

ASHRAE HQ **Rooftop PV Generation Potential**

4.16.2019



Rooftop PV Generation Potential: HVAC Option 2 (Hydronic Systems)

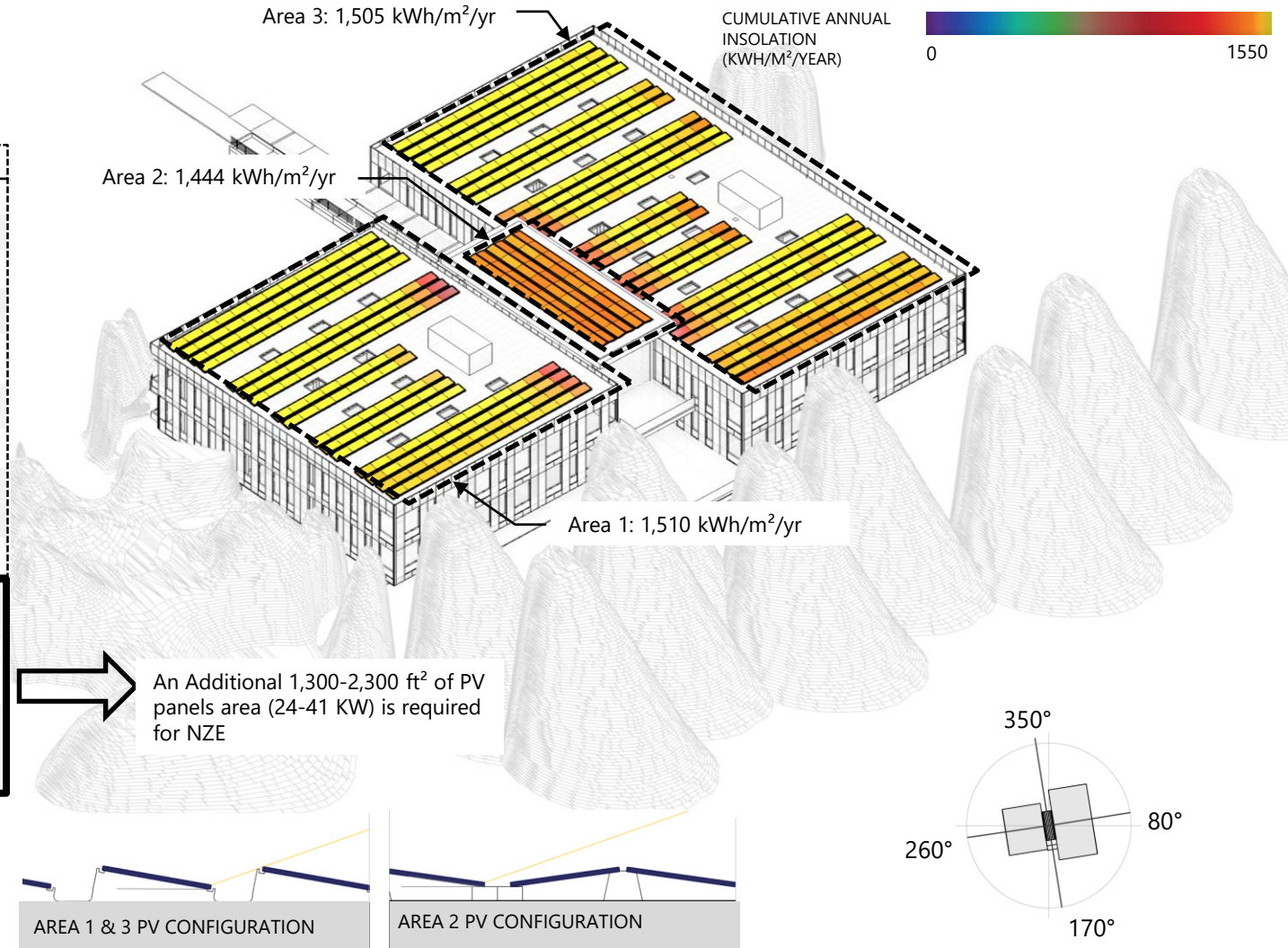
190415 Update

ROOFTOP PHOTOVOLTAIC (PV) ENERGY GENERATION POTENTIAL

		Area 1	Area 2	Area 3	Total
Annual Insolation	(kWh/m ²)	1510	1444	1505	1,500
Array Tilt (Flat=0)	Degrees	10	8	10	8-10
Array Azimuth (S=180)	Degrees	170	80/260	170	Varies
PV Panel Efficiency	(%)	19.5%	19.5%	19.5%	19.5%
System Losses	(%)	15%	15%	15%	15%
Inverter Losses	(%)	4%	4%	4%	4%
PV Panel Area	(m ²)	378	116	594	1,088
Roof Utilization	(%)	38%	60%	39%	40%
# 405W Panels*	#	183	54	295	532
DC System Size	(kW)	74	22	119	215
Annual Energy Generation Potential	(kWh/yr)	91,000	27,000	142,000	260,000
Annual EUI Offset (EUI**)	(kBtu/ft ² /yr)	4.57	1.35	7.13	13.0
Annual Energy Generation Per Panel Area	(kWh/m ² /yr)	241	233	239	239

* Based on LG NeON 2 (405W) Dimensions and Specifications

** Floor area used for EUI calculation: 68,000 ft²



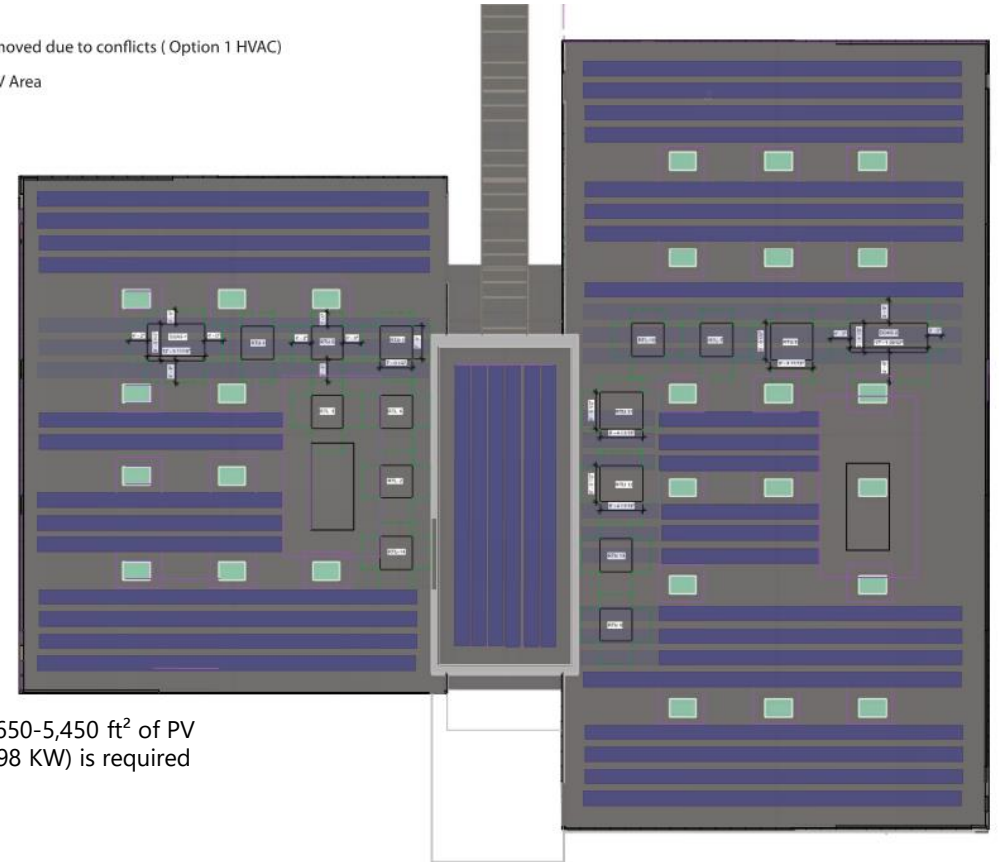
Rooftop PV Generation Potential: HVAC Option 1 (All-Air)

190416 Update

ROOFTOP PHOTOVOLTAIC (PV) ENERGY GENERATION POTENTIAL

		Area 1	Area 2	Area 3	Total
Annual Insolation	(kWh/m ²)	1510	1444	1505	1,500
Array Tilt (Flat=0)	Degrees	10	8	10	8-10
Array Azimuth (S=180)	Degrees	170	80/260	170	Varies
PV Panel Efficiency	(%)	19.5%	19.5%	19.5%	19.5%
System Losses	(%)	15%	15%	15%	15%
Inverter Losses	(%)	4%	4%	4%	4%
PV Panel Area	(m ²)	298	116	470	1,088
Roof Utilization	(%)	30%	60%	31%	33%
# 405W Panels*	#	143	54	226	423
DC System Size	(kW)	58	22	92	171
Annual Energy Generation Potential	(kWh/yr)	72,000	27,000	113,000	212,000
Annual EUI Offset (EUI**)	(kBtu/ft ² /yr)	3.61	1.35	5.67	10.6
Annual Energy Generation Per Panel Area	(kWh/m ² /yr)	241	233	239	239

PV Panels removed due to conflicts (Option 1 HVAC)
 Remaining PV Area



An Additional 3,650-5,450 ft² of PV panels area (66-98 KW) is required for NZE

* Based on LG NeON 2 (405W) Dimensions and Specifications

** Floor area used for EUI calculation: 68,000 ft²

HVAC Options : Pros and Cons

- NET ZERO ENERGY
- FIRST COST
- LIFE CYCLE COST
- THERMAL COMFORT
- ACOUSTICS
- PV ROOF AREA
- SPACE ALLOCATION
- MAINTENANCE
- THE ASHRAE STORY

