# 2020 NYStretch Energy Code Commercial Cost Effectiveness Analysis

Final Report | Report Number 19-34 | July 2019



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# 2020 NYStretch Energy Code Commercial Cost Effectiveness Analysis

Final Report

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## **Abstract**

This report summarizes the energy savings and cost-effectiveness analysis of the commercial provisions of the 2020 NYStretch Energy Code of New York State. For this study, cost effectiveness means comparing the annual energy cost and first costs of complying with NYStretch versus the commercial provisions of the 2020 ECCC NYS to determine the incremental cost of design and construction as compared to the annual energy cost savings. NYStretch includes overlays of both the 2018 IECC and ASHRAE 90.1-2016. This analysis is limited to the overlay of ASHRAE 90.1-2016. The report includes the methodology used in the analysis, assumptions, and results at the applicable climate design zones for New York State.

# Keywords

Energy code, stretch energy code, cost effectiveness, NYSERDA

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# **Definitions**

**Climate Zones:** The three climate zones of New York State: 4A, 5A, and 6A. For purposes of these analyses, the weather files used are New York City (CZ 4A), Buffalo (CZ 5A), and Watertown (CZ 6A).

**Prototypes:** Prototypes developed by the Department of Energy for modeling purposes for the following building types: Large Office, Stand-alone Retail, Secondary School, Large Hotel, Full-Service Restaurant, Outpatient Healthcare, Warehouse, 10-Story High-Rise Apartment, and 20-Story High-Rise Apartment. The 10- and 20-Story High-Rise Apartment prototypes were developed by PNNL based on New York City building permit data for multifamily buildings for use in the NYStretch Code analysis.

**2020 Energy Conservation Code of New York State (2020 ECCC NYS):** An energy code based on the *2018 International Energy Conservation Code*, published by the International Code Council and subsequently modified by New York State.

# **Summary**

With guidance from a 25-member advisory group composed of public and private stakeholders, the New York State Energy Research and Development Authority (NYSERDA) developed the NYStretch Energy Code-2020 (draft dated January 2019) (NYStretch) as a voluntary, locally adoptable stretch energy code. It is intended that NYStretch will overlay the 2020 Energy Conservation Construction Code of New York State (2020 ECCC NYS) resulting in an energy code that is roughly 7% more efficient than the commercial provisions of ASHRAE 90.1-2016.

To assist communities in adopting NYStretch, NYSERDA contracted Vidaris to provide a cost-effectiveness analysis of the commercial provisions of NYStretch. For this study, cost effectiveness means comparing the annual energy cost and first costs of complying with NYStretch versus the 2020 ECCC NYS to determine the incremental cost of design and construction as compared to the annual energy cost savings. NYStretch includes overlays of both the 2018 IECC and ASHRAE 90.1-2016. The analysis presented in this report is limited to the overlay of ASHRAE 90.1-2016.

The NYStretch overlay for 90.1-2016 includes a new requirement for choosing an additional set of increased efficiency requirements. For this analysis, the option for reduced lighting power was included for all buildings. A summary of results is presented in Tables ES-1 through ES-6.

The differences between ASHRAE 90.1-2016 and NYStretch vary by building type and climate zone with site energy savings ranging from 2.3 to 14%, source energy savings ranging from 3.0 to 15.3%, and energy cost savings ranging from 3.0 to 16.4%. Incremental costs range from \$0.28 to \$5.59 per square foot and simple payback ranges from 3.0 to 18.4 years.

In aggregate, this analysis indicates that versus ASHRAE 90.1-2016, the NYStretch yields savings statewide for each building in each climate zone with site energy savings of 5.4%, source energy savings of 6.7%, and energy cost savings of 7.1%. These savings are achieved with an average additional cost of \$1.14 per square foot with a 10.5-year simple payback.

Table ES-1. Aggregate Summary of Results

	Construction Weight	Site 1	Energy [kBtu/f	t2/yr]	Source	Energy [kBtu	/ft2/yr]		En	ergy Cost	[\$/ft2]		remental rst Cost	Simple Payback
Prototype	[%]	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1	-2016	NYStreto	h % Sa	vings	\$/ft2	years
Large Office	8.8%	60.5	58.5	3.4%	179.5	172.4	4.0%	\$	2.26	\$ 2	16 4.1	%	\$ 0.31	3.27
Standalone Retail	14.6%	46.2	40.9	11.6%	130.7	111.2	14.9%	\$	1.62	\$ 1.	36 15.8	3%	\$ 3.39	13.25
Secondary School	9.8%	37.4	34.3	8.3%	102.7	94.3	8.2%	\$	1.26	\$ 1.	16 8.1	%	\$ 0.55	5.36
Large Hotel	7.8%	83.1	77.4	6.9%	185.6	170.4	8.2%	\$	2.13	\$ 1.	94 8.7	%	\$ 1.64	8.84
Full-Service Restaurant	0.5%	414.9	378.2	8.8%	741.0	659.6	11.0%	\$	7.65	\$ 6	72 12.	1%	\$ 4.29	4.60
Outpatient Healthcare	5.4%	113.0	108.2	4.3%	313.2	295.2	5.7%	\$	3.86	\$ 3	62 6.1	%	\$ 2.85	12.03
Warehouse	7.5%	21.5	18.6	13.7%	41.8	36.3	13.2%	\$	0.45	\$ 0.	39 12.9	9%	\$ 0.77	13.26
10-Story High-Rise Apartment	21.9%	48.4	47.1	2.8%	96.0	93.1	3.0%	\$	1.04	\$ 1.	01 3.0	%	\$ 0.43	11.45
20-Story High-Rise Apartment	23.7%	48.5	47.4	2.4%	106.4	103.2	3.1%	\$	1.21	\$ 1.	17 3.4	%	\$ 0.47	13.50
Weighted Average	100.0%	54.1	51.2	5.4%	129.4	120.7	6.7%	\$	1.52	\$ 1.	41 7.1	%	\$ 1.14	10.50

Table ES-2. Summary of Results for Climate Zone 4A

	Construction	Site E	nergy [kBtu/t	ft2/yr]	Source	Energy [kBtı	ı/ft2/yr]		En	ergy Cost [\$/f	t2]	Inc.	First Cost	Simple Payback
Prototype	Weight	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1	1-2016	NYStretch	% Savings		\$/ft2	years
Large Office	7.5%	60.0	58.0	3.4%	179.3	172.2	3.9%	\$	2.26	\$ 2.16	4.1%	\$	0.28	3.1
Standalone Retail	4.9%	44.5	39.1	12.1%	130.1	111.0	14.7%	\$	1.63	\$ 1.38	15.4%	\$	3.89	15.6
Secondary School	5.0%	37.0	33.9	8.5%	104.0	95.6	8.1%	\$	1.29	\$ 1.18	8.0%	\$	0.61	6.0
Large Hotel	3.5%	81.7	75.9	7.1%	187.4	172.2	8.1%	\$	2.17	\$ 1.99	8.5%	\$	1.77	9.6
Full-Service Restaurant	0.1%	380.3	341.6	10.2%	717.1	629.0	12.3%	\$	7.62	\$ 6.60	13.3%	\$	5.59	5.5
Outpatient Healthcare	2.0%	111.7	106.7	4.5%	314.6	296.5	5.8%	\$	3.90	\$ 3.66	6.2%	\$	3.10	12.9
Warehouse	2.5%	17.7	15.2	14.0%	37.4	32.4	13.5%	\$	0.42	\$ 0.36	13.3%	\$	1.03	18.4
10-Story High-Rise Apartment	21.9%	48.4	47.1	2.8%	96.0	93.1	3.0%	\$	1.04	\$ 1.01	3.0%	\$	0.43	13.5
20-Story High-Rise Apartment	23.5%	48.4	47.3	2.4%	106.4	103.1	3.1%	\$	1.21	\$ 1.17	3.4%	\$	0.47	11.5
Weighted Average (CLIMATE ZONE 4A)	70.9%	51.4	49.2	4.2%	120.6	114.5	5.1%	\$	1.41	\$ 1.33	5.5%	\$	0.85	11.0

Table ES-3. Summary of Results for Climate Zone 5A

	Construction	Site E	nergy [kBtu/t	ft2/yr]	Source	Energy [kBt	u/ft2/yr]			Energy (	Cost		Inc.	First Cost	Simple Payback
Prototype	Weight	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1	1-2016	NYStre	tch	% Savings		\$/ft2	years
Large Office	1.0%	63.4	61.2	3.4%	180.6	173.1	4.1%	\$	2.24	\$ 2.	.15	4.3%	\$	0.47	4.8
Standalone Retail	7.1%	46.5	41.2	11.6%	129.9	110.0	15.3%	\$	1.60	\$ 1.	.34	16.4%	\$	3.08	11.7
Secondary School	3.7%	37.7	34.6	8.1%	101.2	92.9	8.2%	\$	1.24	\$ 1.	.13	8.3%	\$	0.43	4.3
Large Hotel	2.5%	83.3	77.7	6.8%	183.4	168.1	8.4%	\$	2.09	\$ 1.	.90	9.0%	\$	1.55	8.3
Full-Service Restaurant	0.3%	418.0	381.9	8.6%	741.4	661.8	10.7%	\$	7.63	\$ 6.	.72	11.9%	\$	3.90	4.3
Outpatient Healthcare	2.4%	112.9	108.2	4.2%	310.6	292.8	5.7%	\$	3.82	\$ 3.	.58	6.2%	\$	2.70	11.5
Warehouse	3.8%	23.9	20.6	13.8%	43.9	38.2	13.0%	\$	0.46	\$ 0.	.40	12.6%	\$	0.60	10.4
10-Story High-Rise Apartment	0.0%	54.5	52.5	3.6%	99.8	96.3	3.5%	\$	1.04	\$ 1.	.01	3.5%	\$	0.38	10.5
20-Story High-Rise Apartment	0.1%	54.4	53.2	2.3%	112.2	103.1	8.1%	\$	1.24	\$ 1.	.17	6.0%	\$	0.43	10.3
Weighted Average (CLIMATE ZONE 5A)	20.9%	59.1	54.2	8.2%	147.5	132.8	10.0%	\$	1.76	\$ 1.	.57	10.5%	\$	1.81	9.8

Table ES-4. Summary of Results for Climate Zone 6A

	Construction	Site E	Energy [kBtu/i	ft2/yr]	Source	Energy [kBtu	ı/ft2/yr]			Energy	y Cost		Inc.	First Cost	Simple Payback
Prototype	Weight	90.1-2016	NYStretch*	% Savings	90.1-2016	NYStretch*	% Savings	90.	1-2016	NYSt	retch*	% Savings		\$/ft2	years
Large Office	0.3%	64.4	62.1	3.5%	181.7	174.1	4.2%	\$	2.25	\$	2.15	4.4%	\$	0.30	3.0
Standalone Retail	2.6%	48.6	43.4	10.7%	133.9	115.0	14.1%	\$	1.65	\$	1.40	15.1%	\$	3.27	13.2
Secondary School	1.1%	38.2	35.0	8.3%	101.8	93.3	8.3%	\$	1.24	\$	1.14	8.3%	\$	0.65	6.3
Large Hotel	1.8%	85.4	79.9	6.5%	185.1	170.0	8.2%	\$	2.09	\$	1.91	8.8%	\$	1.49	8.1
Full-Service Restaurant	0.1%	439.9	403.5	8.3%	763.7	683.6	10.5%	\$	7.76	\$	6.85	11.7%	\$	4.18	4.6
Outpatient Healthcare	1.0%	116.0	111.3	4.0%	316.4	298.6	5.6%	\$	3.88	\$	3.64	6.1%	\$	2.71	11.5
Warehouse	1.2%	22.0	19.1	13.2%	44.2	38.3	13.4%	\$	0.48	\$	0.42	13.5%	\$	0.75	11.6
10-Story High-Rise Apartment	0.0%	54.5	52.6	3.6%	99.8	96.2	3.5%	\$	1.04	\$	1.01	3.5%	\$	0.42	11.6
20-Story High-Rise Apartment	0.1%	55.1	53.3	3.3%	113.0	108.7	3.8%	\$	1.25	\$	1.20	4.0%	\$	0.40	8.1
Weighted Average (CLIMATE ZONE 6A)	8.2%	65.0	60.2	7.4%	159.1	144.3	9.3%	\$	1.88	\$	1.70	9.9%	\$	1.96	10.5

Life-cycle cost savings were calculated based on a 10- and 30-year period. The results for these analyses are in Tables ES-5 and ES-6. Over the 10-year period, the present value of the energy savings are more than the incremental costs of \$0.85/sq.ft., \$1.81/sq.ft., and \$1.96/sq.ft. for climate zones 4A, 5A, and 6A, respectively. Net energy savings over 10 years are \$0.18/sf in aggregate statewide.

Over the 30-year period, the net present value of the energy savings also accounts for replacement and residual value, and yields savings of \$0.52/sq.ft., \$1.57/sq.ft., and \$1.38/sq.ft. for climate zones 4A, 5A, and 6A, respectively. Net energy savings over 30 years are \$0.81/sf in aggregate statewide.

Table ES-5. Summary of 10-year Life-Cycle Cost Analysis

	Construction		Annual En	erg	y Cost		10 Year Li	ife Cycle Ene	rgy	Cost	Ir	cremental	R	esidual	N	et Savings ove	er 10	Years
Prototype	Weight [%]	9(	0.1-2016	N	YStretch	Ç	00.1-2016	NYStretch		Savings		First Cost		Value t 10yrs		Total		\$/sf
4A Totals	70.9%	\$	253,616	\$	242,215	\$	2,365,240	\$ 2,259,659	\$	105,581	\$	83,955	\$	25,162	\$	46,788	\$	0.11
5A Totals	20.9%	\$	167,142	\$	154,337	\$	1,556,783	\$ 1,438,147	\$	118,636	\$	1,558,123	\$	24,902	\$	781,498.62	\$	0.37
6A Totals	8.2%	\$	170,912	\$	157,469	\$	1,595,414	\$ 1,470,838	\$	124,576	\$	1,252,578	\$	30,782	\$	617,704	\$	0.30
AGGREGATE VALUES	100.0%	\$	228,761	2	216,899	\$	2,133,146	\$ 2,023,280	\$	109,867	\$	88,326	\$	25,568	\$	47,109	\$	0.18

Table ES-6. Summary of 30-year Life-Cycle Cost Analysis

Protetrno	Construction	CZ	First Cost	Replacement	Maintenance	Residual	Energy Cost	30 Year Net Pr Savi	
Prototype	Weights	CZ	First Cost	Costs	Wramtenance	Value	Savings	\$	\$/sf
4A Totals	70.9%	4A	\$83,955	\$40,133	\$0	\$1,671	\$260,157	\$137,741	\$0.52
5A Totals	20.9%	5A	\$94,765	\$41,112	\$0	(\$107)	\$292,323	\$156,339	\$1.57
6A Totals	8.2%	6A	\$109,714	\$50,027	\$0	\$1,211	\$305,970	\$147,441	\$1.38
AGGREGATE VALUES			\$88,326	\$41,149	\$0	\$1,262	\$270,636	\$142,423	\$0.81

# 1 Cost Effectiveness Study

# 1.1 Background

The PNNL report *Final Energy Savings Analysis of the Proposed NYStretch-Energy Code 2018*, February 2019 (*PNNL-ACT-10073 Rev. 1*) presents the energy and energy cost savings for nine prototype buildings, which represent more than 73% of the projected new construction by floor-space accounted for in the full suite of 16 DOE prototypes. *PNNL-ACT-10073 Rev. 1* identifies 15 Energy Efficiency Measures (EEMS) required by the NYStretch. The PNNL analysis and report compare the provisions of the NYStretch against ASHRAE Standard 90.1-2013 to determine savings.

To determine the cost effectiveness of NYStretch relative to ASHRAE 90.1-2016, Vidaris quantified the difference in annual energy performance between NYStretch and ASHRAE 90.1-2016 using Energy Plus models for nine prototype buildings in three New York cities representing the climates zones shown in Table 1.

Table 1. Prototypes and New York Climate Zones

DOE Prototype	Climate Zone: City (Weather file)
Large Office Building	
Stand-alone Retail	
Secondary School	CZ 4A: New York (USA_NY_New .York-
Large Hotel	J.F.Kennedy.Intl.A P.744860_TMY3.epw)
Full-service Restaurant	CZ 5A: Buffalo (USA_NY_Buffalo-
Outpatient Healthcare	Greater.Buffalo.Intl.AP.725280_TMY3.epw)
Warehouse	CZ 6A: Watertown (USA_NY_Watertown.AP.726227_TMY3.epw)
10-Story High-rise Apartment	(0.5.1.2.1.2.1.5.1.1.1.1.1.1.2.5.2.1.2.1.1.1.1
20-Story High-rise Apartment	

The cities selected for CZs 4A and 5A are the same cities used by PNNL in its most recent national analysis of ASHRAE 90.1-2016: Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2016, October 2017 (PNNL 2017); namely, New York City and Buffalo, NY.

Changes to the climate zone map in ASHRAE 90.1-2016 reclassified some cities in CZ 6A to CZ 5A, including Buffalo, NY. Consequently, for CZ 5A Buffalo supplanted Albany, which had been used in previous State-specific analyses for CZ 5A. Moving Buffalo meant selecting another city for CZ 6A as PNNL 2017 used Rochester, MN to represent CZ 6A in the national analysis. Based on consultation with NYSERDA, Watertown, NY was selected to represent CZ 6A for this analysis. Weather files were downloaded directly from the DOE's EERE website for this analysis. <sup>1</sup>

Note that the cities used for this analysis are the same cities used in support of the New York State Department of State rulemaking process for adopting the 2020 ECCC NYS.

# 1.2 Energy Analysis Results

PNNL developed the EnergyPlus prototype models specifically for the NYStretch analysis done for NYSERDA. NYSERDA provided PNNL's nine prototype building types to be used by Vidaris in this analysis. Vidaris started with the NYStretch models and modified them as necessary to create the ASHRAE 90.1-2016 baseline models for each prototype appropriate to each climate zone. A list of the differences between the NYStretch and 90.1-2016 models is provided in Appendix A.

To determine the statewide savings that the NYStretch offers beyond ASHREA 90.1-2016, weighting factors for each result were applied to determine the aggregate savings. The weighting factors used in this analysis were developed by PNNL based on construction volume by building type and climate zone and are presented in *PNNL-ACT-10073 Rev. 1*.

Vidaris used the same energy prices used for the 2020 ECCC NYS cost-effectiveness and are shown in Table 4. These rates are based on commercial energy price information available from the U.S. Energy Information Administration (EIA) for the 2017 calendar year.<sup>2</sup>

www.energycodes.gov/development/commercial/90.1\_models

The year 2017 was the most current year for which complete data for electricity and natural gas rates and heat content for natural gas was available as of January 2019 when the 2020 NYS ECC cost-effectiveness analysis was started.

Vidaris used EnergyPlus v8.0.0 and generated the results for each prototype under both codes and for each climate zone. Based on the prototype buildings, 2020 NYStretch has been shown to be 7.1% more efficient than ASHRAE 90.1-2016 on a cost per square foot basis. With respect to site and source energy, NYStretch yields savings of 5.4% and 6.7%, respectively. The aggregated results by code and by climate zone are presented in Table 2 (See Appendix B for more detailed results by building type.)

Table 2. Aggregated Differences in Annual Energy Use and Annual Energy Cost between ASHRAE 90.1-2016 and 2020 NYStretch

		Total (kBtu)		NY	S Energy C	ost	t	Ene	ergy Cost	EUI (kF	tu/sf)	_	ECI	Weighting
		Site	Source	E	lectricity		Gas		Total	Site	Source		\$/sf	Factors
te	ASHRAE 90.1-2016	65,273,116	156,127,787	\$	1,655,039	\$	179,661	\$	1,834,701	54.2	129.6	\$	1.52	
ega1 lues	NYStretch	61,721,089	145,682,605	\$	1,528,231	\$	175,543	\$	1,703,773	51.2	120.9	\$	1.41	
Aggregate Values	Savings	3,552,026	10,445,183	\$	126,809	\$	4,118	\$	130,927	2.9	8.7	\$	0.11	
A	Savings	5.44%	6.69%		7.66%		2.29%		7.14%	5.44%	6.69%		7.14%	
	4A	2,618,314	7,452,920	\$	88,826	\$	3,752	\$	92,578	2.2	6.2	\$	0.0768	70.8%
ings CZ	5A	5,815,539	17,673,722	\$	218,408	\$	5,081	\$	223,490	4.8	14.7	\$	0.1855	21.0%
Savings by CZ	6A	5,828,422	17,805,195	\$	220,633	\$	4,824	\$	225,457	4.8	14.8	\$	0.1871	8.2%
	Combined	3,552,026	10,445,183	\$	126,809	\$	4,118	\$	130,927	2.9	8.7	\$	0.11	100.0%

#### 1.3 Cost-Effectiveness Analysis

As part of its analysis, Vidaris included statewide-average utility rates available from the EIA. Additionally, Vidaris modified the cost data to reflect city-specific cost factors from RS Means. For consistency, the EIA rate data and RS Means cost factors were selected from 2017, the most recent year for which complete annual average utility data was available from the EIA.

Cost-effectiveness analysis was not included in *PNNL-ACT-10073 Rev. 1*. Consequently, Vidaris developed incremental cost data based predominantly on the following sources:

- 2018 Building Construction Costs with RSMeans Data (RSMeans 2018),
- 2018 Mechanical Costs with RSMeans Data (RSMeans 2018), and
- cost data used by PNNL in their national cost-effectiveness analysis of ASHRAE 90.1-2016

Where these sources were insufficient, Vidaris obtained estimates based on data from the internet (e.g., electric vehicle charging stations), or its own experience supplemented as needed with conversations with other practitioners (e.g., infiltration testing, lighting).

The life of energy efficiency measures was determined from NYSERDA's *Whole Building Incentive Calculator* and are summarized in Table 3. Detailed cost estimates by building type and climate zone are included in Appendix D.

**Table 3. Measure Life Assumptions** 

Measure Description	Life (years)
Energy Star Kitchen Equipment	7
Lighting System	15
Motor/drives	15
Gas fired DHW	15
HVAC- Air handlers	15
Building Shell/Glazing-Windows	20
HVAC - Electric chillers	20
HVAC - Boilers	20
Building Shell/Roof, Wall, Slab	30

Regarding the life-cycle costing, PNNL's latest analysis of ASHRAE 90.1-2016 is based upon Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis published by the National Institute of Standards and Technology (NIST). NIST data for 2017 was selected to be consistent with the other cost data being used. NIST identifies the real discount rate for non-energy related expenses (i.e., maintenance and replacement costs) and delineates Uniform Present Value Factors (UPV Factors) to be used for life-cycle periods from one to 30 years, by energy type, for Census Region 1 (which includes New York State) and based on a real DOE discount rate of 3.0%. The UPV Factor is multiplied by the annual energy cost to determine the life-cycle value of energy cost over the life-cycle period. The city cost factors, utility cost data, and life-cycle parameters used in the analysis are presented in Table 4.

Table 4. Life-Cycle Cost Analysis Parameters

		Valu	ie	Source
	Electricity	0.1475	\$/kWh	
NYS Energy - 2017	Natural Gas	6.87	\$/1000 cf	U.S. Energy Information Administration
	Heat Content of Natural Gas	1,032	Btu/cf	
	Uniform Present Value Factors:	Commercial		
Enougy Duice Escalation		<u>10 yr</u>	<u>30 yr</u>	Table Ba.1: Energy Price Indices and Discount Factors
Energy Price Escalation	Electricity	9.22	22.72	for Life-Cycle Cost Analysis – 2017, (Lavappa, et.al.)
	Natural Gas	10.57	26.00	
Discount Rate (Real)		3.00%		Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2017, (Lavappa, et.al.)
C'ta Cada Indan	4A. New York	1.346		DS Manage Building Construction Cost Data (2017)
City Code Index	5A.Buffalo	1.057		RS Means Building Construction Cost Data (2017)
	6A. Watertown	0.995		

The life of a measure does not necessarily equal the life-cycle study period. Measures may have longer or shorter lives than the 10- and 30-year periods used for this analysis, as detailed in Table 3. Consequently, a residual value of the measures was included in the analysis to account for the value of the measure associated with the remaining life of the materials installed as part of the measure. The residual values used are based on straight line depreciation of the present value of the measure over the life of the measure. For example, if a measure has a 20-year life, then at the end of 10 years it has a residual value equal to 50% of the first cost to install the measure.

Economic analysis results based on annual energy savings and simple payback are presented in Tables 5 and 6. The payback period varies from 3.0 years for Large Office in CZ6A to 18.4 years for Warehouse in CZ4A. In aggregate, the statewide area weighted payback period is 10.5 years.

Table 5. Energy Savings and Simple Payback for By Building Type and Climate Zone

Prototype	CZ	Construction	Site 1	Energy [kBtu/f	t2/yr]	Source	Energy [kBtu	/ft2/yr]			Energy Co	st	 cremental irst Cost	Simple Payback
		Weight [%]	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1	1-2016	NYStretcl	% Savings	\$/ft2	years
Large Office	4A	7.5%	60.0	58.0	3.4%	179.3	172.2	3.9%	\$	2.26	\$ 2.1	6 4.1%	\$ 0.28	3.1
	5A	1.0%	63.4	61.2	3.4%	180.6	173.1	4.1%	\$	2.24	\$ 2.1	5 4.3%	\$ 0.47	4.8
	6A	0.3%	64.4	62.1	3.5%	181.7	174.1	4.2%	\$	2.25	\$ 2.1	5 4.4%	\$ 0.30	3.0
Standalone Retail	4A	4.9%	44.5	39.1	12.1%	130.1	111.0	14.7%	\$	1.63	\$ 1.3	8 15.4%	\$ 3.89	15.6
	5A	7.1%	46.5	41.2	11.6%	129.9	110.0	15.3%	\$	1.60	\$ 1.3	4 16.4%	\$ 3.08	11.7
	6A	2.6%	48.6	43.4	10.7%	133.9	115.0	14.1%	\$	1.65	\$ 1.4	0 15.1%	\$ 3.27	13.2
Secondary School	4A	5.0%	37.0	33.9	8.5%	104.0	95.6	8.1%	\$	1.29	\$ 1.1	8 8.0%	\$ 0.61	6.0
	5A	3.7%	37.7	34.6	8.1%	101.2	92.9	8.2%	\$	1.24	\$ 1.1	3 8.3%	\$ 0.43	4.3
	6A	1.1%	38.2	35.0	8.3%	101.8	93.3	8.3%	\$	1.24	\$ 1.1	4 8.3%	\$ 0.65	6.3
Large Hotel	4A	3.5%	81.7	75.9	7.1%	187.4	172.2	8.1%	\$	2.17	\$ 1.9	9 8.5%	\$ 1.77	9.6
	5A	2.5%	83.3	77.7	6.8%	183.4	168.1	8.4%	\$	2.09	\$ 1.9	0 9.0%	\$ 1.55	8.3
	6A	1.8%	85.4	79.9	6.5%	185.1	170.0	8.2%	\$	2.09	\$ 1.9	1 8.8%	\$ 1.49	8.1
Full-Service	4A	0.1%	380.3	341.6	10.2%	717.1	629.0	12.3%	\$	7.62	\$ 6.6	0 13.3%	\$ 5.59	5.5
Restaurant	5A	0.3%	418.0	381.9	8.6%	741.4	661.8	10.7%	\$	7.63	\$ 6.7	2 11.9%	\$ 3.90	4.3
	6A	0.1%	439.9	403.5	8.3%	763.7	683.6	10.5%	\$	7.76	\$ 6.8	5 11.7%	\$ 4.18	4.6
Outpatient Healthcare	4A	2.0%	111.7	106.7	4.5%	314.6	296.5	5.8%	\$	3.90	\$ 3.6	6 6.2%	\$ 3.10	12.9
	5A	2.4%	112.9	108.2	4.2%	310.6	292.8	5.7%	\$	3.82	\$ 3.5	8 6.2%	\$ 2.70	11.5
	6A	1.0%	116.0	111.3	4.0%	316.4	298.6	5.6%	\$	3.88	\$ 3.6	4 6.1%	\$ 2.71	11.5
Warehouse	4A	2.5%	17.7	15.2	14.0%	37.4	32.4	13.5%	\$	0.42	\$ 0.3	6 13.3%	\$ 1.03	18.4
	5A	3.8%	23.9	20.6	13.8%	43.9	38.2	13.0%	\$	0.46	\$ 0.4	0 12.6%	\$ 0.60	10.4
	6A	1.2%	22.0	19.1	13.2%	44.2	38.3	13.4%	\$	0.48	\$ 0.4	2 13.5%	\$ 0.75	11.6
10-Story High-Rise	4A	21.9%	48.4	47.1	2.8%	96.0	93.1	3.0%	\$	1.04	\$ 1.0	1 3.0%	\$ 0.43	13.5
Apartment	5A	0.0%	54.5	52.5	3.6%	99.8	96.3	3.5%	\$	1.04	\$ 1.0	1 3.5%	\$ 0.38	10.5
	6A	0.0%	54.5	52.6	3.6%	99.8	96.2	3.5%	\$	1.04	\$ 1.0	1 3.5%	\$ 0.42	11.6
20-Story High-Rise	4A	23.5%	48.4	47.3	2.4%	106.4	103.1	3.1%	\$	1.21	\$ 1.1	7 3.4%	\$ 0.47	11.5
Apartment	5A	0.1%	54.4	53.2	2.3%	112.2	103.1	8.1%	\$	1.24	\$ 1.1	7 6.0%	\$ 0.43	10.3
	6A	0.1%	55.1	53.3	3.3%	113.0	108.7	3.8%	\$	1.25	\$ 1.2	0 4.0%	\$ 0.40	8.1
4A Totals	4A	70.9%	51.4	49.2	4.2%	120.6	114.5	5.1%	\$	1.41	\$ 1.3	3 5.5%	\$ 0.85	11.0
5A Totals	5A	20.9%	59.1	54.2	8.2%	147.5	132.8	10.0%	\$	1.76	\$ 1.5	7 10.5%	\$ 1.81	9.8
6A Totals	6A	8.2%	65.0	60.2	7.4%	159.1	144.3	9.3%	\$	1.88	\$ 1.7	0 9.9%	\$ 1.96	10.5
AGGREGATE VALUE	s	100.0%	54.1	51.2	5.4%	129.4	120.7	6.7%	\$	1.52	\$ 1.4	1 7.1%	\$ 1.14	10.5

Table 6. Energy Savings and Simple Payback by Building Type

	Construction Weight	Site I	Energy [kBtu/f	t2/yr]	Source	Energy [kBtu	/ft2/yr]		Er	ergy Co	ost [\$/ft2	2]	 ncremental First Cost	Simple Payback
Prototype	[%]	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.	1-2016	NYSt	retch	% Savings	\$/ft2	years
Large Office	8.8%	60.5	58.5	3.4%	179.5	172.4	4.0%	\$	2.26	\$	2.16	4.1%	\$ 0.31	3.27
Standalone Retail	14.6%	46.2	40.9	11.6%	130.7	111.2	14.9%	\$	1.62	\$	1.36	15.8%	\$ 3.39	13.25
Secondary School	9.8%	37.4	34.3	8.3%	102.7	94.3	8.2%	\$	1.26	\$	1.16	8.1%	\$ 0.55	5.36
Large Hotel	7.8%	83.1	77.4	6.9%	185.6	170.4	8.2%	\$	2.13	\$	1.94	8.7%	\$ 1.64	8.84
Full-Service Restaurant	0.5%	414.9	378.2	8.8%	741.0	659.6	11.0%	\$	7.65	\$	6.72	12.1%	\$ 4.29	4.60
Outpatient Healthcare	5.4%	113.0	108.2	4.3%	313.2	295.2	5.7%	\$	3.86	\$	3.62	6.1%	\$ 2.85	12.03
Warehouse	7.5%	21.5	18.6	13.7%	41.8	36.3	13.2%	\$	0.45	\$	0.39	12.9%	\$ 0.77	13.26
10-Story High-Rise Apartment	21.9%	48.4	47.1	2.8%	96.0	93.1	3.0%	\$	1.04	\$	1.01	3.0%	\$ 0.43	11.45
20-Story High-Rise Apartment	23.7%	48.5	47.4	2.4%	106.4	103.2	3.1%	\$	1.21	\$	1.17	3.4%	\$ 0.47	13.50
Weighted Average	100.0%	54.1	51.2	5.4%	129.4	120.7	6.7%	\$	1.52	\$	1.41	7.1%	\$ 1.14	10.50

Additionally, the results of the 10- and 30-year life-cycle analyses are presented in Tables 7 and 8, respectively. The results show that the 10-year present value of energy savings between NYStretch and ASHRAE 90.1-2016 is greater than the installed cost of materials for most building types in each of the climate zones examined with the exception of Standalone Retail, Outpatient Healthcare and Warehouse in CZ4A. The net savings are aggregated based on the floor space-based weighting factors. The resulting aggregated energy cost savings, for all climate zones and prototypes, is greater than the installed cost of materials to achieve the savings of \$0.18/sf over the 10-year period.

Table 7. 10-Year Present Values of Energy Cost Savings between ASHRAE 90.1-2016 and NYStretch

			Construction		Annual Er	erg	gy Cost	10 Year L	ife	Cycle Energ	gy (	Cost	In	cremental	esidual	Net Savings o Years	ver 10
Prototype	Area	CZ	Weight [%]	9	0.1-2016	N	YStretch	90.1-2016	ľ	NYStretch	;	Savings	First Cost		Value 10 years	Total	\$/sf
Large Office	497,337	4A	7.5%	\$	1,122,721	\$	1,076,703	\$ 10,392,669	\$	9,968,956	\$	423,714	\$	141,187	\$ 37,036	\$319,563	\$0.64
		5A	1.0%	\$	1,115,954	\$	1,067,460	\$ 10,349,779	\$	9,903,163	\$	446,616	\$	234,656	\$ 40,924	\$252,884	\$0.51
		6A	0.3%	\$	1,119,808	\$	1,070,785	\$ 10,389,609	\$	9,937,763	\$	451,846	\$	148,621	\$ 23,746	\$326,971	\$0.66
Standalone Retail	24,630	4A	4.9%	\$	40,095	\$	33,936	\$ 371,457	\$	314,777	\$	56,679	\$	95,821	\$ 25,882	(\$13,259)	(\$0.54)
		5A	7.1%	\$	39,525	\$	33,042	\$ 366,882	\$	307,296	\$	59,586	\$	75,788	\$ 18,591	\$2,389	\$0.10
		6A	2.6%	\$	40,555	\$	34,425	\$ 376,676	\$	320,293	\$	56,383	\$	80,645	\$ 21,594	(\$2,668)	(\$0.11)
Secondary School	210,357	4A	5.0%	\$	270,675	\$	249,133	\$ 2,511,847	\$	2,311,520	\$	200,327	\$	128,629	\$ 54,590	\$126,288	\$0.60
		5A	3.7%	\$	260,020	\$	238,559	\$ 2,417,702	\$	2,218,244	\$	199,458	\$	91,266	\$ 35,287	\$143,479	\$0.68
		6A	1.1%	\$	260,845	\$	239,071	\$ 2,426,145	\$	2,223,689	\$	202,456	\$	137,223	\$ 55,849	\$121,082	\$0.58
Large Hotel	121,813	4A	3.5%	\$	264,267	\$	241,853	\$ 2,477,276	\$	2,268,602	\$	208,673	\$	215,819	\$ 58,057	\$50,912	\$0.42
		5A	2.5%	\$	254,323	\$	231,509	\$ 2,390,220	\$	2,178,138	\$	212,083	\$	189,061	\$ 46,283	\$69,305	\$0.57
		6A	1.8%	\$	255,157	\$	232,605	\$ 2,400,350	\$	2,190,813	\$	209,537	\$	182,079	\$ 45,577	\$73,035	\$0.60
Full-Service	5,488	4A	0.1%	\$	41,811	\$	36,233	\$ 397,393	\$	345,075	\$	52,318	\$	30,670	\$ 9,805	\$31,453	\$5.73
Restaurant		5A	0.3%	\$	41,857	\$	36,882	\$ 400,005	\$	353,253	\$	46,751	\$	21,387	\$ 7,721	\$33,085	\$6.03
		6A	0.1%	\$	42,607	\$	37,601	\$ 408,012	\$	360,965	\$	47,046	\$	22,967	\$ 8,675	\$32,754	\$5.97
Outpatient	40,843	4A	2.0%	\$	159,158	\$	149,351	\$ 1,476,791	\$	1,386,620	\$	90,171	\$	126,695	\$ 30,589	(\$5,934)	(\$0.15
Healthcare		5A	2.4%	\$	155,998	\$	146,402	\$ 1,448,966	\$	1,360,775	\$	88,191	\$	110,444	\$ 24,158	\$1,905	\$0.05
		6A	1.0%	\$	158,498	\$	148,849	\$ 1,472,744	\$	1,384,110	\$	88,634	\$	110,741	\$ 25,228	\$3,121	\$0.08
Warehouse	51,914	4A	2.5%	\$	21,760	\$	18,870	\$ 205,049	\$	177,741	\$	27,308	\$	53,254	\$ 14,315	(\$11,631)	(\$0.22)
		5A	3.8%	\$	23,926	\$	20,919	\$ 227,895	\$	199,092	\$	28,803	\$	31,272	\$ 10,203	\$7,734	\$0.15
		6A	1.2%	\$	25,092	\$	21,707	\$ 237,340	\$	205,358	\$	31,982	\$	39,118	\$ 14,592	\$7,455	\$0.14
10-Story High-	84,140	4A	21.9%	\$	87,838	\$	85,168	\$ 831,581	\$	806,423	\$	25,157	\$	36,040	\$ 12,192	\$1,310	\$0.02
Rise Apartment		5A	0.0%	\$	87,886	\$	84,824	\$ 837,400	\$	808,170	\$	29,230	\$	32,095	\$ 11,372	\$8,507	\$0.10
		6A	0.0%	\$	87,795	\$	84,762	\$ 836,627	\$	807,645	\$	28,982	\$	35,330	\$ 13,443	\$7,094	\$0.08
20-Story High-	168,279	4A	23.5%	\$	203,645	\$	196,793	\$ 1,914,173	\$	1,850,628	\$	63,545	\$	78,578	\$ 22,905	\$7,872	\$0.05
Rise Apartment		5A	0.1%	\$	209,293	\$	202,329	\$ 1,975,537	\$	1,910,836	\$	64,701	\$	71,908	\$ 21,836	\$14,629	\$0.09
		6A	0.1%	\$	210,112	\$	201,789	\$ 1,984,121	\$	1,906,196	\$	77,926	\$	67,193	\$ 20,681	\$31,414	\$0.19
4A Totals	_	4A	70.9%	\$	253,616	\$	242,215	\$ 2,365,240	\$	2,259,659	\$	105,581	\$	83,955	\$ 25,162	\$46,788	\$0.11
5A Totals		5A	20.9%	\$	167,142	\$	154,337	\$ 1,556,783	\$	1,438,147	\$	118,636	\$	1,558,123	\$ 24,902	\$781,499	\$0.37
6A Totals		6A	8.2%	\$	170,912	\$	157,469	\$ 1,595,414	\$	1,470,838	\$	124,576	\$	1,252,578	\$ 30,782	\$617,704	\$0.30
AGGREGATE VA	LUES		100.0%	\$	228,761		216,899	\$ 2,133,146	\$	2,023,280	\$	109,867	\$	88,326	\$ 25,568	\$47,109	\$0.18

Table 8 shows that over 30 years, the present value of the energy savings is worth more than the first, maintenance and replacement costs for each of the buildings in each of the climate zones examined, with the exception of Standalone Retail in CZ4A. The resulting aggregated energy cost savings, for all climate zones and prototypes, is greater than the installed cost of materials to achieve the savings of \$0.81/sf over the 30-year period.

Table 8. 30-Year Present Values of Energy Cost Savings between ASHRAE 90.1-2016 and NYStretch

Prototype	CZ	Construction	Incremental	Replacement	Maintenance	Residual	Energy Cost	30 Year Net Pre Savin	
Посотурс	CL	Weights	First Cost	Costs	Costs	Value	Savings	Total	\$/sf
	4A	7.5%	\$141,187	\$72,568	\$0	(\$5,456)	\$1,044,138	\$824,927	\$1.66
Large Office	5A	1.0%	\$234,656	\$90,142	\$0	(\$6,118)	\$1,100,573	\$769,657	\$1.55
	6A	0.3%	\$148,621	\$35,951	\$0	(\$3,995)	\$1,113,447	\$924,879	\$1.86
	4A	4.9%	\$95,821	\$49,532	\$0	(\$458)	\$139,674	(\$6,138)	(\$0.25)
Standalone Retail	5A	7.1%	\$75,788	\$36,331	\$0	(\$1,298)	\$146,839	\$33,422	\$1.36
	6A	2.6%	\$80,645	\$38,657	\$0	(\$420)	\$138,944	\$19,222	\$0.78
	4A	5.0%	\$128,629	\$54,294	\$0	\$6,911	\$493,589	\$317,577	\$1.51
Secondary School	5A	3.7%	\$91,266	\$31,305	\$0	\$1,169	\$491,451	\$370,049	\$1.76
	6A	1.1%	\$137,223	\$44,735	\$0	\$6,162	\$491,451	\$315,656	\$1.50
	4A	3.5%	\$215,819	\$135,226	\$0	\$2,880	\$514,145	\$165,980	\$1.36
Large Hotel	5A	2.5%	\$189,061	\$107,301	\$0	\$2,495	\$522,556	\$228,690	\$1.88
	6A	1.8%	\$182,079	\$107,446	\$0	\$2,407	\$516,287	\$229,169	\$1.88
	4A	0.1%	\$30,670	\$31,248	\$0	\$3,649	\$128,892	\$70,624	\$12.87
Full Service Restaurant	5A	0.3%	\$21,387	\$24,554	\$0	\$2,871	\$115,174	\$72,105	\$13.14
	6A	0.1%	\$22,967	\$24,552	\$0	\$2,703	\$115,901	\$71,084	\$12.95
	4A	2.0%	\$126,695	\$62,998	\$0	\$519	\$222,209	\$33,035	\$0.81
Outpatient Healthcare	5A	2.4%	\$110,444	\$49,572	\$0	\$452	\$217,331	\$57,766	\$1.41
	6A	1.0%	\$110,741	\$51,869	\$0	\$395	\$218,424	\$56,209	\$1.38
	4A	2.5%	\$53,254	(\$2,443)	\$0	\$28	\$67,271	\$16,487	\$0.32
Warehouse	5A	3.8%	\$31,272	(\$781)	\$0	\$22	\$70,939	\$40,470	\$0.78
	6A	1.2%	\$39,118	(\$1,274)	\$0	\$21	\$78,783	\$40,960	\$0.79
	4A	21.9%	\$36,040	\$11,036	\$0	\$1,015	\$61,974	\$15,914	\$0.19
10 Story Highrise Apartment	5A	0.0%	\$32,095	\$9,033	\$0	\$937	\$71,995	\$31,805	\$0.38
	6A	0.0%	\$35,330	\$8,116	\$0	\$551	\$71,382	\$28,488	\$0.34
	4A	23.5%	\$78,578	\$40,382	\$0	\$3,972	\$156,575	\$41,587	\$0.25
20 Story Highrise Apartment	5A	0.1%	\$71,908	\$36,963	\$0	\$5,132	\$159,420	\$55,681	\$0.33
	6A	0.1%	\$67,193	\$35,250	\$0	\$4,213	\$191,984	\$93,754	\$0.56
4A Totals	4A	70.9%	\$83,955	\$40,133	\$0	\$1,671	\$260,157	\$137,741	\$0.52
5A Totals	5A	20.9%	\$94,765	\$41,112	\$0	(\$107)	\$292,323	\$156,339	\$1.57
6A Totals	6A	8.2%	\$109,714	\$50,027	\$0	\$1,211	\$305,970	\$147,441	\$1.38
AGGREGATE VALUES			\$88,326	\$41,149	\$0	\$1,262	\$270,636	\$142,423	\$0.81

# Appendix A.

# Differences between 2020 NYStretch Energy Code and ASHRAE 90.1-2016

#### by DOE Prototype and Climate Zone

Note: This appendix adopts the EEM numbering convention used in the PNNL report, Final Energy Savings Analysis of the Proposed NYStretch-Energy Code 2018, February 2019 (PNNL-ACT-10073, Rev. 1).

The following EEMs were not included in Vidaris' analysis as they are not considered stretch measures with respect to ASHRAE 90.1-2016:

•	EEM 5	Occupancy Sensors and Automatic Lighting Controls
•	EEM 6	Exterior Lighting Controls

EEM 8 Hotel Guestroom HVAC Vacancy Control
 EEM 14 ERV for Apartment Makeup Air Units

The following EEMs were not included in the final version of the 2020 NYStretch Energy Code:

•	EEM 9	High-efficiency S	SHW (Refer to A	Appendix C	for further	discussion)
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• EEM 15 Demand-based Controls for Recirculated SHW systems

#### **EEM 1 Enhanced Insulation for Roofs and Walls**

This measure amends Table C402.1.4 with more stringent U-factors for opaque thermal envelope assemblies. The ASHRAE compliance path is required to comply with this revision per section C401.2.1.a of NYStretch.

Cost data for this measure was developed by determining an insulation cost per R-value from RSMeans and applying this to the additional insulation required to achieve the improved U-values specified in table C402.1.4. It was assumed that continuous mineral fiber would be used to meet the required thermal performance for walls; additional extruded polystyrene was used to meet the increased performance for roofs. This requirement applies to each of the building prototypes as follows.

OPAQUE THERMAL ENVELOPE (U-factor)	NYStretch	ASHRAE 90.1 -2016
Large office, Stand-alone retail		
CL	IMATE ZONE 4	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (non-res)	0.099	0.104
CL	IMATE ZONE 5	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (non-res)	0.086	0.090
CL	IMATE ZONE 6	
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: mass (non-res)	0.076	0.080
Full-Service Restaurant <sup>3</sup>		
CL	IMATE ZONE 4	
Roofs: attic and other	0.020	0.021
Walls, above grade: steel framed (non-res)	0.061	0.064
CL	IMATE ZONE 5	
Roofs: attic and other	0.020	0.021
Walls, above grade: steel framed (non-res)	0.052	0.055
CL	IMATE ZONE 6	•
Roofs: attic and other	0.019	0.021
Walls, above grade: steel framed (non-res)	0.047	0.049
Secondary School, Outpatient Healthcare		
CL	IMATE ZONE 4	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (non-res)	0.061	0.064
CL	IMATE ZONE 5	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (non-res)	0.052	0.055
·	IMATE ZONE 6	·
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: steel framed (non-res)	0.047	0.049

U-factor for attic roof in the NYStretch model was revised to reflect updated draft requirements

OPAQUE THERMAL ENVELOPE (U-factor)	NYStretch	ASHRAE 90.1 -2016
Large Hotel		
	CLIMATE ZONE 4	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (residential)	0.086	0.090
	CLIMATE ZONE 5	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (residential)	0.076	0.080
	CLIMATE ZONE 6	
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: mass (residential)	0.067	0.071
Warehouse <sup>4</sup>		
	CLIMATE ZONE 4	
Roofs: metal building	0.035	0.037
Walls, above grade: metal building	0.048	0.060
	CLIMATE ZONE 5	
Roofs: metal building	0.035	0.037
Walls, above grade: metal building	0.048	0.050
	CLIMATE ZONE 6	
Roofs: metal building	0.028	0.031
Walls, above grade: metal building	0.048	0.050
10-Story Apartment, 20-Story Apartment		
	CLIMATE ZONE 4	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (residential)	0.061	0.064
	CLIMATE ZONE 5	
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (residential)	0.052	0.055
	CLIMATE ZONE 6	
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: steel framed (residential)	0.044	0.049

 $<sup>^{\</sup>rm 4}$   $\,$  U-factor for metal building walls  $\,$  and roof in the NYStretch model were revised to reflect updated  $\,$  2020 NYStretch requirements.

#### **EEM 2 Enhanced Fenestration**

This measure amends Table C402.2.4 with more stringent U-factors and SHGCs for building envelope fenestration assemblies. The ASHRAE compliance path is required to comply with this revision per section C401.2.1.b of NYStretch. Currently under the 2020 NYS ECCC, there is a proposed revision to 2018 IECC such that north-facing vertical fenestration will be required to meet the SHGC requirements applicable to south, east and west facing fenestration. Consequently, this analysis assumes all orientations will meet the SHGC requirements for the south, east, and west orientations. Window performance in the energy models is based on weighting factors provided by PNNL for fixed, operable, and non-metal framing for each of the building prototypes. This requirement applies to all the building prototypes. Vidaris revised the U-factors in the PNNL NYStretch models to reflect the current NYStretch requirements.

Cost data for this measure was developed based on the incremental costs between windows with respect to decreased U-factor in PNNL's national cost effectiveness analysis.

VERTICAL FENESTRATION (U-Factor)	NYStretch	ASHRAE 90.1-2016					
Large Office, Stand-alone Retail, Secondary School, Large Hotel, Full-Service Restaurant, Outpatient Healthcare, Warehouse, 10-Story High-Rise Apartment, and 20-Story High-Rise Apartment							
	CLIMATE ZONE 4						
Fixed fenestration (metal)	0.36	0.38					
Operable fenestration (metal)	0.43	0.46					
Non-metal	0.30	0.31					
SHGC	0.36	0.36					
Skylight U	0.48	0.50					
Skylight SHGC	0.38	0.40					
	CLIMATE ZONE 5						
Fixed fenestration (metal)	0.36	0.38					
Operable fenestration (metal)	0.43	0.46					
Non-metal	0.27	0.31					
SHGC	0.38	0.38					
Skylight U	0.48	0.50					
Skylight SHGC	0.38	0.40					
	CLIMATE ZONE 6						
Fixed fenestration (metal)	0.34	0.36					
Operable fenestration (metal)	0.41	0.45					
Non-metal	0.27	0.30					
SHGC	0.40	0.40					
Skylight U	0.48	0.50					
Skylight SHGC	0.38	0.40					

## **EEM 3 Air Leakage Testing for Mid-sized Buildings**

This measure amends section 5.4.3.1.3 to add a requirement for buildings 25,000 to 50,000 square feet and less than or equal to 75 feet in height to comply with whole building pressurization testing and air barrier requirements. Previously, testing was not required.

For this analysis, the new testing requirement applied only to the Outpatient Healthcare and Warehouse prototypes. The difference between 90.1-2016 and NYStretch are as follows:

AIR LEAKAGE [cfm/sf]	NYStretch	90.1-2016		
Outpatient Healthcare	0.40	1.00		
Warehouse	0.40	1.00		

Infiltration testing was assumed to be done once to confirm compliance. Any additional testing would be optional since it would not necessarily be required for compliance but would be an aid during construction. Costing for this measure was based on Vidaris experience with this work and feedback from industry professionals. For CZ 5A and 6A the size of the Outpatient Healthcare allows for a cost of \$3,200, and \$8,500 for climate CZ 4A due to complexity related testing in locations like New York City.

The Warehouse was considered more complex due to the volume and height of a typical warehouse with greater cost of testing equipment and more effort to do the work. Ultimately, the cost was judged to be twice that of the Outpatient Healthcare, or about \$17,000 for CZ 4A and \$6,400 for CZs 5A and 6A.

# **EEM 4 Reduced LPD for Interior Lighting**

This measure amends Tables C405.3.2(1) and C405.3.2(2) with reduced lighting power densities (LPD). The ASHRAE compliance path is required to comply with this revision per section C401.2.1.c of NYStretch. The ASHRAE compliance path is also directed to follow the requirements of section C406—Additional Efficiency Package Options. Per direction from NYSERDA, the analysis is based on Option 2—reduced lighting power in accordance with section C406.3, which specifies an additional 10% reduction in connected lighting power. This requirement applies to all the building prototypes.

Previous cost estimates from PNNL associate a lower first cost for buildings with lower LPD; based on feedback from lighting design professionals, it is anticipated there will be no cost associated with this measure. LPDs are based on the space-by-space method unless indicated otherwise.

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INTERIOR LIGHTING POWER DENSITY (W/ft²)	NYStretch	NYStretch less 10%	90.1-2016
Large Office			
Office (building area method)	0.69	0.62	0.79
Stand-Alone Retail			
BOH (area w eighted average)	0.50	0.45	
Sales Area	1.06	0.95	1.22
Lobby <sup>5</sup>	0.90	0.81	1.00
Display lighting - type 1,2,3 (area w eighted average)	0.32	0.29	
Secondary School			
Classroom	0.74	0.67	0.92
Corridor	0.58	0.52	0.66
Lobby <sup>5</sup>	0.90	0.81	1.00
Mechanical <sup>5</sup>	0.39	0.35	0.43
Restroom	0.75	0.68	0.85
Office	0.85	0.77	0.93
Gymnasium/exercise area <sup>5</sup>	0.50	0.45	0.50
Kitchen/Food Preparation Area	0.92	0.83	1.06
Cafeteria/Dining	0.53	0.48	0.63
Library/reading area (Building Area Method)	0.78	0.70	0.82
Audience seating area – auditorium <sup>5</sup>	0.63	0.57	0.63
Large Hotel			
Office (Building Area Method)	0.69	0.62	0.79
Retail (Building Area Method)	0.91	0.82	1.06
Mechanical rooms <sup>5</sup>	0.39	0.35	0.43
Storage	0.43	0.39	0.46
Laundry Room	0.43	0.39	0.43
Dining Area - family dining <sup>5</sup>	0.54	0.49	0.71
Lobby - hotel	0.68	0.61	1.06
Guest rooms	0.75	0.68	0.77
Corridor	0.58	0.52	0.66
Kitchen/Food Preparation Area	0.92	0.83	1.06
10-story Apartment			
Office - enclosed <sup>5</sup>	0.85	0.77	0.93
Corridor	0.58	0.52	0.792
Stairw ell	0.50	0.45	0.58
Mechanical rooms <sup>5</sup>	0.39	0.35	0.43

5 LPDs in PNNL's NYStretch model were revised to reflect current NYStretch code requirements.

INTERIOR LIGHTING POWER DENSITY (W/ft2)	<u>NYStretch</u>	NYStretch less 10%	90.1-2016
20-story Apartment			
Office - enclosed <sup>6</sup>	0.85	0.77	0.93
Corridor	0.58	0.52	0.792
Stairw ell	0.50	0.45	0.58
Mechanical rooms <sup>7</sup>	0.39	0.35	0.43
Sales Area <sup>7</sup>	1.06	0.954	1.22
Display lighting - retail type 37 (w eighted average)	1.05	0.945	1.05
Display lighting - retail type 27 (w eighted average)	0.45	0.405	0.45
Display lighting - retail type 17 (w eighted average)	0.45	0.405	0.45
Additional retail allow ance [Watts] 7	1,000	900	1,000
Outpatient Healthcare			
Conference/Meeting/Multipurpose	0.93	0.84	1.07
Corridor	0.58	0.52	0.792
Dining Area - cafeteria/fastfood	0.53	0.48	0.63
Healthcare Facility - nurse station	0.75	0.68	0.81
Healthcare Facility - patient room	0.45	0.41	0.62
Healthcare Facility - physical therapy	0.84	0.76	0.84
Healthcare Facility - recovery room	0.89	0.80	1.03
Healthcare Facility - exam/treatment	1.16	1.04	1.68
Healthcare Facility - imaging room	0.98	0.88	1.06
Healthcare Facility - operating room	1.87	1.68	2.17
Lobby - all other <sup>7</sup>	0.90	0.81	1.00
Lounge/breakroom – healthcare <sup>7</sup>	0.53	0.48	0.78
Office - enclosed >250 sf <sup>7</sup>	0.85	0.77	0.93
Restroom <sup>7</sup>	0.75	0.68	0.85
Storage room, 50-100 sf	0.43	0.39	0.46
Full-service Restaurant			
Dining Area - family dining	0.54	0.49	0.71
Kitchen/Food Preparation Area	0.92	0.83	1.06
Warehouse			
Office (Building Area Method)	0.69	0.62	0.79
Warehouse - storage- medium to bulky	0.27	0.24	0.35
Warehouse - storage - small hand carried items	0.65	0.59	0.69

<sup>6</sup> LPDs in PNNL's NYStretch model were revised to reflect current NYStretch draft code requirements

#### **EEM 7 Reduced Fan Power Allowances**

This measure found in Tables C403.8.1(1) and 6.5.3.1-1 limits the fan energy used by heating, ventilation, and air-conditioning (HVAC) equipment. It requires that variable air volume (VAV) systems use no more than 0.0010 bhp/cfm and constant air volume (CAV) systems use no more than 0.00088 bhp/cfm for fan power. These limits only apply to fan motors larger than 5 nameplate horsepower; smaller fan sizes are not regulated in either code. This requirement applies to the large office, standalone retail, secondary school, large hotel, and outpatient healthcare building prototypes. Vidaris revised the PNNL NYStretch models to reflect current NYStretch code requirements for these fan systems.

Costing for this measure was based on increased system capacities for larger air handling equipment that would result in increased cross-sectional areas of the unit and components (e.g., coils, filters, ducts, unit housings, etc.) that would reduce the static pressure, and thus the brake horsepower, for the affected systems. For constant volume fans, this required an increased capacity of 3.2%; variable volume systems required a 13.4% increase in capacity.

Fan Power Allowance	NYStretch	90.1-2016				
Large Office, Standalone Retail, Secondary School, Large Hotel, and Outpatient Healthcare						
CV (bhp/cfm)	0.00088	0.00094				
VAV (bhp/cfm)	0.00100	0.00130				

## **EEM 10 High-efficiency Commercial Kitchen Equipment**

EEM10 reduces plug load energy usage. This measure upgrades major commercial kitchen appliances to ENERGY STAR®.

Costing for this measure was based on equipment lists from previous projects and the incremental costs from the Savings Calculator for ENERGY STAR® Commercial Kitchen Equipment developed by the U.S. EPA and DOE. <sup>7</sup> To account for the variation of kitchen sizes in the affected prototypes, an incremental cost per square foot was used.

Affected prototypes: secondary school, full-service restaurant, and large hotel.

The Savings Calculator for Energy Commercial Kitchen Equipment is available at https://www.energystar.gov/sites/.../commercial\_kitchen\_equipment\_calculator.xlsx

## **EEM 11 Thermal Bridging Reduction**

EEM11 addresses the mandatory provision in NYStretch to include a minimum R-3 thermal break at penetrations, including parapet walls and balcony projections. None of the prototypes include balconies. Each building with a flat roof is assumed to have a parapet that is 42 in. high and follows the perimeter of the roof.

This analysis assumes that each prototype meets prescriptive requirements of the code. This measure simply requires that elements of the envelope that are noncompliant have an R-value no less than R-3, which is itself less than code compliant. Consequently, the remainder of the envelope systems would have to be improved to reach overall code compliance.

Consequently, this measure does not result in any energy savings. Additional insulation is included in the lifecycle cost analysis to address the additional cost of meeting the prescriptive requirements for opaque envelope assemblies.

Costing for this measure was based on the assumption of additional mineral wool insulation at the parapet to eliminate thermal bridging. It was assumed that this will require 12in at wall +42in of parapet height +12in wide parapet +42in of parapet height to roof deck =9 ft of total insulation of R-4.2/in for entire perimeter of roof.

Affected prototypes: large office, standalone retail, secondary school, large hotel, outpatient healthcare, 10-story high-rise apartment, and 20-story high-rise apartment.

## **EEM 12 Exterior Lighting Power Reduction**

This measure modifies Table C405.4.2(2) with reduced exterior lighting power allowances. As allowances vary by lighting zone, the model uses an average of lighting zones for each protype building; these averages were developed by PNNL for the national analysis of ASHRAE 90.1-2016. Following the methodology used by PNNL's analysis of NYStretch, it is assumed there are no parking lots for prototypes in climate zone 4A. PNNL also excluded exterior lighting for 10-story and 20-story apartment prototypes as the majority of these buildings are in climate zone 4A and have no or limited exterior lighting.

At the time of this analysis, this measure is only included in the IECC overlay of the NYStretch draft. Vidaris included this measure in the analysis at NYSERDA's direction as the final version of the code is anticipated to include it in the ASHRAE path as well.

Based on an analysis of typical parking lot lighting, it was determined that standard metal halide lamps could be used to achieve the LPD limits for NYStretch. As there is only a minimal reduction in façade and entryway lighting, it was assumed there is no incremental cost for this measure.

	Façade	e W/sf]	Doors [\	N/If]	Parking lot [W/sf] *			
Lighting Zone	NYStretch	90.1-2016	NYStretch	2016	NYStretch	2016		
1	0.000	0.000	12.6	14.0	0.03	0.03		
2	0.075	0.100	12.6	14.0	0.04	0.04		
3	0.113	0.150	20.0	21.0	0.05	0.06		
4	0.150	0.200	20.0	21.0	0.05	0.08		

<sup>\*</sup>Parking lot lighting is only included in climate zones 5A and 6A

Lighting	Prototype	Façade	W/sf]	Doors [\	N/If]	Parking lot [W/sf] *		
Zone	riolotype	NYStretch	90.1- 2016	NYStretch	2016	NYStretch	2016	
4	Large Office	0.150	0.200	20.0	21.0	0.050	0.080	
2,3	Stand-alone Retail	0.094	0.125	16.3	17.5	0.045	0.050	
2,3	Secondary School	0.094	0.125	16.3	17.5	0.045	0.050	
3,4	Large Hotel	0.132	0.175	20.0	21.0	0.050	0.070	
2,3,4	Full-service Restaurant	0.113	0.150	17.5	18.7	0.050	0.060	
2,3	Outpatient Healthcare	0.094	0.125	16.3	17.5	0.045	0.050	
2,3	Warehouse	0.094	0.125	16.3	17.5	0.045	0.050	
3,4	10 Story Mid-Rise Apt.	n/a	n/a			n/a		
3,4	20 Story High-Rise Apt.	n/a		n/a		n/a		

Parking lot lighting is only included in climate zones 5A and 6A

# **EEM 13 Efficient Elevator, Regenerative Drives**

This measure requires regenerative drives for elevator motors with a rise of 75 feet or greater.

The PNNL NYStretch models included this as a 5% power reduction for the elevator motors.

Costing for this measure was based on data from previous projects.

Prototype Building	NYStretch [W, total]	90.1-2016 [W, total]
LARGE OFFICE - (12) 30hp motors	232,222	244,444
10-STORY APARTMENT - (1) 30hp motor	19,352	20,371
20-STORY APARTMENT - (2) 30hp motors	19,352	20,371

# **Appendix B**

# Differences in Energy Performance, and Annual Energy Cost between 2020 NYStretch Energy Code and ASHRAE 90.1-2016

by Climate Zone and Building Type

TABLE B1: Differences in Energy Performance, and Annual Energy Cost between ASHRAE 90.1-2016 and 2020 NYStretch by Climate Zone and Building Type (Part A)

		Energy Us	age	Total (k	Btu)	I	energy Cost		EUI (k)	Btu/sf)	EC	ECI (\$/sf)		Weighting
		kWh	therms	Site	Source	Dectricity	Gas	Total	Site	Source	<b>Electricity</b>	Gas	Total	Factors
Large Offi	ice	497,337 s	quare feet											
4A	ASHRAE 90.1-2016	7,404,873	45,821	29,847,478	89,183,930	1,092,219	30,503	1,122,721	60.01	179.32	2.196	0.061 \$	2.26	
4A	NYStretch	7,090,011	46,458	28,836,870	85,662,437	1,045,777	30,927	1,076,703	57.98	172.24	2.103	0.062 \$	2.16	
4A	Savings	314,861	(637)	1,010,608	3,521,492	46,442	(424)	46,018	2.03	7.08	0.093	(0.001) \$	0.09	7.5%
5A	ASHRAE 90.1-2016	7,261,025	67,527	31,527,310	89,817,293	1,071,001	44,953	1,115,954	63.39	180.60	2.153	0.090 \$	2.24	
5A	NYStretch	6,929,778	68,076	30,452,005	86,099,862	1,022,142	45,318	1,067,460	61.23	173.12	2.055	0.091 \$	2.15	
5A	Savings	331,247	(549)	1,075,306	3,717,431	48,859	(366)	48,493	2.16	7.47	0.098	(0.001) \$	0.10	1.0%
6A	ASHRAE 90.1-2016	7,265,584	72,306	32,020,810	90,369,650	1,071,674	48,134	1,119,808	64.38	181.71	2.155	0.097 \$	2.25	
6A	NYStretch	6,932,525	72,462	30,900,009	86,590,416	1,022,547	48,238	1,070,785	62.13	174.11	2.056	0.097 \$	2.15	
6A	Savings	333,059	(156)	1,120,801	3,779,234	49,126	(104)	49,022	2.25	7.60	0.099	(0.000) \$	0.10	0.3%
Standalone	e Retail	24,630 s	quare feet											
4A	ASHRAE 90.1-2016	262,889	1,981	1,095,100	3,203,339	38,776	1,319	40,095	44.46	130.06	1.574	0.054 \$	1.63	
4A	NYStretch	220,589	2,102	962,803	2,733,881	32,537	1,399	33,936	39.09	111.00	1.321	0.057 \$	1.38	
4A	Savings	42,300	(120)	132,297	469,458	6,239	(80)	6,159	5.37	19.06	0.253	(0.003) \$	0.25	4.9%
5A	ASHRAE 90.1-2016	255,586	2,742	1,146,310	3,199,822	37,699	1,826	39,525	46.54	129.91	1.531	0.074 \$	1.60	
5A	NYStretch	210,720	2,946	1,013,551	2,709,799	31,081	1,961	33,042	41.15	110.02	1.262	0.080 \$	1.34	
5A	Savings	44,867	(203)	132,759	490,023	6,618	(135)	6,483	5.39	19.90	0.269	(0.005) \$	0.26	7.1%
6A	ASHRAE 90.1-2016	261,103	3,068	1,197,708	3,296,796	38,513	2,043	40,555	48.63	133.85	1.564	0.083 \$	1.65	
6A	NYStretch	218,834	3,225	1,069,137	2,831,477	32,278	2,147	34,425	43.41	114.96	1.310	0.087 \$	1.40	
6A	Savings	42,269	(157)	128,571	465,319	6,235	(104)	6,131	5.22	18.89	0.253	(0.004) \$	0.25	2.6%
Secondary	School	210,357 s	quare feet											
4A	ASHRAE 90.1-2016	1,753,599	18,055	7,788,751	21,874,479	258,656	12,019	270,675	37.03	103.99	1.230	0.057 \$	1.29	
4A	NYStretch	1,616,146	16,151	7,129,347	20,108,691	238,381	10,751	249,133	33.89	95.59	1.133	0.051 \$	1.18	
4A	Savings	137,453	1,904	659,404	1,765,788	20,274	1,268	21,542	3.13	8.39	0.096	0.006 \$	0.10	5.0%
5A	ASHRAE 90.1-2016	1,660,790	22,612	7,927,850	21,294,010	244,967	15,053	260,020	37.69	101.23	1.165	0.072 \$	1.24	
5A	NYStretch	1,523,268	20,845	7,281,909	19,541,774	224,682	13,877	238,559	34.62	92.90	1.068	0.066 \$	1.13	
5A	Savings	137,522	1,767	645,941	1,752,236	20,285	1,176	21,461	3.07	8.33	0.096	0.006 \$	0.10	3.7%
6A	ASHRAE 90.1-2016	1,662,210	23,538	8,025,261	21,407,104	245,176	15,669	260,845	38.15	101.77	1.166	0.074 \$	1.24	
6A	NYStretch	1,523,135	21,645	7,361,422	19,623,981	224,662	14,409	239,071	34.99	93.29	1.068	0.068 \$	1.14	
6A	Savings	139,075	1,893	663,839	1,783,124	20,514	1,260	21,774	3.16	8.48	0.098	0.006 \$	0.10	1.1%

 $<sup>^*</sup>$  Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

TABLE B1: Differences in Energy Performance, and Annual Energy Cost between ASHRAE 90.1-2016 and 2020 NYStretch by Climate Zone and Building Type (Part B)

		Energy Us	age	Total (k	(Btu)	I	Energy Cost		EUI (k	Btu/sf)	ECI (\$/sf)		Weighting	
		kWh	therms	Site	Source	Electricity	Gas	Total	Site	Source	Electricity	Gas	Total	Factors
Large Hote	el	121,813 s	quare feet											
4A	ASHRAE 90.1-2016	1,587,057	45,330	9,947,992	22,832,229	234,091	30,176	264,267	81.67	187.44	1.922	0.248 \$	2.17	
4A	NYStretch	1,445,229	43,085	9,239,607	20,980,929	213,171	28,681	241,853	75.85	172.24	1.750	0.235 \$	1.99	
4A	Savings	141,828	2,245	708,385	1,851,300	20,920	1,494	22,414	5.82	15.20	0.172	0.012 \$	0.18	3.5%
5A	ASHRAE 90.1-2016	1,496,437	50,472	10,153,016	22,337,909	220,725	33,599	254,323	83.35	183.38	1.812	0.276 \$	2.09	
5A	NYStretch	1,350,487	48,539	9,461,786	20,472,318	199,197	32,312	231,509	77.67	168.06	1.635	0.265 \$	1.90	
5A	Savings	145,950	1,932	691,231	1,865,591	21,528	1,286	22,814	5.67	15.32	0.177	0.011 \$	0.19	2.5%
6A	ASHRAE 90.1-2016	1,489,832	53,188	10,402,112	22,547,031	219,750	35,407	255,157	85.39	185.10	1.804	0.291 \$	2.09	
6A	NYStretch	1,345,009	51,399	9,729,110	20,709,350	198,389	34,216	232,605	79.87	170.01	1.629	0.281 \$	1.91	
6A	Savings	144,822	1,789	673,001	1,837,681	21,361	1,191	22,552	5.52	15.09	0.175	0.010 \$	0.19	1.8%
Full Servic	e Restaurant	5,488 s	quare feet											
4A	ASHRAE 90.1-2016	223,706	13,240	2,087,321	3,935,635	32,997	8,814	41,811	380.33	717.11	6.012	1.606 \$	7.62	
4A	NYStretch	190,350	12,252	1,874,650	3,452,004	28,077	8,156	36,233	341.58	628.99	5.116	1.486 \$	6.60	
4A	Savings	33,356	989	212,671	483,631	4,920	658	5,578	38.75	88.12	0.896	0.120 \$	1.02	0.1%
5A	ASHRAE 90.1-2016	213,031	15,675	2,294,327	4,068,852	31,422	10,435	41,857	418.05	741.39	5.725	1.901 \$	7.63	
5A	NYStretch	183,745	14,691	2,096,005	3,632,083	27,102	9,780	36,882	381.91	661.80	4.938	1.782 \$	6.72	
5A	Savings	29,286	984	198,322	436,769	4,320	655	4,975	36.14	79.58	0.787	0.119 \$	0.91	0.3%
6A	ASHRAE 90.1-2016	212,659	16,885	2,414,046	4,191,286	31,367	11,240	42,607	439.86	763.70	5.715	2.048 \$	7.76	
6A	NYStretch	183,195	15,893	2,214,359	3,751,697	27,021	10,580	37,601	403.48	683.60	4.924	1.928 \$	6.85	
6A	Savings	29,464	992	199,687	439,589	4,346	660	5,006	36.38	80.10	0.792	0.120 \$	0.91	0.1%
Outpatient	Healthcare	40,843 s	quare feet											
4A	ASHRAE 90.1-2016	1,032,065	10,408	4,562,204	12,851,209	152,230	6,929	159,158	111.70	314.65	3.727	0.170 \$	3.90	
4A	NYStretch	964,334	10,684	4,358,667	12,108,201	142,239	7,112	149,351	106.72	296.46	3.483	0.174 \$	3.66	
4A	Savings	67,731	(276)	203,537	743,009	9,990	(183)	9,807	4.98	18.19	0.245	(0.004) \$	0.24	2.0%
5A	ASHRAE 90.1-2016	1,004,067	11,865	4,612,345	12,684,663	148,100	7,898	155,998	112.93	310.57	3.626	0.193 \$	3.82	
5A	NYStretch	937,570	12,183	4,417,320	11,960,217	138,292	8,110	146,402	108.15	292.83	3.386	0.199 \$	3.58	
5A	Savings	66,497	(319)	195,025	724,447	9,808	(212)	9,596	4.77	17.74	0.240	(0.005) \$	0.23	2.5%
6A	ASHRAE 90.1-2016	1,017,373	12,672	4,738,507	12,920,854	150,063	8,436	158,498	116.02	316.35	3.674	0.207 \$	3.88	
6A	NYStretch	950,276	13,044	4,546,734	12,195,118	140,166	8,683	148,849	111.32	298.58	3.432	0.213 \$	3.64	
6A	Savings	67,097	(372)	191,773	725,736	9,897	(247)	9,649	4.70	17.77	0.242	(0.006) \$	0.24	1.0%

 $<sup>^{*}</sup>$  Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

TABLE B1: Differences in Energy Performance, and Annual Energy Cost between ASHRAE 90.1-2016 and 2020 NYStretch by Climate Zone and Building Type (Part C)

		Energy Us:	age	Total (k	Btu)	I	Energy Cost		EUI (l	Btu/sf)	Б	CI (\$/sf)		Weighting
		kWh	therms	Site	Source	Electricity	Gas	Total	Site	Source	<b>Electricity</b>	Gas	Total	Factors
Warehous	e	51,914 s	quare feet											
4A	ASHRAE 90.1-2016	125,317	4,921	919,663	1,943,329	18,484	3,276	21,760	17.72	37.43	0.356	0.063	\$ 0.42	
4A	NYStretch	109,025	4,189	790,848	1,681,000	16,081	2,788	18,870	15.23	32.38	0.310	0.054	\$ 0.36	
4A	Savings	16,292	732	128,814	262,330	2,403	487	2,890	2.48	5.05	0.046	0.009	\$ 0.06	2.5%
5A	ASHRAE 90.1-2016	125,589	8,115	1,240,006	2,280,859	18,524	5,402	23,926	23.89	43.94	0.357	0.104	\$ 0.46	
5A	NYStretch	110,586	6,921	1,069,439	1,984,898	16,311	4,607	20,919	20.60	38.23	0.314	0.089	\$ 0.40	
5A	Savings	15,003	1,194	170,567	295,961	2,213	795	3,008	3.29	5.70	0.043	0.015	\$ 0.06	3.8%
6A	ASHRAE 90.1-2016	140,039	6,664	1,144,259	2,293,664	20,656	4,437	25,092	22.04	44.18	0.398	0.085	\$ 0.48	
6A	NYStretch	120,967	5,805	993,282	1,986,376	17,843	3,865	21,707	19.13	38.26	0.344	0.074	\$ 0.42	
6A	Savings	19,072	859	150,977	307,288	2,813	572	3,385	2.91	5.92	0.054	0.011	\$ 0.07	1.2%
10 Story H	lighrise Apt.	84,140 s	quare feet											
4A	ASHRAE 90.1-2016	486,453	24,164	4,076,188	8,073,640	71,752	16,086	87,838	48.45	95.96	0.853	0.191	\$ 1.04	
4A	NYStretch	471,098	23,557	3,963,044	7,835,041	69,487	15,682	85,168	47.10	93.12	0.826	0.186	\$ 1.01	
4A	Savings	15,356	608	113,144	238,599	2,265	404	2,669	1.34	2.84	0.027	0.005	\$ 0.03	21.9%
5A	ASHRAE 90.1-2016	459,795	30,143	4,583,161	8,395,873	67,820	20,066	87,886	54.47	99.79	0.806	0.238	\$ 1.04	
5A	NYStretch	444,061	29,030	4,418,150	8,100,014	65,499	19,325	84,824	52.51	96.27	0.778	0.230	\$ 1.01	
5A	Savings	15,733	1,113	165,011	295,860	2,321	741	3,062	1.96	3.52	0.028	0.009	\$ 0.04	0.0%
6A	ASHRAE 90.1-2016	458,814	30,223	4,587,788	8,393,046	67,675	20,119	87,795	54.53	99.75	0.804	0.239	\$ 1.04	
6A	NYStretch	443,359	29,091	4,421,886	8,098,427	65,395	19,366	84,762	52.55	96.25	0.777	0.230	\$ 1.01	
6A	Savings	15,456	1,132	165,902	294,620	2,280	753	3,033	1.97	3.50	0.027	0.009	\$ 0.04	0.0%
20 Story H	lighrise Apt	168,279 s	quare feet											
4A	ASHRAE 90.1-2016	1,197,004	40,689	8,153,111	17,901,324	176,558	27,087	203,645	48.45	106.38	1.049	0.161	\$ 1.21	
4A	NYStretch	1,152,409	40,277	7,959,762	17,349,994	169,980	26,813	196,793	47.30	103.10	1.010	0.159	\$ 1.17	
4A	Savings	44,594	412	193,349	551,331	6,578	274	6,852	1.15	3.28	0.039	0.002	\$ 0.04	23.5%
5A	ASHRAE 90.1-2016	1,188,626	51,029	9,158,537	18,888,461	175,322	33,970	209,293	54.42	112.24	1.042	0.202	\$ 1.24	
5A	NYStretch	1,143,904	50,478	8,950,788	18,321,053	168,726	33,603	202,329	53.19	108.87	1.003	0.200	\$ 1.20	
5A	Savings	44,722	552	207,749	567,408	6,597	367	6,964	1.23	3.37	0.039	0.002	\$ 0.04	0.1%
6A	ASHRAE 90.1-2016	1,188,990	52,179	9,274,748	19,012,980	175,376	34,736	210,112	55.12	112.98	1.042	0.206	\$ 1.25	
6A	NYStretch	1,138,529	50,857	8,970,389	18,299,523	167,933	33,856	201,789	53.31	108.75	0.998	0.201	\$ 1.20	
6A	Savings	50,461	1,322	304,359	713,458	7,443	880	8,323	1.81	4.24	0.044	0.005	\$ 0.05	0.1%

 $<sup>^{*}</sup>$  Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

TABLE B2: Payback Period of Incremental First Cost between ASHRAE 90.1-2016 and 2020 NYStretch by CZ and Building Type (Part A)

Climate	ASHRAE	Energy Usag	ge	Annual N	YS Energy Cost		Annual Savin	gs	I	ncremental Fir	st Cost	Payback Period	Weighting
Zone	Standard	kWh	therms	Electricity	Gas	Total	Total	(\$/sf)		Total	(\$/sf)	(Years)	Factors
Large Office		497,337 sq	ıare feet										
4A	90.1-2016	7,404,873	45,821	\$ 1,092,219 \$	30,503 \$	1,122,721							
4A	NYStretch	7,090,011	46,458	\$ 1,045,777 \$	30,927 \$	1,076,703	\$ 46,018 \$	0.093	\$	141,187 \$	0.284	3.1	7.5%
5A	90.1-2016	7,261,025	67,527	\$ 1,071,001 \$	44,953 \$	1,115,954							
5A	NYStretch	6,929,778	68,076	\$ 1,022,142 \$	45,318 \$	1,067,460	\$ 48,493 \$	0.098	\$	234,656 \$	0.472	4.8	1.0%
6A	90.1-2016	7,265,584	72,306	\$ 1,071,674 \$	48,134 \$	1,119,808							
6A	NYStretch	6,932,525	72,462	\$ 1,022,547 \$	48,238 \$	1,070,785	\$ 49,022 \$	0.099	\$	148,621 \$	0.299	3.0	0.3%
Standalone Re		24,630 sqt	are feet										
4A	90.1-2016	262,889	1,981	\$ 38,776 \$	1,319 \$	40,095							
4A	NYStretch	220,589	2,102	\$ 32,537 \$	1,399 \$	33,936	\$ 6,159 \$	0.250	\$	95,821 \$	3.890	15.6	4.9%
5A	90.1-2016	255,586	2,742	\$ 37,699 \$	1,826 \$	39,525							
5A	NYStretch	210,720	2,946	\$ 31,081 \$	1,961 \$	33,042	\$ 6,483 \$	0.263	\$	75,788 \$	3.077	11.7	7.1%
6A	90.1-2016	261,103	3,068	\$ 38,513 \$	2,043 \$	40,555							
6A	NYStretch	218,834	3,225	\$ 32,278 \$	2,147 \$	34,425	\$ 6,131 \$	0.249	\$	80,645 \$	3.274	13.2	2.6%
Secondary Sch	hool	210,357 squ	are feet										
4A	90.1-2016	1,753,599	18,055	\$ 258,656 \$	12,019 \$	270,675							
4A	NYStretch	1,616,146	16,151	\$ 238,381 \$	10,751 \$	249,133	\$ 21,542 \$	0.102	\$	128,629 \$	0.611	6.0	5.0%
5A	90.1-2016	1,660,790	22,612	\$ 244,967 \$	15,053 \$	260,020							
5A	NYStretch	1,523,268	20,845	\$ 224,682 \$	13,877 \$	238,559	\$ 21,461 \$	0.102	\$	91,266 \$	0.434	4.3	3.7%
6A	90.1-2016	1,662,210	23,538	\$ 245,176 \$	15,669 \$	260,845							
6A	NYStretch	1,523,135	21,645	\$ 224,662 \$	14,409 \$	239,071	\$ 21,774 \$	0.104	\$	137,223 \$	0.652	6.3	1.1%
Large Hotel		121,813 squ	are feet										
4A	90.1-2016	1,587,057	45,330	\$ 234,091 \$	30,176 \$	264,267							
4A	NYStretch	1,445,229	43,085	\$ 213,171 \$	28,681 \$	241,853	\$ 22,414 \$	0.184	\$	215,819 \$	1.772	9.6	3.5%
5A	90.1-2016	1,496,437	50,472	\$ 220,725 \$	33,599 \$	254,323							
5A	NYStretch	1,350,487	48,539	\$ 199,197 \$	32,312 \$	231,509	\$ 22,814 \$	0.187	\$	189,061 \$	1.552	8.3	2.5%
6A	90.1-2016	1,489,832	53,188	\$ 219,750 \$	35,407 \$	255,157							
6A	NYStretch	1,345,009	51,399	\$ 198,389 \$	34,216 \$	232,605	\$ 22,552 \$	0.185	\$	182,079 \$	1.495	8.1	1.8%
Full Service R	les taurant	5,488 squ	are feet										
4A	90.1-2016	223,706	13,240	\$ 32,997 \$	8,814 \$	41,811							
4A	NYStretch	190,350	12,252	\$ 28,077 \$	8,156 \$	36,233	\$ 5,578 \$	1.016	\$	30,670 \$	5.588	5.5	0.1%
5A	90.1-2016	213,031	15,675	\$ 31,422 \$	10,435 \$	41,857							
5A	NYStretch	183,745	14,691	\$ 27,102 \$	9,780 \$	36,882	\$ 4,975 \$	0.906	\$	21,387 \$	3.897	4.3	0.3%
6A	90.1-2016	212,659	16,885	\$ 31,367 \$	11,240 \$	42,607							
6A	NYStretch	183,195	15,893	\$ 27,021 \$	10,580 \$	37,601	\$ 5,006 \$	0.912	\$	22,967 \$	4.185	4.6	0.1%

TABLE B2: Payback Period of Incremental First Cost between ASHRAE 90.1-2016 and 2020 NYStretch by CZ and Building Type (Part B)

Climate	ASHRAE	Energy Usa	ge	Annual N	YS Energy	Cost	t		Annual S	avin	igs	I	ncremental	Firs	t Cost	Payback Period	Weighting
Zone	Standard	kWh	therms	Electricity	Gas		Total		Total		(\$/sf)		Total		(\$/sf)	(Years)	Factors
Outpatient Ho	ealthcare	40,843 sq	uare feet														
4A	90.1-2016	1,032,065	10,408	\$ 152,230 \$	6,929	\$	159,158										
4A	NYStretch	964,334	10,684	\$ 142,239 \$	7,112	\$	149,351	\$	9,807	\$	0.240	\$	126,695	\$	3.102	12.9	2.0%
5A	90.1-2016	1,004,067	11,865	\$ 148,100 \$	7,898	\$	155,998										
5A	NYStretch	937,570	12,183	\$ 138,292 \$	8,110	\$	146,402	\$	9,596	\$	0.235	\$	110,444	\$	2.704	11.5	2.4%
6A	90.1-2016	1,017,373	12,672	\$ 150,063 \$	8,436	\$	158,498										
6A	NYStretch	950,276	13,044	\$ 140,166 \$	8,683	\$	148,849	\$	9,649	\$	0.236	\$	110,741	\$	2.711	11.5	1.0%
Warehouse		51,914 sq	uare feet														
4A	90.1-2016	125,317	4,921	\$ 18,484 \$	3,276	\$	21,760										
4A	NYStretch	109,025	4,189	\$ 16,081 \$	2,788	\$	18,870	\$	2,890	\$	0.056	\$	53,254	\$	1.026	18.4	2.5%
5A	90.1-2016	125,589	8,115	\$ 18,524 \$	5,402	\$	23,926										
5A	NYStretch	110,586	6,921	\$ 16,311 \$	4,607	\$	20,919	\$	3,008	\$	0.058	\$	31,272	\$	0.602	10.4	3.8%
6A	90.1-2016	140,039	6,664	\$ 20,656 \$	4,437	\$	25,092										
6A	NYStretch	120,967	5,805	\$ 17,843 \$	3,865	\$	21,707	\$	3,385	\$	0.065	\$	39,118	\$	0.754	11.6	1.2%
10 Story High	hrise Apt.	84,140 sq	uare feet														
4A	90.1-2016	486,453	24,164	\$ 71,752 \$	16,086	\$	87,838										
4A	NYStretch	471,098	23,557	\$ 69,487 \$	15,682	\$	85,168	\$	2,669	\$	0.032	\$	36,040	\$	0.428	13.5	21.9%
5A	90.1-2016	459,795	30,143	\$ 67,820 \$	20,066	\$	87,886										
5A	NYStretch	444,061	29,030	\$ 65,499 \$	19,325	\$	84,824	\$	3,062	\$	0.036	\$	32,095	\$	0.381	10.5	0.0%
6A	90.1-2016	458,814	30,223	\$ 67,675 \$	20,119	\$	87,795										
6A	NYStretch	443,359	29,091	\$ 65,395 \$	19,366	\$	84,762	\$	3,033	\$	0.036	\$	35,330	\$	0.420	11.6	0.0%
20 Story High	hrise Apt	168,279 sq	uare feet														
4A	90.1-2016	1,197,004	40,689	\$ 176,558 \$	27,087	\$	203,645										
4A	NYStretch	1,152,409	40,277	\$ 169,980 \$	26,813	\$	196,793	\$	6,852	\$	0.041	\$	78,578	\$	0.467	11.5	23.5%
5A	90.1-2016	1,188,626	51,029	\$ 175,322 \$	33,970	\$	209,293										
5A	NYStretch	1,143,904	50,478	\$ 168,726 \$	33,603	\$	202,329	\$	6,964	\$	0.041	\$	71,908	\$	0.427	10.3	0.1%
6A	90.1-2016	1,188,990	52,179	\$ 175,376 \$	34,736	\$	210,112										
6A	NYStretch	1,138,529	50,857	\$ 167,933 \$	33,856	\$	201,789	\$	8,323	\$	0.049	\$	67,193	\$	0.399	8.1	0.1%
			T						4A	\$	0.077			\$	0.848	11.04	70.9%
				Weighted Avera	ac by C	lima	to Zono		5A	\$	0.185			\$	1.808	9.76	20.9%
				weigiteu Avera	iges ny C	iiiiidi	te zulle		6A	\$	0.187			\$	1.962	10.48	8.2%
			L					Co	ombined	\$	0.109			\$	1.140	10.50	100.0%

TABLE B3: 10 Year Present value of differences in Annual Energy Performance, Energy Cost and First Cost between ASHRAE 90.1-2016 and 2020 NYStretch by CZ and Building Type (Part A)

Climate	ASHRAE	Energy Us	age	I	Energy Cost			10	yr Life Cycle E	nergy Cost			In	cremental	Residual Value	Net Savings	over 10 yr	Weighting
Zone	Standard	kWh	therms		Total	I	Dectricity		Gas	Total	S	Savings	]	First Cost	At 10 Years	Total	Cost Index (\$/sf)	Factors
Large Office		497,337 s	quare feet															
4A	90.1-2016	7,404,873	45,821	\$	1,122,721	\$	10,070,256	\$	322,413 \$	10,392,669								
4A	NYStretch	7,090,011	46,458	\$	1,076,703	\$	9,642,061	\$	326,895 \$	9,968,956	\$	423,714	\$	141,187	\$ 37,036	\$319,563	\$0.64	7.5%
5A	90.1-2016	7,261,025	67,527	\$	1,115,954	\$	9,874,631	\$	475,148 \$	10,349,779								
5A	NYStretch	6,929,778	68,076	\$	1,067,460	\$	9,424,151	\$	479,012 \$	9,903,163	\$	446,616	\$	234,656	\$ 40,924	\$252,884	\$0.51	1.0%
6A	90.1-2016	7,265,584	72,306	\$	1,119,808	\$	9,880,830	\$	508,778 \$	10,389,609								
6A	NYStretch	6,932,525	72,462	\$	1,070,785	\$	9,427,887	\$	509,876 \$	9,937,763	\$	451,846	\$	148,621	\$ 23,746	\$326,971	\$0.66	0.3%
Standalone Re	etail	24,630 s	quare feet															
4A	90.1-2016	262,889	1,981	\$	40,095	\$	357,516	\$	13,941 \$	371,457								
4A	NYStretch	220,589	2,102	\$	33,936	\$	299,990	\$	14,787 \$	314,777	\$	56,679	\$	95,821	\$ 25,882	(\$13,259)	(\$0.54)	4.9%
5A	90.1-2016	255,586	2,742	\$	39,525	\$	347,585	\$	19,297 \$	366,882								
5A	NYStretch	210,720	2,946	\$	33,042	\$	286,568	\$	20,728 \$	307,296	\$	59,586	\$	75,788	\$ 18,591	\$2,389	\$0.10	7.1%
6A	90.1-2016	261,103	3,068	\$	40,555	\$	355,087	\$	21,589 \$	376,676								
6A	NYStretch	218,834	3,225	\$	34,425	\$	297,603	\$	22,691 \$	320,293	\$	56,383	\$	80,645	\$ 21,594	(\$2,668)	(\$0.11)	2.6%
Secondary Sc	hool	210,357 s	quare feet															
4A	90.1-2016	1,753,599	18,055	\$	270,675	\$	2,384,806	\$	127,041 \$	2,511,847								
4A	NYStretch	1,616,146	16,151	\$	249,133	\$	2,197,877	\$	113,642 \$	2,311,520	\$	200,327	\$	128,629	\$ 54,590	\$126,288	\$0.60	5.0%
5A	90.1-2016	1,660,790	22,612	\$	260,020	\$	2,258,592	\$	159,110 \$	2,417,702								
5A	NYStretch	1,523,268	20,845	\$	238,559	\$	2,071,568	\$	146,676 \$	2,218,244	\$	199,458	\$	91,266	\$ 35,287	\$143,479	\$0.68	3.7%
6A	90.1-2016	1,662,210	23,538	\$	260,845	\$	2,260,522	\$	165,623 \$	2,426,145								
6A	NYStretch	1,523,135	21,645	\$	239,071	\$	2,071,387	\$	152,302 \$	2,223,689	\$	202,456	\$	137,223	\$ 55,849	\$121,082	\$0.58	1.1%
Large Hotel		121,813 s	quare feet															
4A	90.1-2016	1,587,057	45,330	\$	264,267	\$	2,158,318	\$	318,958 \$	2,477,276								
4A	NYStretch	1,445,229	43,085	\$	241,853	\$	1,965,439	\$	303,163 \$	2,268,602	\$	208,673	\$	215,819	\$ 58,057	\$50,912	\$0.42	3.5%
5A	90.1-2016	1,496,437	50,472	\$	254,323	\$	2,035,080	\$	355,140 \$	2,390,220								
5A	NYStretch	1,350,487	48,539	\$	231,509	\$	1,836,595	\$	341,543 \$	2,178,138	\$	212,083	\$	189,061	\$ 46,283	\$69,305	\$0.57	2.5%
6A	90.1-2016	1,489,832	53,188	\$	255,157	\$	2,026,097	\$	374,254 \$	2,400,350								
6A	NYStretch	1,345,009	51,399	\$	232,605	\$	1,829,146	\$	361,668 \$	2,190,813	\$	209,537	\$	182,079	\$ 45,577	\$73,035	\$0.60	1.8%
Full Service I	Restaurant	5,488 s	quare feet															
4A	90.1-2016	223,706	13,240	\$	41,811	\$	304,229	\$	93,165 \$	397,393								
4A	NYStretch	190,350	12,252	\$	36,233	\$	258,867	\$	86,209 \$	345,075	\$	52,318	\$	30,670	\$ 9,805	\$31,453	\$5.73	0.1%
5A	90.1-2016	213,031	15,675	\$	41,857	\$	289,711	\$	110,294 \$	400,005								
5A	NYStretch	183,745	14,691	\$	36,882	\$	249,883	\$	103,370 \$	353,253	\$	46,751	\$	21,387	\$ 7,721	\$33,085	\$6.03	0.3%
6A	90.1-2016	212,659	16,885	\$	42,607	\$	289,205	\$	118,807 \$	408,012								
6A	NYStretch	183,195	15,893	\$	37,601	\$	249,135	\$	111,830 \$	360,965	\$	47,046	\$	22,967	\$ 8,675	\$32,754	\$5.97	0.1%

<sup>\*</sup> Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1-2016

TABLE B3: 10 Year Present value of differences in Annual Energy Performance, Energy Cost and First Cost between ASHRAE 90.1-2016 and 2020 NYStretch by CZ and Building Type (Part B)

Climate	ASHRAE	Energy Us	age	F	nergy Cost			10 yr L	ife Cycl	e En	ergy Cost			In	cremental	Residual Value	Net Savings		Weighting
Zone	Standard	kWh	therms		Total	F	dectricity	Gas	s		Total	Saving	ţs	]	First Cost	At 10 Years	Total	Cost Index (\$/sf)	Factors*
Outpatient H	ealthcare	40,843 s	quare feet																
4A	90.1-2016	1,032,065	10,408	\$	159,158	\$	1,403,556	\$	73,235	\$	1,476,791								
4A	NYStretch	964,334	10,684	\$	149,351	\$	1,311,446	\$	75,174	\$	1,386,620	\$ 90	),171	\$	126,695	\$ 30,589	(\$5,934)	(\$0.15)	2.0%
5A	90.1-2016	1,004,067	11,865	\$	155,998	\$	1,365,482	\$	83,485	\$	1,448,966								
5A	NYStretch	937,570	12,183	\$	146,402	\$	1,275,049	\$	85,727	\$	1,360,775	\$ 88	3,191	\$	110,444	\$ 24,158	\$1,905	\$0.05	2.4%
6A	90.1-2016	1,017,373	12,672	\$	158,498	\$	1,383,576	\$	89,168	\$	1,472,744								
6A	NYStretch	950,276	13,044	\$	148,849	\$	1,292,328	\$	91,783	\$	1,384,110	\$ 88	3,634	\$	110,741	\$ 25,228	\$3,121	\$0.08	1.0%
Warehouse		51,914 s	quare feet																
4A	90.1-2016	125,317	4,921	\$	21,760	\$	170,425	\$	34,625	\$	205,049								
4A	NYStretch	109,025	4,189	\$	18,870	\$	148,269	\$	29,472	\$	177,741	\$ 27	7,308	\$	53,254	\$ 14,315	(\$11,631)	(\$0.22)	2.5%
5A	90.1-2016	125,589	8,115	\$	23,926	\$	170,795	\$	57,100	\$	227,895								
5A	NYStretch	110,586	6,921	\$	20,919	\$	150,392	\$	48,700	\$	199,092	\$ 28	3,803	\$	31,272	\$ 10,203	\$7,734	\$0.15	3.8%
6A	90.1-2016	140,039	6,664	\$	25,092	\$	190,446	\$	46,894	\$	237,340								
6A	NYStretch	120,967	5,805	\$	21,707	\$	164,509	\$	40,850	\$	205,358	\$ 31	1,982	\$	39,118	\$ 14,592	\$7,455	\$0.14	1.2%
10 Story Hig	hrise Apt.	84,140 s	quare feet																
4A	90.1-2016	486,453	24,164	\$	87,838	\$	661,552	\$ 1	70,029	\$	831,581								
4A	NYStretch	471,098	23,557	\$	85,168	\$	640,669	\$ 1	65,754	\$	806,423	\$ 25	5,157	\$	36,040	\$ 12,192	\$1,310	\$0.02	21.9%
5A	90.1-2016	459,795	30,143	\$	87,886	\$	625,298	\$ 2	212,102	\$	837,400								
5A	NYStretch	444,061	29,030	\$	84,824	\$	603,901	\$ 2	204,268	\$	808,170	\$ 29	9,230	\$	32,095	\$ 11,372	\$8,507	\$0.10	0.0%
6A	90.1-2016	458,814	30,223	\$	87,795	\$	623,964	\$ 2	212,663	\$	836,627								
6A	NYStretch	443,359	29,091	\$	84,762	\$	602,946	\$ 2	204,700	\$	807,645	\$ 28	3,982	\$	35,330	\$ 13,443	\$7,094	\$0.08	0.0%
20 Story Hig	hrise Apt	168,279 s	quare feet																
4A	90.1-2016	1,197,004	40,689	\$	203,645	\$	1,627,865	\$ 2	286,307	\$	1,914,173								
4A	NYStretch	1,152,409	40,277	\$	196,793	\$	1,567,219	\$ 2	283,409	\$	1,850,628	\$ 63	3,545	\$	78,578	\$ 22,905	\$7,872	\$0.05	23.5%
5A	90.1-2016	1,188,626	51,029	\$	209,293	\$	1,616,472	\$ 3	359,065	\$	1,975,537								
5A	NYStretch	1,143,904	50,478	\$	202,329	\$	1,555,652	\$ 3	355,184	\$	1,910,836	\$ 64	1,701	\$	71,908	\$ 21,836	\$14,629	\$0.09	0.1%
6A	90.1-2016	1,188,990	52,179	\$	210,112	\$	1,616,967	\$ 3	867,155	\$	1,984,121								
6A	NYStretch	1,138,529	50,857	\$	201,789	\$	1,548,342	\$ 3	357,853	\$	1,906,196	\$ 7	7,926	\$	67,193	\$ 20,681	\$31,414	\$0.19	0.1%
																	4A	\$0.11	70.9%
											ده اماماما ۱	C-		h C!:	lucata Zaw -		5A	\$0.37	20.9%
										V	Veighted Av	erage Sa	ivings	ву СП	imate zone		6A	\$0.30	8.2%
																	Combined	\$0.18	100.0%

<sup>\*</sup> Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1-2016

#### **Appendix C**

#### **EEM 9 High-efficiency SHW**

Based on concerns over possible preemption of this measure, the requirement was subsequently removed from NYStretch. The analysis of the impact of the measure is included to memorialize the findings.

This measure required a high-efficiency service water heating (SWH) system. A service water heating system with large input size for either individual water heater or aggregate capacity of all water heaters would be required to have minimum thermal efficiency (Et) of 94%. This requirement only applied to buildings with water heating equipment with an individual or aggregate input rating of 1,000,000 Btu/h or greater.

PNNL's analysis for this measure originally showed savings associated with the prototypes for large hotel, full-service restaurant, outpatient healthcare, 10-story apartments and 20-story apartments.

Upon review, Vidaris found only 20-story apartment building prototype had a SHW system meeting the 1,000,000 Btu/h threshold. Costing for this measure was based on the price differential for three 400 MBH boilers with the efficiencies in the following table.

	2020 NYStretch	ASHRAE 90.1-2016
20-Story Apartment	High efficiency hot water heaters with 94% Et	Hot water heaters with 90% Et
	1,200 MBH total capacity	1,200 MBH total capacity

Based on Vidaris' analysis, savings and payback for this measure varies by climate zone as shown in the following table. Annual energy cost savings are between \$563 and \$633, and payback is between 8.58 and 5.65 years for CZs 4A and 6A, respectively.

20 Story Highrise Apt 168,279 square feet

		Energy	Usage	Annual	NYS Energy (	Cost	Annual Savings	Incremental First Cost	Payback Period
CZ	Description	kWh	therms	Electricity	Gas	Total	Total	Total	(Years)
4A	SHW 90% Eff.	1,152,409	40,277	\$169,980	\$26,813	\$196,793			
4A	SHW 94% Eff.	1,152,409	39,432	\$169,980	\$26,250	\$196,230	\$563	\$4,833	8.58
5A	SHW 90% Eff.	1,143,904	50,478	\$168,726	\$33,603	\$202,329			
5A	SHW 94% Eff.	1,143,904	49,577	\$168,726	\$33,003	\$201,729	\$600	\$3,795	6.33
6A	SHW 90% Eff.	1,138,529	50,857	\$167,933	\$33,856	\$201,789			
6A	SHW 94% Eff.	1,138,529	49,907	\$167,933	\$33,223	\$201,156	\$633	\$3,572	5.65

Based on the limited savings for the measure and concerns regarding potential federal preemption of this section, NYSERDA elected not to include the SHW requirements in the final version of the 2020 NYStretch Energy Code.

#### Appendix D.

#### **Cost Estimates**

#### 2020 NYStretch LARGE OFFICE - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost / U	nit	Total Item Cost	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	Item Cost	EEM Units					\$ 16,034	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		38,353	Area	\$	-	\$ -		
andard	Standard wall insulation (nonresidential mass wall)		74,849	Area	\$	-	\$ -		
	4A: U-0.104; R-7.82 Enhanced roof insulation (insulation entirely above deck)								
ΞM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	38,353	Area	\$ 0.3	881	\$ 14,884		
ΞM	Enhanced wall insulation (nonresidential mass wall)	RSMeans 07 21 13.10	74,849	Area	\$ 0.0	154	\$ 1,150		
	4A: U-0.099; R-8.30 (+ R-0.48)	Noivieans 07 21 15.10	74,049	Alea	φ 0.0	134	φ 1,130		
EM 2 tandard	Enhanced fenestration Standard windows, U-0.38		49,899	Area	\$	-	\$ -	\$ 25,904	
EM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	49,899	Area	S (	0.52	\$ 25,904		
EM 3	Air leakage testing for mid-sized buildings							\$ -	
	n/a - does not apply to this building type		-		\$		\$ -		
EM 4	n/a - does not apply to this building type		-		\$	-	\$ -	•	
	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAE 90.1-2016	T	392,896	watts	\$	6.75	s -	-	No cost assumed for this
EM	Reduced LPDs, ~20% more efficient	HBL	308,846	watts	s		\$ -		buildling type
EM 5	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	300,040	watts	9		Ψ -	s -	
tandard	n/a - IECC only		-		\$	-	\$ -		
EM	n/a - IECC only		-		\$	-	\$ -		
EM 6 tandard	Exterior lighting control n/a		-				s -	\$ -	
EM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$	-	\$ - \$ -		
EM 7	Reduce fan power allowances (based on improved fan efficiencies)				Ţ		<u> </u>	\$ 116,592	
andard	CV fans: 0.00094 bhp/cfm						\$ -		
	•						s -		
tandard	VAV fans: 0.00130 bhp/cfm								
EM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	4.98	tons	\$ 1,	031	\$ 5,137		Costed as increased syster size for reduction in static
EM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	31,262	cfm	\$ 3.	565	\$ 111,456		size for reduction in static pressure
EM 8	Hotel guestroom HVAC vacancy control							s -	procouro
tandard	n/a - already included in 90.1-2016		-		\$	-	\$ - \$ -		
ΞM	n/a - already included in 90.1-2016		-		\$	-	\$ -		
EM 9	High-efficiency SHW				-		_	\$ -	
tandard	n/a - does not apply to this building type n/a - does not apply to this building type		-		\$ \$		\$ - \$ -		
EM 10	High-efficiency commercial kitchen equipment		-		2	-	<b>5</b> -	• -	
	n/a - does not apply to this building type		-		\$	-	\$ -		•
EM	n/a - does not apply to this building type		-		\$	-	\$ -		
EM 11	Thermal bridging reduction				-		_	\$ 2,448	
tandard	Standard wall insulation  Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of		-		\$		\$ -		
EM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	7,200	Area	\$ 0.3	400	\$ 2,448		
EM 12	Exterior lighting power reduction							\$ -	
tandard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	17,406	watts	s	-	\$ -		No cost; parking lot can be
EM	Reduced LPDs, ~32% more efficient	RSMeans 26 51 13.55	17,400	watto	s		\$ -		met with MH
	Efficient elevator, regenerative drives	R5Means 26 51 13.55			2	-	<b>5</b> -	\$ 120,000	
tandard	Standard elevator motors, 30hp		-	each			\$ -	φ 120,000	•
EM	Elevator motors with regenerative drives, 30 hp	Previous projects	12	each	\$ 10.		\$ 120,000		
EM 14	ERV for apartment makeup air units							\$ -	
	n/a - already included in 90.1-2016		-		\$	-	\$ -		
EM 15	n/a - already included in 90.1-2016  Demand-based recirculated SHW controls		-		\$	-	\$ -	\$	
	n/a				\$	-	\$ -		
EM	n/a - applies to IECC path only		-		\$	-	\$ - \$ -		
	AL COST ADJUSTMENTS								
CA 1	Reduced capacity for cooling equipment	D01400 04 46 10			0 010	447	6 000 000	\$ (32,749)	
tandard tandard	Watercooled chiller, 701 tons Cooling tower, 1602 tons	RSMeans 23 64 13.10 RSMeans 23 65 13.10	2 2	units units		147 539	\$ 636,295 \$ 369,079		
tanaara EM	Watercooled chiller, 676 tons	RSMeans 23 64 13.10	2	units		568	\$ 617,136		
EM	Cooling tower, 1543 tons	RSMeans 23 65 13.10	2	units		744	\$ 355,488		
CA 2	Reduced capacity for heating equipment							\$ (12,832)	
tandard	Hot water boiler, gas fired, 8877 MBH	RSMeans D3020 130	1	units	\$ 261,	867	\$ 261,867		
EM CA 3	Hot water boiler, gas fired, 8419 MBH Reduced capacity for air handling equipment	RSMeans D3020 130	1	units	\$ 249	034	\$ 249,034	\$ (133,102)	
tandard	VAV with Reheat. 274885 cfm	RSMeans D3040 134	1	units	\$ 2,727	871	\$ 2,727,871	(133,102)	
EM	VAV with Reheat, 261451 cfm	RSMeans D3040 134	1	units	\$ 2,594		\$ 2,594,768		
CA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	,						\$ -	
andard	n/a - does not apply to this building type		-		\$	-	\$ -		
EM CA E	n/a - does not apply to this building type		-		\$	-	\$ -	\$ 2,600	
CA 5 tandard	Electric vehicle charging station capable parking lots for 5% of spaces  No charging stations, 325,080sf parking lot, 300sf per parking spot		-		S	-	\$ -	<b>a</b> 2,600	
EM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets		300			
CA 6	Solar-ready zone per Appendix CA of 2018 IECC							\$ -	
tandard			-		\$	-	\$ -		No Cost
					S				I .
EM			-		٥		Total	\$ 104.894	

#### 2020 NYStretch LARGE OFFICE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-19

EEM	Description	Source of	Number of	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
	Enhanced insulation for roofs and walls	Item Cost	EEM Units	Unit	Cost / Unit	Total Item Cost	\$ 16,130	Notes / Comments
	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		38,353	Area	\$ -	S -	\$ 16,130	
Ctondord	Standard wall insulation (nonresidential mass wall)		74,849	Area	\$ -	s -		
	5A: U-0.090; R-9.31 Enhanced roof insulation (insulation entirely above deck)		7 1,010	71100				
	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	38,353	Area	\$ 0.3881	\$ 14,884		
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMeans 07 21 13.10	74,849	Area	\$ 0.0166	\$ 1,245		
	5A: U-0.086; R-9.83 (+ R-0.52)  Enhanced fenestration	TROMOGNO OT ET 10:10	7 1,010	71100	<b>\$</b> 0.0100	1,210	\$ 26.344	
	Standard windows, U-0.38		49,899	Area	\$ -	\$ -	\$ 20,344	
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	49,899	Area	\$ 0.53	\$ 26,344		
	Air leakage testing for mid-sized buildings n/a - does not apply to this building type		-		\$ -	\$ -	-	
	n/a - does not apply to this building type		-		\$ -	\$ - \$ -		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -	
	Lighting per ASHRAE 90.1-2016 Reduced LPDs, ~20% more efficient	HBL	392,896 308,846	watts watts	\$ 6.75 \$ -	\$ -		No cost assumed for this building type
	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	300,040	watts	Ψ -	-	\$ -	building type
Standard	n/a - IECC only		-		\$ -	\$ -		
	n/a - IECC only  Exterior lighting control		-		\$ -	\$ -		
	n/a		-		\$ -	\$ -	-	
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ - \$ -	\$ -		
	Reduce fan power allowances (based on improved fan efficiencies)						\$ 120,025	
Standard	CV fans: 0.00094 bhp/cfm					\$ -		
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	5.09	tons	\$ 1,031	\$ 5,250		Costed as increased system
	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	32,193	cfm	\$ 3.565			size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control	Troinicans Booto 104	52,155	OIIII	ψ 3.303	\$ 114,775		pressure
	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ - \$ -	\$ -		
	High-efficiency SHW n/a - does not apply to this building type		_		\$ -	\$ -	-	
	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment				•		\$ -	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type				\$ - \$ -	\$ - \$ -		
EEM 11	Thermal bridging reduction						\$ 2,448	
	Standard wall insulation Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of		-		\$ -	\$ -		
EEM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	7,200	Area	\$ 0.3400	\$ 2,448		
EEM 12	Exterior lighting power reduction						\$ -	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	43,412	watts	\$ - \$ -	\$ - \$ -		
	Reduced LPDs, ~32% more efficient  Efficient elevator, regenerative drives	RSMeans 26 51 13.55			\$ -	\$ -	\$ 120,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
	Elevator motors with regenerative drives, 30 hp  ERV for apartment makeup air units	Previous projects	12	each	\$ 10,000	\$ 120,000	•	
	n/a - already included in 90.1-2016		-		\$ -	\$ -	-	
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ - \$ -		
EEM 15 Standard	Demand-based recirculated SHW controls		-		\$ -	\$ -	-	
EEM	n/a - applies to IECC path only		-		\$ - \$ -	\$ -		
ADDITION/	AL COST ADJUSTMENTS							
ACA 1 Standard	Reduced capacity for cooling equipment Watercooled chiller, 683 tons	RSMeans 23 64 13.10	2	units	\$ 311,297	\$ 622,594	\$ (10,238)	
Standard	Cooling tower, 1560 tons	RSMeans 23 65 13.10	2	units	\$ 179,680	\$ 359,360		
	Watercooled chiller, 675 tons	RSMeans 23 64 13.10	2	units	\$ 308,303	\$ 616,605		
	Cooling tower, 1542 tons Reduced capacity for heating equipment	RSMeans 23 65 13.10	2	units	\$ 177,556	\$ 355,112	\$ (44,204)	
Standard	Hot water boiler, gas fired, 9963 MBH	RSMeans D3020 130	1	units	\$ 292,309		(44,204)	
EEM	Hot water boiler, gas fired, 8386 MBH	RSMeans D3020 130	1	units	\$ 248,105			
ACA 3 Standard	Reduced capacity for air handling equipment VAV with Reheat. 276750 cfm	RSMeans D3040 134	1	units	\$ 2,746,345	\$ 2,746,345	\$ (78,938)	
EEM	VAV with Reheat, 268782 cfm	RSMeans D3040 134	1	units	\$ 2,667,408	\$ 2,667,408	***************************************	***************************************
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	T	1			Le	\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type			units units		\$ - \$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			uillo			\$ 70,434	
Standard	No charging stations, 325,080sf parking lot, 300sf per parking spot				\$ -	\$ -		
EEM ACA 6	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	54	outlets	\$ 1,300	\$ 70,434	\$ -	
Standard	Colar roday Eolio por Appointin on or Eolo (Eolo		-		\$ -	\$ -		
EEM			-		\$ -	\$ -		
						Total	\$ 222,002	
	·	·					· · · · · · · · · · · · · · · · · · ·	

## 2020 NYStretch LARGE OFFICE - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-19

Commonweight   Comm										
Management	EEM	Description	Source of	Number of FFM Units	Unit	С	ost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
Secretary   Secr	EEM 1		item oost	LLIN OIII(3					\$ 24,583	
A control of the co	Standard			38,353	Area	\$	-	\$ -		
Control of Control o	Standard			74.849	Area	\$	-	s -		
Column   C										
Figure 12   Control of Municipal (processes and administration flowers and municipal (processes and administration flowers and municipal (processes and administration flowers)   Figure 12   Figure	EEM		RSMeans 07 22 16.10	38,353	Area	\$	0.5998	\$ 23,003		
Company   Comp			DOM 07.04.40.40	74.040			0.0044			
Secretary   Secr	EEIVI		RSMeans 07 21 13.10	74,849	Area	\$	0.0211	\$ 1,581		
Character controls to the control of the control		Enhanced fenestration							\$ 26,137	
## A Tax Assaura starting from a state of buildings    Company Company   Proceedings   Process										
Secretary   10 - Secr			PNNL CE ANALYSIS	49,899	Area	\$	0.52	\$ 26,137	•	
Control of Control apply to the building byte of microsy lights in desting unit   Control of Cont						\$		\$ -	-	
March   Marc		n/a - does not apply to this building type		-			-			
Standard	EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling unit							\$ -	
March   Marc										No cost assumed for this building type
Secretary   Secr			HBL	308,846	watts	\$	-	\$ -		The deet accumed for the balaning type
Fig.			T					•	\$ -	
East Search Epiphing control				-						
Summer   Company   Compa				-		φ	-	-	s -	
EMAIL   Section   February   Industrial or NYS amendments to 01.12016   Section   Se						\$		\$ -		
Standard   Color   Standard				-		\$	-	s -		
Secondary   Control Standary									\$ 115,148	
EEM Vitans: 0.00100 bityclim     R5Mears 23 74 33 10	Standard	CV fans: 0.00094 bhp/cfm						\$ -		
EEM Vitans: 0.00100 bityclim     R5Mears 23 74 33 10	Standard	VAV fane: 0.00130 hbp/cfm						٠ .		
EM Note: guestroom MACO various control										
Real guestioners MACK Survey (and the first of the control of th	EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	4.95	tons	\$	1,031	\$ 5,107		Costed as increased system size for
Standard	EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	30.865	cfm	\$	3,565	\$ 110.041		reduction in static pressure
Sandard   An - already included in 90.1-2016						Ť		,	•	
Standard						\$	-	s -	-	
Sandard   Air - does not apply to this building type		n/a - already included in 90.1-2016	***************************************	-		\$	-	\$ -	***************************************	
Commons   Comm									\$ -	
Standard   High-efficiency commercial kitchen aquipment   S				-			-			
Sandard   nis - does not apply to this building type   .				-		\$	-	\$ -	•	
EEM   1		High-efficiency commercial kitchen equipment				2		٠ -	-	
Standard				-			-			
EEM   Additional Parapet Insulation: Assume 12m at wall + 42m of parapet height of Parapet No. 2 to 1 to	EEM 11								\$ 2,448	
EBM 12   Exterior lighting power reduction   R3Means 26 51 13.55   43,412   wats \$ \$ . \$ . \$	Standard	Standard wall insulation		-		\$	-	\$ -		
EBM 12   Exterior lighting power reduction   R3Means 26 51 13.55   43,412   wats \$ \$ . \$ . \$	EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of parapet height to	RSMeans 07 22 16.10	7.200	Area	\$	0.3400	\$ 2.448		
Sandard   Lything per ASHRAE 90.1-2016   RSMeans 26 51 13.55   43,412   watts   \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$	CEM 40	roof deck. 9 it of total insulation of K-4.2/in for entire perimeter of roof.		1 11						
EEM   3			RSMeans 26 51 13 55	43 412	watts	\$	-	\$ -		
EEM 14   Efficient elevator, regenerative drives		Reduced LPDs. ~11% more efficient			Wallo		-			
EEM   Elevator motors with regenerative drives, 30 hp   Previous projects   12   each   \$ 10,000   \$ 120,000   \$	EEM 13	Efficient elevator, regenerative drives						·	\$ 120,000	
EEM   Standard   Act										
Sandard   Ais - already included in 90 1-2016			Previous projects	12	each	\$	10,000	\$ 120,000	•	
EEM   1/2   - already included in 90.1-2016			1			•		c	•	
EEM   Standard   Part										
Sandard   Apa		Demand-based recirculated SHW controls				, ,		<del>-</del>	\$ -	
EEM   n/a - applies to IECC path only	Standard	n/a				\$	-	\$ -		
ACA 1   Reduced capacity for cooling equipment   Standard   Cooling tower, 1445 tons   RSMeans 23 64 13.10   2   units   \$ 202.639   \$ 565.278   \$ 332,890   \$ 565.278   \$ 566.486   \$ 586.278   \$ 586.288   \$ 566.486   \$ 586.288   \$ 566.486   \$ 586.288   \$ 5	EEM	n/a - applies to IECC path only		-		\$	-	\$ -		
Standard   Watercooled chiller, 633 lons   R.S.Means 23 64 13, 10   2   units   \$ 292,639   \$ 655,278									6 (91.001)	
Sandard   Cooling tower, 1445 tons   RSMeans 23 65 13.10   2   units   \$ 186,445   \$ 332,890			RSMeans 23 64 13 10	2	units	S	292 630	\$ 585 278		
EEM										
EEM										
Standard   Not water boiler, gas fixed, 936 MBH   RSMeans D3020 130   1	EEM	Cooling tower, 1392 tons			units					
EEM									\$ (14,628)	
ACA 3 Reduced capacity for air handling equipment \$ (163,754)  Standard VAV with Reheat, 275076 cfm RSMeans D3040 134 1 units \$ 2,729,760 \$ 2,729,760 \$ 2,566,006		Hot water boiler, gas tired, 9870 MBH							-	
Standard   Val with Reheat 275076 dm   RSMeans D3040 134   1		Paduced canacity for air handling aguinment	Romeans D3020 130	1	units	\$	2/5,064	a 2/5,064	\$ (162.754)	
EEM			RSMeans D3040 134	1	units	S	2 729 760	\$ 2,729,760		
Sandard   n/a - does not apply to this building type   - 0   \$ - \$ - \$ - \$	EEM	VAV with Reheat, 258548 cfm								
EEM   n/a - does not apply to this building type     0   \$   \$   \$   \$   \$   \$   \$   \$		Increased insulation to account for PTAC openings, thermal bridging requirements							\$ -	
ACA 5 Electric vehicle charging station capable parking lots for 5% of spaces \$70,434\$  Standard No charging stations, 325,0969 f parking lot, 300sf per parking spot - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	Standard	n/a - does not apply to this building type		-		\$	-	\$ -		
Standard   No charging stations, 225,080sf parking lot, 200sf per parking spot   Chargehub.com   54   outlets   5   0.30   5   70,434			L	-	0	\$	-	\$ -		
EEM         208/240V 40 amp outlets (zones 5A and 6A only)         chargehub.com         54         outlets         \$ 1,300         \$ 70,434           ACA 6         Solar-ready zone per Appendix CA of 2018 IECC         -         -         \$ -         \$ -           Standard         -         -         \$ -         \$ -         -           EEM         -         -         \$ -         \$ -		No charging stations 325 080st parking lots 300st per parking spot				9		c	70,434	
ACA 6 Solar-ready zone per Appendix CA of 2018 IECC \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$			chargehub.com	54	outlets		1.300			
Standard         -         \$ -<			J	5.			.,250		\$ -	
	Standard			-		\$	-	\$ -		
Total   \$ 140 368	EEM			-		\$	-	\$ -		
10tai   \$\psi\$ 143,300								Total	\$ 149,368	

#### 2020 NYStretch STANDALONE RETAIL - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

Standard Union   Standard Union	It roof insulation (insulation entirely above deck) 30, R-32.2 (+ R-2.2) I wall insulation (nonresidential mass wall) 99, R-8.30 (+ R-0.48) 10 (+ R-0.48) 11 (+ R-0.48) 11 (+ R-0.48) 12 (+ R-0.48) 13 (+ R-0.48) 14 (+ R-0.48) 15 (+ R-0.48) 16 (+ R-0.48) 16 (+ R-0.48) 17 (+ R-0.48) 18 (+ R-0.48) 18 (+ R-0.48) 19	RSMeans 07 22 16.10 RSMeans 07 21 13.10 PNNL CE ANALYSIS	24,692 11,766 24,692 11,766 904 904	Area Area Area Area Area Area O	\$ \$ \$ \$ \$ \$ \$	- 0.3881 0.0154	\$ 181 \$ -	Total Incremental Cost \$ 9,763 \$	Notes / Comments
EM 1 Standard U-0. EEM 4. U-0.030; Enhanced for EEM 4. U-0.030; Enhanced Win EEM 2 Enhanced Win Enhanced win EEM 3 Air leakaget u- EEM 3 Air leakaget u- EEM 4. EEM 4. EEM 4. EEM 4. EEM 4. EEM 6. EEM 6. EEM 6. EEM 7. EEM 7. EEM 1. EEM	d insulation for roofs and walls  U-0.03z, R-30 roof insulation (insulation entirely above deck) wall insulation (nonresidential mass wall)  (4, R-7, 82  (7, R-7	RSMeans 07 22 16.10 RSMeans 07 21 13.10 PNNL CE ANALYSIS	24,692 11,766 24,692 11,766 904 904	Area Area Area Area Area O	\$ \$ \$ \$	- - 0.3881 0.0154	\$ - \$ - \$ 9,583 \$ 181	\$ 9,763	Notes / Comments
Standard U-0.	U-0.032, R-30 roof insulation (insulation entirely above deck) wall insulation (nornesidential mass wall) 04; R-7.82 1 roof insulation (insulation entirely above deck) 30; R-32.2 (+ R-2.2) 1 wall insulation (nornesidential mass wall) 99; R-8.30 (+ R-0.48) 1 denestration windows, U-0.37 1 windows, U-0.37 1 windows, U-0.35 1 etesting for mid-sized buildings not apply to this building type 1 not apply to this building type 1 not apply to this building; high efficacy lights in dwelling units 1 er ASHRAE 90.1-2016 LPDs, ~25% more efficient 2 y sensors and automatic lighting controls including egress lighting 2 only	RSMeans 07 21 13.10 PNNL CE ANALYSIS	11,766 24,692 11,766 904 904	Area Area Area Area O	\$ \$ \$ \$	- 0.3881 0.0154	\$ - \$ 9,583 \$ 181		
Standard U-0.	U-0.032, R-30 roof insulation (insulation entirely above deck) wall insulation (nornesidential mass wall) 04; R-7.82 1 roof insulation (insulation entirely above deck) 30; R-32.2 (+ R-2.2) 1 wall insulation (nornesidential mass wall) 99; R-8.30 (+ R-0.48) 1 denestration windows, U-0.37 1 windows, U-0.37 1 windows, U-0.35 1 etesting for mid-sized buildings not apply to this building type 1 not apply to this building type 1 not apply to this building; high efficacy lights in dwelling units 1 er ASHRAE 90.1-2016 LPDs, ~25% more efficient 2 y sensors and automatic lighting controls including egress lighting 2 only	RSMeans 07 21 13.10	11,766 24,692 11,766 904 904	Area Area Area Area O	\$ \$ \$ \$	- 0.3881 0.0154	\$ - \$ 9,583 \$ 181		
### 14-0-10-10-10-10-10-10-10-10-10-10-10-10-1	04: R-7.82  1 cof insulation (insulation entirely above deck) 30: R-32.2 (+ R-2.2) 30: R-32.2 (+ R-2.2) 30: R-32.2 (+ R-2.2) 30: R-3.0 (+ R-0.48) 30: R-3.0 (+ R-0.48) 30: R-3.0 (+ R-0.48) 49: R-3.0 (+ R-0.48) 49: R-3.0 (+ R-0.48) 49: R-3.0 (+ R-0.48) 40: R-0.37 40: Windows, U-0.37 40: Windows, U-0.35 40: Windows, U-0.37 40:	RSMeans 07 21 13.10	24,692 11,766 904 904	Area Area Area O	\$ \$	0.3881	\$ 9,583 \$ 181 \$ -	\$ 447	
### 14	It roof insulation (insulation entirely above deck) 30, R-32.2 (+ R-2.2) I wall insulation (nonresidential mass wall) 99, R-8.30 (+ R-0.48) 10 (+ R-0.48) 11 (+ R-0.48) 11 (+ R-0.48) 12 (+ R-0.48) 13 (+ R-0.48) 14 (+ R-0.48) 15 (+ R-0.48) 16 (+ R-0.48) 16 (+ R-0.48) 17 (+ R-0.48) 18 (+ R-0.48) 18 (+ R-0.48) 19	RSMeans 07 21 13.10	24,692 11,766 904 904	Area Area Area O	\$ \$	0.3881	\$ 9,583 \$ 181 \$ -	\$ 447	
4A: U-0.030; F   EM	30, R-32 (+ R-22)    wall insulation (nonresidential mass wall)  99, R-8.30 (+ R-0.48)  99, R-8.30 (+ R-0.48)  14 fenestration  windows, U-0.37  windows, U-0.37  windows, U-0.35  ge testing for mid-sized buildings  not apply to this building type  not apply to this building type    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting; high efficacy lights in dwelling units    DPD for interfor lighting lighting controls including egress lighting	RSMeans 07 21 13.10	11,766 904 904	Area Area 0	\$ \$	0.0154	\$ 181 \$ -	\$ 447	
EEM 4. U.O.099: f. Standard winc. EEM 2. Standard winc. EEM 3. Standard winc. EEM 4. Cobes not n/a - does not n/a - does not n/a - lECC on n/a - does not n/a - does	I wall insulation (nomesidential mass wall) 99; R-8.30 (+ R-0.48) d fenestration windows, U-0.37 ge testing for mid-sized buildings not apply to this building type not apply to this building type not apply to this building; high efficacy lights in dwelling units er ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting Conly	PNNL CE ANALYSIS	904 904	Area Area	\$	-	\$ -	\$ 447	
Asi U-0.099;   EBM 2   Ebm 2   Ebm 3   Ebm 4   Ebm 6	99; R-8.30 (+ R-0.48) d d fenestration windows, U-0.37 lwindows, U-0.37 lwindows, U-0.37 ge testing for mid-sized buildings not apply to this building type LPD for interior lighting; high efficacy lights in dwelling units er ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting 2 only	PNNL CE ANALYSIS	904 904	Area Area	\$	-	\$ -	\$ 447	
EIM 2 Enhanced fer Siendard Winzelett Siandard Siendard Siendard Winzelett Siandard Winzelett Siandard Winzelett Siandard Market Siandard Mark	d fenestration windows, U-0.37 windows, U-0.37 windows, U-0.35 ge testing for mid-sized buildings not apply to this building type not apply to this building type LPD for interior lighting; high efficacy lights in dwelling units er ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting Conly		904	Area 0	\$			\$ 447	
EEM 3 Air leakage is nir de does not nir de do	I windows, U-0,35 ge testing for mid-sized buildings not apply to this building type not apply to this building type LPD for interfor lighting; high efficacy lights in dwelling units er ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting 2 only		904	Area 0	\$				
Air leakage time a des not selected in a des	ge testing for mid-sized buildings in of apply to this building type in of apply to this building type IPD for interior lighting; high efficacy lights in dwelling units er ASHRAE 90.1-2016 IPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting C only			0		0.50	\$ 447		
Slandard   n/a - does not	in or apply to this building type in on apply to this building type in on apply to this building type LPD for interior lighting; high efficacy lights in dwelling units er ASHRAE 90.1-2016  LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting 2 only	HBL	-		2				
Reduced LPL	not apply to this building type LPD for interior lighting; high efficacy lights in dwelling units or ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting Conly	HBL	-		2			\$ -	
Reduced LPD	LPD for interior lighting; high efficacy lights in dwelling units  er ASHRAE 90.1-2016  LPDs, -25% more efficient cy sensors and automatic lighting controls including egress lighting  confy	HBL	-				\$ -		
Standard Lighting per A  Reduced LPD  Standard Lighting per A  Reduced LPD  Standard na - IECC on na - IECC o	er ASHRAE 90.1-2016 LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting 2 only	HBL		U	\$	-	\$ -	\$ 59.518	
EEM Seduced LPD  COUDANCY SEMS  GRANDARD AND SEMS	LPDs, ~25% more efficient cy sensors and automatic lighting controls including egress lighting Conly	HBL						\$ 59,518	Cost assumed to be
Slandard n/a - IECC on l'EEM n/a - already in l'EEM n/a - does not l'EEM n/a - already in l'A - already in l'EEM n/a - already in l'A - already in l'EEM n/a - already	cy sensors and automatic lighting controls including egress lighting Conly	HBL	35,787	watts	\$	6.75	\$ 241,565		proportional to increased
Standard   n/a - IECC on	Conly		26,970	watts	\$	-	\$ 301,083.28		efficiency
Standard   n/a - IECC on	Conly							s -	,
in a - IECC on In a section light in a section ligh			-	0	\$	-	\$ -		
All			-	0	\$		\$ -		
Reduced Cap	ighting control							\$ -	
Reduce fan   CV fans: 0.0			-	0	\$	-	\$ -		
Standard CV fans: 0.00  EEM B Hotel questre  Standard n'a- already in  standard n'a- does not  standard n'a- does not  n'a- already in  standard n'a- does not  n'a- already in  standard n'a- does not  n'a- does n	Conly; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
CV fans: 0.00  EEM 8  Hotel guestre  n/a - already in  EEM 9  High-efficien  Standard n/a - does not  standard n/a - does not  n/a - does not  standard n/a - does not  standard n/a - does not  n/a - does not  standard Lighting per A  EEM 11  EEM 12  EEM n/a - does not  standard Lighting per A  EEM 12  EEM 13  EIGEN 13  EIGEN 14  EEM 15  EEM 15  EEM 15  Boandard n/a - does not  standard n/a - already in  Demand-bass not  standard n/a - appliest com  n/a - appliest com  COST ADJ  COA 1  Reduced cap  Standard N/a - appliest com  Rod 2  Reduced cap  Reduced cap  Reduced cap  (INCLUCED V  EEM (CA) 3  Reduced cap  (INCLUCED V	an power allowances			tono			c	\$ 960	
IEM 8 Hotel guestro Standard n/a - already in IEM 9 High-efficien n/a - does not IEM 10 High-efficien n/a - does not IEM 10 High-efficien n/a - does not IEM 10 High-efficien Standard n/a - does not IEM 10 High-efficien IEM 11 A does not IEM 12 High-efficien IEM 12 High-efficien IEM 13 High-efficien IEM 14 Exterior light IEM 15 High-efficien IEM 16 High-efficien IEM 16 High-efficien IEM 17 High-efficien IEM 18 High-efficien III High-effic	U.UUU94 DNP/CIM			tons			\$ -		Costed as increased system
Slandard n/a - already in EEM 9 A - already in EEM 9 High-efficien n/a - does not High-efficien n/a - does not High-efficien slandard n/a - does not n/a - does n	0.00088 bhp/cfm	RSMeans 23 74 33.10	0.93	tons	\$	1,031	\$ 960		size for reduction in static
Slandard n/a - already in EEM 9 A - already in EEM 9 High-efficien n/a - does not High-efficien n/a - does not High-efficien slandard n/a - does not n/a - does n	•								pressure
ind a already in plane file in a light of the individual individual in a light of the individual indi	estroom HVAC vacancy control		4					ş -	
Signatura de la companya del companya del companya de la companya del companya del companya de la companya del companya de	ady included in 90.1-2016 ady included in 90.1-2016		-	0	\$		\$ - \$ -		
Siandard n/a - does not High-efficien n/a - does not Lighting per A Reduced LpD LEEM 13 Efficient elsev. N/a - does not LEEM n/a - does not LEEM n/a - already in n/			-	U	- D				
EEM n/a - does not steem 1. A cost of not ste	s not apply to this building type	<u> </u>	-	0	\$	- [	\$ -		
SEM 10 High-efficient n/a - does not n/a - already in n/a - already	not apply to this building type		-	0	\$		\$ -		
EEM 1 - does not n'a - does not l'elem 1 - does not	ciency commercial kitchen equipment							\$ -	
EEM 11 Thermal brid individual programme of the programme	not apply to this building type		-	0	\$		\$ -		
Slandard n/a - does not EEM 12 - does not EEM 12 - does not EEM 12 - Exterior light Slandard Lighting per A Gette 18 - does not Lighting per A Gette 18 - does not n/a - does not n/a - does not n/a - does not n/a - already in EEM 14 - EEM n/a - already in EEM 15 - does not n/a - already in Lighting 18 - does not n/a - already in n/a - applies to NODITIONAL COST ADJ ACA 1 - Reduced cap sing GA 2 - Reduced cap sing GA 2 - Reduced cap sing GA 3 - Reduced cap sin	not apply to this building type		-	0	\$	-	\$ -		
EEM 1 2	bridging reduction	4						\$ -	
EEM 12 Exterior light in a constant of the con	s not apply to this building type		-	0	\$	-	\$ -		
Siandard Lighting per A Reduced LPD EEM 13 Efficient elev. Slandard n/a - does not EEM 14 ERV for apart EEM 15 EEM 15 EEM 15 EEM 15 EEM 16 EEM 16 EEM 16 EEM 16 EEM 16 EEM 17 EEM	not apply to this building type ighting power reduction		-	Area	2	0	\$ -	•	
EEM Reduced LPD Standard n/a - does not LEEM n/a - does not LEEM n/a - does not LEEM n/a - already in LEEM n/a - applies to ADDITIONAL COST ADJ Standard n/a - applies to ADDITIONAL COST ADJ Standard n/a - applies to ADDITIONAL COST ADJ Standard n/a - Reduced cap (INCLUCED V LEEM CAS a REDUCED	er ASHRAF ON 1-2016	RSMeans 26 51 13.55	1,702	watts	\$	-	\$ -	•	
EEM 13 Efficient elev n/a - does not n/a - does not net elem 14 ERV for apart standard n/a - already it n/a - applies to DDITIONAL COST ADJ ROLLOGO AL REDUCED AL COST ADJ ROLLOGO AL REDUCED AL COST ADJ ROLLOGO AL COS	LPDs, ~11% more efficient	RSMeans 26 51 13.55	1,702	watto	\$		\$ -		
Istandard n/a - does not LEEM n/a - does not LEEM 1 a - anieady in a - anieady in n/a - anieady n	elevator, regenerative drives							s -	
Signalard Ind - already in Ind - already Ind	not apply to this building type		-	each	\$	-	\$ -		
Siandard n/a - already ii n/a - alpiles tr.  ADDITIONAL COST ADJ.  ACA 1 Reduced cap Packaged sing Packaged sing Packaged sing Packaged sing (INCLUCED V LAGA)  ACA 3 Reduced cap (INCLUCED V LAGA)  ACA 3 Reduced cap (INCLUCED V LEEM (INCLUCED V LEEM V LAGA)	not apply to this building type		-	each	\$	-	\$ -		
EEM n/a - already in EEM 15 Demand-base Standard n/a applies to NODITIONAL COST ADJ NCA 1 Reduced cap Packaged sing Packaged sing CA 2 Reduced cap (INCLUCED V EM CA) Reduced cap (INCLUCED V EM CA) Reduced cap Standard (INCLUCED V EM CA) Reduced cap Standard (INCLUCED V EM CA) Reduced cap Standard (INCLUCED V EM CA)	partment makeup air units	-						\$ -	
Standard n/a - applies to NODITIONAL COST ADJ 104 - applies to NODITIONAL COST ADJ 105 ADD 105	ady included in 90.1-2016		-	0	\$		\$ -		
Standard n/a - applies to ADDITIONAL COST ADJICON AL COST ADJI	ndy included in 90.1-2016		-	0	\$	- 1	\$ -	•	
LEM n/a - applies to ADDITIONAL COST ADJINO ACA 1 Reduced cap Element of ACA 2 Reduced cap (INCLUCED VIEW ACA 3 REDUCED VIEW ACA	based recirculated SHW controls		-	0	\$	-	\$ -	-	
ADDITIONAL COST ADJ  ACA 1 Reduced cap  Standard Packaged sing  EEM Packaged sing  ACA 2 Reduced cap  Standard (INCLUCED V  EEM (INCLUCED V  EEM (INCLUCED V	es to IECC path only	-		0	\$	-	\$ -		
ACA 1 Reduced cap Citandard Packaged sing ACA 2 Reduced cap Standard (INCLUCED V EEM (INCLUCED V EEM (INCLUCED V EEM)									
Standard Packaged sing EEM Packaged sing ACA 2 Reduced cap Standard (INCLUCED V EEM ACA 3 Reduced cap Standard (INCLUCED V EEM	capacity for cooling equipment							\$ (2,100)	
EEM Packaged sing ACA 2 Reduced cap Standard (INCLUCED V EEM ACA 3 Reduced cap Standard (INCLUCED V EEM	I single-zone AC, 56 tons	RSMeans 23 74 33.10	1	units	\$	72,373	\$ 72,373		
Standard (INCLUCED V EEM ACA 3 Reduced cap Standard (INCLUCED V		RSMeans 23 74 33.10	1	units	\$	70,273	\$ 70,273		
ACA 3 Reduced cap Standard (INCLUCED V	single-zone AC, 53 tons							\$ -	
ACA 3 Reduced cap Standard (INCLUCED V	capacity for heating equipment		-	units	\$		\$ -		
Standard (INCLUCED V			-	units	\$	-	\$ -	S -	
EM	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)							•	
	capacity for heating equipment ED WIPACKAGED UNITS IN ACA 1) capacity for air handling equipment	1		unite	2			1	
ACA 4 Increased ins	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)		-	units units	\$		\$ - \$ -		
Standard n/a - does not	capacity for heating equipment ED WIPACKAGED UNITS IN ACA 1)  capacity for air handling equipment ED WIPACKAGED UNITS IN ACA 1)			units units	\$			\$ -	
EM n/a - does not	capacity for heating equipment ED WIPACKAGED UNITS IN ACA 1) capacity for air handling equipment				\$	-		s -	
ACA 5 Electric vehic	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)  capacity for air handling equipment ED W/PACKAGED UNITS IN ACA 1)  I insulation to account for PTAC openings, thermal bridging requirements in or apply to this building type in or apply to this building type		-	units	\$	-	\$ -	\$ -	
Standard	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)  capacity for air handling equipment ED W/PACKAGED UNITS IN ACA 1)  I insulation to account for PTAC openings, thermal bridging requirements in not apply to this building type		-	units 0 0	\$	-	\$ - \$ - \$ -	\$ - \$ 2,600	
	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)  capacity for air handling equipment ED W/PACKAGED UNITS IN ACA 1)  I insulation to account for PTAC openings, thermal bridging requirements not apply to this building type not apply to this building type ehicle charging station capable parking lots for 5% of spaces		-	units 0 0	\$ \$ \$	-	\$ - \$ - \$ -	\$ - \$ 2,600	
	capacity for heating equipment  ED W/PACKAGED UNITS IN ACA 1)  capacity for in handling equipment  ED W/PACKAGED UNITS IN ACA 1)  It insulation to account for PTAC openings, thermal bridging requirements  in or apply to this building type  in or apply to this building type  which charging station capable parking lots for 5% of spaces  40 amp outlets (zones 5A and 6A only)	chargehub.com	-	units 0 0	\$	-	\$ - \$ - \$ -		
Standard EEM	capacity for heating equipment ED W/PACKAGED UNITS IN ACA 1)  capacity for air handling equipment ED W/PACKAGED UNITS IN ACA 1)  I insulation to account for PTAC openings, thermal bridging requirements not apply to this building type not apply to this building type ehicle charging station capable parking lots for 5% of spaces	chargehub.com	-	units  0 0 0 outlets	\$ \$	- - - 1,300	\$ - \$ - \$ - \$ 2,600	\$ - \$ 2,600 \$ -	
LIVI	capacity for heating equipment  ED W/PACKAGED UNITS IN ACA 1)  capacity for in handling equipment  ED W/PACKAGED UNITS IN ACA 1)  It insulation to account for PTAC openings, thermal bridging requirements  in or apply to this building type  in or apply to this building type  which charging station capable parking lots for 5% of spaces  40 amp outlets (zones 5A and 6A only)	chargehub.com	-	units  0 0 0 outlets	\$ \$ \$ \$	- - - 1,300	\$ - \$ - \$ - \$ 2,600		
	capacity for heating equipment  ED W/PACKAGED UNITS IN ACA 1)  capacity for in handling equipment  ED W/PACKAGED UNITS IN ACA 1)  It insulation to account for PTAC openings, thermal bridging requirements  in or apply to this building type  in or apply to this building type  which charging station capable parking lots for 5% of spaces  40 amp outlets (zones 5A and 6A only)	chargehub.com	-	units  0 0 0 outlets	\$ \$	- - - 1,300	\$ - \$ - \$ - \$ 2,600 \$ - \$ -		

#### 2020 NYStretch STANDALONE RETAIL - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Co		Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls								\$ 9,778	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		24,692	Area	\$	-	\$	-	0,0	
Standard	Standard wall insulation (nonresidential mass wall)		11,766	Area	\$	_	\$	-		
	5A: U-0.090; R-9.31 Enhanced roof insulation (insulation entirely above deck)		,				-			
	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	24,692	Area	\$	0.3881	\$	9,583		
	Enhanced wall insulation (nonresidential mass wall)	RSMeans 07 21 13.10	44 700	Area	\$			196		
	5A: U-0.086; R-9.83 (+ R-0.52)	RSMeans 07 21 13.10	11,766	Area	3	0.0166	\$	196		
EEM 2	Enhanced fenestration						-		\$ 517	
Standard EEM	Standard windows, U-0.37 Enhanced windows, U-0.35	PNNL CE ANALYSIS	904 904	Area Area	\$	0.57	\$	- 517		
EEM 3	Air leakage testing for mid-sized buildings	PININE CE AINALTSIS	904	Alea	Þ	0.57	) <b>3</b>	517	s -	
	n/a - does not apply to this building type		-	0	\$	-	\$	-		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$	-		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	,	1						\$ 59,518	
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$	6.75	\$ 2	41,565		Cost assumed to be
					-					proportional to increased
EEM	Reduced LPDs, ~20% more efficient	HBL	26,970	watts	\$	-	\$ 3	01,083		efficiency
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting								\$ -	
Standard EEM	n/a - IECC only		-	0	\$		\$	- :		
	n/a - IECC only Exterior lighting control		-	U	Þ		Φ	-	•	
	n/a		-	0	\$	-	\$	-		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$	-		
EEM 7	Reduce fan power allowances								\$ 780	0
Standard	CV fans: 0.00094 bhp/cfm			tons			\$	-		Costed as increased system size for reduction in static
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	0.76	tons	\$	1,031	\$	780		pressure
EEM 8	Hotel guestroom HVAC vacancy control								\$ -	produito
	n/a - already included in 90.1-2016		-	0	\$	-	\$	-		
	n/a - already included in 90.1-2016		-	0	\$	-	\$	-		
EEM 9 Standard	High-efficiency SHW		-	0	\$	-	\$	-	\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$		\$			
	High-efficiency commercial kitchen equipment				<u> </u>				s -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$	-		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$	-		
	Thermal bridging reduction			0	•		•		\$ -	
EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0 Area	\$	- 0	\$	-	***************************************	
EEM 12	Exterior lighting power reduction		-	Area	Þ	U	3	-	s -	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	3,453	watts	\$	-	\$	-		
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55			\$	-	\$	-		
EEM 13	Efficient elevator, regenerative drives	·	1						\$ -	
	n/a - does not apply to this building type		-	each	\$	-	\$	-		
EEM 14	n/a - does not apply to this building type ERV for apartment makeup air units		-	each	\$	-	\$	-	• -	
	n/a - already included in 90.1-2016		-	0	\$	-	\$	-		
	n/a - already included in 90.1-2016		-	0	\$	-	\$	-		
	Demand-based recirculated SHW controls	,							\$ -	
Standard			-	0	\$	-	\$	-		
EEM ADDITION	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$	-	\$	-		
ACA 1	AL COST ADJUSTMENTS  Reduced capacity for cooling equipment								\$ (6,479)	
	Packaged single-zone AC, 53 tons	RSMeans 23 74 33.10	1	units	\$	69,354	\$	69,354	(0,473)	
EEM	Packaged single-zone AC, 46 tons	RSMeans 23 74 33.10	1	units	\$	62,875		62,875		
ACA 2	Reduced capacity for heating equipment	,							\$ -	
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$		\$	-		
ACA 3	Deduced consols for six bondling equipment		-	units	\$	-	\$	-	•	
	Reduced capacity for air handling equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$		\$	-	•	
EEM	THE SECOND WILLIAM IN THE SECOND SECO			units	\$		\$	-		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements								\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$	-		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$	-		
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces	1	-	0	•	-		_	\$ 7,586	
EEM .	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 6	0 outlets	\$	1,300	\$	7,586		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	onargonub.com		outicio	Ψ	1,000	,	7,000	\$ -	
			1	0	\$		\$	-		
Standard			-			-	φ			
			-	0	\$	-	\$	-	\$ 71.701	

#### 2020 NYStretch STANDALONE RETAIL - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

Standard Standard Will sustain (no 64: U-0.08; R-30 no 64: U-0.08; R-10.70 EEM 6A: U-0.08; R-10.70 EEM 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 2: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 3: Chanced wall insulation (in 6A: U-0.02; R-33.4 (+R-EEM 3: Chanced windows, U-0.35 (EEM 3: Cha	Description	Source of Item Cost	Number of EEM Units	Unit	Cos	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
Standard Scandard wall insulation (no Scandard wall insulation (no Scandard wall insulation (no Scandard wall insulation (no Scandard windows, U-0.35 Standard Standard Standard Scandard Wall insulation (no Scandard windows, U-0.35 Standard Wall insulation (no Scandard windows, U-0.35 Standard Wall insulation (no Scandard Wall insulat	d insulation for roofs and walls							\$ 15,058	
EEM 6. L'A.0.02; R-3.3.4 (+ R- EEM 12. Enhanced valin insulation (in 6A: U-0.07c; R-11.36 (+ R-C EEM 2. Enhanced wall insulation (in 6A: U-0.07c; R-11.36 (+ R-C EEM 2. Enhanced windows, U-0.35 EEM 3. Standard m/a- does not apply to this 1. EEM 4. Reduced LPD for interior 1. EEM 4. Reduced LPDs, ~20w more EEM 5. Cocupancy sensors and a reduced LPDs, ~20w more EEM 6. Standard m/a- IECC only; already included in 80. EEM 1. EEC only; already included in 80. Reduced LPD for interior 1. Reduced LPD for interior 1. EEM 1. EEC only; already included in 80. EEM 1. EEC only; already included in 80. Reduced LPDs. EEM 1. EEM 11. EEC only included in 80. Reduced LPD. Standard m/a- already included in 80. Reduced LPD. Standard m/a- does not apply to this 1. EEM 11. Standard leEM 1. A does not apply to this 1. EEM 12. EEM 12. EEM 13. A does not apply to this 1. EEM 14. Standard leEM 15. A does not apply to this 1. EEM 15. EEM 16. A does not apply to this 1. EEM 16. A does not apply to this 1. EEM 17. A does not apply to this 1. EEM 18. Standard leEM 18. A does not apply to this 1. EEM 19	U-0.032, R-30 roof insulation (insulation entirely above deck)		24,692	Area	\$	-	\$ -		
EEM 6. LO.0.29: R.3.3.4 (+ R. EEM 2. LO.0.29: R.3.3.4 (+ R. EEM 2. LO.0.29: R. E.			11,766	Area	\$	-	\$ -		
BEM SA U-0,029, R-33.4 (+ R- BEM EM EM Emhanced wall insulation (in 6a: U-0,076; R-11.36 (+ R- Standard Standard windows, U-0.35 EEM S EEM S Enhanced windows, U-0.35 EEM S EEM S EEM S END STANDARD S	d roof insulation (insulation entirely above deck)				_				
BEM 2 Standard Standard windows, U-0.35 EEM 3 Standard Standard windows, U-0.35 EEM 3 Standard Are a despired windows, U-0.35 EEM 4 Standard Are a despired windows, U-0.35 EEM 4 Reduced LPD for interior 1 EEM 4 Reduced LPDs, -20% more EEM 5 Cocupancy sensors and a Standard Are - IECC only EEM 6 EEM 1 Standard Are - IECC only EEM 6 EEM 1 Standard CV fans: 0.00094 bhpictim CV fans: 0.00098 bhpictim CV fans: 0.00088 bhpictim EEM 8 Standard Are - IECC only already included in 90. In a - does not apply to this to the standard Are - does not apply to this to the standard Are - does not apply to this to the standard Are - does not apply to this to the standard Are - does not apply to this to the standard Are - already included in 90. In a - does not apply to this to the standard Are - does not apply to this to the standard Are - does not apply to this to the standard Are - already included in 90. In a - already included in 90. In a - does not apply to this to the standard Are - does not apply to this to the standard Are - already included in 90. In a - already included in 90. In a - does not apply to this to the standard Are - does not apply to this to the standard Are - already included in 90. In a - already included in 90. In		RSMeans 07 22 16.10	24,692	Area	\$	0.5998	\$ 14,809		
EEM 2  Financed finesteration Standard Standard Standard windows, U-0.35 EEM 3  Financed windows, U-0.35  Financed windows, U-0.35  Financed windows, U-0.35 EEM 3  Financed windows, U-0.35  Financed windows undows windows window	d wall insulation (nonresidential mass wall)	RSMeans 07 21 13.10	11.766	Area	\$	0.0211	\$ 248		
Standard Standard windows, U-0.35 EEM 3 Air leakage testing for mic Standard Lighting per ASHRAE 90.1- EEM 5 Cocupancy sensors and a Standard Air - IECC only EEM 6 EEM 7 Standard Na - IECC only EEM 6 EEM 7 Standard Na - IECC only EEM 7 Standard Cocupancy sensors and a Standard Na - IECC only EEM 7 Standard Cocupancy sensors and a Standard Na - IECC only EEM 7 Standard Cocupancy sensors and a Standard Na - IECC only EEM 7 Standard Cocupancy sensors and a Standard Cocupancy sensors and a Standard Na - IECC only EEM 7 Standard Cocupancy sensors and a Standard Cocupancy sensors and a Standard Cocupancy sensors and a Standard Na - IECC only IEC only EEM 1 Standard Na - IECC only IECM 1 Standard Na - Alexady included in 90. EEM 1 Na - Alexady includ		TOWICE/13 07 21 10.10	11,700	Alca	Ψ	0.0211	ÿ 240		
EEM 1 Ehanced windows, U-0.33 EEM 3 Are leakage testing for mid and one of the second apply to this to the second apply to the second apply to the second apply to the second apply to this to the second apply to the second appl			904	Area	\$	-	\$ -	\$ 496	
EEM 3 AI leakage testing for mid Standard Standard Standard Lighting per ASHRAE 90.1- EEM 4 Cocupancy sensors and a Standard AI - IECC only EEM 6 Standard AI - IECC only EEM 7 Standard Cocupancy sensors and a Standard AI - IECC only EEM 8 Standard Cocupancy sensors and a Standard AI - IECC only Standard Cocupancy sensors and a Standard AI - IECC only Standard AI - a - aleady included in 90. EEM 9 Standard In - a - does not apply to this to Inla - already included in 90. Inla - already included in		PNNL CE ANALYSIS	904	Area	\$	0.55			
Standard n/a - does not apply to this t EEM 1 Standard lighting per ASHRAE 90.1- EEM 6 Cocupancy sensors and a Standard n/a - lECC only leEM 6 EEM 1 Standard n/a - lECC only leEM 6 EEM 1 Standard n/a - lECC only leEM 6 EEM 1 Standard n/a - lECC only leEM 6 EEM 1 Standard n/a - leCC only already included in 90. EEM 5 Standard n/a - already included in 90. EEM 9 Standard n/a - already included in 90. EEM 1 Standard n/a - does not apply to this t EEM 11 Standard leEM 1 Standard leEM 1 Standard n/a - does not apply to this t EEM 11 Standard leEM 1 Standard n/a - does not apply to this t EEM 11 Standard leEM 1 Standard n/a - does not apply to this teem 1 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard Packaged single-zone AC, a Reduced capacity for cool standard n/a - already included in 90. EEM 15 Standard Packaged single-zone AC, a Reduced capacity for oil 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not apply to this teem 1 N/a - does not appl	ge testing for mid-sized buildings	I THE SETTING	001	7400	, v	0.00	<u> </u>	\$ -	
EEM 4  Standard  Lighting per ASHRAE 90.1- Reduced LPDs., ~20% more EEM 5  Cocupancy sensors and a Na- IECC only EEM 6  Standard Na- IECC only EEM 7  Reduced LPDs., ~20% more EEM 8  Standard Na- IECC only EEM 8  Standard Na- IECC only IEC only IE	s not apply to this building type		-	0	\$		\$ -		
Standard  EEM 5  Occupancy sensors and a not letter only a leCC only  EEM 6  Standard of leEM 7  Standard of leEM 8  Standard of leEM 8  Standard of leEM 9  Standard of leEM 9  Standard of leEM 18  Standard of leEM 18  Standard of leEM 18  Standard of leEM 18  Hotel guestroom HVAC va Standard of leEM 19  Reduced capacity for lead of lead			-	0	\$	-	\$ -		
Reduced LPDs, ~20% more Standard n/a - IECC only EEM 6 Seterior lighting control A - IECC only EEM 7 Standard EEM 1 - IECC only stready incl EEM 7 Standard CV fans: 0.00094 bhp/cfm EEM 8 Standard n/a - IECC only; already incl EEM 8 Standard n/a - IECC only; already incl EEM 1 - IECM 0.00094 bhp/cfm EEM 8 Standard n/a - already included in 90. EEM 9 High-efficiency SHW n/a - does not apply to this the IEM 11 Standard n/a - does not apply to this the IEM 11 Standard n/a - does not apply to this the IEM 12 Standard n/a - does not apply to this the IEM 12 Standard n/a - does not apply to this the IEM 13 Standard n/a - does not apply to this the IEM 14 Standard n/a - does not apply to this the IEM 14 Standard n/a - does not apply to this the IEM 15 Standard n/a - does not apply to this the IEM 14 Standard n/a - does not apply to this the IEM 15 Standard n/a - does not apply to this the IEM 15 Standard n/a - already included in 90. EEM 15 Domand-based recirculate n/a - already included in 90. EEM 15 Standard Packaged single-zone AC, a Reduced capacity for cool standard n/a - apples to IECC path or a larged n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - does not apply to this the IEM n/a - do	LPD for interior lighting; high efficacy lights in dwelling units	7			-			\$ 59,518	
EEM 5  Occupancy sensors and a Standard n/a - IECC only EEM 6  EEM 18  Standard Conly - IECC only - IECC only EEM 7  Standard CV fans: 0.00084 bhp/cfm CV fans: 0.00088 bhp/cfm CV fans: 0.00089 bhp/cfm CEM 9  Lighting included in 90. Lighting per ASHRAE 90.1- EEM 12 EEM 12 EEM 14 EEM 14 EEM 15 EEM 15 EEM 15 EEM 16 EEM 17 EEM 15 EEM 16	per ASHRAE 90.1-2016		35,787	watts	\$	6.75	\$ 241,565		Cost assumed to be
EEM 5  Occupancy sensors and a Standard n/a - IECC only EEM 6  EEM 18  Standard Conly - IECC only - IECC only EEM 7  Standard CV fans: 0.00084 bhp/cfm CV fans: 0.00088 bhp/cfm CV fans: 0.00089 bhp/cfm CEM 9  Lighting included in 90. Lighting per ASHRAE 90.1- EEM 12 EEM 12 EEM 14 EEM 14 EEM 15 EEM 15 EEM 15 EEM 16 EEM 17 EEM 15 EEM 16	I PDs ~20% more efficient	HBL	26.970	watts	\$	-	\$ 301.083		proportional to increased efficiency
Standard n/a - IECC only EEM 6 EEM n/a - IECC only Standard n/a - IECC only Standard n/a - IECC only, already incl EEM n/a - IECC only, already incl IECC only, al		THE STATE OF THE S	20,070	watto	, ,		<b>\$</b> 001,000	•	Cincicity
EEM 6 Standard EEM 7 Reduced fan power allowar CV fans: 0.0098 bhp/cfm EEM 8 Hotel guestroom HVAC va Standard EEM 4 Standard EEM 8 Hotel guestroom HVAC va Standard EEM 10 Standard EEM 10 Standard EEM 10 Standard EEM 11 Standard EEM 11 Standard EEM 12 Standard EEM 12 Standard EEM 11 Standard EEM 12 Standard EEM 12 Standard EEM 13 Standard EEM 14 EEM 15 Standard EEM 16 Standard EEM 17 Standard EEM 18 Standard EEM 18 Standard EEM 19 Standard EEM 10 Standard EEM	cy sensors and automatic lighting controls including egress lighting		-	0	\$	-	\$ -	•	
EEM 6 Standard on a LECC only; already incident of Standard on a LECC only; already incident on a standard on a LECC only; already incident on a standard on a LECC only; already incident on some of the standard on a LECC only; already incident on some of the standard on a LECC only; already incident on some of the standard on a LECC on a constandard on a consta			-	0	\$		\$ -		
EEM 7 Standard CV fans: 0.00089 bhp/cfm CV fans: 0.00089 bhp/cfm CV fans: 0.00089 bhp/cfm EEM 8 Standard n/a - already included in 90. EEM 9 Standard n/a - already included in 90. EEM 9 Standard n/a - does not apply to this t EEM 10 Standard n/a - does not apply to this t EEM 11 Standard n/a - does not apply to this t EEM 11 Standard n/a - does not apply to this t EEM 12 Standard n/a - does not apply to this t EEM 12 Standard n/a - does not apply to this t EEM 12 Standard l/a - does not apply to this t EEM 14 Standard l/a - does not apply to this t EEM 14 Standard n/a - does not apply to this t EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Standard Packaged single-zone AC, 4 ACA 2 Reduced capacity for cool Reduced apply to this t EEM ACA 3 Standard (INCLUCED W/PACKAGEL EEM ACA 4 Standard n/a - does not apply to this t ACA 5 Standard n/a - does not apply to this t ACA 5 Standard n/a - does not apply to this t ACA 6 Solar-ready zone per Appl								\$ -	
EEM 7 Standard CV fans: 0.00094 bhp/cfm  EEM 8 CV fans: 0.00098 bhp/cfm  EEM 8 Hotel guestroom HVAC vs A= already included in 90. EEM 10-a already included in 90. EEM 10-a already included in 90. EEM 10-a does not apply to this 1 EEM 11 Standard n/a - does not apply to this 1 EEM 11 Standard n/a - does not apply to this 1 EEM 11 Termal bridging reduction n/a - does not apply to this 1 EEM 12 EEM 13 Standard n/a - does not apply to this 1 EEM 14 EEM 15 EEM 15 EEM 16 EEM 16 EEM 17 EEM 17 EEM 18 Standard n/a - does not apply to this 1 EEM 18 EEM 19 EEM 19 EEM 19 EEM 19 Standard n/a - does not apply to this 1 EEM 14 EEM 14 EEM 15 EEM 16 EEM 16 EEM 17 EEM 16 EEM 17 EEM 18 Standard n/a - does not apply to this 1 EEM 18 Standard n/a - does not apply to this 1 EEM 18 Standard n/a - does not apply to this 1 EEM 18 Standard n/a - already included in 90. EEM 15 EEM 16 EEM 17 EEM 18 Standard n/a - already included in 90. EEM 18 Standard n/a - already included in 90. EEM 18 Standard n/a - already included in 90. EEM 18 Standard n/a - already included in 90. EEM 18 Standard n/a - already included in 90. EEM 18 Standard n/a - already included in 90. EEM 18 EEM 19 EEM			-	0	\$		\$ -		
Standard CV fans: 0.00094 bhp/cfm EEM 8 Standard Ind - already included in 90. EEM 9 Standard Ind - already included in 90. EEM 9 Standard Ind - already included in 90. EEM 11 Standard Ind - ades not apply to this the Individual in 190. EEM 11 Standard Ind - ades not apply to this the Individual	C only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -	¢ 000	
EEM 8  CV fans: 0.00088 bhp/cfm  EEM 8  Hotel guestroom HVACA  Standard  An - already included in 90.  An - already included in 90.  Standard  An - already included in 90.  Standard  An - does not apply to this the EEM 10.  Standard  An - does not apply to this the EEM 11.  Standard  An - does not apply to this the EEM 12.  EEM 12.  EEM 13.  EEM 14.  EEM 14.  EEM 15.  EEM 15.  Standard  An - does not apply to this the EEM 12.  Standard  In - does not apply to this the EEM 13.  EEM 14.  EEM 15.  Standard  An - does not apply to this the EEM 14.  EEM 15.  Standard  In - does not apply to this the EEM 15.  Standard  In - does not apply to this the EEM 14.  Standard  In - does not apply to this the EEM 15.  Standard  In - does not apply to this the EEM 14.  Standard  In - does not apply to this the EEM 14.  Standard  In - already included in 90.  Domand-based recirculate  EEM 15.  Standard  In - already included in 90.  Standard  In - already included in 90.  Standard  In - already included in 90.  Standard  Packaged single-zone AC, a ACA 2.  Reduced capacity for cool  Standard  EEM  ACA 3.  Reduced capacity for ear the Standard  In - does not apply to this the Standard  In - already included in 90.  Standard  In - already include	an power anowances			tons			\$ -	\$ 936	Costed as increased system
EEM 8  Hotel guestroom HVAC va Standard n/a - aiready included in 90.  EEM 9  High-efficiency SHW  Na - does not apply to this t EEM 10  Standard n/a - does not apply to this t EEM 11  Standard n/a - does not apply to this t EEM 12  Standard n/a - does not apply to this t EEM 13  Thermal bridging reductio  Standard n/a - does not apply to this t EEM 12  EEM 12  EEM 12  EEM 12  EEM 13  Reduced LPDs, -11% more  EEM 13  Standard n/a - aiready included in 90.  EEM 14  EEM 15  EEM 14  EEM 16  EEM 16  EEM 17  EEM 17  EEM 17  EEM 18  Standard n/a - aiready included in 90.  EEM 16  EEM 17  EEM 17  EEM 18  EEM 19  EEM 10  E		DSMoone 22 74 22 40	0.04		\$	1,031			size for reduction in static
Standard n/a - already included in 90.  EEM 9  Standard n/a - does not apply to this t EEM 11  Standard n/a - does not apply to this t EEM 11  Standard n/a - does not apply to this t EEM 12  Standard n/a - does not apply to this t EEM 12  Standard n/a - does not apply to this t EEM 12  Standard n/a - does not apply to this t EEM 12  EEM 12  EEM 12  EEM 13  EEM 14  EEM 15  EEM 15  EEM 16  EEM 16  EEM 16  EEM 16  EEM 17  EEM 17  EEM 17  EEM 18  EEM 18  EEM 19  EEM 20  EEM 19  EEM 20  EEM 19  EEM 20  EEM 19  EEM 20  EEM 20  EEM 20  EEM 20  EEM 20  EEM 30	·	RSMeans 23 74 33.10	0.91	tons	2	1,031	a 936		pressure
EEM 1 Acos not apply to this to the time of time o				0	•		•	\$ -	
Standard not a close not apply to this to the team of				0	\$		\$ - \$ -		
Standard n/a - does not apply to this t EEM 10 High-efficiency commercial standard n/a - does not apply to this t EEM 11 Thermal bridging reduced to Standard n/a - does not apply to this t EEM 11 Thermal bridging reduced to Standard n/a - does not apply to this t EEM 12 Standard Lighting per ASHRAE 90.1 - 11% more EEM 13 Efficient elevator, regener EEM 14 EEM n/a - does not apply to this t EEM 14 Standard n/a - does not apply to this t EEM 15 EEM 15 EEM 16 EEM 16 - does not apply to this t EEM 16 EEM 17 EEM 17 EEM 18 EEM	ciency SHW			,	Ų		•	\$ -	
EEM 10 Standard 10	s not apply to this building type		-	0	\$		\$ -		
Standard n/a - does not apply to this t EEM 11 Standard n/a - does not apply to this t EEM 12 EEM 13 Thermal bridging reduction of a does not apply to this t EEM 12 EEM 12 EEM 12 EEM 12 EEM 13 Standard n/a - does not apply to this t EEM 13 Standard n/a - does not apply to this t EEM 14 EEM 14 EEM 14 EEM 15 Standard n/a - does not apply to this t EEM 15 EEM 16 EEM 17 EEM 17 EEM 18 Standard n/a - already included in 90. EEM 15 EEM 16 EEM 17 EEM n/a - already included in 90. EEM 15 EEM 16 EEM n/a - already included in 90. EEM 15 EEM 17 EEM n/a - already included in 90. EEM 15 EEM 16 EEM n/a - already included in 90. EEM 15 EEM 16 EEM n/a - already included in 90. EEM 15 EEM 16 EEM n/a - already included in 90. EEM 15 EEM n/a -	not apply to this building type		-	0	\$	-	\$ -		
EEM 11 Standard   na-does not apply to this t   EEM 12 Standard   na-does not apply to this t   EEM 12 Standard   na-does not apply to this t   EEM 12 Standard   na-does not apply to this t   EEM 13 Efficient elevator, regener   EEM 14 Standard   na-does not apply to this t   EEM 14 Standard   na-does not apply to this t   EEM 15   na-does not apply to this t   EEM 16   na-does not apply to this t   EEM 17   na-does not apply to this t   EEM 18   na-does not apply to this t   EEM 19   na-does not apply to this t   EEM 20   na-does not apply to this t	ciency commercial kitchen equipment			0	•		0	5 -	
EEM 11 Standard An does not apply to this to EEM 12 EEM 12 EXERTION 13	s not apply to this building type		-	0	\$		\$ - \$ -		
Standard n/a - does not apply to this t EEM 12   Standard 12   Standard 13   EEM 13   Etherior lighting power res   Standard 14   EEM 14   EEM 15   EEM 14   Standard 16   EEM 16   Standard 17   EEM 17   EEM 18   Standard 18   EEM 19   Standard 19   EEM 19					Ψ			\$ -	
EEM 12 Standard Lighting par SAFRAE 90.1- EEM 13 Standard Lighting par SAFRAE 90.1- EEM 14 Standard Lighting par SAFRAE 90.1- EEM 14 Standard Lighting par SAFRAE 90.1- EEM 15 Standard Lighting par SAFRAE 90.1- EEM 15 Demand-based recirculate Standard Lighting par SAFRAE 90.1- EEM 16 ADDITIONAL COST ADJUSTMENTS ACA 1 Standard Packaged single-zone AC, a AGA 2 Reduced capacity for load Standard Lighting Stan	s not apply to this building type		-	0	\$		\$ -		
Standard Lighting per ASHRAE 9.1. ** EEM 13 Reduced LPDs. ~11% more EEM 13 Standard Ind ~ does not apply to this t EEM 14 EEM for a partment makeu Standard ** EEM 14 EEW for a partment makeu EEM ** EEM 15 Standard ** EEM 15 Standard ** EEM 15 Standard ** EEM 16 Demand-based recirculate ** ACA 1 Reduced capacity for cool Standard ** EEM Packaged single-zone AC, ** Standard ** EEM ACA 2 Standard ** Standard ** EEM ACA 3 Reduced capacity for heat Standard ** EEM ACA 4 ** Standard ** CACA 5 Standard ** EEM ACA 5 Standard ** ACA 5 Standard ** EEM ACA 6 Standard ** EEM ACA 7 Standard ** EEM ACA 8 Standard ** EEM ACA 9 Standard ** EEM			-	Area	\$	0	\$ -		
EEM Reduced LPDs, -11% more Striction televator, regener Indianation and apply to this Indianation and Indianation		D014 00 54 40 55	0.450		•		•	\$ -	
EEM 13 Efficient elevator, regenere n/a - does not apply to this t EEM 14 EEM 14 EEM 14 EEM 15 EEM 14 EEM 15 EEM 16 ADDITIONAL COST ADJUSTMENTS ACA 1 Reduced capacity for cost EEM 15 EEM 15 EEM 16 ACA 2 Standard (INCLUCED W/PACKAGEL EEM ACA 3 Reduced capacity for heat ACA 3 Standard (INCLUCED W/PACKAGEL EEM ACA 4 ACA 5 Standard (INCLUCED W/PACKAGEL EEM 16 ACA 5 Standard (INCLUCED W/PACKAGEL EIM 16 ACA 5 AC	IPDs ~11% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	3,453	watts	\$		\$ - \$ -		
Standard n/a - does not apply to this t EEM 14 Standard n/a - already included in 90. EEM 15 Standard n/a - already included in 90. EEM 15 Domand-based recirculate EEM n/a - already included in 90. EEM 15 Domand-based recirculate EEM n/a - applies to IECC path o ADDITIONAL COST ADJUSTMENTS AGA 1 Reduced capacity for cost Standard Packaged single-zone AC, - AGA 2 Reduced capacity for air h Standard (INCLUCED WPACKAGEL EEM ACA 3 Standard EEM n/a - does not apply to this the AGA 5 Electric vehicle charging a Standard EEM 208/240V 40 amp outlets (z. AGA 6 Solar-ready zone per Appl		Nowcans 20 01 10.00			Ψ	-	_	s -	
EEM 14 - KEW for apartment makeu Standard n. 2- already included in 90. EEM 15 Standard n. 2- already included in 90. EEM 15 Standard n. 2- already included in 90. EEM 15 Standard n. 2- already included in 90. EEM 16 Standard n. 2- already included in 90. EEM n. 3- already included in 90. EEM n. 3- already included in 90. Standard Packaged single-zone AC, 4- ACA 2 Reduced capacity for has 12- already included in 90. EEM n. 3- already included i	s not apply to this building type		-	each	\$	-	\$ -		
Standard n/a - alieady included in 90.  EEM 15 Demand-based recirculate n/a - alieady included in 90.  EEM 15 Demand-based recirculate n/a - applies to IECC path o n/a - ackaged single-zone AC, 4 ACA 2 Reduced capacity for has t EEM ACA 3 Standard (INCLUCED W/PACKAGEL EEM ACA 4 Increased insulation to ac n/a - does not apply to this t EEM ACA 5 Electric vehicle charging 3 Electric vehicle charging 4 Electric veh	s not apply to this building type		-	each	\$	-	\$ -		
EEM 15 Demand-based recirculate 1/2 Demand-based 1/2 Demanded 1/2	apartment makeup air units						•	\$ -	
EEM 15 Standard in applies to IECC path on ADDITIONAL COST ADJUSTMENTS ACA 1 Reduced capacity for cool Standard Packaged single-zone AC, 4 ACA 2 Reduced capacity for heat Standard (INCLUCED WPACKAGEL EEM ACA 3 Standard (INCLUCED WPACKAGEL EEM ACA 3 Standard (INCLUCED WPACKAGEL EEM ACA 5 Standard (INCLUCED WPACKAGEL EEM ACA 6 Solar-ready zone per Appl 2018/240V 40 amp outlets to Solar-ready zone per Appl			····	0	\$		\$ - \$ -		
Standard n/a applies to IECC path o ADDITIONAL COST ADJUSTMENTS ACA 1 Reduced capacity for cost Standard Packaged single-zone AC, C Standard (INCLUCED W/PACKAGED EEM ACA 3 Standard (INCLUCED W/PACKAGED EEM ACA 4 Increased insulation to a CStandard ACA 5 Standard EEM ACA 5 Standard EEM 208/240V 40 amp outlets (z ACA 6 Solar-ready zone per App	based recirculated SHW controls			U	φ		-	\$ -	
ACA 5 Solar-ready zone per Apple so Standard (INCLUCED WPACKAGEL EEM ACA 3 Standard (INCLUCED WPACKAGEL EEM ACA 5 STANDARD (INCLUCED WP				0	\$	-	\$ -		
ACA 1 Reduced capacity for coo Standard EEM Packaged single-zone AC, 4 Reduced capacity for the Standard Reduced capacity for air h Standard (INCLUCED W/PACKAGEL EEM ACA 3 Standard (INCLUCED W/PACKAGEL EEM ACA 4 Increased insulation to ac Standard ac does not apply to this t EEM ACA 5 Siandard EEM ACA 6 Solar-ready zone per App	ies to IECC path only		-	0	\$		\$ -		
Standard Packaged single-zone AC, 4 ACA 2 Reduced capacity for heat Standard (INCLUCED W/PACKAGEL EEM ACA 3 Standard (INCLUCED W/PACKAGEL EEM ACA 4 Increased insulation to ac Standard ACA 5 Standard EEM ACA 5 Standard 2									
EEM Packaged single-zone AC, & AGA 2 Reduced capacity for heat Standard (INCLUCED WPACKAGEL EEM AGA 3 Reduced capacity for air h Standard (INCLUCED WPACKAGEL EEM ACA 4 Increased insulation to a Standard to AGA 5 Electric evaluate to the standard EEM 208/240V 40 amp outlets (z. AGA 6 Solar-ready zone per App		RSMeans 23 74 33.10	1	units	\$	66,677	\$ 66,677	\$ (2,543)	
AGA 2 Reduced capacity for heat Standard (INCLUCED WPACKAGEL EEM AGA 3 Reduced capacity for air is Standard (INCLUCED WPACKAGEL EEM AGA 4 Increased insulation to ac Standard AGA 5 Electric vehicle charging 5 Standard 208/240V 40 amp outlets (z AGA 6 Solar-ready zone per Appy		RSMeans 23 74 33.10 RSMeans 23 74 33.10	1	units	\$	64,134			
Standard (INCLUCED WPACKAGED EEM ACA 3 Reduced capacity for air h Standard (INCLUCED WPACKAGED EEM ACA 4 Capacity for air h ACA 5 Standard EEM ACA 5 Standard EEM 208/240V 40 amp outles (zz Solar-ready zone per App	capacity for heating equipment					,,,,,,	. 0.,.54	\$ -	
ACA 3 Reduced capacity for air to Standard (INCLUCED W/PACKAGEL EEM ACA 4 Increased insulation to ac Standard r/a - does not apply to this 1 EEM aCA 5 Standard 2 EEM 208/240V 40 amp outlets (z Solar-ready zone per App	ED W/PÁCKAGED UNITS ÎN ACA 1)		-	units	\$	-	\$ -		
Standard (INCLUCED WPACKAGEE EEM ACA 4 Increased insulation to a Na - does not apply to this t ACA 5 Electric vehicle charging s Zandard EEM 208/240V 40 amp outlets (z Solar-ready zone per App			-	units	\$	-	\$ -		
EEM ACA 4 Standard n/a - does not apply to this to ac Standard N/a - does not apply to this to access to a does not apply to this to access to a does not apply to this to access to a does not apply to this to access	capacity for air handling equipment			units	\$		\$ -		
ACA 4 Increased insulation to ac Standard n/a - does not apply to this b ACA 5 Electric vehicle charging s Standard EEM 208/240V 40 amp outlets (z ACA 6 Solar-ready zone per App	LU 11/1 AONAGED UNITO IN MON I)		-	units	\$		\$ - \$ -		
Standard LEEM n/a - does not apply to this LEEM n/a - does not apply to this LEEM n/a - does not apply to this LEEM Standard LEEM 208/240V 40 amp outlets (z Solar-ready zone per App	d insulation to account for PTAC openings, thermal bridging requirements			4,110				\$ -	
ACA 5 Standard EEM 208/240V 40 amp outlets (zo ACA 6 Solar-ready zone per Appe	s not apply to this building type		-	0	\$		\$ -		
Standard EEM 208/240V 40 amp outlets (zo ACA 6 Solar-ready zone per Appe			-	0	\$	-	\$ -		
EEM 208/240V 40 amp outlets (zo ACA 6 Solar-ready zone per Appe	ehicle charging station capable parking lots for 5% of spaces			0	\$		\$ -	\$ 7,586	
ACA 6 Solar-ready zone per Appe	40 amp outlets (zones 5A and 6A only)	chargehub.com	- 6	outlets	\$	1,300			
	dy zone per Appendix CA of 2018 IECC		0	00000		1,000	- 1,500	\$ -	
Otandard			-	0	\$		\$ -		
EEM			-	0	\$	-	s -		
							Total	\$ 81,051	

#### 2020 NYStretch SECONDARY SCHOOL - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cos	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls	item oost					0031	\$ 50,747	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		128,112	Area	\$	-	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 4A: U-0.064; R-13.4		41,755	Area	\$	-	\$ -		
	Enhanced roof insulation (insulation entirely above deck)								
EEM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	128,112	Area	\$	0.3881	\$ 49,718		
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13.10	41,755	Area	\$	0.0246	\$ 1,029		
EEM 2	4A: U-0.061; R-14.2 (+ R-0.77) Enhanced fenestration	Tromound of 21 to:10	11,700	7100	<u> </u>	0.02.10	Ψ 1,020	\$ 12,004	
Standard	Standard windows, U-0.39		22,484	Area	\$		\$ -	\$ 12,004	
	Enhanced windows, U-0.37	PNNL CE ANALYSIS	22,484	Area	\$	0.53	\$ 12,004		
EEM 3	Air leakage testing for mid-sized buildings							\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EEM 4	n/a - does not apply to this building type		-	0	\$	-	\$ -	•	
	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAE 90.1-2016		157,768	watts	\$	6.75	s -		No cost assumed for this
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$	-	\$ -		buildling type
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							\$ -	3 ,1
Standard	n/a - IECC only		-	0	\$	-	\$ -		
	n/a - IECC only		-	0	\$	-	\$ -		
	Exterior lighting control n/a		-	0	· ·		\$ -	\$ -	
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016			0	\$		\$ -		
EEM 7	Reduce fan power allowances (based on improved fan efficiencies)							\$ 36,643	
Standard	CV fans: 0.00094 bhp/cfm						\$ -		
							s -		
Standard	VAV fans: 0.00130 bhp/cfm						\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	1.97	tons	\$	1,031	\$ 2,032		Costed as increased system
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	9,708	cfm	\$	3.565	\$ 34,611		size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control	TROMOGNO DOCTO TO T	0,700	0	<u> </u>	0.000	\$ 01,011	e	pressure
	n/a - already included in 90.1-2016		-	0	\$		\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM 9	High-efficiency SHW							\$ -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EEM EEM 10	n/a - does not apply to this building type High-efficiency commercial kitchen equipment		-	U	3	-	\$ -	\$ 14.280	
	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	\$ -	φ 14,200	
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	2,319	Area	\$	6.16			
		Calculator	2,319	Alea	φ	0.10	9 14,200		
EEM 11	Thermal bridging reduction						•	\$ 7,344	
	Standard wall insulation Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of		<del>-</del>		\$		\$ -		
EEM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	21,600	Area	\$	0.3400	\$ 7,344		
EEM 12	Exterior lighting power reduction							\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	3,549	watts	\$	-	\$ -		
EEM 13	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55			\$	-	\$ -	•	
	Efficient elevator, regenerative drives n/a - does not apply to this building type		-	each	\$	-	\$ -	-	
EEM	n/a - does not apply to this building type		-	each	\$		S -		
	ERV for apartment makeup air units							\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM 45	n/a - already included in 90.1-2016		-	0	\$	-	\$ -	•	
EEM 15 Standard	Demand-based recirculated SHW controls		-	0	\$		\$ -	•	
EEM	n/a - applies to IECC path only			0	\$	-	\$ -		
	AL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment							\$ (5,166)	
	Air-cooled chiller, 308 tons	RSMeans 23 64 19.10	1	units		206,960			
EEM ACA 2	Air-cooled chiller, 300 tons  Reduced capacity for heating equipment	RSMeans 23 64 19.10	1	units	\$	201,794	\$ 201,794	\$ (2.314)	
	Hot water boiler, gas fired, 3237 MBH	RSMeans D3020 130	1	units	\$	103,770	\$ 103,770	(2,314)	
EEM	Hot water boiler, gas fired, 3155 MBH	RSMeans D3020 130	i	units	\$	101,456			
ACA 3	Reduced capacity for air handling equipment							\$ (20,574)	
	VAV with Reheat, 64817 cfm	RSMeans D3040 134	1	units		646,519			
EEM ACA 4	VAV with Reheat, 62741 cfm Increased insulation to account for PTAC openings, thermal bridging requirements	RSMeans D3040 134	1	units	\$	625,945	\$ 625,945	c	
	n/a - does not apply to this building type			0	\$		\$ -	-	
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 2,600	
Standard	0000040V40	-bbb	-	0	\$	-	\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$	1,300	\$ 2,600		
	Solal-leady Zolle per Appendix GA of 2010 IEGG			0	•		\$ -	•	
ACA 6 Standard									
ACA 6 Standard EEM			-	0	\$		\$ -		
Standard			-		\$	-	š . Total	\$ 95,564	

#### 2020 NYStretch SECONDARY SCHOOL - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost	t / Unit	Total Item	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	item cost	EEW UIIIS		l		Cost	\$ 51,121	
tandard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		128,112	Area	\$	-	\$ -		
tandard	Standard wall insulation (nonresidential steel-frame wall)		41,755	Area	\$	-	\$ -		
	5A: U-0.055; R-16.0 Enhanced roof insulation (insulation entirely above deck)								
EΜ	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	128,112	Area	\$	0.3881	\$ 49,718		
EM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13.10	41,755	Area	s	0.0336	\$ 1,403		
	5A: U-0.052; R-17.1 (+ R-1.05)	Roweans 07 21 15.10	41,755	Alea	Ф	0.0336	\$ 1,403		
EM 2	Enhanced fenestration		00.404	4	•		•	\$ 15,786	
tandard EM	Standard windows, U-0.39 Enhanced windows, U-0.36	PNNL CE ANALYSIS	22,484 22,484	Area Area	\$	0.70	\$ - \$ 15,786		
EM 3	Air leakage testing for mid-sized buildings	FININE CE ANALTSIS	22,404	Alea	φ	0.70	φ 15,760	s -	
tandard	n/a - does not apply to this building type		-	0	\$	-	\$ -	Ť	
EM	n/a - does not apply to this building type		- 1	0	\$	-	\$ -		
EM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		155.500			0.75		\$ -	
Standard EM	Lighting per ASHRAE 90.1-2016	HBL	157,768	watts watts	\$	6.75			No cost assumed for this building type
EM 5	Reduced LPDs, ~20% more efficient Occupancy sensors and automatic lighting controls including egress lighting	HBL	127,266	watts	\$	-	\$ -	•	building type
	n/a - IECC only		-	0	\$	-	\$ -	-	
EM	n/a - IECC only		-	0	\$	-	\$ -		
EM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		
EM 7	n/a - IECC only; already included in NYS amendments to 90.1-2016  Reduce fan power allowances (based on improved fan efficiencies)		-	0	\$	-	\$ -	\$ 37,359	
								\$ 31,359	
Standard	CV fans: 0.00094 bhp/cfm						\$ -		
tandard	VAV fans: 0.00130 bhp/cfm						\$ -		
EM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	2.01	tons	\$	1,031	\$ 2,070		Costed as increased syste
	·								size for reduction in static
EM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	9,898	cfm	\$	3.565	\$ 35,289		pressure
EM 8	Hotel guestroom HVAC vacancy control							\$ -	
Standard EM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$	-	\$ - \$ -		
EM 9	High-efficiency SHW		-		φ	-	-	s -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM 10	High-efficiency commercial kitchen equipment							\$ 14,280	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	-	0	\$	-	\$ -		
EM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Calculator	2,319	Area	\$	6.16	\$ 14,280		
EM 11	Thermal bridging reduction							\$ 7,344	
Standard	Standard wall insulation		- [		\$	-	\$ -		
EM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	21,600	Area	\$	0.3400	\$ 7,344		
EM 12	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.  Exterior lighting power reduction		, , , , ,						
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	6,525	watts	\$	-	\$ -	-	
EM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55	0,020	watto	\$		\$ -		
EEM 13	Efficient elevator, regenerative drives							\$ -	
Standard	n/a - does not apply to this building type		-	each	\$	-	\$ -		
	n/a - does not apply to this building type ERV for apartment makeup air units		-	each	\$	-	\$ -	•	
	n/a - already included in 90.1-2016			0	\$		\$ -	•	
EM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM 15	Demand-based recirculated SHW controls							\$ -	
	n/a		-	0	\$	-	\$ -		
EM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
DDITIONA CA 1	AL COST ADJUSTMENTS  Reduced capacity for cooling equipment							\$ (30.626)	
	Air-cooled chiller, 295 tons	RSMeans 23 64 19.10	1	units	\$ 1	198,755	\$ 198,755		
EM	Air-cooled chiller, 243 tons	RSMeans 23 64 19.10	1	units		168,129			
CA 2	Reduced capacity for heating equipment							\$ (192)	
tandard	Hot water boiler, gas fired, 3420 MBH	RSMeans D3020 130	1	units		108,879			
EM	Hot water boiler, gas fired, 3413 MBH	RSMeans D3020 130	1	units	\$ 1	108,687	\$ 108,687		
CA 3 tandard	Reduced capacity for air handling equipment VAV with Reheat, 66152 cfm	RSMeans D3040 134	1	units	\$ 6	559,746	\$ 659,746	\$ (21,624)	
	VAV with Reheat, 63970 cfm	RSMeans D3040 134	1	units		338,122			
:EM	Increased insulation to account for PTAC openings, thermal bridging requirements						,	\$ -	
CA 4	n/a - does not apply to this building type		-	0	\$	-	\$ -		
CA 4 Standard			-	0	\$	-	\$ -		
CA 4 tandard EM	n/a - does not apply to this building type							\$ 12,896	
CA 4 Standard EM CA 5					•		•	4 12,030	
CA 4 Standard EEM CA 5 Standard	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces	charnshuh com	- 10	0 outlets	\$	1 300	\$ -		
CA 4 tandard EM CA 5 tandard EM	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces 208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 10	0 outlets	\$		\$ - \$ 12,896		
EEM ACA 5 Standard EEM ACA 6 Standard	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces	chargehub.com	- 10	outlets 0	\$		\$ 12,896 \$ -		
CA 4 tandard EM CA 5 tandard EM CA 6	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces 208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 10 -	outlets	\$	1,300	\$ 12,896		

#### 2020 NYStretch SECONDARY SCHOOL - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

		Course of	Number of				Total Itam		
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	itom coot						\$ 78,907	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		128,112	Area	\$	-	\$ -		
tandard	Standard wall insulation (nonresidential steel-frame wall)		41,755	Area	\$		\$ -		
	6A: U-0.049; R-17.5 Enhanced roof insulation (insulation entirely above deck)								
EM	6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	128,112	Area	\$	0.5998	\$ 76,836		
EM	Enhanced wall insulation (nonresidential steel-frame wall)	DOM 07 04 40 40	44.755			0.0400	0.074		
	6A: U-0.047; R-19.1 (+ R-1.55)	RSMeans 07 21 13.10	41,755	Area	\$	0.0496	\$ 2,071		
EM 2	Enhanced fenestration		00.404	A	•		•	\$ 16,119	
Standard EM	Standard windows, U-0.37 Enhanced windows, U-0.34	PNNL CE ANALYSIS	22,484 22,484	Area Area	\$	0.72	\$ - \$ 16,119		
EM 3	Air leakage testing for mid-sized buildings	I THILL OF ANAETOIO	22,404	Alca	Ψ	0.72	Ψ 10,113	s -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		457.700	44		0.75	s -	\$ -	No A
EM	Lighting per ASHRAE 90.1-2016 Reduced LPDs, ~20% more efficient	HBL	157,768 127,266	watts watts	\$	6.75 -	\$ -		No cost assumed for this building type
EM 5	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	127,200	watts	φ		<b>.</b>	¢ _	building type
	n/a - IECC only		-	0	\$	-	\$ -		
EM	n/a - IECC only		-	0	\$	-	\$ -		
EM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		***************************************
EM 7	n/a - IECC only; already included in NYS amendments to 90.1-2016  Reduce fan power allowances (based on improved fan efficiencies)		-	0	\$	-	\$ -	\$ 36,864	
	CV fans: 0.00094 bhp/cfm						\$ -	30,004	
	-								
Standard	VAV fans: 0.00130 bhp/cfm						\$ -		
EM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	1.99	tons	\$	1,031	\$ 2,054		Costed as increased systen
	-								size for reduction in static
EM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	9,764	cfm	\$	3.565	\$ 34,810		pressure
EEM 8 Standard	Hotel guestroom HVAC vacancy control			0	•			\$ -	
EEM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016			0	\$		\$ - \$ -		
EM 9	High-efficiency SHW		-	<u> </u>	Ψ	-	Ψ -	s -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM 10 Standard	High-efficiency commercial kitchen equipment			0	•			\$ 14,280	
	Standard efficiency fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	-	·····	\$	-	\$ -		
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Calculator	2,319	Area	\$	6.16	\$ 14,280		
EEM 11	Thermal bridging reduction							\$ 7,344	
Standard	Standard wall insulation		-		\$	-	\$ -		
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	21,600	Area	\$	0.3400	\$ 7,344		
EM 12	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.  Exterior lighting power reduction							•	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	6,525	watts	\$	-	\$ -	-	
EM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55	5,525		\$	-	\$ -		
	Efficient elevator, regenerative drives							\$ -	
Standard	n/a - does not apply to this building type		-	each	\$	-	\$ -		
EM 14	n/a - does not apply to this building type ERV for apartment makeup air units		-	each	\$	-	\$ -	•	
	n/a - already included in 90.1-2016		-	0	\$	-	\$ -	-	
EM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	Demand-based recirculated SHW controls							\$ -	
	n/a		-	0	\$	-	\$ -		
EM	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$	-	\$ -		
	Reduced capacity for cooling equipment							\$ (3.519)	
	Air-cooled chiller, 230 tons	RSMeans 23 64 19.10	1	units	\$	159,995	\$ 159,995	(0,013)	
EM	Air-cooled chiller, 224 tons	RSMeans 23 64 19.10	1	units	\$	156,476			
CA 2	Reduced capacity for heating equipment	DOLL D				04		\$ (2,935)	
Standard EM	Hot water boiler, gas fired, 2438 MBH Hot water boiler, gas fired, 2333 MBH	RSMeans D3020 130 RSMeans D3020 130	1	units	\$	81,357 78,423			
CA 3	Reduced capacity for air handling equipment	IVOIMERIIR DOUZO 130	1	urins	ф	10,423	10,423 پ	\$ (22,044)	
	VAV with Reheat, 65326 cfm	RSMeans D3040 134	1	units	\$	651,558	\$ 651,558	(22,044)	
EM	VAV with Reheat, 63101 cfm	RSMeans D3040 134	1	units	\$	629,514			
CA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	7	1					s -	
Standard EM	n/a - does not apply to this building type	****	-	0	\$	-	\$ -		
CA 5	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces		-	U	\$	-	\$ -	\$ 12,896	
Standard	Electric remote charging station capable painting lots for 0 % of spaces		-	0	\$	-	s -	12,030	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	10	outlets	\$	1,300			
EM.	Solar-ready zone per Appendix CA of 2018 IECC	· · · · · ·						\$ -	
CA 6	Colai Today 20110 por Apportant CA OF 2010 1200								
EM CA 6 Standard	30th 10th J 2010 por Appointment of the 2010 1200		-	0	\$	-	\$ -		
CA 6			-	0	\$	-	\$ - \$ -	\$ 137.912	

#### 2020 NYStretch LARGE HOTEL - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of	Number of EEM Units	Unit	Co	st / Unit	Total Item	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	Item Cost	EEM Units				Cost	\$ 8.770	
tandard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		21,300	Area	\$	-	\$ -		
tandard	Standard wall insulation (residential mass wall)		30,265	Area	\$	-	\$ -		
arraar a	4A: U-0.090; R-9.31		00,200	71100			•		
EM	Enhanced roof insulation (insulation entirely above deck) 4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	21,300	Area	\$	0.3881	\$ 8,266		
	Enhanced wall insulation (residential mass wall)				-				
EM	4A: U-0.086; R-9.83 (+ R-0.52)	RSMeans 07 21 13.10	30,265	Area	\$	0.0166	\$ 504		
EM 2	Enhanced fenestration							\$ 7,042	
andard	Standard windows, U-0.39		13,068	Area	\$	-	\$ -		
EM 3	Enhanced windows, U-0.37	PNNL CE ANALYSIS	13,068	Area	\$	0.54	\$ 7,042		
tandard	Air leakage testing for mid-sized buildings n/a - does not apply to this building type		-	0	\$	-	\$ -	•	
EM	n/a - does not apply to this building type	***************************************		0	\$		\$ -		***************************************
EM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$ 138,136	
	Lighting per ASHRAE 90.1-2016		95,014	watts	\$	6.75			
EM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$	-	\$ 779,481		
EM 5	Occupancy sensors and automatic lighting controls including egress lighting				•		•	\$ -	
tandard EM	n/a - IECC only n/a - IECC only		-	0	\$	-	\$ - \$ -		
EM 6	Exterior lighting control				φ		-	\$ -	
tandard	n/a		-	0	\$	-	\$ -		
EM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
EM 7	Reduce fan power allowances							\$ 21,952	Costed as increased system
tandard	VAV fans: 0.00130 bhp/cfm						\$ -		size for reduction in static
EM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,157.34	cfm	\$	3.565	\$ 21,952		pressure
EM 8	Hotel guestroom HVAC vacancy control							-	
tandard EM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$	-	\$ - \$ -		
EM 9	High-efficiency SHW		-	U	\$	-	\$ -	c	
tandard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM 10	High-efficiency commercial kitchen equipment							\$ 6,810	
tandard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	\$ -		
EM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,106	Area	\$	6.16	\$ 6,810		
EM 11	Thermal bridging reduction	Calculator						\$ 2.197	
tandard	Standard wall insulation		-		\$	-	\$ -		
EM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	6,462	Area	\$	0.3400	\$ 2,197		
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	NSIVIEBIIS 07 22 10:10	0,402	Alea	۳	0.3400	2,197		
EM 12 tandard	Exterior lighting power reduction	RSMeans 26 51 13.55	40.054		•		•	\$ -	
tanaara EM	Lighting per ASHRAE 90.1-2016 Reduced LPDs. ~24% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	12,951	watts	\$		\$ - \$ -		
EM 13	Efficient elevator, regenerative drives	110Wearis 20 01 10:00			Ψ	-	-	S -	
tandard	n/a - does not apply to this building type		-	each	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	each	\$	-	\$ -		
EM 14 tandard	ERV for apartment makeup air units			0	•			5 -	
tandard EM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$		\$ - \$ -		
EM 15	Demand-based recirculated SHW controls				Ψ		-	s -	
tandard	n/a		-	0	\$	-	\$ -		
EM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	AL COST ADJUSTMENTS								
CA 1 tandard	Reduced capacity for cooling equipment  Air-cooled chiller, 255 tons	RSMeans 23 64 19.10	1	units	\$	175,162	\$ 175,162	\$ (3,703)	
EM	Air-cooled chiller, 255 tons Air-cooled chiller, 249 tons	RSMeans 23 64 19.10	1	0	\$	171,459			
CA 2	Reduced capacity for heating equipment					, .50	,,,,,,,,,	\$ (2,677)	
tandard	Hot water boiler, gas fired, 2197 MBH	RSMeans D3020 130	1	units	\$	74,604			
EM	Hot water boiler, gas fired, 2101 MBH	RSMeans D3020 130	1	0	\$	71,926	\$ 71,926		
CA 3 tandard	Reduced capacity for air handling equipment  VAV w/reheat. 41891 c/m	RSMeans D3040 134	1	units	•	419,364	\$ 419.364	\$ (20,784)	
tandard EM	VAV w/reheat, 41891 cfm VAV w/reheat, 39793 cfm	RSMeans D3040 134 RSMeans D3040 134	1	units units	\$	419,364 398,580			***************************************
CA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	I CONICALIS DOUGO 134		uiiio	φ	030,000	9 390,300	s -	
tandard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
CA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 2,600	
tandard	209/240V 40 comp cutlete (Tenes EA and 6A culu)	aharrahuh aana	- 2	0	\$	1 200	\$ -		
EM CA 6	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$	1,300	\$ 2,600	S	
tandard	Colum reducy zonic per Appendix CA of 2010 IECC		-	0	\$	-	\$ -	-	
EM			-	0	\$	-	\$ -		
	•						Total	\$ 160.341	

#### 2020 NYStretch LARGE HOTEL - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of	Number of EEM Units	Unit	Co	ost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls	Item Cost	EEM Units		4		Cost	\$ 8.905	
	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		21,300	Area	\$	-	\$ -	0,000	
Standard	Standard wall insulation (residential mass wall)		30,265	Area	\$		\$ -		
	5A: U-0.080; R-10.70		30,203	Alea	φ	-	φ -		
EM	Enhanced roof insulation (insulation entirely above deck) 5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	21,300	Area	\$	0.3881	\$ 8,266		
	Enhanced wall insulation (residential mass wall)								
	5A: U-0.076: R-11.3 (+ R-0.66)	RSMeans 07 21 13.10	30,265	Area	\$	0.0211	\$ 639		
EEM 2	Enhanced fenestration							\$ 8,212	
	Standard windows, U-0.39		13,068	Area	\$	-	\$ -		
	Enhanced windows, U-0.36	PNNL CE ANALYSIS	13,068	Area	\$	0.63	\$ 8,212		
	Air leakage testing for mid-sized buildings			0	•		s -	\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type			0	\$		\$ - \$ -		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units			Ü	Ψ			\$ 138,136	
	Lighting per ASHRAE 90.1-2016		95,014	watts	\$	6.75	\$ 641,345		
	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$	-	\$ 779,481		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							\$ -	
	n/a - IECC only		-	0	\$	-	\$ -		
	n/a - IECC only Exterior lighting control		-	0	\$	-	\$ -	•	
Standard			-	0	s	-	\$ -	•	
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
EM 7	Reduce fan power allowances							\$ 22,502	
	VAV fans: 0.00130 bhp/cfm						\$ -		Costed as increased system
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,311.43	cfm	\$	3.565	\$ 22,502		size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control							\$ -	pressure
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	High-efficiency SHW							\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$		\$ - \$ -		
	High-efficiency commercial kitchen equipment		-	U	Þ	-	<b>3</b> -	\$ 6.810	
	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$		\$ -	0,010	
	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	1,106	Area	\$	6.16			
		Calculator	1,100	Alea	φ	0.10	9 0,010		
	Thermal bridging reduction	····· <del>·</del>						\$ 2,197	
	Standard wall insulation Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of		-		\$	-	\$ -		
EEM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	6,462	Area	\$	0.3400	\$ 2,197		
	Exterior lighting power reduction							s -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	12,951	watts	\$	-	\$ -		
	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55			\$	-	\$ -		
	Efficient elevator, regenerative drives			a a a la			•	\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type		-	each each	\$	-	\$ - \$ -		
	ERV for apartment makeup air units		-	eacii	φ	-	-	s -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	Demand-based recirculated SHW controls							\$ -	
Standard EEM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	In/a - applies to IECC path only AL COST ADJUSTMENTS		-	U	\$	-	\$ -		I
	Reduced capacity for cooling equipment							\$ (3.555)	
Standard	Air-cooled chiller, 249 tons	RSMeans 23 64 19.10	1	units	\$	171,684		(0,000)	
EEM	Air-cooled chiller, 243 tons	RSMeans 23 64 19.10	1	0	\$	168,129			
	Reduced capacity for heating equipment							\$ (2,925)	
Standard EM	Hot water boiler, gas fired, 2484 MBH	RSMeans D3020 130 RSMeans D3020 130	1	units	\$	82,642			
	Hot water boiler, gas fired, 2379 MBH  Reduced capacity for air handling equipment	roweans D3020 130	1	0	\$	79,717	a /9,/1/	\$ (20,574)	
	VAV w/reheat, 42865 cfm	RSMeans D3040 134	1	units	\$	429,021	\$ 429,021	(20,074)	
EM	VAV w/reheat, 40789 cfm	RSMeans D3040 134	1	units	\$	408,447			
	Increased insulation to account for PTAC openings, thermal bridging requirements							\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	\$	-	\$ -	6 40.450	
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces			0	\$		\$ -	\$ 19,158	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	15	outlets	\$	1,300			
	Solar-ready zone per Appendix CA of 2018 IECC		.0		*	.,000	,	\$ -	
Standard			-	0	\$	-	\$ -		
EM			-	0	\$	-	\$ -		
								\$ 178.865	

#### 2020 NYStretch LARGE HOTEL - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	С	ost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls	nom cool						\$ 12,775	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		21,300	Area	\$	-	\$ -		
Standard	Standard wall insulation (residential mass wall)		30.265	Area	s		\$ -		
	6A: U-0.071; R-12.3								
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	21,300	Area	\$	0.5998	\$ 12,775		
	Enhanced wall insulation (residential mass wall)		-						
EEM	6A: U-0.067; R-13.1 (+ R-0.84)	RSMeans 07 21 13.10	30,265	Area	\$	0.0269	\$ 814		
EEM 2	Enhanced fenestration							\$ 8,470	
	Standard windows, U-0.37		13,068	Area	\$	-	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	13,068	Area	\$	0.65	\$ 8,470		
EEM 3	Air leakage testing for mid-sized buildings		-					\$ -	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$	-	\$ - \$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		-	U	ş		<b>5</b> -	\$ 138.136	
	Lighting per ASHRAE 90.1-2016		95,014	watts	\$	6.75	\$ 641,345	¥ 100,100	
EEM	Reduced LPDs, ~20% more efficient	HBL	74.550	watts	S	-	\$ 779,481		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							s -	
	n/a - IECC only		-	0	\$	-	\$ -		
EEM	n/a - IECC only		-	0	\$	-	\$ -		
EEM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$		\$ -	***************************************	
EEM 7	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -	\$ 22.057	
EEM 7 Standard	Reduce fan power allowances VAV fans: 0.00130 bhp/cfm						\$ -	\$ 22,057	Costed as increased system
EEM		DSM-one D2040 424	6 106 05	cfm	s	2 505			size for reduction in static
	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,186.85	ctm	2	3.565	\$ 22,057		pressure
EEM 8	Hotel guestroom HVAC vacancy control						_	\$ -	•
Standard EEM	n/a - already included in 90.1-2016		-	0	\$		\$ - \$ -		
EEM 9	n/a - already included in 90.1-2016 High-efficiency SHW		-	U	\$	-	\$ -	•	
	n/a - does not apply to this building type		_	0	\$	-	\$ -	•	
EEM	n/a - does not apply to this building type			0	S		\$ -		
EEM 10	High-efficiency commercial kitchen equipment		- 1		J		-	\$ 6.810	
	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	\$ -		
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,106	Area	\$	6.16	\$ 6,810		
EEM 11	Thermal bridging reduction							\$ 2,197	
Standard	Standard wall insulation		-		\$	-	\$ -		
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	6,462	Area	\$	0.3400	\$ 2,197		
EEM 12	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.		.,					_	
	Exterior lighting power reduction Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	12,951	watts	\$		\$ -	•	
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55	12,901	watts	S		\$ -		
EEM 13	Efficient elevator, regenerative drives	Troineane 20 01 10:00					<u> </u>	s -	
	n/a - does not apply to this building type		-	each	\$	-	\$ -	•	
EEM	n/a - does not apply to this building type		-	each	\$		\$ -		
EEM 14	ERV for apartment makeup air units							\$ -	
	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM 15 Standard	Demand-based recirculated SHW controls			0	\$	-	\$ -	•	
Standard EEM	n/a - applies to IECC path only			0	S		\$ -		
	AL COST ADJUSTMENTS		-	,			-		
ACA 1	Reduced capacity for cooling equipment							\$ (3,519)	
Standard	Air-cooled chiller, 230 tons	RSMeans 23 64 19.10	1	units	\$	159,995			
EEM	Air-cooled chiller, 224 tons	RSMeans 23 64 19.10	1	0	\$	156,476	\$ 156,476		
ACA 2	Reduced capacity for heating equipment							\$ (2,935)	
	Hot water boiler, gas fired, 2438 MBH	RSMeans D3020 130	1	units	\$	81,357			
EEM	Hot water boiler, gas fired, 2333 MBH	RSMeans D3020 130	1	0	\$	78,423	\$ 78,423		
ACA 3	Reduced capacity for air handling equipment	DSMann D2040 124		unite	6	420.600	6 420.000	\$ (20,154)	
Standard EEM	VAV w/reheat, 42018 cfm VAV w/reheat, 39984 cfm	RSMeans D3040 134 RSMeans D3040 134	1	units units	\$	420,623 400,469			
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	INDIVIDALIS DOUGU 104	1	uriits	Þ	400,469	φ 400,469	\$ -	
	n/a - does not apply to this building type		- 1	0	\$	-	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$		\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 19,158	
Standard			-	0	\$		\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	15	outlets	\$	1,300	\$ 19,158		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						_	\$ -	
Standard			-	0	\$	-	\$ -		
EEM			-	0	\$		\$ -	A	
							Total	\$ 182,994	

### 2020 NYStretch FULL-SERVICE RESTAURANT - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1 Standard	Enhanced insulation for roofs and walls		0.400	Area	S -		\$ 2,602	
	Standard U-0.021, R-49 roof insulation (attic roof) Standard wall insulation (nonresidential steel-frame wall)		6,130			\$ -		
Standard	4A: U-0.064; R-13.4		2,460	Area	\$ -	\$ -		
	Enhanced roof insulation (attic roof)	RSMeans 07 22 16.10	6,130	Area	\$ 0.4145	\$ 2.541		
	4A: U-0.020; R-51.4 (+ R-2.35) Enhanced wall insulation (nonresidential steel-frame wall)	TOMOGRA OF EL TOTTO	0,100	71100	<b>Q</b> 0.1110	2,011		
	4A: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	2,460	Area	\$ 0.0246	\$ 61		
	Enhanced fenestration						\$ 251	
	Standard windows, U-0.37		508	Area	\$ -	\$ -		
	Enhanced windows, U-0.35	PNNL CE ANALYSIS	508	Area	\$ 0.50	\$ 251		
	Air leakage testing for mid-sized buildings n/a - does not apply to this building type	T	-	0	\$ -	s -	s -	
	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ 8,372	
	Lighting per ASHRAE 90.1-2016		4,418	watts	\$ 6.75			
	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$ -	\$ 38,192		
	Occupancy sensors and automatic lighting controls including egress lighting n/a - IECC only		-	0	\$ -	\$ -	\$ -	
	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
	n/a		-	0	s -	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016  Reduce fan power allowances		-	0	\$ -	\$ -	•	
	n/a - does not apply to this building type			tons	\$ 1,031	S -	-	
EEM	n/a - does not apply to this building type			cfm		\$ -		
	Hotel guestroom HVAC vacancy control						\$ -	
	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$ - \$ -	\$ - \$ -		
	h/a - aiready included in 90.1-2016  High-efficiency SHW		-	U	5 -	\$ -	s -	
	n/a - does not apply to this building type		-	0	\$ -	\$ -	•	
	n/a - does not apply to this building type		-	0	\$ -	\$ -		
	High-efficiency commercial kitchen equipment	1					\$ 9,216	
	Standard efficiency fryers, dishwashers, ovens, and holding cabinets Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	0 Area	\$ - \$ 6.16	\$ - \$ 9,216		
	Thermal bridging reduction	Energy of a Cavings Calculator	1,457	Alca	0.10	ψ 3, <u>2</u> 10	S -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
	n/a - does not apply to this building type		-	Area	\$ 0	\$ -		
	Exterior lighting power reduction Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,433	watts	\$ -	\$ -	\$ -	
	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55	1,400	wans	\$ -	\$ -		
	Efficient elevator, regenerative drives						\$ -	
	n/a - does not apply to this building type		-	each	\$ -	\$ -		
	n/a - does not apply to this building type  ERV for apartment makeup air units		-	each	\$ -	\$ -	c	
	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	s -	\$ -		
	Demand-based recirculated SHW controls	[					\$ -	
Standard EEM	n/a - applies to IECC path only		<del>-</del>	0	\$ - \$ -	\$ - \$ -		
ADDITIONA	AL COST ADJUSTMENTS		-		,	I. ¥		
ACA 1	Reduced capacity for cooling equipment						\$ (255)	
	Packaged single-zone AC, 26.2 tons	RSMeans 23 74 33.10	1	units	\$ 31,039 \$ 30,784			
ACA 2	Packaged single-zone AC, 26 tons Reduced capacity for heating equipment	RSMeans 23 74 33.10	1	units	\$ 30,784	\$ 30,784	S	
	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM	,		-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)			unite	6		\$ -	
Standard EEM	(INCLUCED W/FACKAGED UNITS IN ACA T)		-	units units	\$ - \$ -	\$ - \$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements			41110			\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM ACA 5	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces	L	-	0	\$ -	\$ -	\$ 2.600	
Standard	Electric vehicle charging station capable parking lots for 5% of spaces		-	0	s -	\$ -	\$ 2,600	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard EEM			-	0	\$ - \$ -	\$ - \$ -		
LLIVI		I.	-	U		Total	\$ 22,786	
						i Ulai	\$ 22,786	

### 2020 NYStretch FULL SERVICE RESTAURANT - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls	110111 0001	22 00				\$ 2.624	
	Standard U-0.021, R-49 roof insulation (attic roof)		6,130	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 5A: U-0.055: R-16.0		2,460	Area	\$ -	\$ -		
	5A: U-0.055; R-16.0 Enhanced roof insulation (attic roof)							
	5A: U-0.020; R-51.4 (+ R-2.35)	RSMeans 07 22 16.10	6,130	Area	\$ 0.4145	\$ 2,541		
	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13.10	2,460	Area	\$ 0.0336	\$ 83		
	5A: U-0.052; R-17.1 (+ R-1.05)  Enhanced fenestration		-,				\$ 291	
	Standard windows, U-0.37		508	Area	s -	\$ -	\$ 291	
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	508	Area	\$ 0.57			
EEM 3	Air leakage testing for mid-sized buildings	1					\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$ - \$ -	\$ - \$ -		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units		-		, -	<b>y</b> -	\$ 8.372	
Standard	Lighting per ASHRAE 90.1-2016		4,418	watts	\$ 6.75			
EEM	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$ -	\$ 38,192		
	Occupancy sensors and automatic lighting controls including egress lighting		-	0	\$ -	\$ -	\$ -	
	n/a - IECC only n/a - IECC only		-	0	\$ - \$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard			-	0	s -	\$ -		***************************************
	n/a - IECC only; already included in NYS amendments to 90.1-2016  Reduce fan power allowances		-	0	\$ -	\$ -		
	n/a - does not apply to this building type			tons	\$ 1,031	s -	-	
EEM	n/a - does not apply to this building type			cfm	\$ 4	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard EEM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$ - \$ -	\$ - \$ -		
	High-efficiency SHW		-	U	\$ -	\$ -	s -	
	n/a - does not apply to this building type		-	0	\$ -	\$ -	•	
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
	High-efficiency commercial kitchen equipment Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -	\$ 9,216	
	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$ 6.16			
EEM 11	Thermal bridging reduction	J	.,				\$ -	
Standard	n/a - does not apply to this building type		-	.0	\$ -	\$ -		
	n/a - does not apply to this building type  Exterior lighting power reduction		-	Area	\$ 0	\$ -	•	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,433	watts	\$ -	\$ -	-	
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
	Efficient elevator, regenerative drives			b		•	\$ -	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type			each each	\$ - \$ -	\$ - \$ -		
	ERV for apartment makeup air units			oud!!		<u> </u>	\$ -	
	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	n/a - already included in 90.1-2016  Demand-based recirculated SHW controls		-	0	\$ -	\$ -	•	
Standard			_	0	s -	\$ -	-	
	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ACA 1 Standard	Reduced capacity for cooling equipment Packaged single-zone AC, 26.3 tons	RSMeans 23 74 33.10	1	units	\$ 31,156	\$ 31,156	\$ (268)	
EEM	Packaged single-zone AC, 26.3 tons Packaged single-zone AC, 26.1 tons	RSMeans 23 74 33.10	1	units	\$ 31,156			
ACA 2	Reduced capacity for heating equipment						\$ -	
	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment		-	units	\$ -	\$ -	•	
	Reduced capacity for air handling equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	s -	\$ -	•	
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$ - \$ -	\$ - \$ -		
	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces			J	,	· -	\$ -	
Standard			-	0	\$ -	\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	outlets	\$ 1,300	\$ -		
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC		-	0	\$ -	\$ -	\$ -	
EEM			-	0	\$ -	\$ -		
				-		Total	\$ 20.234	
L						, otal	y 20,234	

#### 2020 NYStretch FULL SERVICE RESTAURANT - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Со	ost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
	Enhanced insulation for roofs and walls							\$ 5,475	
	Standard U-0.021, R-49 roof insulation (attic roof)		6,130	Area	\$	-	\$ -		
	Standard wall insulation (nonresidential steel-frame wall)		2,460	Area	\$	-	\$ -		
	6A: U-0.049; R-17.5		_,						
	Enhanced roof insulation (attic roof) 6A: U-0.019; R-53.9 (+ R-4.95)	RSMeans 07 22 16.10	6,130	Area	\$	0.8732	\$ 5,353		
	Enhanced wall insulation (nonresidential steel-frame wall)				-				
M	6A: U-0.047; R-19.1 (+ R-1.55)	RSMeans 07 21 13.10	2,460	Area	\$	0.0496	\$ 122		
	Enhanced fenestration							\$ 278	
	Standard windows, U-0.35		508	Area	\$		\$ -		
	Enhanced windows, U-0.33	PNNL CE ANALYSIS	508	Area	\$	0.55	\$ 278		
	Air leakage testing for mid-sized buildings	7			-			\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type  Reduced LPD for interior lighting; high efficacy lights in dwelling units		-	0	2	-	\$ -	\$ 8,372	
	Lighting per ASHRAE 90.1-2016	T.	4,418	watts	\$	6.75	\$ 29,820	\$ 0,372	
	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$		\$ 38,192		
	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	0,110				Φ 00,102		
	n/a - IECC only		-	0	\$	-	\$ -	-	
	n/a - IECC only		-	0	\$	-	\$ -		
	Exterior lighting control							\$ -	
ndard	n/a	-	-	0	\$	-	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
	Reduce fan power allowances	7				1.00		\$ -	
	n/a - does not apply to this building type			tons	S S	1,031			
	n/a - does not apply to this building type  Hotel guestroom HVAC vacancy control			cfm	2	4	\$ -	•	
	n/a - already included in 90.1-2016		-	0	9	-	\$ -	-	
	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$		\$ -		
	High-efficiency SHW						Ι Ψ	\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
1	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	High-efficiency commercial kitchen equipment							\$ 9,216	
ndard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	\$ -		
И	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$	6.16	\$ 9,216		
VI 11	Thermal bridging reduction							\$ -	
ndard	n/a - does not apply to this building type		-	0	\$		\$ -		
И	n/a - does not apply to this building type		-	Area	\$	0	\$ -		
VI 12	Exterior lighting power reduction	DOI:						\$ -	
ndard M	Lighting per ASHRAE 90.1-2016 Reduced LPDs. ~9% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	1,433	watts	S S		\$ - \$ -		
	Efficient elevator, regenerative drives	KSIVIEBIIS 20 31 13.33			Ş	-	, -	e	
	n/a - does not apply to this building type		-	each	\$	-	\$ -	-	
	n/a - does not apply to this building type		-	each	\$		\$ -		
	ERV for apartment makeup air units							s -	
ndard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
Λ	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	Demand-based recirculated SHW controls	1						\$ -	
ndard			-	0	\$	-	\$ -		
A DITIONA	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	Reduced capacity for cooling equipment							\$ (258)	
	Packaged single-zone AC, 25.3 tons	RSMeans 23 74 33.10	1	units	\$	30,079	\$ 30.079		
	Packaged single-zone AC, 25.1 tons	RSMeans 23 74 33.10	1	units	\$	29,821			
A 2	Reduced capacity for heating equipment							\$ -	
ndard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -		
Л			-	units	\$	-	\$ -		
	Reduced capacity for air handling equipment							\$ -	
	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -		
1	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	\$	-	\$ -	c	
	n/a - does not apply to this building type		-	0	\$	-	\$ -	•	
	n/a - does not apply to this building type		-	0	\$		\$ -		
	Electric vehicle charging station capable parking lots for 5% of spaces							s -	
ndard			-	0	\$	-	\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	outlets	\$		\$ -		
	Solar-ready zone per Appendix CA of 2018 IECC							\$ -	
A 6				0			\$ -		
ndard			-		\$	-			
			-	0	\$		s Total	\$ 23.083	

### 2020 NYStretch OUTPATIENT HEALTHCARE - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls	Rem Cost	ELW OIRS					\$ 6,067	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		14,782	Area	\$	-	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 4A: U-0.064; R-13.4		13,402	Area	\$	-	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck)  4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	14,782	Area	\$	0.3881	\$ 5,737		
EEM	Enhanced wall insulation (nonresidential steel-frame wall) 4A: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	13,402	Area	\$	0.0246	\$ 330		
	Enhanced fenestration		0.040				•	\$ 1,740	
	Standard windows, U-0.38 Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318 3,318	Area Area	\$	- 0.52	\$ - \$ 1,740		
	Air leakage testing for mid-sized buildings	FININE OF ANALTOIS	3,310	Alca	φ	0.32	ψ 1,740	\$ 8.500	
	Not Required		-	units	\$	-	\$ -	0,000	
EEM	Testing required	BET, LLC	1	units	\$	8,500			
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$ 71,679	
	Lighting per ASHRAE 90.1-2016	LIBI	39,536	watts	\$	6.75			
	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$	-	\$ 338,548	•	
	Occupancy sensors and automatic lighting controls including egress lighting  n/a - IECC only		-	0	\$	-	\$ -	-	
	n/a - IECC only			0	\$		\$ -		
EEM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
	Reduce fan power allowances						•	\$ 17,767	Costed as increased system
	VAV fans: 0.00130 bhp/cfm	DOM B0010 10:	4 000 5-	-1		0.505	\$ -		size for reduction in static
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	4,983.57	cfm	\$	3.565	\$ 17,767		pressure
	Hotel guestroom HVAC vacancy control						•	\$ -	
	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$		\$ - \$ -		
	High-efficiency SHW		-	U	Ф	-	<b>3</b> -	• -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	High-efficiency commercial kitchen equipment							\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type  Thermal bridging reduction		-	0	\$	-	\$ -	\$ 1.596	
	Standard wall insulation		-		\$	-	\$ -	3 1,550	
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	4,694	Area	\$	0.3400	\$ 1,596		
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	130Wearis 07 22 10.10	4,054	Alea	φ	0.5400	ψ 1,550		
EEM 12	Exterior lighting power reduction	DOM 00 54 40 55						\$ -	
Standard EEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	1,619	watts	\$		\$ - \$ -		
	Efficient elevator, regenerative drives	TKOWICE/13 20 01 10:00			Ψ	-	Ψ -	\$ -	
	n/a - does not apply to this building type		-	each	\$	-	\$ -		
	n/a - does not apply to this building type		-	each	\$	-	\$ -		
	ERV for apartment makeup air units							\$ -	
	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$	-	\$ - \$ -		
	Demand-based recirculated SHW controls		-	U	Ф		φ -	\$ -	
Standard	n/a		-	0	\$	-	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	AL COST ADJUSTMENTS								
	Reduced capacity for cooling equipment			unito	6		6	5 -	
Standard EEM	INCLUDED WITH AHU IN ACA 3		-	units units	\$	177,744	\$ - \$ -		
	Reduced capacity for heating equipment		-	urina	φ	177,744	Ψ -	\$ 133	
Standard	Hot water boiler, gas fired, 302 MBH	RSMeans D3020 130	1	units	\$	21,475			
EEM	Hot water boiler, gas fired, 306 MBH	RSMeans D3020 130	1	0	\$	21,608			
ACA 3	Reduced capacity for air handling equipment							\$ (15,955)	
	VAV AHU, 33818 cfm VAV AHU, 32207 cfm	RSMeans D3040 134 RSMeans D3040 134	1	<i>units</i> units	\$	339,376 323,421			
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	Roweans D3040 134	1	units	2	323,421	⊕ 3∠3,421	\$ -	
	n/a - does not apply to this building type		-	0	S	-	S -		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 2,600	
Standard				0	\$		\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300	\$ 2,600	•	
Standard	Solar-ready zone per Appendix CA of 2018 IECC		-	0	\$	-	\$ -	-	
EEM			-	0	\$	-	\$ -		
							Total	\$ 94.127	

### 2020 NYStretch OUTPATIENT HEALTHCARE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	nem cost	EEW UIIIS					\$ 6,187	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		14,782	Area	\$	-	\$ -		
tandard	Standard wall insulation (nonresidential steel-frame wall)		13,402	Area	s	-	\$ -		
nanuanu	5A: U-0.055; R-16.0		15,402	Alea	Ψ	-	Ψ -		
EM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	14,782	Area	\$	0.3881	\$ 5,737		
	5A: U-0.030; R-32.2 (+ R-2.2) Enhanced wall insulation (nonresidential steel-frame wall)								
EM	Ennanced waii insulation (nonresidential steel-irame waii)   5A: U-0.052; R-17.1 (+ R-1.05)	RSMeans 07 21 13.10	13,402	Area	\$	0.0336	\$ 450		
EM 2	Enhanced fenestration							\$ 1.972	
	Standard windows, U-0.38		3,318	Area	\$	-	\$ -	,,0.2	
EM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318	Area	\$	0.59	\$ 1,972		
EM 3	Air leakage testing for mid-sized buildings							\$ 3,200	
	Not Required		-	units	\$	-	\$ -		
EM 4	Testing required	BET, LLC	1	units	\$	3,200	\$ 3,200		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAE 90.1-2016		39,536	watts	\$	6.75	\$ 266,868	\$ 71,679	
EM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$		\$ 338,548		
EM 5	Occupancy sensors and automatic lighting controls including egress lighting	TIBL	20,517	waiis	φ		φ 330,340		
	n/a - IECC only		-	0	\$	-	\$ -	_	
EM	n/a - IECC only		-	0	\$	-	\$ -		
EM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		
EM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
EM 7	Reduce fan power allowances							\$ 18,375	Control on ingressed
	VAV fans: 0.00130 bhp/cfm						\$ -		Costed as increased system size for reduction in static
EM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	5,154.07	cfm	\$	3.565	\$ 18,375		pressure
EM 8	Hotel guestroom HVAC vacancy control							\$ -	p. coourc
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM 9	High-efficiency SHW							\$ -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM 10 Standard	High-efficiency commercial kitchen equipment n/a - does not apply to this building type		-	0	•	-	\$ -	\$ -	
	n/a - does not apply to this building type		-	0	\$	········	\$ -		
EM 11	Thermal bridging reduction		-	Ü	φ		φ -	\$ 1.596	
	Standard wall insulation		-		\$	-	\$ -	1,000	
EM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	4.004			0.0400			
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	4,694	Area	\$	0.3400	\$ 1,596		
EM 12	Exterior lighting power reduction							\$ -	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,764	watts	\$	-	\$ -		
EM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55			\$	-	\$ -		
EM 13	Efficient elevator, regenerative drives  n/a - does not apply to this building type						6	-	
EM	n/a - does not apply to this building type n/a - does not apply to this building type		-	each each	\$		\$ - \$ -		
EM 14	ERV for apartment makeup air units		-	eaui	φ	-	Ψ -	٠ .	
	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM 15	Demand-based recirculated SHW controls							\$ -	
Standard	n/a		-	0	\$	-	\$ -		
	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	AL COST ADJUSTMENTS								
CA 1	Reduced capacity for cooling equipment			unito	6		6	\$ -	
Standard EM	INCLUDED WITH AHU IN ACA 3		-	units units	\$	- 177,744	\$ - \$ -		
CA 2	Reduced capacity for heating equipment		-	units	Þ	177,744	φ -	\$ 102	
	Hot water boiler, gas fired, 364 MBH	RSMeans D3020 130	1	units	\$	23,223	\$ 23,223	102	
EM	Hot water boiler, gas fired, 364 MBH	RSMeans D3020 130	1	0	S	23,325			
CA 3	Reduced capacity for air handling equipment					,		\$ (16,585)	
	VAV AHU, 34983 cfm	RSMeans D3040 134	1		\$	350,923	\$ 350,923		
EM	VAV AHU, 33309 cfm	RSMeans D3040 134	1	units	\$	334,338	\$ 334,338		
CA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						_	\$ -	
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EM CA 5	n/a - does not apply to this building type		-	0	\$	-	\$ -	\$ 17.962	
Standard	Electric vehicle charging station capable parking lots for 5% of spaces		-	0	e		\$ -	<b>3</b> 17,962	
EM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	14	outlets	\$		\$ 17,962		
CA 6	Solar-ready zone per Appendix CA of 2018 IECC	onargonab.00III	14	outicis	¥	1,500	¥ 11,502	s -	
Standard	Committee for a position of the formation of the formatio		-	0	\$	-	\$ -		
EM		***************************************	-	0	\$	-	\$ -	***************************************	
				-			Total	\$ 104,489	
								U 104,403	

# 2020 NYStretch OUTPATIENT HEALTHCARE - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

Example	EEM	Description	Source of Item Cost	Number of	Unit	Co	ost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
Secretary   Company   Co	EEM 1	Enhanced insulation for roofs and walls	item cost	EEW UIIIIS					\$ 9,530	
Act   Local Print		Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		14,782	Area	\$	-	\$ -		
Edit	Standard			13,402	Area	\$	-	\$ -		
Effect   Control   Contr	EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	14,782	Area	\$	0.5998	\$ 8,866		
Services of Control (1)	EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13 10	13.402	Δτοο	•	0.0496	¢ 665		
Sourchard warrhowner   O. J. 28   Sourchard   O. J. 28   O. J. 28   Sourchard			INSIMEALS OF 21 13:10	10,402	Alea	φ	0.0490	\$ 000	¢ 1.931	
EMAIL   Comment of uncloser, LUC 3-3   Comment of the Comment of				3.318	Area	S	-	s -	φ 1,031	
Secretary   Color			PNNL CE ANALYSIS							
CEM   March   Control on Copy to the bottomy type   Cem									\$ 3,200	
### Reduced PD for interior is plating 'bigs - Reduced part   Post of the Post			DET II O							
Secretary   Company   Astrocate   Secretary   Secret			BE1, LLC	1	0	\$	3,200	\$ 3,200	\$ 71.679	
Reduced LPDs - 20th more efficient   Fig.   28,917   was   \$ .				39.536	watts	S	6.75	\$ 266.868	Ψ 71,073	
Section   Sect			HBL							
Mar   SEC Conty			·	·					\$ -	
Early   State   Stat										
Sample	EEM	n/a - IECC only		-	0	\$	-	\$ -	•	
Mar   ECC only, aleasy included in NYS amendments to 90 1-2016	Standard	n/a			n	2		\$ -	-	
Section of the proper allowances					•					
Sample   War   Fame   Cost 30 ship chim   Sample   Samp	EEM 7	Reduce fan power allowances	·					·	\$ 18,212	
EEM Note   Way traits: Country depreted   State   Country   State	Standard	VAV fans: 0.00130 bhp/cfm						\$ -		Costed as increased system
Robot   Questroom NYAC vacancy control		· · · · · · · · · · · · · · · · · · ·	RSMeans D3040 134	5,108.16	cfm	\$	3.565	\$ 18,212		size for reduction in static pressure
EEM   Mar - already included in 901-2016									\$ -	
Sanadard										
Sandard   n/a - does not apply to this building type	FFM 9	High-efficiency SHW		-	- 0	2	-	\$ -	• -	
EEM 10   Na - does not apply to this building type	Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -	-	
Sandard   Na - does not apply to this building type   . 0   \$ . 5 .   .   .   .   .   .   .   .   .				-						
EEM 1									\$ -	
Semandar   Semandar   Managaman   Semandar										
Sandard   Slandard wall insulation   Sandard wall insulation of R4.2/in for entire perimeter of roof.				-	0	\$	-	\$ -	¢ 1.506	
Additional Parapet Institution   Additional Parapet Institution   Assume 12 nat wait + 42 no for parapet height to role does. 9 at 10 tail nuisation of R4. 2/in for entire perimeter of roof.				-		S	-	s -	ψ 1,590	
Semandar   Lighting per ASHRAFS 90.12016   RSMeans 26 51 13.55   5.764   wats   \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$ . \$		Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	4,694	Area					
Standard   Lighting per ASHRAE 90.1-2016   RSMeans 26 51 13.55   5,764   watts   \$ . \$ .	EEM 12								\$ -	
Standard   An - does not apply to this building type		Lighting per ASHRAE 90.1-2016		5,764	watts		-	\$ -		
Sandard   n/a - does not apply to this building type   each   \$ .   \$ .			RSMeans 26 51 13.55			\$	-	\$ -		
EEM   1/4 - does not apply to this building type   .   each   \$ .   \$					ooob	6		•	\$ -	
EEM   4				-						
Sandard   N/a - already included in 90.1-2016   - 0   \$ - \$ -					04011	Ţ		<u> </u>	\$ -	
EEM   15   Demand-based recirculated SHW controls	Standard	n/a - already included in 90.1-2016		-			-	\$ -		
Sandard   n/a				-	0	\$		\$ -		
EEM					^	0		e	-	
ACA 1 Reduced capacity for cooling equipmen   Standard   INCLUDED WITH AHU IN ACA 3										
Standard   MCLUDED WITH AHU IN ACA 3	ADDITION		·		- Č	-				
EEM									\$ -	
ACA 2 Reduced capacity for heating equipmen  Standard Hot water boiler, gas fired, 366 MBH RSMeans D3020 130 1 units \$ 23,274 \$ 2		INCLUDED WITH AHU IN ACA 3								
Standard		Deduced conseits for heating equipmen	ļ	- 1	units	\$	177,744	\$ -	6 04	
EEM			RSMeans D3020 130	1	units	S	23 274	\$ 23.274	<b>9</b>	
ACA 3 Reduced capacity for air handling equipmen    Standard   VAV AHU, 34305 cfm										
EEM   VAV AHU, 33012 cfm   RSMeans D3040 134   1 units   \$ 331,399   \$ 331,3	ACA 3	Reduced capacity for air handling equipmen	·						\$ (12 <u>,</u> 806)	
ACA 4   Increased insulation to account for PTAC openings, thermal bridging requirement   \$   \$   \$   \$   \$   \$   \$   \$   \$		VAV AHU, 34305 cfm	RSMeans D3040 134							
Standard   n/a - cloes not apply to this building type   - 0 \$ - \$ -			RSMeans D3040 134	1	units	\$	331,399	\$ 331,399	•	
EEM         n/a - does not apply to this building type         -         0         \$         -         S         -         S         -         S         -         -         D         \$         -         D         B         -         D         B         -         D         B         -         D         B         -         D         D         B         -         D <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>2</td> <td></td> <td>\$ -</td> <td><b>-</b></td> <td></td>					0	2		\$ -	<b>-</b>	
ACA 5 Electric vehicle charging station capable parking lots for 5% of space \$17,962\$  Standard   - 0 \$ - 5 -    EEM 208/240V 40 amp outlets (zones 5A and 6A only)   chargehub.com 14 outlets \$1,300 \$ 17,962    ACA 6   Solar-ready zone per Appendix CA of 2018 IECC   - 0 \$ - \$ -    EEM   - 0 \$ - 5 -    E										
EEM         208/240V 40 amp outlets (zones 5A and 6A only)         chargehub.com         14         outlets         \$ 1,300         \$ 17,962           ACA 6         Solar-ready zone per Appendix CA of 2018 IECC         \$ -         0         \$ -         \$ -           Standard         -         0         \$ -         \$ -           EEM         -         0         \$ -         \$ -			·						\$ 17,962	
ACA 6 Solar-ready zone per Appendix CA of 2018 IECC \$ - 0 \$ - \$ -   EEM - 0 \$ - \$ -				-						
Standard         -         0         \$ -         \$ -           EEM         -         0         \$ -         \$ -			chargehub.com	14	outlets	\$	1,300	\$ 17,962	•	
EEM - 0 \$ - \$ -		Solar-ready zone per Appendix CA of 2018 IECC			0	0		e	-	
				-						
			•					Total	\$ 111.298	
10tai \$ 111,230								iotai	Ψ 111,290	

#### 2020 NYStretch WAREHOUSE - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Ite	п т	Fotal Incremental Cost	Notes / Comments
	Enhanced insulation for roofs and walls							\$	22,863	
	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$		s	.		
	4A: U-0.037; R-32.2 (+ R-2.2)		10,100	71100						
Standard	Standard wall insulation (metal building) 4A: U-0.060; R-15.3		26,687	Area	\$	-	\$	-		
	#A: 0-0.000; R-15.3 Enhanced roof insulation (insulation entirely above deck)									
	4A: U-0.035; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	49,495	Area	\$	0.3881	\$ 19,	208		
	Enhanced wall insulation (nonresidential mass wall)					0.4070				
	4A: U-0.048; R-19.5 (+ R-4.28)	RSMeans 07 21 13.10	26,687	Area	\$	0.1370	\$ 3,	355		
	Enhanced fenestration							\$	100	
	Standard windows, U-0.38		190	Area	\$	-		-		
	Enhanced windows, U-0.36	PNNL CE ANALYSIS	190	Area	\$	0.53	\$	100		
EEM 3	Air leakage testing for mid-sized buildings	· · · · · · · · · · · · · · · · · · ·						\$	17,000	
	Not Required			units	\$		\$	-		
EEM 4	Testing required	Vidaris	1	units	\$	17,000	\$ 17,	000		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAE 90.1-2016	1	24.400	watts	\$	6.75	•	\$	-	No cost assumed for this
	Reduced LPDs, ~20% more efficient	HBL	18,689	watts	\$	0.75		-		building type
		ILDE	10,009	watts	Ф	-	٥	-		building type
	Occupancy sensors and automatic lighting controls including egress lighting n/a - IECC only		-		\$	-	\$	-	•	
	n/a - IECC only				\$	- :		-		
	Exterior lighting control				Ψ		Ÿ	e	-	
Standard			-		\$	-	\$	-		
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$			-		
	Reduce fan power allowances							S		
Standard	n/a - does not apply to this building type				\$	1,031	\$	-		
EEM	n/a - does not apply to this building type				\$	4		-		
	Hotel guestroom HVAC vacancy control							\$		
	n/a - already included in 90.1-2016		-		\$	-		-		
EEM	n/a - already included in 90.1-2016		-		\$	-	\$	-		
	High-efficiency SHW	,						\$		
Standard	n/a - does not apply to this building type		-		\$	-		-		
EEM	n/a - does not apply to this building type		-		\$	-	\$	-		
EEM 10	High-efficiency commercial kitchen equipment				•		\$	\$	•	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type				\$			-		
	Thermal bridging reduction		-		Ф	-	٥	-		
	n/a - does not apply to this building type		-		\$		\$	-		
	n/a - does not apply to this building type			Area	\$	0				
	Exterior lighting power reduction			71100	ų.	, ,	,	S		
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	4,100	watts	\$	-	\$	-		
	Reduced LPDs, ~8% more efficient	RSMeans 26 51 13.55	-		\$	-	\$	-		
EEM 13	Efficient elevator, regenerative drives							\$	-	
	n/a - does not apply to this building type		-	each	\$	-		-		
	n/a - does not apply to this building type		-	each	\$	-	\$	-		
	ERV for apartment makeup air units	,						\$	-	
	n/a - already included in 90.1-2016		-		\$	-		-		
	n/a - already included in 90.1-2016		- )		\$	-	\$	-		
	Demand-based recirculated SHW controls		1				6	\$	-	
Standard EEM	n/a - applies to IECC path only		-		\$	-	\$	-		
	N/A - Applies to IECC path only		-		à		9	_		
	Reduced capacity for cooling equipment									
	INCLUDED WITH AHU IN ACA 3		-	units	\$		\$	-		
EEM		·	-	units	*		\$	-		
	Reduced capacity for heating equipment							S	-	
	INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$	-		
EEM			-	units	\$	-		-		
ACA 3	Reduced capacity for air handling equipment							\$	(2,999)	
	PSZ AHU, CAV, 3390 cfm	RSMeans 23 74 33.10	1	units	\$	16,691				
	PSZ AHU, CAV, 2543 cfm	RSMeans 23 74 33.10	1	units	\$	13,692	\$ 13,	392		
	Increased insulation to account for PTAC openings, thermal bridging requirements							\$	-	
	n/a - does not apply to this building type	-	-		\$	-		-		
	n/a - does not apply to this building type		-		\$	-	\$	-		
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces			0	0		6	\$	2,600	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 2	0 outlets	\$	1,300	\$	500		
	Solar-ready zone per Appendix CA of 2018 IECC	chargenub.com	2	outiets	à	1,300	,2 ک	JUU		
Standard	Solar-ready Zone per Appendix CA Of 2010 IECC		-		\$		\$	-	-	
EEM					\$		\$	-		
vi		1			Ψ		7	-	\$ 39,565	
							Tot			

#### 2020 NYStretch WAREHOUSE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

		Course of	Mumbarat						
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Со	st / Unit	Total Item Cos	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls	- Rom Oost	OIIIG					\$ 20,019	
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	s	_	\$ -		
stariuaru	5A: U-0.037; R-32.2 (+ R-2.2)		45,450	Alea	٠		Ψ -		
Standard	Standard wall insulation (metal building) 5A: U-0.050: R-18.6		26,687	Area	\$	-	\$ -		
	Enhanced roof insulation (insulation entirely above deck)								
	5A: U-0.035; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	49,495	Area	\$	0.3881	\$ 19,208		
	Enhanced wall insulation (nonresidential mass wall)	DOM 07 04 40 40	00.007			0.0004	. 044		
	5A: U-0.048; R-19.5 (+ R-0.95)	RSMeans 07 21 13.10	26,687	Area	\$	0.0304	\$ 811		
EEM 2	Enhanced fenestration							\$ 103	
	Standard windows, U-0.38		190	Area	\$		\$ -		
EEM 3	Enhanced windows, U-0.36 Air leakage testing for mid-sized buildings	PNNL CE ANALYSIS	190	Area	\$	0.54	\$ 103	\$ 6.400	
	Not Required	······		units	S		\$ -	\$ 6,400	
EEM	Testing required	Vidaris	1	units	S	6,400			
EM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units					5,155		\$ -	
Standard	Lighting per ASHRAE 90.1-2016		24,400	watts	\$	6.75	\$ -		No cost assumed for this
	Reduced LPDs, ~20% more efficient	HBL	18,689		\$	-	\$ -		buidling type
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							\$ -	
	n/a - IECC only		-		\$	-	\$ -		
	n/a - IECC only		-		\$	-	\$ -		
EEM 6 Standard	Exterior lighting control		-		\$		\$ -	-	
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		S		\$ -		
EEM 7	Reduce fan power allowances							s -	
	CV fans: 0.00094 bhp/cfm				s	1.001	s -		
Standard	VAV fans: 0.00130 bhp/cfm				3	1,031	٠ -		
	CV fans: 0.00088 bhp/cfm				s	4	\$ -		
	VAV fans: 0.00100 bhp/cfm				•	7	Ψ -		
	Hotel guestroom HVAC vacancy control							\$ -	
	n/a - already included in 90.1-2016		-		\$		\$ - \$ -		
EM 9	n/a - already included in 90.1-2016 High-efficiency SHW		-		\$	-	\$ -	•	
	n/a - does not apply to this building type		-		\$		\$ -	-	
	n/a - does not apply to this building type		-		S		\$ -		
	High-efficiency commercial kitchen equipment							\$ -	
Standard	n/a - does not apply to this building type		-		\$	-	\$ -		
EEM	n/a - does not apply to this building type		-		\$	-	\$ -		
EM 11	Thermal bridging reduction							\$ -	
Standard	n/a - does not apply to this building type		-		\$		\$ -		
	n/a - does not apply to this building type  Exterior lighting power reduction		-		\$	0	\$ -	_	
	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,101	watts	\$	-	\$ -	-	
EEM	Reduced LPDs, ~8% more efficient	RSMeans 26 51 13.55	3,101	wans	S		\$ -		
EM 13	Efficient elevator, regenerative drives							s -	
Standard	n/a - does not apply to this building type		-	each	\$	-	\$ -		
	n/a - does not apply to this building type		-	each	\$	-	\$ -		
	ERV for apartment makeup air units						,	\$ -	
	n/a - already included in 90.1-2016			0	\$	-	\$ -		
EM 15	n/a - already included in 90.1-2016  Demand-based recirculated SHW controls		-	0	\$	-	\$ -		
Standard			-	0	\$		\$ -	-	
	n/a - applies to IECC path only		-	0	S		\$ -	-	
	AL COST ADJUSTMENTS			ŭ	Ţ				
ACA 1	Reduced capacity for cooling equipment							\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$ -		
EM			-	units	\$	177,744	\$ -		
ACA 2	Reduced capacity for heating equipment							\$ -	
	INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$ -		
EM ACA 3	Peduced canacity for air handling equipment		-	units	\$	-	\$ -	\$ (1,274)	
Standard	Reduced capacity for air handling equipment PSZ AHU, CAV, 2755 cfm	RSMeans 23 74 33.10	1	units	\$	14,442	\$ 14,442		
EEM	PSZ AHU, CAV, 2394 cfm	RSMeans 23 74 33.10	1	units	\$	13,167			
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		'		7	,		\$ -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 4,338	
Standard	000(040)/40	-bbb	-	0	\$	-	\$ -	-	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	3	outlets	\$	1,300	\$ 4,338		
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC		-	0	\$		\$ -	•	
, anudi U		***************************************	<u>-</u>	0	\$	-	\$ -		
=EM									
EM					Ψ		Total	\$ 29.586	

#### 2020 NYStretch WAREHOUSE - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
	Enhanced insulation for roofs and walls	item cost	LEW OIIIS					\$ 30,496	
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	s	-	s -		,
	6A: U-0.031; R-33.4 (+ R-3.4)		49,495	Area	3	-	\$ -		
	Standard wall insulation (metal building)		26,687	Area	s		\$ -		
	6A: U-0.050; R-18.6		20,007	7404			<b>.</b>		
	Enhanced roof insulation (insulation entirely above deck)  6A: U-0.028; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	49,495	Area	\$	0.5998	\$ 29,685		
	bA: 0-0.028; R-33.4 (+ R-3.4) Enhanced wall insulation (nonresidential mass wall)								
	6A: U-0.048; R-19.5 (+ R-0.95)	RSMeans 07 21 13.10	26,687	Area	\$	0.0304	\$ 811		
	Enhanced fenestration				-			\$ 105	
	Standard windows, U-0.36		190	Area	\$	-	\$ -		
EM		PNNL CE ANALYSIS	190	Area	\$	0.55			
EM 3	Air leakage testing for mid-sized buildings							\$ 6,400	
	Not Required		1	units	\$	-	\$ -		
		Vidaris	1	units	\$	6,400	\$ 6,400		
	Reduced LPD for interior lighting; high efficacy lights in dwelling units				-			\$ -	
	Lighting per ASHRAE 90.1-2016		24,400	watts	\$	6.75			No cost assumed for this
		HBL	18,689		\$	-	\$ -		buidling type
EM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting				-		0	, S -	
	n/a - IECC only n/a - IECC only				\$		\$ - \$ -		
	Exterior lighting control				٠		-	\$	
Standard			-		\$	-	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$	-	\$ -		
	Reduce fan power allowances							\$ -	
Mandard	CV fans: 0.00094 bhp/cfm				s	1,031	s -		
	VAV fans: 0.00130 bhp/cfm				ې	1,031	- پ		
	CV fans: 0.00088 bhp/cfm				s	4	s -		
	VAV fans: 0.00100 bhp/cfm				Ÿ	7			
	Hotel guestroom HVAC vacancy control						_	\$ -	
	n/a - already included in 90.1-2016		-		\$	-	\$ -		
	n/a - already included in 90.1-2016 High-efficiency SHW		-		\$	-	\$ -		
	n/a - does not apply to this building type		-		\$		\$ -	-	
	n/a - does not apply to this building type				S		\$ -		
	High-efficiency commercial kitchen equipment		-				_	s -	
	n/a - does not apply to this building type		-		\$	-	\$ -		
EM	n/a - does not apply to this building type		-		\$	-	\$ -		
EM 11	Thermal bridging reduction							\$ -	
Standard	n/a - does not apply to this building type		-		\$		\$ -		
	n/a - does not apply to this building type		-		\$	0	\$ -		
	Exterior lighting power reduction							\$ -	
Standard	Lighting per ASHRAE 90.1-2016 Reduced LPDs, ~8% more efficient	RSMeans 26 51 13.55	5,101	watts	\$	- :	\$ -		
		RSMeans 26 51 13.55			\$	-	\$ -		
	Efficient elevator, regenerative drives n/a - does not apply to this building type		-	each	\$		\$ -	-	
	n/a - does not apply to this building type			each	S		\$ -		
	ERV for apartment makeup air units			00011			Ť	s -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM 15	Demand-based recirculated SHW controls							\$ -	
Standard	n/a		-	0	\$	-	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	L COST ADJUSTMENTS								
	Reduced capacity for cooling equipment				-			\$ -	
	INCLUDED WITH AHU IN ACA 3		-	units	\$	477.741	\$ -		
EM CA 2	Deduced consolity for booting equipment		-	units	\$	177,744	\$ -	•	
	Reduced capacity for heating equipment INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$ -	•	
EM	INDEDDED WITH AND IN ADA 3		-	units	S		\$ -		
	Reduced capacity for air handling equipment			U				\$ (2.024)	
	PSZ AHU, CAV, 2882 cfm	RSMeans 23 74 33.10	1	units	\$	14,891	\$ 14,891	,_,,,,,,	
EM	PSZ AHU, CAV, 2310 cfm	RSMeans 23 74 33.10	1	units	\$	12,867			
	Increased insulation to account for PTAC openings, thermal bridging requirements							\$ -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 4,338	
Standard	000/040/40 5A 4 0A		-	0	\$	-	\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	3	outlets	\$	1,300	\$ 4,338	•	
CA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC		-	0	\$		\$ -	•	
				0	\$	-	\$ -		
		1		U	Ψ				
EM							Total	\$ 39.315	

#### 2020 NYStretch 10 STORY HIGH-RISE APARTMENT - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	С	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls							\$ 3,991	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$	-	\$ -		
Standard	Standard wall insulation (residential steel-frame wall)		29.112	Area	\$	-	s -		
Otaridara	4A: U-0.064; R-13.4		20,112	7404			¥		
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	8,435	Area	\$	0.3881	\$ 3,274		
	4A: U-0.030; R-32.2 (+ R-2.2) Enhanced wall insulation (residential steel-frame wall)								
EEM	4A: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	29,112	Area	\$	0.0246	\$ 717		
EEM 2	Enhanced fenestration							\$ 6,679	
	Standard windows, U-0.39		12,383	Area	\$	-	s -	0,0.0	
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	12,383	Area	\$	0.54			
EEM 3	Air leakage testing for mid-sized buildings							\$ -	
	n/a - does not apply to this building type		-	0	\$		\$ -		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$ -	
	Lighting per ASHRAE 90.1-2016		60,160	watts	\$		\$ - \$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	57,804	watts	\$	-	\$ -		9 77
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting			0	0		¢.	\$ -	
Standard EEM	n/a - IECC only n/a - IECC only		-	0	\$		\$ - \$ -		
EEM 6	Exterior lighting control		-	U	φ	-	-	\$ -	
	n/a		-	0	\$		\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$		\$ -		
EEM 7	Reduce fan power allowances							\$ -	
	n/a - does not apply to this building type				\$	-	\$ -		
EEM	n/a - does not apply to this building type				\$	-	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control							\$ -	
	n/a - already included in 90.1-2016		-		\$	-	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$	-	\$ -		
EEM 9	High-efficiency SHW				•		•	\$ -	
Standard EEM	Hot water boiler with 80% thermal efficiency Hot water boiler with 94% thermal efficiency		-		\$	-	\$ - \$ -		
EEM 10	High-efficiency commercial kitchen equipment		-		ş	-	٠ -	e	
	n/a - does not apply to this building type		-		\$	-	\$ -	•	
EEM	n/a - does not apply to this building type		-		S	-	š -		
EEM 11	Thermal bridging reduction							\$ 1,270	
Standard	Standard wall insulation		-		\$	-	\$ -		
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	3,735	Area	\$	0.3400	\$ 1,270		
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	TOWICANS 07 22 10.10	0,700	Aica	٠	0.0400	9 1,270		
EEM 12	Exterior lighting power reduction	2014					_	\$ -	
Standard EEM	n/a - not modeled for this building type n/a - not modeled for this building type	RSMeans 26 51 13.55 RSMeans 26 51 13.55	-		\$		\$ - \$ -		
EEM 13	Efficient elevator, regenerative drives	RSIVIERIIS 20 51 13.55	-		ş	-	٠ -	\$ 10.000	
	Standard elevator, regenerative drives			each	\$		S -	\$ 10,000	
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	S	10,000			
EEM 14	ERV for apartment makeup air units							\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	Demand-based recirculated SHW controls							\$ -	
	n/a		-	0	\$		\$ -		
EEM	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$	-	s -		
ACA 1	Reduced capacity for cooling equipment							\$ (2,551)	
	PTAC. 105 tons	RSMeans D3050 255	1	units	\$	179,837	\$ 179,837	\$ (2,551)	
EEM	PTAC, 104 tons	RSMeans D3050 255	1	units	\$	177,287			
ACA 2	Reduced capacity for heating equipment			u	Ţ	,251	,201	\$ (469)	
	Hot water boiler, gas fired, 1076 MBH	RSMeans D3020 130	1	units	\$	43,188	\$ 43,188	(400)	
EEM	Hot water boiler, gas fired, 1059 MBH	RSMeans D3020 130	1	0	\$	42,719			
ACA 3	Reduced capacity for air handling equipment							\$ -	
	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$		\$ -		
EEM	In control to the last of the DTAO on the		-	units	\$	-	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements				•		•	\$ 5,255	
Standard EEM	Opaque wall with U-0.061 Opaque wall with U-0.045, R-22.2 (+R-5.85)	RSMeans 07 21 13.10	28,086	0	\$	- 0.1871	\$ - \$ 5,255		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces	NOINIEGIIS 0/ 21 13.10	20,000	U	٥	0.1071	ψ 5,235	\$ 2.600	
Standard	Electric Formers Straighing Station capable parking lots for 0 /6 or spaces		-	0	\$	-	\$ -	2,000	
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300			
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC							\$ -	
Standard			-	0	\$	-	\$ -		
EEM			-	0	\$	-	\$ -		
							Total	\$ 26,775	
-								-,	·

#### 2020 NYStretch 10 STORY HIGH-RISE APARTMENT - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

standard Statandard India Statand	(1-0-0.03); R-3.22 (FA.2) Inanced wall insulation (residential steel-frame wall) I-0-0.052; R-17.1 (R-1.05) Inanced wall insulation (residential steel-frame wall) Inanced windows, U-0.39 Inanced win	RSMeans 07 22 16.10 RSMeans 07 21 13.10 PNNL CE ANALYSIS	Number of EEM Units 8,435 29,112 8,435 29,112 12,383 12,383	Area Area Area Area Area Area O 0 watts	Cost / Unit  \$ - \$ 0.3881 \$ 0.0336  \$ - \$ 0.79	\$ - \$ -	Total Incremental Cost \$ 4,252 \$ 9,755 \$	Notes / Comments
standard Statandard India Statand	andard U-0.032. R-30 roof insulation (insulation entirely above deck) andard wall insulation (residential steel-frame wall) : U-0.055; R-16.0 hanced roof insulation insulation entirely above deck) U-0.030; R-322 (- R-2.2) hanced wall insulation (residential steel-frame wall) : U-0.052; R-17.1 (+ R-1.05) hanced fenestration andard windows, U-0.39 hanced windows, U-0.39 hanced windows, U-0.36 leakage testing for mid-sized buildings - does not apply to this building type - does not apply to finis building type duced LPD for interior lighting; high efficacy lights in dwelling units htting per ASHRAE 90.1-2016 duced LPDs, ~20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only - IECC only	RSMeans 07 21 13.10 PNNL CE ANALYSIS	29,112 8,435 29,112 12,383 12,383 - - - - - - - - - - - - - - - - - -	Area Area Area Area Area O 0 watts	\$ - \$ 0.3881 \$ 0.0336 \$ - \$ 0.79 \$ - \$ -	\$ - \$ 3,274 \$ 978 \$ - \$ 9,755 \$ - \$ -		
Indiand State Indiand	andard wall insulation (residential steel-frame wall)  **L***\(\text{U}_0.05S; R-16.0\)  hanced roof insulation (insulation entirely above deck)  **L***\(\text{U}_0.030; R-32.2\) (+ R-2.2)  hanced wall insulation (residential steel-frame wall)  **L**\(\text{U}_0.052; R-17.1\) (+ R-1.05)  hanced fronestration  **ndard windows, U-0.39  hanced windows, U-0.39  hanced windows, U-0.36  **leakage testing for mid-sized buildings  - does not apply to this building type  - does not apply to this building type  - does not apply to this building; high efficacy lights in dwelling units  **hting per ASHRAE 90.1-2016  duced LPD for interior lighting; high efficacy lights in dwelling units  **thing per ASHRAE 90.1-2016  duced LPD bowers and automatic lighting controls including egress lighting  - IECC only  - IECC only  - IECC only	RSMeans 07 21 13.10 PNNL CE ANALYSIS	29,112 8,435 29,112 12,383 12,383 - - - - - - - - - - - - - - - - - -	Area Area Area Area Area O 0 watts	\$ - \$ 0.3881 \$ 0.0336 \$ - \$ 0.79 \$ - \$ -	\$ - \$ 3,274 \$ 978 \$ - \$ 9,755 \$ - \$ -	\$ 9,755 \$ -	
EM Ship Ship Ship Ship Ship Ship Ship Ship	: U-0.05; R-16.0 hanced roof insulation (insulation entirely above deck) : U-0.030; R-32.2 (+ R-2.2) hanced wall insulation (residential steel-frame wall) : U-0.052; R-17.1 (+ R-1.05) hanced fenestration andard windows, U-0.39 hanced windows, U-0.36 leakage testing for mid-sized buildings - does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units htting per ASHRAE 90.1-2016 duced LPDs20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control	RSMeans 07 21 13.10 PNNL CE ANALYSIS	8,435 29,112 12,383 12,383 - - - 60,160 57,804	Area Area Area Area O 0 watts	\$ 0.3881 \$ 0.0336 \$ - \$ 0.79 \$ - \$ -	\$ 3,274 \$ 978 \$ - \$ 9,755 \$ - \$ -	\$ 9,755	
EM	hanced roof insulation (insulation entirely above deck)  1-0-0.030: R.32.2 (- R.2.2)  hanced wall insulation (residential steel-frame wall)  1-0-0.052: R-17.1 (+ R-1.05)  hanced fenestration  nuclard windows, U-0.39  hanced windows, U-0.39  leakage testing for mid-sized buildings  1- does not apply to this building type  1- does not apply to this building type  1- does not apply to this building; high efficacy lights in dwelling units  thing per ASHRAE 90, 1-2.016  duced LPD for interior lighting; high efficacy lights in dwelling units  thing per ASHRAE 90, 1-2.016  duced LPD bo., "-20% more efficient  cupancy sensors and automatic lighting controls including egress lighting  1- IECC only  - IECC only  terior lighting control	RSMeans 07 21 13.10 PNNL CE ANALYSIS	29,112 12,383 12,383 - - - 60,160 57,804	Area Area 0 0 watts	\$ 0.0336 \$ - \$ 0.79 \$ - \$ -	\$ 978 \$ - \$ 9,755 \$ - \$ -	\$ 9,755 \$ -	
SA:   Ent   SA:	: U-0 030; R-322 ( r. R-2.2) hanced wall insulation (residential steel-frame wall) : U-0.052; R-17.1 (r. R-1.05) hanced fenestration andard windows, U-0.36 hanced windows, U-0.36 leakage testing for mid-sized buildings - does not apply to this building type - does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units thing per ASHRAE 90.1-2016 duced LPDs20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only	RSMeans 07 21 13.10 PNNL CE ANALYSIS	29,112 12,383 12,383 - - - 60,160 57,804	Area Area 0 0 watts	\$ 0.0336 \$ - \$ 0.79 \$ - \$ -	\$ 978 \$ - \$ 9,755 \$ - \$ -	\$ 9,755 \$ -	
EM 5A: EM 2 Entl standard Sta EM 3 Air standard n/a EM 4 Ret EM 5 Oct standard n/a EM 5 Oct standard n/a EM 6 Ext standard n/a EM 7 Ret	: U-0.052; R-17.1 ( r R-1.05) hanced fenestration indiand windows, U-0.36 hanced windows, U-0.36 hanced windows, U-0.36 leakage testing for mid-sized buildings l- does not apply to this building type does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units htting per ASHRAE 9.0.1-2.016 duced LPDs -20% more efficient cupancy sensors and automatic lighting controls including egress lighting l-ECC only leterior lighting control	PNNL CE ANALYSIS	12,383 12,383 - - - 60,160 57,804	Area Area 0 0	\$ - \$ 0.79 \$ - \$ -	\$ - \$ 9,755 \$ - \$ -	\$ 9,755 \$ -	
SACTION OF THE PROPERTY OF THE	Ananced fenestration andard windows, U-0.39 hanced windows, U-0.39 leakage testing for mid-sized buildings - does not apply to this building type - does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units thing per ASHRAE 90.1-2016 duced LPD to.90% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control	PNNL CE ANALYSIS	12,383 12,383 - - - 60,160 57,804	Area Area 0 0	\$ - \$ 0.79 \$ - \$ -	\$ - \$ 9,755 \$ - \$ -	\$ 9,755 \$ -	
tandard Statement Statemen	andard windows, U-0.39 hanced windows, U-0.39 leakage testing for mid-sized buildings - does not apply to this building type - does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units hiting per ASHRAE 90.1-2016 duced LPDs, -20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control		12,383 - - - 60,160 57,804	Area 0 0 watts	\$ 0.79 \$ - \$ -	\$ 9,755 \$ - \$ -	\$ -	
EM Ent EM 3 Air Interpretation EM n/a EM 4 Rec Interpretation EM 6 Rec Interpretation EM 6 Ext Interpretation EM n/a EM 6 Ext Interpretation EM n/a EM 7 Rec Interpretation EM n/a	hanced windows, U-0.36  leakage testing for mid-sized buildings  - does not apply to this building type  - does not apply to this building type  duced LPD for interior lighting; high efficacy lights in dwelling units  thing per ASHRAE 90.1-2016  duced LPDs720% more efficient  cupancy sensors and automatic lighting controls including egress lighting  - IECC only  - IECC only  terior lighting control		12,383 - - - 60,160 57,804	Area 0 0 watts	\$ 0.79 \$ - \$ -	\$ 9,755 \$ - \$ -	\$ <u>-</u>	
tandard n/a EM n/a EM Ret tandard Ligi EM Ret EM 5 Oct tandard n/a EM 6 Ext tandard n/a EM 7 Ret EM 7 Ret EM 7 Ret	I - does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units thing per ASHRAE 90.1-2016 duced LPD, 2709 more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control	нвь	60,160 57,804	0 watts	\$ -   \$ -	\$ -	\$ -	
EM n/a EM4 Ret tandard Ligi EM Rec EM 5 Occ tandard n/a EM 6 Ext tandard n/a EM 7 Rec EM7 Rec EM7 Ret EM7 n/a	- does not apply to this building type duced LPD for interior lighting; high efficacy lights in dwelling units hiting per ASHRAE 90.1-2016 duced LPDs, -20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control	HBL	60,160 57,804	0 watts	\$ -   \$ -	\$ -	\$	
EM 4 Ret tandard Ligit EM Ret EM 5 Oct tandard n/a EM 6 Ext tandard n/a EM n/a EM 7 Ret	duced LPD for interior lighting; high efficacy lights in dwelling units  thing per ASHRAE 90.1-2016 duced LPDs, ~20% more efficient cupancy sensors and automatic lighting controls including egress lighting - I-ECC only - IECC only terior lighting control	нвь	57,804	watts	\$ -		\$ -	
tandard Ligi EM Rec EM 5 Occ tandard n/a EM 6 Ext tandard n/a EM 7 Rec EM 7 Rec tandard n/a	hting per ASHRAE 90.1-2016 duced LPDs, ~20% more efficient cupancy sensors and automatic lighting controls including egress lighting - /ECC only - IECC only terior lighting control	HBL	57,804					
EM Rec EM 5 Occ tandard n/a EM n/a EM 6 Ext tandard n/a EM n/a EM n/a EM n/a EM 7 Rec tandard n/a EM n/a	duced LPDs, ~20% more efficient cupancy sensors and automatic lighting controls including egress lighting - IECC only - IECC only terior lighting control	HBL		watts		\$ -		No cost assumed for this
tandard n/a EM n/a EM 6 Ext tandard n/a EM n/a EM 7 Rec tandard n/a EM n/a	- IECC only - IECC only terior lighting control				\$ -	\$ -		buidling type
EM n/a EM 6 Ext tandard n/a EM n/a EM 7 Rec tandard n/a EM n/a	- IECC only terior lighting control						\$ -	
EM 6 Ext tandard n/a EM n/a EM 7 Rec tandard n/a EM n/a	terior lighting control		-	0	\$ -	\$ -		
tandard n/a EM n/a EM 7 Rec tandard n/a EM n/a			-	0	\$ -	\$ -	•	
EM n/a EM 7 Rec tandard n/a EM n/a			-	0	\$ -	\$ -	-	·
tandard n/a EM n/a	- IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EM n/a	duce fan power allowances						\$ -	
	- does not apply to this building type				\$ -	\$ -		
EM 8 Hot	- does not apply to this building type tel guestroom HVAC vacancy control				\$ -	\$ -		
	- already included in 90.1-2016		-		\$ -	\$ -	-	·
	- already included in 90.1-2016		-		\$ -	\$ -		
	ph-efficiency SHW						\$ -	
	- does not apply to this building type		-		\$ -	\$ -		
	- does not apply to this building type ph-efficiency commercial kitchen equipment		-		\$ -	\$ -	*	
	- does not apply to this building type		-		\$ -	\$ -	-	·
EM n/a	- does not apply to this building type		-		\$ -	\$ -		
EM 11 The	ermal bridging reduction						\$ 1,270	
	andard wall insulation		-		\$ -	\$ -		
	Iditional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of rapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
	terior lighting power reduction						\$ -	
		RSMeans 26 51 13.55	-		\$ -	\$ -		·
EM n/a	- not modeled for this building type	RSMeans 26 51 13.55	-		\$ -	\$ -		
	icient elevator, regenerative drives					_	\$ 10,000	
	andard elevator motors, 30hp evator motors with regenerative drives, 30 hp	Previous projects	- 1	each each	\$ - \$ 10.000	\$ - \$ 10.000		
	V for apartment makeup air units	r revious projects		eacii	\$ 10,000	\$ 10,000	s -	
tandard n/a	- already included in 90.1-2016		-	0	\$ -	\$ -		
	- already included in 90.1-2016		-	0	\$ -	\$ -		
	mand-based recirculated SHW controls				1.0	•	\$ -	
tandard n/a EM n/a	- applies to IECC path only		-	0	\$ - \$ -	\$ - \$ -		
DDITIONAL (	COST ADJUSTMENTS			v		· -		
CA 1 Red	duced capacity for cooling equipment						\$ (4,679)	
tandard PT	AC, 106 tons	RSMeans D3050 255	1	units	\$ 180,632			
		RSMeans D3050 255	1	units	\$ 175,954	\$ 175,954	6 (77.4)	
	duced capacity for heating equipment t water boiler, gas fired, 1073 MBH	RSMeans D3020 130	1	units	\$ 43,089	\$ 43.089	\$ (771)	
		RSMeans D3020 130	1	0	\$ 42,318			
CA 3 Red	duced capacity for air handling equipment						\$ -	
	CLUCED W/PACKAGED UNITS IN ACA 1)		-	units	s -	\$ -		
EM CA 4 Inci	reased inculation to account for PTAC enemings, thermal hydring requirements		-	units	\$ -	\$ -	. 7000	
	reased insulation to account for PTAC openings, thermal bridging requirements aque wall with U-0.052		-	0	\$ -	\$ -	\$ 7,938	
		RSMeans 07 21 13.10	28,086	0	\$ 0.2826			
CA 5 Ele	ectric vehicle charging station capable parking lots for 5% of spaces						\$ 2,600	
tandard			-	0	\$ -	\$ -		
		chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
CA 6 Sol tandard	lar-ready zone per Appendix CA of 2018 IECC		-	0	\$ -	\$ -	•	
EM			-	0	\$ -	\$ -		
						Total	\$ 30.364	

#### 2020 NYStretch 10 STORY HIGH-RISE APARTMENT - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls				1		\$ 6,503	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$ -	\$ -		
Standard	Standard wall insulation (residential steel-frame wall) 6A: U-0.049: R-17.5		29,112	Area	\$ -	\$ -		l
	Enhanced roof insulation (insulation entirely above deck)							
	6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	8,435	Area	\$ 0.5998	\$ 5,059		l
	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	29,112	Area	\$ 0.0496	\$ 1,444		
	6A: U-0.044; R-19.1 (+ R-1.55)	Rowealis 07 21 15.10	29,112	Alea	\$ 0.0496	\$ 1,444		
	Enhanced fenestration		40.000		-		\$ 10,005	
	Standard windows, U-0.38 Enhanced windows, U-0.35	PNNL CE ANALYSIS	12,383 12,383	Area Area	\$ - \$ 0.81			
	Air leakage testing for mid-sized buildings	FININE CE ANALTOIS	12,303	Alea	\$ 0.01	\$ 10,003	s -	
	n/a - does not apply to this building type		-	0	\$ -	\$ -		
	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	.,					\$ -	
	Lighting per ASHRAE 90.1-2016	HBL	60,160	watts	\$ 6.75 \$ -			No cost assumed for this
	Reduced LPDs, ~20% more efficient	HBL	57,804	watts	\$ -	\$ -	•	buidling type
	Occupancy sensors and automatic lighting controls including egress lighting  n/a - IECC only		-	0	\$ -	\$ -	\$ -	
	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
	n/a		-	0	\$ -	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						5 -	
	n/a - does not apply to this building type n/a - does not apply to this building type				\$ - \$ -	\$ - \$ -		
EEM 8	Hotel guestroom HVAC vacancy control					_	s -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	High-efficiency SHW						\$ -	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-		\$ - \$ -	\$ - \$ -		
EEM 10	High-efficiency commercial kitchen equipment		-		\$ -	3 -	٠ .	
	n/a - does not apply to this building type	1	-		\$ -	\$ -	-	·
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
	Thermal bridging reduction						\$ 1,270	
Standard	Standard wall insulation		-		\$ -	\$ -		
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
EEM 12	Exterior lighting power reduction						\$ -	
	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$ -	\$ -		
EEM	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$ -	\$ -		
	Efficient elevator, regenerative drives	1		_			\$ 10,000	
	Standard elevator motors, 30hp Elevator motors with regenerative drives, 30 hp	Previous projects	- 1	each each	\$ - \$ 10,000	\$ -		
	ERV for apartment makeup air units	Previous projects	'	eacri	\$ 10,000	\$ 10,000		
	n/a - already included in 90.1-2016		-	0	\$ -	\$ -	· · · · · · · · · · · · · · · · · · ·	
	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
	Demand-based recirculated SHW controls		ب		Ĺ		S -	
	n/a		-	0	\$ -	\$ -		
	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$ -	\$ -		
	Reduced capacity for cooling equipment						\$ (6,309)	
Standard	PTAC, 108 tons	RSMeans D3050 255	1	units	\$ 183,620			
EEM	PTAC, 104 tons	RSMeans D3050 255	1	units	\$ 177,311			
ACA 2	Reduced capacity for heating equipment	Inout north					\$ (1,006)	
Standard EEM	Hot water boiler, gas fired, 1112 MBH Hot water boiler, gas fired, 1076 MBH	RSMeans D3020 130 RSMeans D3020 130	1 1	units	\$ 44,195 \$ 43,189			
ACA 3	Reduced capacity for air handling equipment	rt-Sivietans D3020 130	1	0	ə 43,189	a 43,189	\$	
	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	s -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	_				_	\$ 12,444	
Standard	Opaque wall with U-0.044	DOM: 07.04.40.10		0	\$ -	\$ -		
	Opaque wall with U-0.027, R-36.57 (+R-13.9) Electric vehicle charging station capable parking lots for 5% of spaces	RSMeans 07 21 13.10	28,086	0	\$ 0.4431	\$ 12,444	\$ 2.600	
Standard	Electric vehicle charging station capable parking lots for 5% of spaces		-	0	\$ -	\$ -	\$ 2,600	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300		1	
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
				0		S -		
EEM			-		\$ -	Total	\$ 35.508	

### 2020 NYStretch 20 STORY HIGH-RISE APARTMENT - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EM 1	Enhanced insulation for roofs and walls							\$ 4,397	
tandard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$	-	\$ -		
Standard	Standard wall insulation (residential steel-frame wall) 4A: U-0.064: R-13.4		45,603	Area	\$	-	\$ -		
	4A: U-0.064; R-13.4 Enhanced roof insulation (insulation entirely above deck)								
EM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	8,435	Area	\$	0.3881	\$ 3,27	1	
EEM	Enhanced wall insulation (residential steel-frame wall)	DOLL 07.01.10.10	45.000						
	4A: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	45,603	Area	\$	0.0246	\$ 1,124	<del>1</del>	
EM 2	Enhanced fenestration							\$ 20,165	
Standard	Standard windows, U-0.39		37,387	Area	\$	-	\$ -		
EM 3	Enhanced windows, U-0.37	PNNL CE ANALYSIS	37,387	Area	\$	0.54	\$ 20,16	5	
	Air leakage testing for mid-sized buildings n/a - does not apply to this building type			0	S		·	-	
EM	n/a - does not apply to this building type			0	\$		\$ - \$ -		
EM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		-		Ų			\$ 15.786	
	Lighting per ASHRAE 90.1-2016		13,812	watts	\$	6.75	\$ 93,22		
EM	Reduced LPDs, ~20% more efficient	HBL	11,473	watts	\$	-	\$ 109,015.5		Cost for retail area only
EM 5	Occupancy sensors and automatic lighting controls including egress lighting		-					\$ -	
tandard	n/a - IECC only		-	0	\$	-	\$ -		
EM	n/a - IECC only		-	0	\$	-	\$ -		
EM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		
EM Z	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		
EM 7 tandard	Reduce fan power allowances n/a - does not apply to this building type				\$		\$ -	-	
tanaara EM	n/a - does not apply to this building type n/a - does not apply to this building type				\$		\$ -		
EM 8	Hotel guestroom HVAC vacancy control				ų.	-	Ψ -	s -	
tandard	n/a - already included in 90.1-2016		-		\$		\$ -	•	
EM	n/a - already included in 90.1-2016		-		\$	-	\$ -		
EM 9	High-efficiency SHW							\$ -	
tandard	Natural gas water heaters, 1200 MBH, 90% thermal efficiency (as (3) 400MBH units)		3	each	\$	-	\$ -		
EM	Natural gas water heaters, 1200 MBH, 94% thermal efficiency(as (3) 400MBH units)		3	each	\$	-	\$ -		
EM 10	High-efficiency commercial kitchen equipment							\$ -	
Standard EM	n/a - does not apply to this building type n/a - does not apply to this building type		-		\$	- :	\$ - \$ -		
EM 11	Thermal bridging reduction				ې	-	φ -	\$ 1.270	
tandard	Standard wall insulation		-		\$		\$ -	,,_,	
	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of		0.705						
EM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$	0.3400	\$ 1,270	,	
EM 12	Exterior lighting power reduction							\$ -	
tandard	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$ -		
EM	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$ -	\$ 20,000	
EM 13 tandard	Efficient elevator, regenerative drives Standard elevator motors, 30hp	·	-	each	\$		\$ -	\$ 20,000	
EM	Elevator motors, 30np Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$	10,000		)	
EM 14	ERV for apartment makeup air units	i revious projects		Cacii	,	10,000	Ψ 20,000	, s -	
	n/a - already included in 90.1-2016		-	0	\$		\$ -	-	
ΞM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EM 15	Demand-based recirculated SHW controls							\$ -	
tandard			-	0	\$	-	\$ -		
EM	n/a - applies to IECC path only		-	0	\$	-	\$ -		
	AL COST ADJUSTMENTS							(	
CA 1 tandard	Reduced capacity for cooling equipment WSHP, 174 tons	RSMeans D3050 240	-	units	S	492,590	\$ 492.59	\$ (5,840)	
tandard tandard	WSHP, 174 tons Closed circuit cooling tower, 140 tons	RSMeans D3050 240 RSMeans 23 65 133.10	1	units	\$	109,749	\$ 492,59		
anaara EM	WSHP, 172 tons	RSMeans D3050 240	1	units	\$	487,823			
EM	Closed circuit cooling tower, 138.2 tons	RSMeans 23 65 133.10	1	units	\$	108,676			
CA 2	Reduced capacity for heating equipment					,		\$ -	
tandard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -		
EM			-	units	\$	-	\$ -		
CA 3	Reduced capacity for air handling equipment							\$ -	
tandard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -		
EM .	In conserved the collection for a conserved for DTAO and collection of the conserved best deliberate and collection.		-	units	\$	-	\$ -		
CA 4 tandard	Increased insulation to account for PTAC openings, thermal bridging requirements  n/a - does not apply to this building type		-	0	\$		\$ -	•	
anaara EM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$	- :	\$ -		
CA 5	Electric vehicle charging station capable parking lots for 5% of spaces		-	U	9		Ψ -	\$ 2.600	
tandard	Lieutric verificie enarging station capable parking lots for 0 % or spaces		-	0	\$	-	\$ -	2,000	
	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300		)	
ΞM									
CA 6	Solar-ready zone per Appendix CA of 2018 IECC							\$ -	
EM CA 6 tandard			-	0	\$		\$ -	-	
CA 6				0	\$	-	\$ - \$ -	\$ -	

#### 2020 NYStretch 20 STORY HIGH-RISE APARTMENT - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

Standard Standard	Description  Enhanced insulation for roofs and walls	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
Standard Standard									
Standard Standard								\$ 4,806	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$	-	\$ -	•	
	Standard wall insulation (residential steel-frame wall)		45,603	Area	\$		\$ -		
	5A: U-0.055; R-16.0 Enhanced roof insulation (insulation entirely above deck)								
	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	8,435	Area	\$	0.3881	\$ 3,274		
тм	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	45,603	Area	\$	0.0336	\$ 1,532		
	5A: U-0.052; R-17.1 (+ R-1.05)	Roweans 07 21 15.10	45,603	Alea	à	0.0336	\$ 1,552		
	Enhanced fenestration Standard windows, U-0.39		37.387	Area	•	-	\$ -	\$ 29,452	
	Enhanced windows, U-0.39	PNNL CE ANALYSIS	37,387	Area	\$	0.79			
	Air leakage testing for mid-sized buildings	THE SETTIFICATION	07,007	7000	Ψ	0.10	20,102	s -	
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	\$	-	\$ -	\$ 15.786	
	Reduced LPD for interior lighting; high efficacy lights in dwelling units  Lighting per ASHRAE 90.1-2016	1	13,812	watts	\$	6.75	\$ 93,229	\$ 15,786	
	Reduced LPDs, ~20% more efficient	HBL	11,473	watts	\$	-	\$ 109,016		Cost for retail area only
	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	11,470	watto	Ψ	-	Ψ 103,010	s -	
Standard	n/a - IECC only		-	0	\$	-	\$ -		
	n/a - IECC only		-	0	\$	-	\$ -	_	
	Exterior lighting control		-	0	2		\$ -		
	n/a n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	- :	\$ -		
EEM 7	Reduce fan power allowances							\$ -	
Standard	n/a - does not apply to this building type				\$	-	\$ -		
	n/a - does not apply to this building type				\$	-	\$ -	•	
EEM 8 Standard	Hotel guestroom HVAC vacancy control n/a - already included in 90.1-2016		-		\$	-	\$ -	\$ -	
	n/a - already included in 90.1-2016		-		\$	-	\$ -		
	High-efficiency SHW							\$ -	
	n/a - does not apply to this building type		3	each	\$	-	\$ -		
	n/a - does not apply to this building type High-efficiency commercial kitchen equipment		3	each	\$	-	\$ -	•	
	n/a - does not apply to this building type		-		\$	-	\$ -	-	
EEM	n/a - does not apply to this building type		-		\$	-	\$ -		
	Thermal bridging reduction							\$ 1,270	
	Standard wall insulation		-		\$	-	\$ -		
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$	0.3400	\$ 1,270		
	Exterior lighting power reduction							\$ -	
Standard	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$ -		
EM 13	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$ -	\$ 20,000	
Standard	Efficient elevator, regenerative drives Standard elevator motors, 30hp		-	each	\$		s -	\$ 20,000	
	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	S		\$ 20,000		
EEM 14	ERV for apartment makeup air units							\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	n/a - already included in 90.1-2016  Demand-based recirculated SHW controls		-	0	\$	-	\$ -	•	
	n/a		-	0	\$	-	\$ -	-	
EEM	n/a - applies to IECC path only		-	Ŏ	\$	-	\$ -		
	AL COST ADJUSTMENTS								
	Reduced capacity for cooling equipment WSHP, 172 tons	RSMeans D3050 240	1	units	S	486.559	\$ 486.559	\$ (5,884)	
	WSHP, 172 tons Closed circuit cooling tower, 138 tons	RSMeans 23 65 133.10	1	units	\$		\$ 486,559 \$ 108,392		
	WSHP, 169.8 tons	RSMeans D3050 240	1	units	\$		\$ 481,756		
EEM	Closed circuit cooling tower, 136.5 tons	RSMeans 23 65 133.10	1	units	\$		\$ 107,311		
ACA 2	Reduced capacity for heating equipment							\$ -	
Standard EEM	(INCLUDED W/PACKAGED UNITS IN ACA 1)			units units	\$		\$ - \$ -		
ACA 3	Reduced capacity for air handling equipment			unto				\$ -	
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -		
EM			-	units	\$	-	\$ -		
	Increased insulation to account for PTAC openings, thermal bridging requirements  n/a - does not apply to this building type		-	0	\$	-	\$ -	5 -	
	n/a - does not apply to this building type		-	0	S		\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$ 2,600	
Standard			-	0	\$		\$ -		
	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$	1,300	\$ 2,600	•	
IUM D	Solar-ready zone per Appendix CA of 2010 IECC		-	0	S		\$ -	-	
Standard EM			-	0	\$	-	\$ -		

#### 2020 NYStretch 20 STORY HIGH-RISE APARTMENT - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019

EEM	Description	Source of	Number of	Unit	Cost	t / Unit	Total Item	Total Incremental Cost	Notes / Comments
		Item Cost	EEM Units				Cost	Total moremental desc	1101007 001111101110
	Enhanced insulation for roofs and walls							\$ 7,321	
	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$	-	\$ -		
	Standard wall insulation (residential steel-frame wall) 6A: U-0,049: R-17.5		45,603	Area	\$	-	\$ -		
	Enhanced roof insulation (insulation entirely above deck)			[	-				
	6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	8,435	Area	\$	0.5998	\$ 5,059		
	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	45,603	Area	s	0.0496	\$ 2.262		
	6A: U-0.044; R-19.1 (+ R-1.55)	R5Means 07 21 13.10	45,603	Area	3	0.0496	\$ 2,262		
	Enhanced fenestration							\$ 30,209	
Standard EEM	Standard windows, U-0.38	DNNI OF ANALYSIS	37,387	Area	\$		\$ -		
EEM 3	Enhanced windows, U-0.35 Air leakage testing for mid-sized buildings	PNNL CE ANALYSIS	37,387	Area	\$	0.81	\$ 30,209		
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -		
	n/a - does not apply to this building type		-	0	S		\$ -	***************************************	
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$ 15,786	
Standard	Lighting per ASHRAE 90.1-2016		13,812	watts	\$	6.75	\$ 93,229		
EEM	Reduced LPDs, ~20% more efficient	HBL	11,473	watts	s	-	\$ 109,016		Cost for retail area only
	Occupancy sensors and automatic lighting controls including egress lighting				عند ا			s -	
	n/a - IECC only		-	0	\$	-	\$ -	-	
EEM	n/a - IECC only		-	0	\$	-	\$ -		
EEM 6	Exterior lighting control							\$ -	
	n/a		-	0	\$	-	\$ -		
	n/a - IECC only; already included in NYS amendments to 90.1-2016  Reduce fan power allowances		-	0	\$	-	\$ -	•	
	n/a - does not apply to this building type				\$	-	\$ -	•	
	n/a - does not apply to this building type			1	\$	-	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control							\$ -	
Standard	n/a - already included in 90.1-2016		-		\$		\$ -		
	n/a - already included in 90.1-2016		-		\$	-	\$ -	•	
	High-efficiency SHW n/a - does not apply to this building type		3	each	\$	-	\$ -	-	
	n/a - does not apply to this building type  n/a - does not apply to this building type		3	each	\$		\$ -		
	High-efficiency commercial kitchen equipment			50011			<u> </u>	\$ -	
Standard	n/a - does not apply to this building type		-		\$	-	\$ -		
	n/a - does not apply to this building type		-	L	\$	-	\$ -		
	Thermal bridging reduction							\$ 1,270	
	Standard wall insulation  Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of				\$		\$ -		
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$	0.3400	\$ 1,270		
	Exterior lighting power reduction							\$ -	
	n/a - not modeled for this building type	RSMeans 26 51 13.55	-	1	\$	-	\$ -		
	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$ -		
EEM 13 Standard	Efficient elevator, regenerative drives Standard elevator motors, 30hp			each	\$		\$ -	\$ 20,000	
	Elevator motors with regenerative drives, 30 hp	Previous projects	- 2	each	\$	10,000			
	ERV for apartment makeup air units	T Tevious projects		Cacii	,	10,000	Ψ 20,000	s -	
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -		
	Demand-based recirculated SHW controls							\$ -	
Standard EEM	n/a		-	0	\$		\$ - \$ -		
	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	U	2	-	<b>Ф</b> -		
	Reduced capacity for cooling equipment							\$ (9,656)	
	WSHP, 166 tons	RSMeans D3050 240	1	units	\$ 4	471,779	\$ 471,779		
Standard	Closed circuit cooling tower, 134 tons	RSMeans 23 65 133.10	1	units	\$ 1	105,066	\$ 105,066		
EEM	WSHP, 163.5 tons	RSMeans D3050 240	1	units		463,897	\$ 463,897		
	Closed circuit cooling tower, 131.3 tons	RSMeans 23 65 133.10	1	units	\$ 1	103,292	\$ 103,292		
	Reduced capacity for heating equipment (INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	S		\$ -		
EEM .	UNIOCODED WIFACTONDED UNITO IN ACA I)		-	units	\$		\$ -		
ACA 3	Reduced capacity for air handling equipment			UU	, in the second			\$ -	
	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$		\$ -		
EEM			-	units	\$		\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements				-		_	\$ -	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$		\$ - \$ -		
	In/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces			U	a a	-	φ -	\$ 2.600	
Standard			-	0	\$	-	\$ -	2,000	
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300			
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC							\$ -	
Standard			-	0	\$	-	\$ -		
EEM			-	0	\$	-	s - Total	\$ 67.531	

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