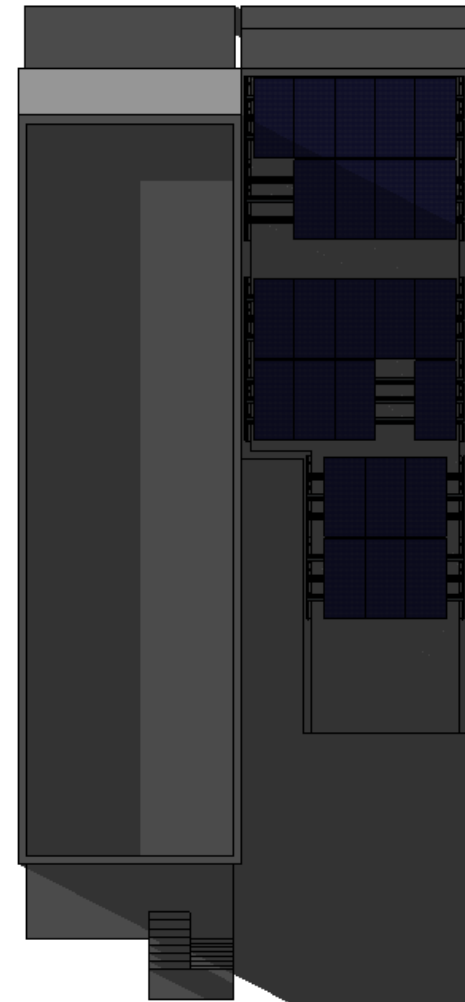


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# SUMMER

## 6/21

(CONT)



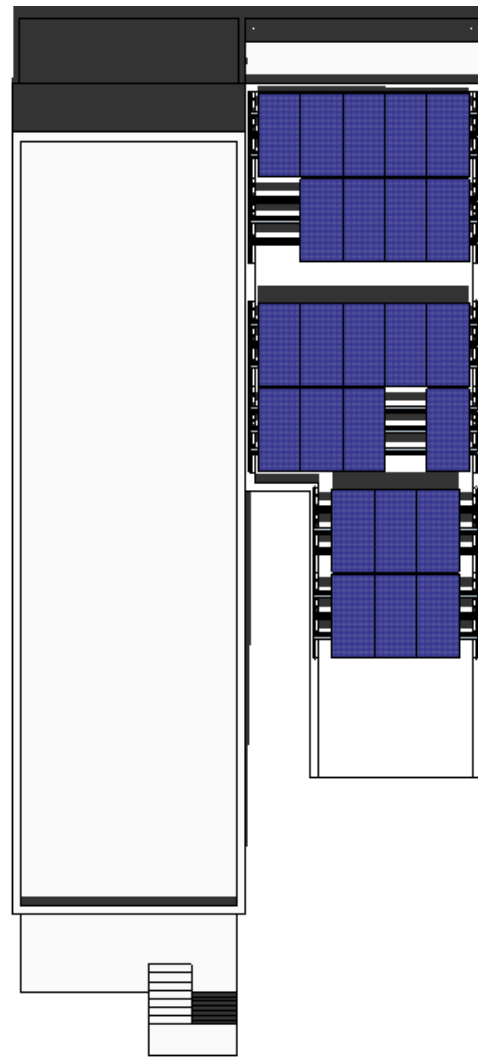
*Summer – 7pm: 75% Shaded to sunset*

1320 RANDOLPH ST. NW

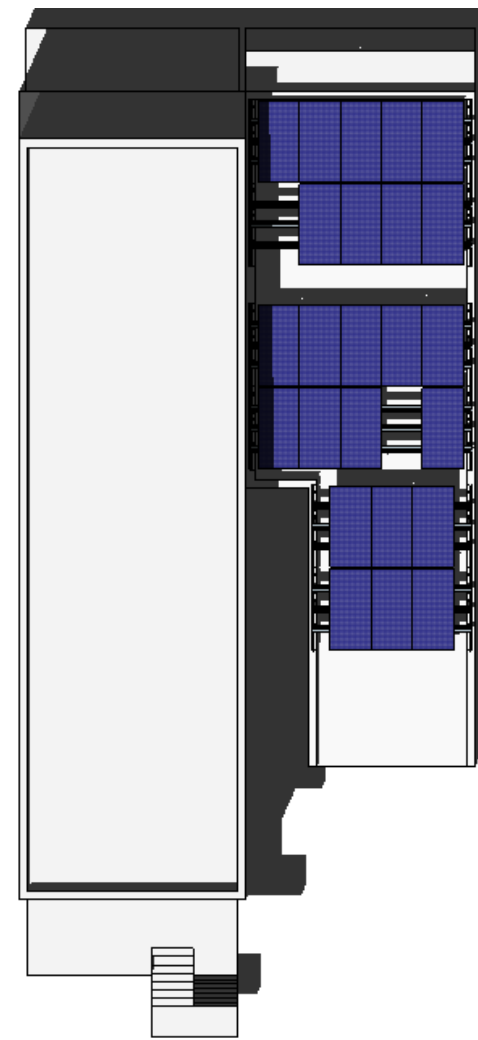


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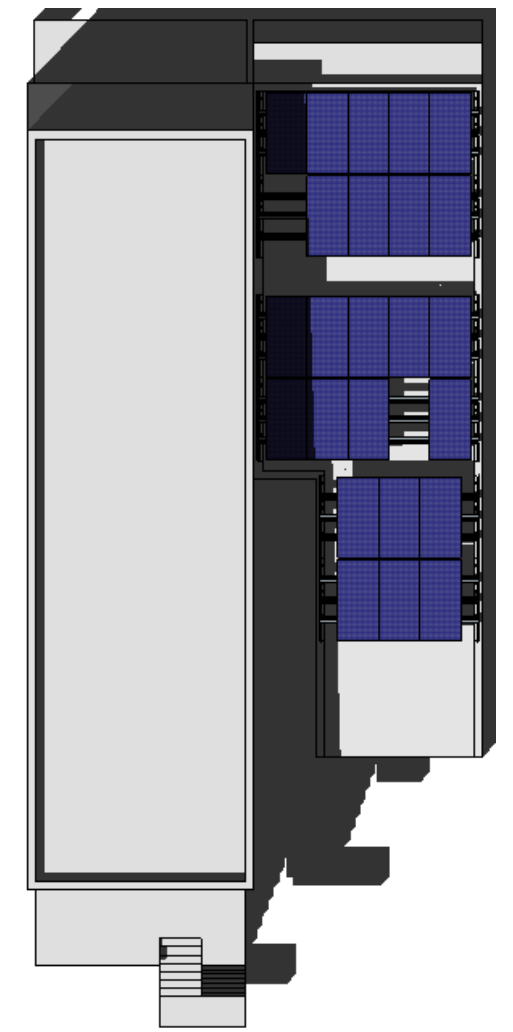
**FALL  
9/22**



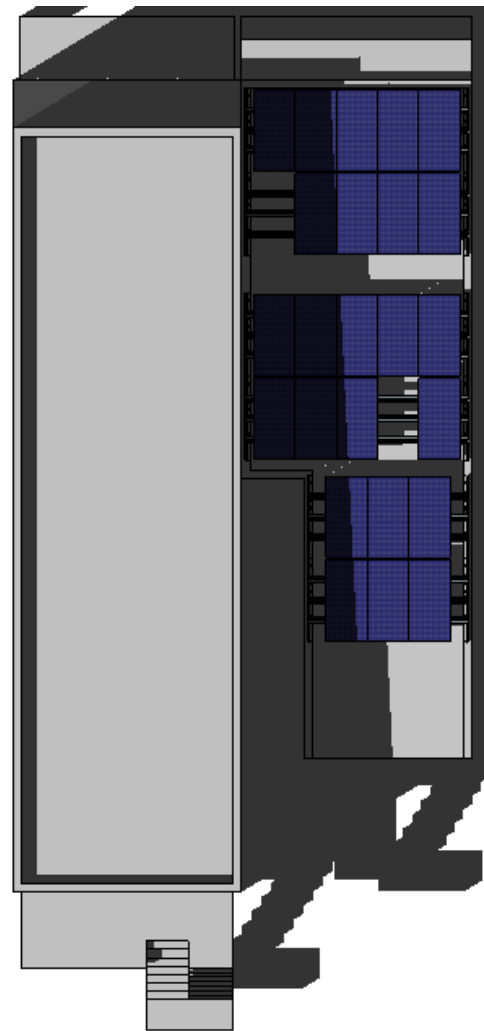
*Fall – 12pm: 0% Shaded*



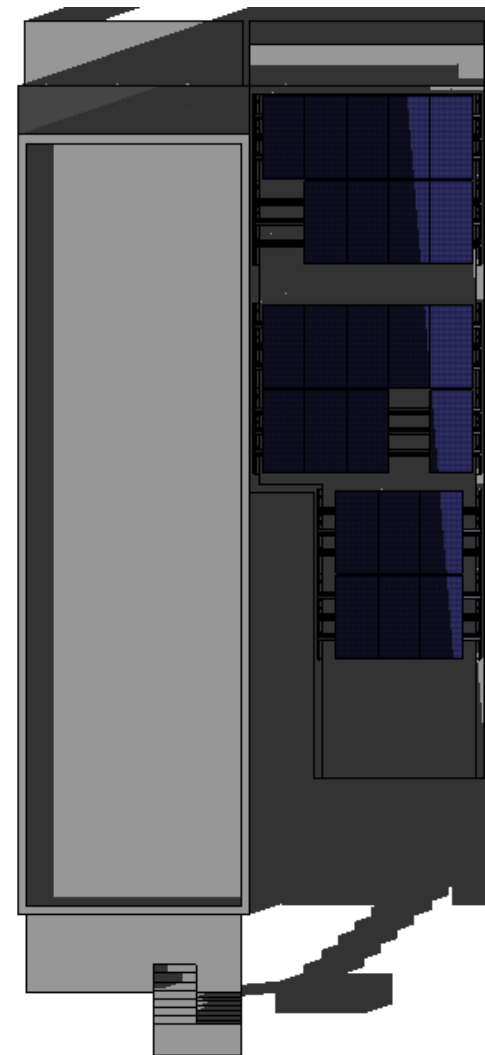
*Fall – 1pm: 4% Shaded*



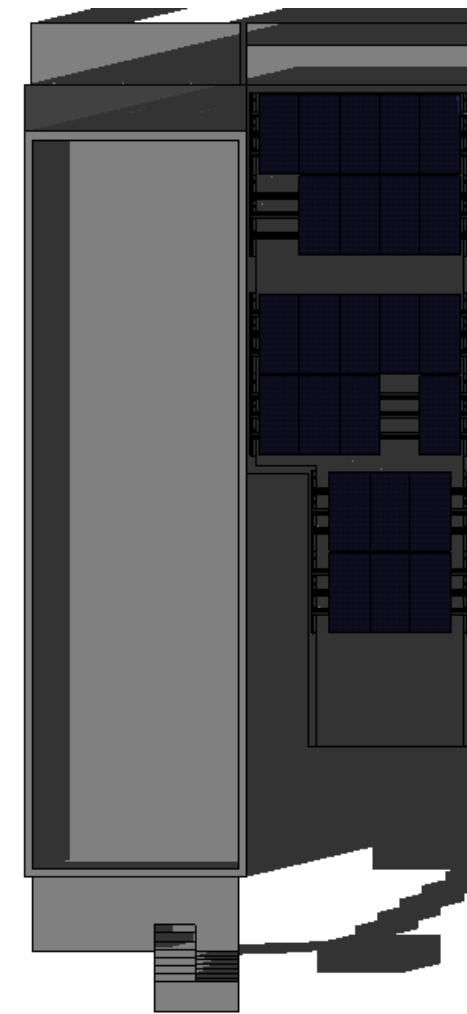
*Fall – 2pm: 13% Shaded*



*Fall – 3pm: 35% Shaded*



*Fall – 4pm: 75% Shaded*



*Fall – 4:30pm: 100% Shaded*

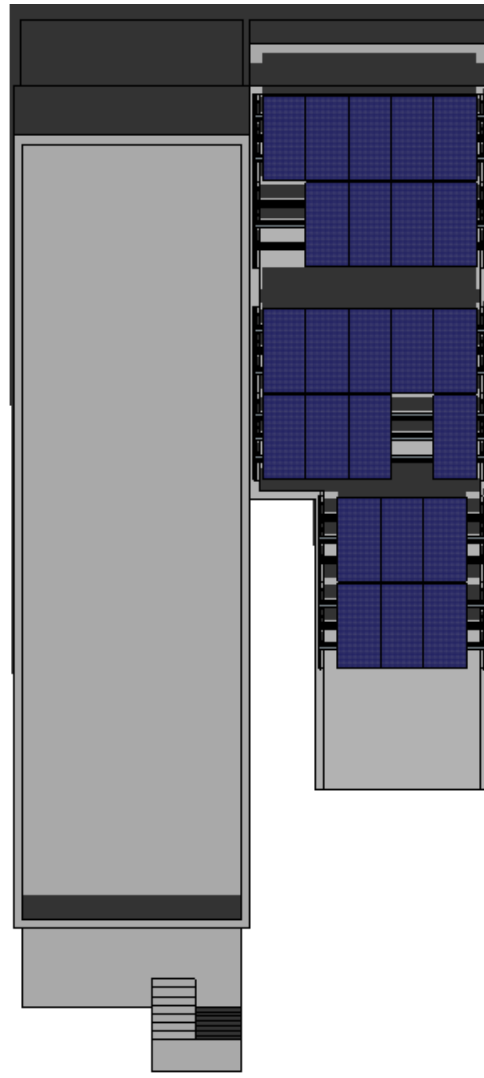
**1320 RANDOLPH ST. NW**



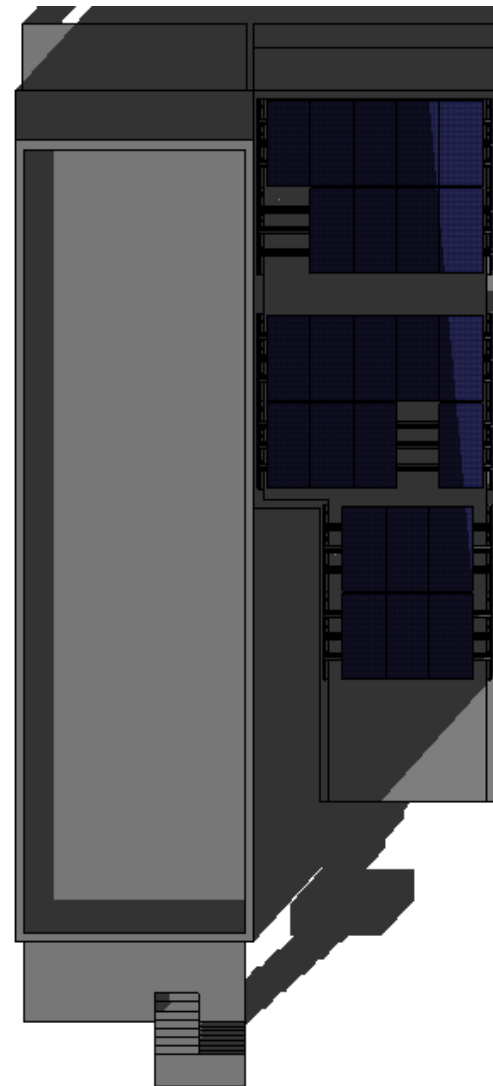
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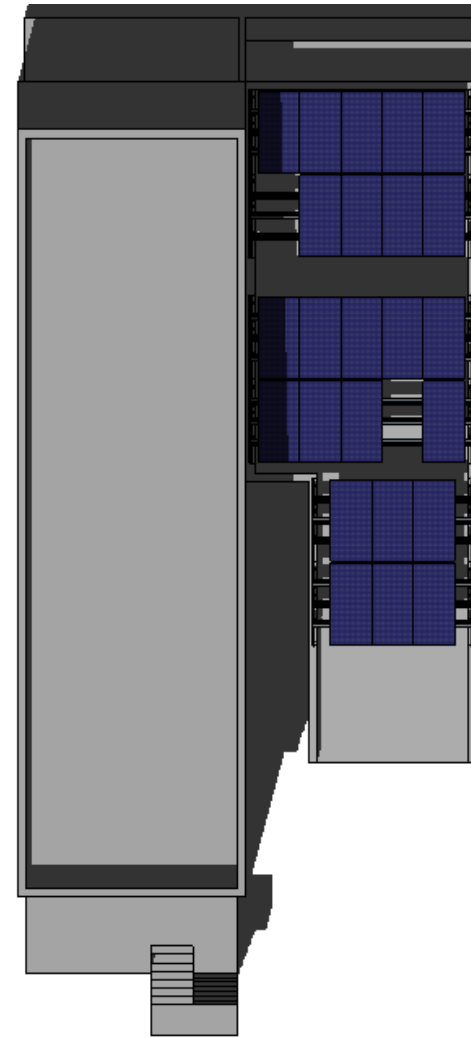
# WINTER 12/21



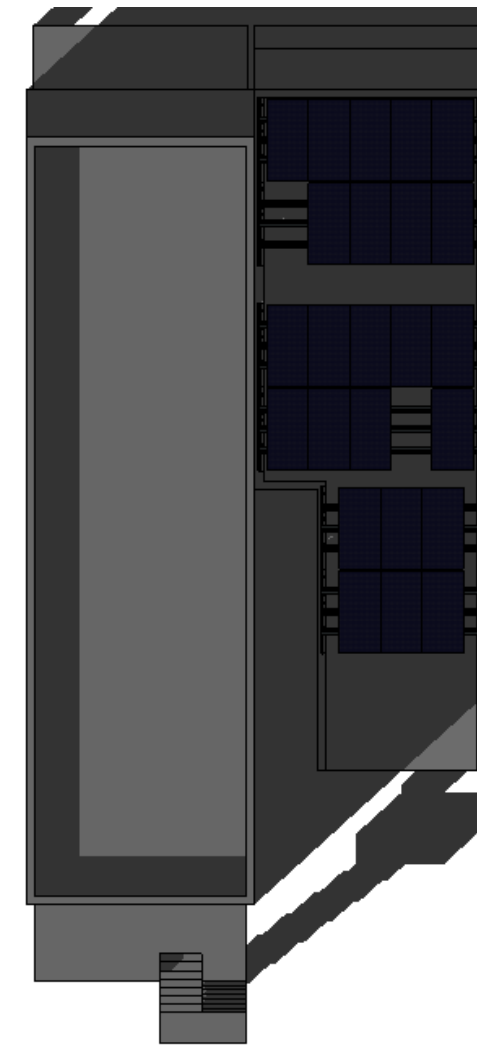
Winter – 12pm: 0% Shaded



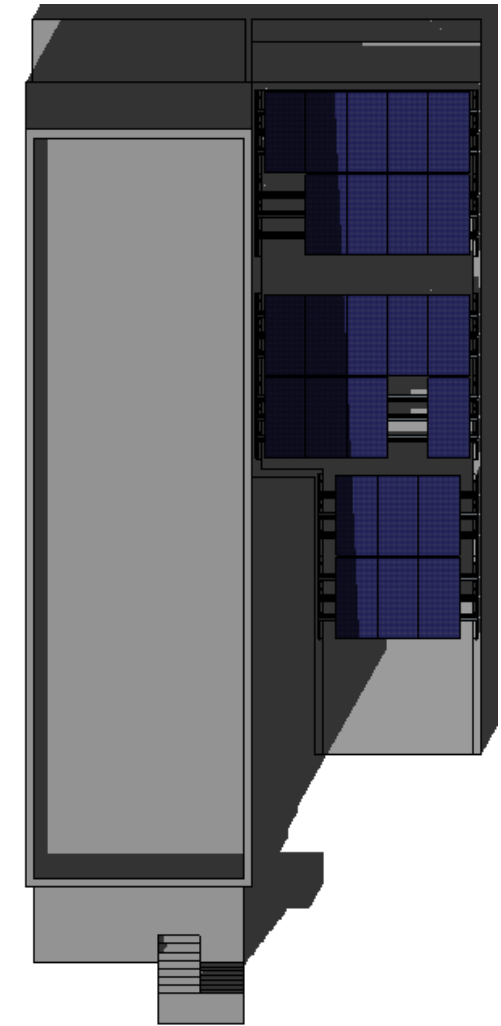
Winter – 3pm: 85% Shaded



Winter – 1pm: 8% Shaded



Winter – 4pm: 100% Shaded



Winter – 2pm: 27% Shaded

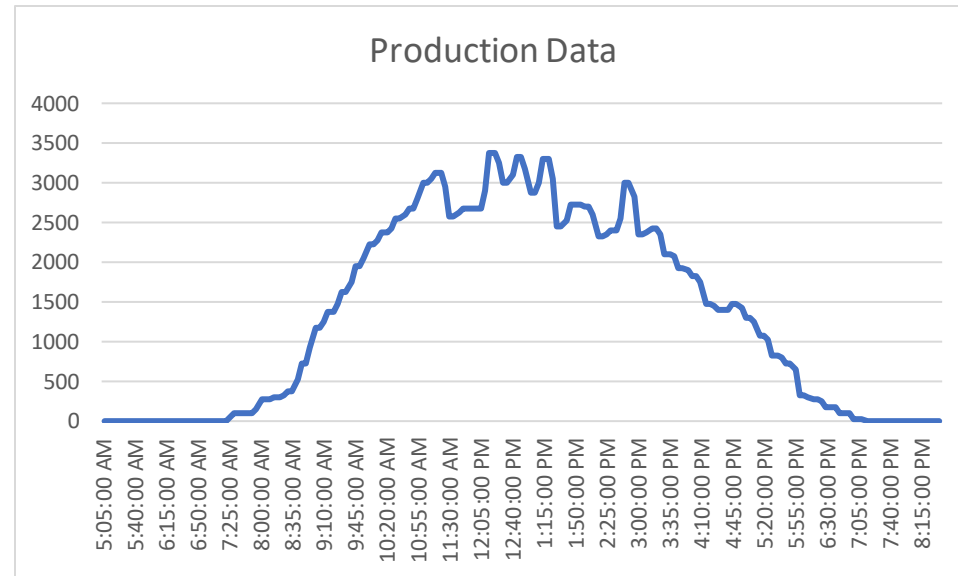
1320 RANDOLPH ST. NW



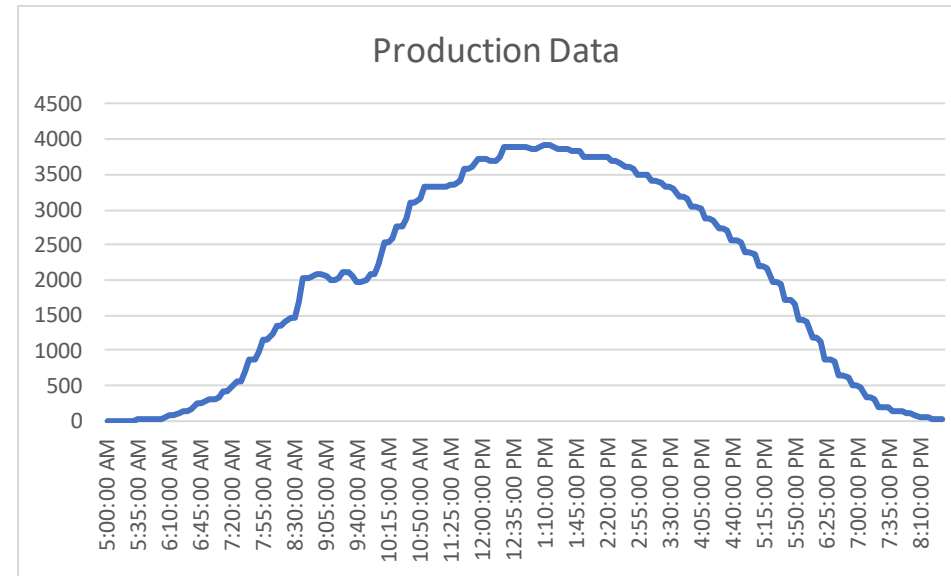
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# PRODUCTION DATA

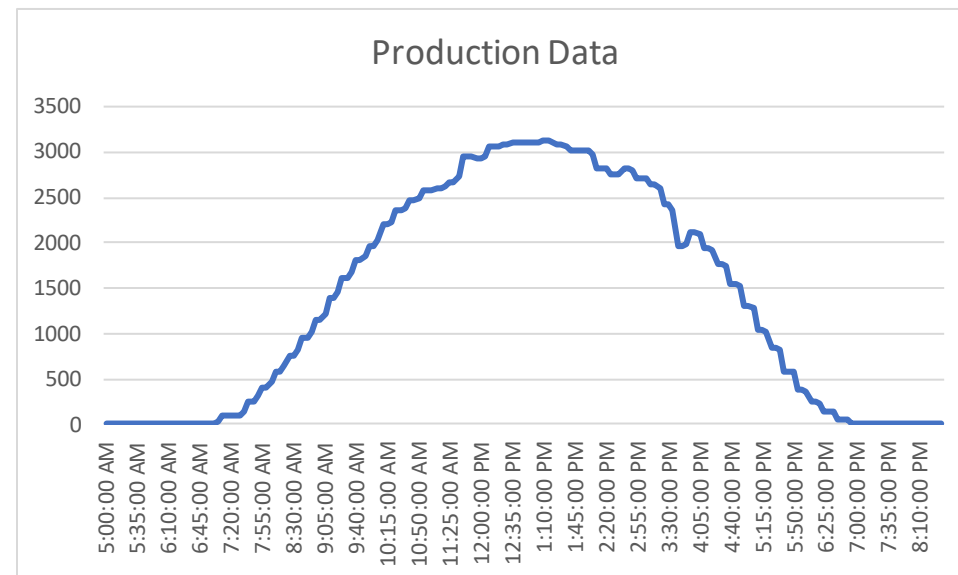
Solar Solution has a client whose solar system is in the same vicinity as the property in question. That client's property production data has been pulled to determine the general production behavior year-round. Note the production numbers are of no interest as the system size is different from the property in question. These graphs are used solely to find the production percentages throughout the day near the four selected dates.



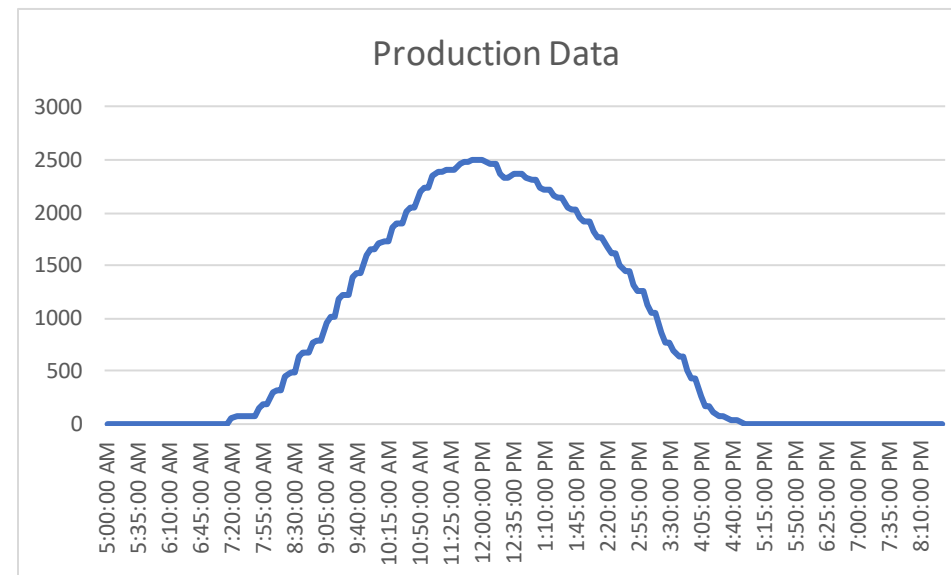
Spring ~65% production in afternoon. (162kWh/251kWh)



Summer ~66% of production in afternoon. (247kWh/375kWh)



Fall ~65% of production in afternoon. (169kWh/260kWh)



Winter ~53% of production in afternoon. (84kWh/158kWh)

1320 RANDOLPH ST. NW

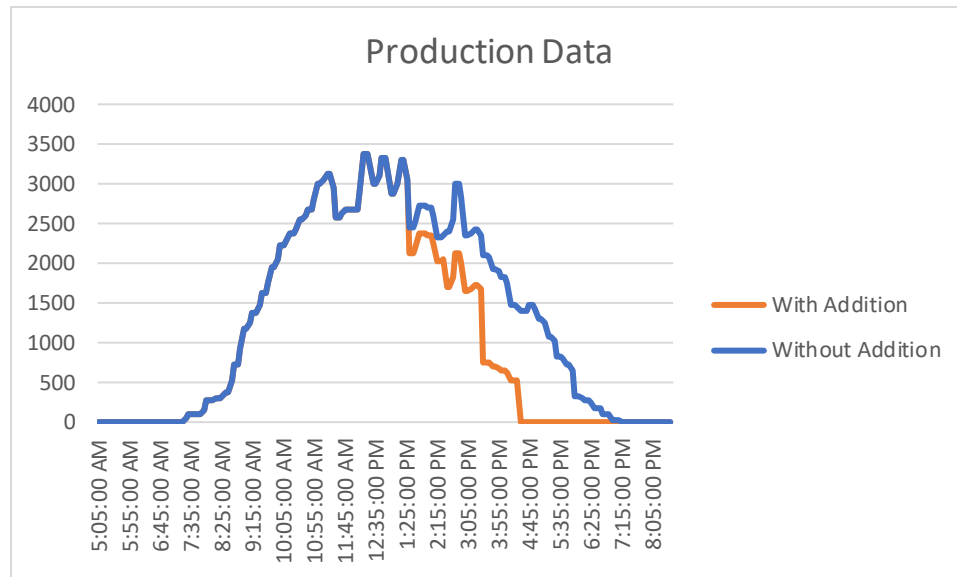


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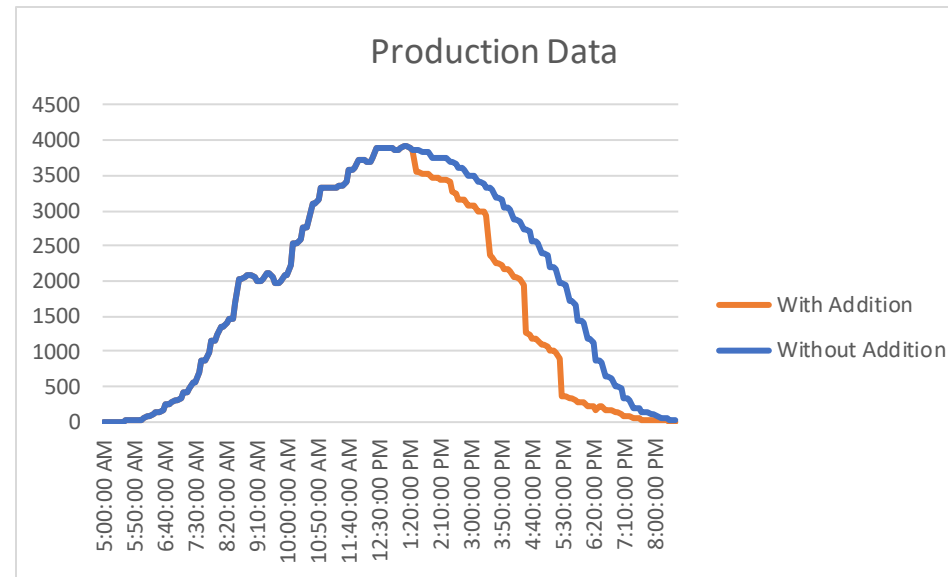


# ESTIMATED SCALED PRODUCTION DATA

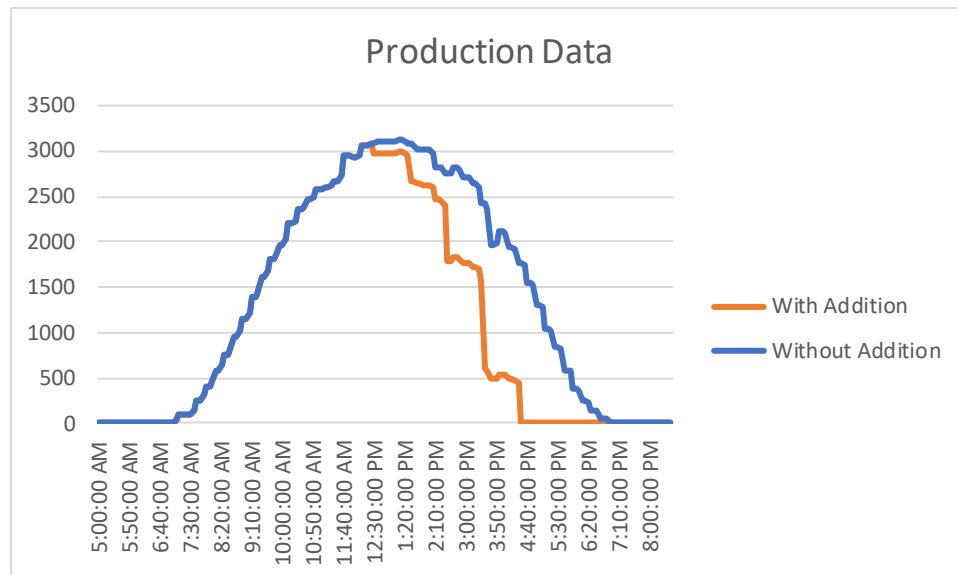
The production data obtained by the existing client's system are used to scale the production of the system under shade by the neighboring addition. The result is made with the assumption that the shaded portions of a panel produces no power and that if a panel is shaded 50% it would produce 50% of its original production. The times collected from the shade data and their respective shade percentage would be used to scale down the production. The results are as follow:



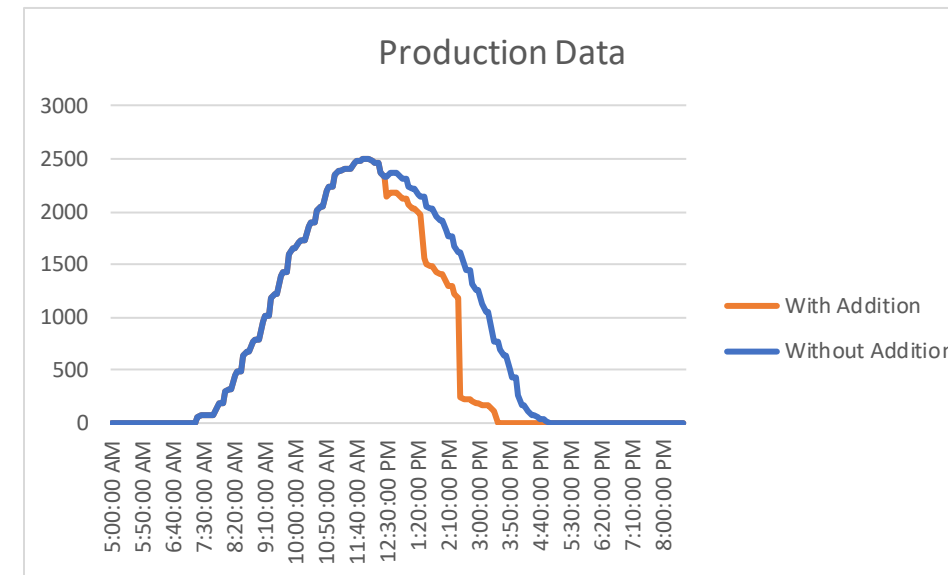
*Spring ~20% of production reduced with addition*



*Summer ~15% of production reduced with addition*



*Fall ~22% of production reduced with addition*



*Winter ~16% of production reduced with addition*



# DATA ANALYSIS

Using the data pulled from the existing solar system in the vicinity, the production and shading findings were used to calculate how much of the current system, percentage wise, would be affected.

The total production is measured and ran against the shaded system to extrapolate the production lost due to the addition of the neighboring property.

Below are the extrapolated findings:

Spring – 20% reduced production

Summer – 15% reduced production

Fall – 22% reduced production

Winter – 16% reduced production

# CONCLUSION

**The current solar system located on the roof of property at 1320 Randolph St. NW would see an estimated reduced production of 18% on average**, year-round with the addition on neighboring property at 1322 Randolph St. NW.

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