

2020 NYStretch Energy Code Commercial Cost Effectiveness Analysis

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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 Construction 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, NYSEDA 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

Prototype	Construction Weight [%]	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost [\$/ft2]			Incremental First Cost	Simple Payback
		90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% 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

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

Prototype	Construction Weight	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost [\$/ft2]			Inc. First Cost \$/ft2	Simple Payback years
		90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings		
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

Prototype	Construction Weight	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost			Inc. First Cost	Simple Payback
		90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% 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

Prototype	Construction Weight	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost			Inc. First Cost	Simple Payback
		90.1-2016	NYStretch*	% Savings	90.1-2016	NYStretch*	% Savings	90.1-2016	NYStretch*	% 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

Prototype	Construction Weight [%]	Annual Energy Cost		10 Year Life Cycle Energy Cost			Incremental First Cost	Residual Value at 10yrs	Net Savings over 10 Years	
		90.1-2016	NYStretch	90.1-2016	NYStretch	Savings			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	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

Prototype	Construction Weights	CZ	First Cost	Replacement Costs	Maintenance	Residual Value	Energy Cost Savings	30 Year Net Present Value of 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	<p data-bbox="954 1234 1382 1318">CZ 4A: New York (USA_NY_New.York- J.F.Kennedy.Intl.AP.744860_TMY3.epw)</p> <p data-bbox="943 1360 1398 1444">CZ 5A: Buffalo (USA_NY_Buffalo- Greater.Buffalo.Intl.AP.725280_TMY3.epw)</p> <p data-bbox="927 1486 1414 1539">CZ 6A: Watertown (USA_NY_Watertown.AP.726227_TMY3.epw)</p>
Stand-alone Retail	
Secondary School	
Large Hotel	
Full-service Restaurant	
Outpatient Healthcare	
Warehouse	
10-Story High-rise Apartment	
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.¹

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.²

¹ www.energycodes.gov/development/commercial/90.1_models

² 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)		NYS Energy Cost		Energy Cost	EUI (kBtu/sf)		ECI	Weighting Factors
		Site	Source	Electricity	Gas	Total	Site	Source	\$/sf	
Aggregate Values	ASHRAE 90.1-2016	65,273,116	156,127,787	\$ 1,655,039	\$ 179,661	\$ 1,834,701	54.2	129.6	\$ 1.52	
	NYStretch	61,721,089	145,682,605	\$ 1,528,231	\$ 175,543	\$ 1,703,773	51.2	120.9	\$ 1.41	
	Savings	3,552,026	10,445,183	\$ 126,809	\$ 4,118	\$ 130,927	2.9	8.7	\$ 0.11	
		5.44%	6.69%	7.66%	2.29%	7.14%	5.44%	6.69%	7.14%	
Savings by CZ	4A	2,618,314	7,452,920	\$ 88,826	\$ 3,752	\$ 92,578	2.2	6.2	\$ 0.0768	70.8%
	5A	5,815,539	17,673,722	\$ 218,408	\$ 5,081	\$ 223,490	4.8	14.7	\$ 0.1855	21.0%
	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

		Value		Source
NYS Energy - 2017	Electricity	0.1475	\$/kWh	U.S. Energy Information Administration
	Natural Gas	6.87	\$/1000 cf	
	Heat Content of Natural Gas	1,032	Btu/cf	
Uniform Present Value Factors: Commercial				
Energy Price Escalation		<u>10 yr</u>	<u>30 yr</u>	Table Ba.1: Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2017, (Lavappa, et.al.)
	Electricity	9.22	22.72	
	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.)
City Code Index	4A. New York	1.346		RS Means Building Construction Cost Data (2017)
	5A. Buffalo	1.057		
	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 Weight [%]	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost			Incremental First Cost	Simple Payback
			90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings		
Large Office	4A	7.5%	60.0	58.0	3.4%	179.3	172.2	3.9%	\$ 2.26	\$ 2.16	4.1%	\$ 0.28	3.1
	5A	1.0%	63.4	61.2	3.4%	180.6	173.1	4.1%	\$ 2.24	\$ 2.15	4.3%	\$ 0.47	4.8
	6A	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	4A	4.9%	44.5	39.1	12.1%	130.1	111.0	14.7%	\$ 1.63	\$ 1.38	15.4%	\$ 3.89	15.6
	5A	7.1%	46.5	41.2	11.6%	129.9	110.0	15.3%	\$ 1.60	\$ 1.34	16.4%	\$ 3.08	11.7
	6A	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	4A	5.0%	37.0	33.9	8.5%	104.0	95.6	8.1%	\$ 1.29	\$ 1.18	8.0%	\$ 0.61	6.0
	5A	3.7%	37.7	34.6	8.1%	101.2	92.9	8.2%	\$ 1.24	\$ 1.13	8.3%	\$ 0.43	4.3
	6A	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	4A	3.5%	81.7	75.9	7.1%	187.4	172.2	8.1%	\$ 2.17	\$ 1.99	8.5%	\$ 1.77	9.6
	5A	2.5%	83.3	77.7	6.8%	183.4	168.1	8.4%	\$ 2.09	\$ 1.90	9.0%	\$ 1.55	8.3
	6A	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	4A	0.1%	380.3	341.6	10.2%	717.1	629.0	12.3%	\$ 7.62	\$ 6.60	13.3%	\$ 5.59	5.5
	5A	0.3%	418.0	381.9	8.6%	741.4	661.8	10.7%	\$ 7.63	\$ 6.72	11.9%	\$ 3.90	4.3
	6A	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	4A	2.0%	111.7	106.7	4.5%	314.6	296.5	5.8%	\$ 3.90	\$ 3.66	6.2%	\$ 3.10	12.9
	5A	2.4%	112.9	108.2	4.2%	310.6	292.8	5.7%	\$ 3.82	\$ 3.58	6.2%	\$ 2.70	11.5
	6A	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	4A	2.5%	17.7	15.2	14.0%	37.4	32.4	13.5%	\$ 0.42	\$ 0.36	13.3%	\$ 1.03	18.4
	5A	3.8%	23.9	20.6	13.8%	43.9	38.2	13.0%	\$ 0.46	\$ 0.40	12.6%	\$ 0.60	10.4
	6A	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	4A	21.9%	48.4	47.1	2.8%	96.0	93.1	3.0%	\$ 1.04	\$ 1.01	3.0%	\$ 0.43	13.5
	5A	0.0%	54.5	52.5	3.6%	99.8	96.3	3.5%	\$ 1.04	\$ 1.01	3.5%	\$ 0.38	10.5
	6A	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	4A	23.5%	48.4	47.3	2.4%	106.4	103.1	3.1%	\$ 1.21	\$ 1.17	3.4%	\$ 0.47	11.5
	5A	0.1%	54.4	53.2	2.3%	112.2	103.1	8.1%	\$ 1.24	\$ 1.17	6.0%	\$ 0.43	10.3
	6A	0.1%	55.1	53.3	3.3%	113.0	108.7	3.8%	\$ 1.25	\$ 1.20	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	\$ 1.33	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	\$ 1.57	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	\$ 1.70	9.9%	\$ 1.96	10.5
AGGREGATE VALUES		100.0%	54.1	51.2	5.4%	129.4	120.7	6.7%	\$ 1.52	\$ 1.41	7.1%	\$ 1.14	10.5

Table 6. Energy Savings and Simple Payback by Building Type

Prototype	Construction Weight [%]	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost [\$ /ft2]			Incremental First Cost \$/ft2	Simple Payback years
		90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings		
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

Prototype	Area	CZ	Construction Weight [%]	Annual Energy Cost		10 Year Life Cycle Energy Cost			Incremental First Cost	Residual Value at 10 years	Net Savings over 10 Years		
				90.1-2016	NYStretch	90.1-2016	NYStretch	Savings			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 Restaurant	5,488	4A	0.1%	\$ 41,811	\$ 36,233	\$ 397,393	\$ 345,075	\$ 52,318	\$ 30,670	\$ 9,805	\$31,453	\$5.73	
			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 Healthcare	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)	
			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-Rise Apartment	84,140	4A	21.9%	\$ 87,838	\$ 85,168	\$ 831,581	\$ 806,423	\$ 25,157	\$ 36,040	\$ 12,192	\$1,310	\$0.02	
			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-Rise Apartment	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	
			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 VALUES			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 NYSStretch

Prototype	CZ	Construction Weights	Incremental First Cost	Replacement Costs	Maintenance Costs	Residual Value	Energy Cost Savings	30 Year Net Present Value of Savings	
								Total	\$/sf
Large Office	4A	7.5%	\$141,187	\$72,568	\$0	(\$5,456)	\$1,044,138	\$824,927	\$1.66
	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
Standalone Retail	4A	4.9%	\$95,821	\$49,532	\$0	(\$458)	\$139,674	(\$6,138)	(\$0.25)
	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
Secondary School	4A	5.0%	\$128,629	\$54,294	\$0	\$6,911	\$493,589	\$317,577	\$1.51
	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
Large Hotel	4A	3.5%	\$215,819	\$135,226	\$0	\$2,880	\$514,145	\$165,980	\$1.36
	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
Full Service Restaurant	4A	0.1%	\$30,670	\$31,248	\$0	\$3,649	\$128,892	\$70,624	\$12.87
	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
Outpatient Healthcare	4A	2.0%	\$126,695	\$62,998	\$0	\$519	\$222,209	\$33,035	\$0.81
	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
Warehouse	4A	2.5%	\$53,254	(\$2,443)	\$0	\$28	\$67,271	\$16,487	\$0.32
	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
10 Story Highrise Apartment	4A	21.9%	\$36,040	\$11,036	\$0	\$1,015	\$61,974	\$15,914	\$0.19
	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
20 Story Highrise Apartment	4A	23.5%	\$78,578	\$40,382	\$0	\$3,972	\$156,575	\$41,587	\$0.25
	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 SHW (Refer to Appendix C for further discussion)
- 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		
CLIMATE ZONE 4		
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (non-res)	0.099	0.104
CLIMATE ZONE 5		
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: mass (non-res)	0.086	0.090
CLIMATE ZONE 6		
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: mass (non-res)	0.076	0.080
Full-Service Restaurant³		
CLIMATE ZONE 4		
Roofs: attic and other	0.020	0.021
Walls, above grade: steel framed (non-res)	0.061	0.064
CLIMATE ZONE 5		
Roofs: attic and other	0.020	0.021
Walls, above grade: steel framed (non-res)	0.052	0.055
CLIMATE 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		
CLIMATE ZONE 4		
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (non-res)	0.061	0.064
CLIMATE ZONE 5		
Roofs: insulation entirely above deck	0.030	0.032
Walls, above grade: steel framed (non-res)	0.052	0.055
CLIMATE ZONE 6		
Roofs: insulation entirely above deck	0.029	0.032
Walls, above grade: steel framed (non-res)	0.047	0.049

³ 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
Warehouse⁴		
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

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.

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 weighted average)	0.50	0.45	
Sales Area	1.06	0.95	1.22
Lobby ⁵	0.90	0.81	1.00
Display lighting - type 1,2,3 (area w weighted average)	0.32	0.29	
Secondary School			
Classroom	0.74	0.67	0.92
Corridor	0.58	0.52	0.66
Lobby ⁵	0.90	0.81	1.00
Mechanical ⁵	0.39	0.35	0.43
Restroom	0.75	0.68	0.85
Office	0.85	0.77	0.93
Gymnasium/exercise area ⁵	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 ⁵	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 ⁵	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 ⁵	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 ⁵	0.85	0.77	0.93
Corridor	0.58	0.52	0.792
Stairwell	0.50	0.45	0.58
Mechanical rooms ⁵	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>	<u>NYStretch less 10%</u>	<u>90.1-2016</u>
20-story Apartment			
Office - enclosed ⁶	0.85	0.77	0.93
Corridor	0.58	0.52	0.792
Stairwell	0.50	0.45	0.58
Mechanical rooms ⁷	0.39	0.35	0.43
Sales Area ⁷	1.06	0.954	1.22
Display lighting - retail type 3 ⁷ (weighted average)	1.05	0.945	1.05
Display lighting - retail type 2 ⁷ (weighted average)	0.45	0.405	0.45
Display lighting - retail type 1 ⁷ (weighted average)	0.45	0.405	0.45
Additional retail allowance [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/fast food	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 ⁷	0.90	0.81	1.00
Lounge/breakroom – healthcare ⁷	0.53	0.48	0.78
Office - enclosed >250 sf ⁷	0.85	0.77	0.93
Restroom ⁷	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

⁶ 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.⁷ 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.

⁷ 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 prototype 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.

Lighting Zone	Façade W/sf]		Doors [W/lf]		Parking lot [W/sf] *	
	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

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

Lighting Zone	Prototype	Façade W/sf]		Doors [W/lf]		Parking lot [W/sf] *	
		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 Usage		Total (kBtu)		Energy Cost			EUI (kBtu/sf)		ECI (\$/sf)			Weighting Factors
		kWh	therms	Site	Source	Electricity	Gas	Total	Site	Source	Electricity	Gas	Total	
Large Office		497,337 square 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	7.5%
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	
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	1.0%
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	
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	0.3%
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	
Standalone Retail		24,630 square 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	4.9%
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	
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	7.1%
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	
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	2.6%
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	
Secondary School		210,357 square 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	5.0%
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	
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	3.7%
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	
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	1.1%
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	

* **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 Usage		Total (kBtu)		Energy Cost			EUI (kBtu/sf)		ECI (\$/sf)			Weighting Factors
		kWh	therms	Site	Source	Electricity	Gas	Total	Site	Source	Electricity	Gas	Total	
Large Hotel		121,813 square 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	3.5%
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	
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	2.5%
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	
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	1.8%
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	
Full Service Restaurant		5,488 square 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	0.1%
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	
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	0.3%
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	
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	0.1%
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	
Outpatient Healthcare		40,843 square 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	2.0%
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	
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	2.5%
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	
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	1.0%
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	

* **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 Usage		Total (kBtu)		Energy Cost			EUI (kBtu/sf)		ECI (\$/sf)			Weighting Factors
		kWh	therms	Site	Source	Electricity	Gas	Total	Site	Source	Electricity	Gas	Total	
Warehouse		51,914 square 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	2.5%
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	
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	3.8%
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	
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	1.2%
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	
10 Story Highrise Apt.		84,140 square 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	21.9%
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	
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	0.0%
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	
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	0.0%
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	
20 Story Highrise Apt		168,279 square 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	23.5%
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	
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	0.1%
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	
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	0.1%
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	

* **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 Zone	ASHRAE Standard	Energy Usage		Annual NYS Energy Cost			Annual Savings		Incremental First Cost		Payback Period (Years)	Weighting Factors
		kWh	therms	Electricity	Gas	Total	Total	(\$/sf)	Total	(\$/sf)		
Large Office		497,337 square 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 Retail		24,630 square 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 School		210,357 square 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 square 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 Restaurant		5,488 square 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 Zone	ASHRAE Standard	Energy Usage		Annual NYS Energy Cost			Annual Savings		Incremental First Cost		Payback Period (Years)	Weighting Factors
		kWh	therms	Electricity	Gas	Total	Total	(\$/sf)	Total	(\$/sf)		
Outpatient Healthcare		40,843 square 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 square 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 Highrise Apt.		84,140 square 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 Highrise Apt		168,279 square 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%
Weighted Averages by Climate Zone							4A	\$ 0.077	\$ 0.848	11.04	70.9%	
							5A	\$ 0.185	\$ 1.808	9.76	20.9%	
							6A	\$ 0.187	\$ 1.962	10.48	8.2%	
							Combined	\$ 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 Zone	ASHRAE Standard	Energy Usage		Energy Cost		10 yr Life Cycle Energy Cost				Incremental First Cost	Residual Value At 10 Years	Net Savings over 10 yr		Weighting Factors	
		kWh	therms	Total	Electricity	Gas	Total	Savings	Total			Cost Index (\$/sf)			
Large Office		497,337 square 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 Retail		24,630 square 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 School		210,357 square 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 square 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 Restaurant		5,488 square 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%		

* **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 Zone	ASHRAE Standard	Energy Usage		Energy Cost	10 yr Life Cycle Energy Cost				Incremental First Cost	Residual Value At 10 Years	Net Savings over 10 yr		Weighting Factors*
		kWh	therms	Total	Electricity	Gas	Total	Savings			Total	Cost Index (\$/sf)	
Outpatient Healthcare		40,843 square 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	\$ 88,191	\$ 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	\$ 88,634	\$ 110,741	\$ 25,228	\$3,121	\$0.08	1.0%
Warehouse		51,914 square 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	\$ 27,308	\$ 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	\$ 28,803	\$ 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	\$ 31,982	\$ 39,118	\$ 14,592	\$7,455	\$0.14	1.2%
10 Story Highrise Apt.		84,140 square feet											
4A	90.1-2016	486,453	24,164	\$ 87,838	\$ 661,552	\$ 170,029	\$ 831,581						
4A	NYStretch	471,098	23,557	\$ 85,168	\$ 640,669	\$ 165,754	\$ 806,423	\$ 25,157	\$ 36,040	\$ 12,192	\$1,310	\$0.02	21.9%
5A	90.1-2016	459,795	30,143	\$ 87,886	\$ 625,298	\$ 212,102	\$ 837,400						
5A	NYStretch	444,061	29,030	\$ 84,824	\$ 603,901	\$ 204,268	\$ 808,170	\$ 29,230	\$ 32,095	\$ 11,372	\$8,507	\$0.10	0.0%
6A	90.1-2016	458,814	30,223	\$ 87,795	\$ 623,964	\$ 212,663	\$ 836,627						
6A	NYStretch	443,359	29,091	\$ 84,762	\$ 602,946	\$ 204,700	\$ 807,645	\$ 28,982	\$ 35,330	\$ 13,443	\$7,094	\$0.08	0.0%
20 Story Highrise Apt		168,279 square feet											
4A	90.1-2016	1,197,004	40,689	\$ 203,645	\$ 1,627,865	\$ 286,307	\$ 1,914,173						
4A	NYStretch	1,152,409	40,277	\$ 196,793	\$ 1,567,219	\$ 283,409	\$ 1,850,628	\$ 63,545	\$ 78,578	\$ 22,905	\$7,872	\$0.05	23.5%
5A	90.1-2016	1,188,626	51,029	\$ 209,293	\$ 1,616,472	\$ 359,065	\$ 1,975,537						
5A	NYStretch	1,143,904	50,478	\$ 202,329	\$ 1,555,652	\$ 355,184	\$ 1,910,836	\$ 64,701	\$ 71,908	\$ 21,836	\$14,629	\$0.09	0.1%
6A	90.1-2016	1,188,990	52,179	\$ 210,112	\$ 1,616,967	\$ 367,155	\$ 1,984,121						
6A	NYStretch	1,138,529	50,857	\$ 201,789	\$ 1,548,342	\$ 357,853	\$ 1,906,196	\$ 77,926	\$ 67,193	\$ 20,681	\$31,414	\$0.19	0.1%
Weighted Average Savings by Climate Zone											4A	\$0.11	70.9%
											5A	\$0.37	20.9%
											6A	\$0.30	8.2%
											Combined	\$0.18	100.0%

* **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 1,200 MBH total capacity	Hot water heaters with 90% Et 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

CZ	Description	Energy Usage		Annual NYS Energy Cost			Annual Savings Total	Incremental First Cost Total	Payback Period (Years)
		kWh	therms	Electricity	Gas	Total			
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 / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 16,034	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		38,353	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall)		74,849	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 4A: U-0.104; R-7.82	RSMMeans 07 22 16.10	38,353	Area	\$ 0.3881	\$ 14,884		
EEM	Enhanced wall insulation (nonresidential mass wall) 4A: U-0.099; R-8.30 (+ R-0.48)	RSMMeans 07 21 13.10	74,849	Area	\$ 0.0154	\$ 1,150		
EEM 2	Enhanced fenestration						\$ 25,904	
Standard	Standard windows, U-0.38		49,899	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	49,899	Area	\$ 0.52	\$ 25,904		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		392,896	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	308,846	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	Reduce fan power allowances (based on improved fan efficiencies)						\$ 116,592	
Standard	CV fans: 0.00094 bhp/cfm					\$ -		
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	4.98	tons	\$ 1,031	\$ 5,137		Costed as increased system size for reduction in static pressure
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	31,262	cfm	\$ 3.565	\$ 111,456		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 2,448	
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.	RSMMeans 07 22 16.10	7,200	Area	\$ 0.3400	\$ 2,448		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016					\$ -		
EEM	Reduced LPDs, ~32% more efficient	RSMMeans 26 51 13.55	17,406	watts	\$ -	\$ -		No cost; parking lot can be met with MH
EEM		RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 120,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	12	each	\$ 10,000	\$ 120,000		
EEM 14	ERV for apartment makeup air units						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - applies to IECC path only		-		\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (32,749)	
Standard	Watercooled chiller, 701 tons	RSMMeans 23 64 13.10	2	units	\$ 318,147	\$ 636,295		
Standard	Cooling tower, 1602 tons	RSMMeans 23 65 13.10	2	units	\$ 184,539	\$ 369,079		
EEM	Watercooled chiller, 676 tons	RSMMeans 23 64 13.10	2	units	\$ 308,568	\$ 617,136		
EEM	Cooling tower, 1543 tons	RSMMeans 23 65 13.10	2	units	\$ 177,744	\$ 355,488		
ACA 2	Reduced capacity for heating equipment						\$ (12,632)	
Standard	Hot water boiler, gas fired, 8877 MBH	RSMMeans D3020 130	1	units	\$ 261,867	\$ 261,867		
EEM	Hot water boiler, gas fired, 8419 MBH	RSMMeans D3020 130	1	units	\$ 249,034	\$ 249,034		
ACA 3	Reduced capacity for air handling equipment						\$ (133,102)	
Standard	VAV with Reheat, 274885 cfm	RSMMeans D3040 134	1	units	\$ 2,727,871	\$ 2,727,871		
EEM	VAV with Reheat, 261451 cfm	RSMMeans D3040 134	1	units	\$ 2,594,768	\$ 2,594,768		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces						\$ 2,600	
Standard	No charging stations, 325,080sf parking lot, 300sf per parking spot		-		\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-		\$ -	\$ -		No Cost
EEM			-		\$ -	\$ -		
Total							\$ 104,894	

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

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						\$ 16,130	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		38,353	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall)		74,849	Area	\$ -	\$ -		
	5A: U-0.090; R-9.31							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	38,353	Area	\$ 0.3881	\$ 14,884		
	5A: U-0.030; R-32.2 (+ R-2.2)							
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)							
EEM 2	Enhanced fenestration						\$ 26,344	
Standard	Standard windows, U-0.38		49,899	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	49,899	Area	\$ 0.53	\$ 26,344		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		392,896	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	308,846	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	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 size for reduction in static pressure
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	32,193	cfm	\$ 3.565	\$ 114,775		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 2,448	
Standard	Standard wall insulator		-		\$ -	\$ -		
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	7,200	Area	\$ 0.3400	\$ 2,448		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		43,412	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~32% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 120,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	12	each	\$ 10,000	\$ 120,000		
EEM 14	ERV for apartment makeup air units						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - applies to IECC path only		-		\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (10,238)	
Standard	Watercooled chiller, 683 tons	RSMeans 23 64 13.10	2	units	\$ 311,297	\$ 622,594		
Standard	Cooling tower, 1560 tons	RSMeans 23 65 13.10	2	units	\$ 179,680	\$ 359,360		
EEM	Watercooled chiller, 675 tons	RSMeans 23 64 13.10	2	units	\$ 308,303	\$ 616,605		
EEM	Cooling tower, 1542 tons	RSMeans 23 65 13.10	2	units	\$ 177,556	\$ 355,112		
ACA 2	Reduced capacity for heating equipment						\$ (44,204)	
Standard	Hot water boiler, gas fired, 9963 MBH	RSMeans D3020 130	1	units	\$ 292,309	\$ 292,309		
EEM	Hot water boiler, gas fired, 8386 MBH	RSMeans D3020 130	1	units	\$ 248,105	\$ 248,105		
ACA 3	Reduced capacity for air handling equipment						\$ (78,938)	
Standard	VAV with Reheat, 276750 cfm	RSMeans D3040 134	1	units	\$ 2,746,345	\$ 2,746,345		
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						\$ -	
Standard	n/a - does not apply to this building type		-	units	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	units	\$ -	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces						\$ 70,434	
Standard	No charging stations, 325,080sf parking lot, 300sf per parking spot		-		\$ -	\$ -		
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			-		\$ -	\$ -		
Total							\$ 222,002	

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

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						\$ 24,583	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		38,353	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall) 6A: U-0.080; R-10.70		74,849	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	38,353	Area	\$ 0.5998	\$ 23,003		
EEM	Enhanced wall insulation (nonresidential mass wall) 6A: U-0.076; R-11.36 (+ R-0.66)	RSMeans 07 21 13.10	74,849	Area	\$ 0.0211	\$ 1,581		
EEM 2	Enhanced fenestration						\$ 26,137	
Standard	Standard windows, U-0.36		49,899	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.34	PNNL CE ANALYSIS	49,899	Area	\$ 0.52	\$ 26,137		
EEM 3	Air leakage testing for mid-sized building:						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling unit						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		392,896	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~20% more efficient	HBL	308,846	watts	\$ -	\$ -		No cost assumed for this building type
EEM 5	Occupancy sensors and automatic lighting controls including egress lightin						\$ -	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting contro						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	Reduce fan power allowances (based on improved fan efficiencies)						\$ 115,148	
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	4.95	tons	\$ 1.031	\$ 5,107		Costed as increased system size for reduction in static pressure
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	30,865	cfm	\$ 3.565	\$ 110,041		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 2,448	
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	7,200	Area	\$ 0.3400	\$ 2,448		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	43,412	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 120,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	12	each	\$ 10,000	\$ 120,000		
EEM 14	ERV for apartment makeup air units						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - applies to IECC path only		-		\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (31,001)	
Standard	Watercooled chiller, 633 tons	RSMeans 23 64 13.10	2	units	\$ 292,639	\$ 585,278		
Standard	Cooling tower, 1445 tons	RSMeans 23 65 13.10	2	units	\$ 166,445	\$ 332,890		
EEM	Watercooled chiller, 607 tons	RSMeans 23 64 13.10	2	units	\$ 283,243	\$ 566,486		
EEM	Cooling tower, 1392 tons	RSMeans 23 65 13.10	2	units	\$ 160,340	\$ 320,680		
ACA 2	Reduced capacity for heating equipment						\$ (14,628)	
Standard	Hot water boiler, gas fired, 9870 MBH	RSMeans D3020 130	1	units	\$ 289,692	\$ 289,692		
EEM	Hot water boiler, gas fired, 9349 MBH	RSMeans D3020 130	1	units	\$ 275,064	\$ 275,064		
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		
EEM	VAV with Reheat, 258548 cfm	RSMeans D3040 134	1	units	\$ 2,566,006	\$ 2,566,006		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirement						\$ -	
Standard	n/a - does not apply to this building type		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						\$ 70,434	
Standard	No charging stations, 325,080sf parking lot, 300sf per parking spot		-		\$ -	\$ -		
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 2016 IECC						\$ -	
Standard			-		\$ -	\$ -		
EEM			-		\$ -	\$ -		
Total							\$ 149,368	

**2020 NYStretch
STANDALONE RETAIL - 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	Enhanced insulation for roofs and walls						\$ 9,763	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		24,692	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall)		11,766	Area	\$ -	\$ -		
	4A: U-0.104; R-7.82							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	24,692	Area	\$ 0.3881	\$ 9,583		
	4A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMMeans 07 21 13.10	11,766	Area	\$ 0.0154	\$ 181		
	4A: U-0.099; R-8.30 (+ R-0.48)							
EEM 2	Enhanced fenestration						\$ 447	
Standard	Standard windows, U-0.37		904	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	904	Area	\$ 0.50	\$ 447		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 59,518	
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$ 6.75	\$ 241,565		
EEM	Reduced LPDs, ~25% more efficient	HBL	26,970	watts	\$ -	\$ 301,083.28		Cost assumed to be proportional to increased efficiency
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ 960	
Standard	CV fans: 0.00094 bhp/cfm			tons		\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	0.93	tons	\$ 1,031	\$ 960		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	Area	\$ 0	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		1,702	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (2,100)	
Standard	Packaged single-zone AC, 56 tons	RSMMeans 23 74 33.10	1	units	\$ 72,373	\$ 72,373		
EEM	Packaged single-zone AC, 53 tons	RSMMeans 23 74 33.10	1	units	\$ 70,273	\$ 70,273		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 71,189	

**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	Cost / Unit	Total Item Cost	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	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall)		11,766	Area	\$ -	\$ -		
	5A: U-0.090; R-9.31							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	24,692	Area	\$ 0.3881	\$ 9,583		
	5A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMMeans 07 21 13.10	11,766	Area	\$ 0.0166	\$ 196		
	5A: U-0.086; R-9.83 (+ R-0.52)							
EEM 2	Enhanced fenestration						517	
Standard	Standard windows, U-0.37		904	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	904	Area	\$ 0.57	\$ 517		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						59,518	
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$ 6.75	\$ 241,565		
EEM	Reduced LPDs, ~20% more efficient	HBL	26,970	watts	\$ -	\$ 301,083		Cost assumed to be proportional to increased efficiency
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	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	
Standard	CV fans: 0.00094 bhp/cfm		0.76	tons	\$ -	\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	0.76	tons	\$ 1,031	\$ 780		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						-	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction						-	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 12	Exterior lighting power reduction						-	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	3,453	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						-	
Standard	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						-	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(6,479)	
Standard	Packaged single-zone AC, 53 tons	RSMMeans 23 74 33.10	1	units	\$ 69,354	\$ 69,354		
EEM	Packaged single-zone AC, 46 tons	RSMMeans 23 74 33.10	1	units	\$ 62,875	\$ 62,875		
ACA 2	Reduced capacity for heating equipment						-	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						-	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-	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						7,586	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	6	outlets	\$ 1,300	\$ 7,586		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 71,701	

**2020 NYStretch
STANDALONE RETAIL - 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						15,058	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		24,692	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential mass wall) 6A: U-0.080; R-10.70		11,766	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029; R-33.4 (+ R-3.4)	RSMMeans 07 22 16.10	24,692	Area	\$ 0.5998	\$ 14,809		
EEM	Enhanced wall insulation (nonresidential mass wall) 6A: U-0.076; R-11.36 (+ R-0.66)	RSMMeans 07 21 13.10	11,766	Area	\$ 0.0211	\$ 248		
EEM 2	Enhanced fenestration						496	
Standard	Standard windows, U-0.35		904	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.33	PNNL CE ANALYSIS	904	Area	\$ 0.55	\$ 496		
EEM 3	Air leakage testing for mid-sized buildings							
Standard	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						59,518	
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$ 6.75	\$ 241,565		Cost assumed to be proportional to increased efficiency
EEM	Reduced LPDs, ~20% more efficient	HBL	26,970	watts	\$ -	\$ 301,083		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control							
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						936	
Standard	CV fans: 0.00094 bhp/cfm			tons		\$ -		Costed as increased system size for reduction in static pressure
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	0.91	tons	\$ 1,031	\$ 936		
EEM 8	Hotel guestroom HVAC vacancy control							
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment							
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction							
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	Area	\$ 0	\$ -		
EEM 12	Exterior lighting power reduction							
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	3,453	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives							
Standard	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							
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls							
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(2,543)	
Standard	Packaged single-zone AC, 50 tons	RSMMeans 23 74 33.10	1	units	\$ 66,677	\$ 66,677		
EEM	Packaged single-zone AC, 48 tons	RSMMeans 23 74 33.10	1	units	\$ 64,134	\$ 64,134		
ACA 2	Reduced capacity for heating equipment							
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment							
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements							
Standard	n/a - does not apply to this building type		-	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						7,586	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	0	\$ -	\$ -		
EEM	Solar-ready zone per Appendix CA of 2018 IECC		6	outlets	\$ 1,300	\$ 7,586		
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 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)		41,755	Area	\$ -	\$ -		
EEM	4A: U-0.064; R-13.4 Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	128,112	Area	\$ 0.3881	\$ 49,718		
EEM	4A: U-0.030; R-32.2 (+ R-2.2) Enhanced wall insulation (nonresidential steel-frame wall)	RSMMeans 07 21 13.10	41,755	Area	\$ 0.0246	\$ 1,029		
EEM 2	Enhanced fenestration						\$ 12,004	
Standard	Standard windows, U-0.39		22,484	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	22,484	Area	\$ 0.53	\$ 12,004		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		157,768	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	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					\$ -		
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	1.97	tons	\$ 1,031	\$ 2,032		Costed as increased system size for reduction in static pressure
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	9,708	cfm	\$ 3.565	\$ 34,611		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 14,280	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings 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 parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMMeans 07 22 16.10	21,600	Area	\$ 0.3400	\$ 7,344		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	3,549	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~10% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (5,166)	
Standard	Air-cooled chiller, 308 tons	RSMMeans 23 64 19.10	1	units	\$ 206,960	\$ 206,960		
EEM	Air-cooled chiller, 300 tons	RSMMeans 23 64 19.10	1	units	\$ 201,794	\$ 201,794		
ACA 2	Reduced capacity for heating equipment						\$ (2,314)	
Standard	Hot water boiler, gas fired, 3237 MBH	RSMMeans D3020 130	1	units	\$ 103,770	\$ 103,770		
EEM	Hot water boiler, gas fired, 3155 MBH	RSMMeans D3020 130	1	units	\$ 101,456	\$ 101,456		
ACA 3	Reduced capacity for air handling equipment						\$ (20,574)	
Standard	VAV with Reheat, 64817 cfm	RSMMeans D3040 134	1	units	\$ 646,519	\$ 646,519		
EEM	VAV with Reheat, 62741 cfm	RSMMeans D3040 134	1	units	\$ 625,945	\$ 625,945		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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 / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 51,121	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		128,112	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall)		41,755	Area	\$ -	\$ -		
	5A: U-0.055; R-16.0							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	128,112	Area	\$ 0.3881	\$ 49,718		
	5A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMMeans 07 21 13.10	41,755	Area	\$ 0.0336	\$ 1,403		
	5A: U-0.052; R-17.1 (+ R-1.05)							
EEM 2	Enhanced fenestration						\$ 15,786	
Standard	Standard windows, U-0.39		22,484	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	22,484	Area	\$ 0.70	\$ 15,786		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		157,768	watts	\$ 6.75	\$ -		
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$ -	\$ -		No cost assumed for this building type
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	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)						\$ 37,359	
Standard	CV fans: 0.00094 bhp/cfm					\$ -		
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	2.01	tons	\$ 1,031	\$ 2,070		
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	9,898	cfm	\$ 3.565	\$ 35,289		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 14,280	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings 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 parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMMeans 07 22 16.10	21,600	Area	\$ 0.3400	\$ 7,344		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		6,525	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~10% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (30,626)	
Standard	Air-cooled chiller, 295 tons	RSMMeans 23 64 19.10	1	units	\$ 198,755	\$ 198,755		
EEM	Air-cooled chiller, 243 tons	RSMMeans 23 64 19.10	1	units	\$ 168,129	\$ 168,129		
ACA 2	Reduced capacity for heating equipment						\$ (192)	
Standard	Hot water boiler, gas fired, 3420 MBH	RSMMeans D3020 130	1	units	\$ 108,879	\$ 108,879		
EEM	Hot water boiler, gas fired, 2413 MBH	RSMMeans D3020 130	1	units	\$ 108,687	\$ 108,687		
ACA 3	Reduced capacity for air handling equipment						\$ (21,624)	
Standard	VAV with Reheat, 66152 cfm	RSMMeans D3040 134	1	units	\$ 659,746	\$ 659,746		
EEM	VAV with Reheat, 63970 cfm	RSMMeans D3040 134	1	units	\$ 638,122	\$ 638,122		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 12,896	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	10	outlets	\$ 1,300	\$ 12,896		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 86,344	

**2020 NYStretch
SECONDARY SCHOOL - 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						78,907	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (nonresidential steel-frame wall)		128,112	Area	\$ -	\$ -		
Standard	6A: U-0.049; R-17.5		41,755	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	128,112	Area	\$ 0.5998	\$ 76,836		
EEM	6A: U-0.029; R-33.4 (+ R-3.4)							
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMMeans 07 21 13.10	41,755	Area	\$ 0.0496	\$ 2,071		
EEM	6A: U-0.047; R-19.1 (+ R-1.55)							
EEM 2	Enhanced fenestration						16,119	
Standard	Standard windows, U-0.37		22,484	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.34	PNNL CE ANALYSIS	22,484	Area	\$ 0.72	\$ 16,119		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						-	
Standard	Lighting per ASHRAE 90.1-2016		157,768	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	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)						36,864	
Standard	CV fans: 0.00094 bhp/cfm					\$ -		
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	CV fans: 0.00088 bhp/cfm	RSMMeans 23 74 33.10	1.99	tons	\$ 1,031	\$ 2,054		Costed as increased system size for reduction in static pressure
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	9,764	cfm	\$ 3.565	\$ 34,810		
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						14,280	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	2,319	Area	\$ 6.16	\$ 14,280		
EEM 11	Thermal bridging reduction						7,344	
Standard	Standard wall insulator		-		\$ -	\$ -		
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.	RSMMeans 07 22 16.10	21,600	Area	\$ 0.3400	\$ 7,344		
EEM 12	Exterior lighting power reduction						-	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	6,525	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~10% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						-	
Standard	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						-	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(3,519)	
Standard	Air-cooled chiller, 230 tons	RSMMeans 23 64 19.10	1	units	\$ 159,995	\$ 159,995		
EEM	Air-cooled chiller, 224 tons	RSMMeans 23 64 19.10	1	units	\$ 156,476	\$ 156,476		
ACA 2	Reduced capacity for heating equipment						(2,935)	
Standard	Hot water boiler, gas fired, 2439 MBH	RSMMeans D3020 130	1	units	\$ 81,357	\$ 81,357		
EEM	Hot water boiler, gas fired, 2333 MBH	RSMMeans D3020 130	1	units	\$ 78,423	\$ 78,423		
ACA 3	Reduced capacity for air handling equipment						(22,044)	
Standard	VAV with Reheat, 65326 cfm	RSMMeans D3040 134	1	units	\$ 651,558	\$ 651,558		
EEM	VAV with Reheat, 63101 cfm	RSMMeans D3040 134	1	units	\$ 629,514	\$ 629,514		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-	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						12,896	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	10	outlets	\$ 1,300	\$ 12,896		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 137,912	

**2020 NYStretch
LARGE HOTEL - 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	Enhanced insulation for roofs and walls						8,770	
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	\$ -	\$ -		
	4A: U-0.090; R-9.31							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	21,300	Area	\$ 0.3881	\$ 8,266		
	4A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (residential mass wall)	RSMMeans 07 21 13.10	30,265	Area	\$ 0.0166	\$ 504		
	4A: U-0.086; R-9.83 (+ R-0.52)							
EEM 2	Enhanced fenestration						7,042	
Standard	Standard windows, U-0.39		13,068	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	13,068	Area	\$ 0.54	\$ 7,042		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						138,136	
Standard	Lighting per ASHRAE 90.1-2016		95,014	watts	\$ 6.75	\$ 641,345		
EEM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$ -	\$ 779,481		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						21,952	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	6,157.34	cfm	\$ 3.565	\$ 21,952		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						6,810	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Eney 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 insulator		-		\$ -	\$ -		
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.	RSMMeans 07 22 16.10	6,462	Area	\$ 0.3400	\$ 2,197		
EEM 12	Exterior lighting power reduction						-	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	12,951	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~24% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						-	
Standard	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						-	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(3,703)	
Standard	Air-cooled chiller, 255 tons	RSMMeans 23 64 19.10	1	units	\$ 175,162	\$ 175,162		
EEM	Air-cooled chiller, 249 tons	RSMMeans 23 64 19.10	1	0	\$ 171,459	\$ 171,459		
ACA 2	Reduced capacity for heating equipment						(2,677)	
Standard	Hot water boiler, gas fired, 2197 MBH	RSMMeans D3020 130	1	units	\$ 74,604	\$ 74,604		
EEM	Hot water boiler, gas fired, 2101 MBH	RSMMeans D3020 130	1	0	\$ 71,926	\$ 71,926		
ACA 3	Reduced capacity for air handling equipment						(20,784)	
Standard	VAV w/reheat, 41891 cfm	RSMMeans D3040 134	1	units	\$ 419,364	\$ 419,364		
EEM	VAV w/reheat, 39793 cfm	RSMMeans D3040 134	1	units	\$ 398,580	\$ 398,580		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-	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						2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 160,341	

**2020 NYStretch
LARGE HOTEL - 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						8,905	
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	\$ -	\$ -		
	5A: U-0.080; R-10.70							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	21,300	Area	\$ 0.3881	\$ 8,266		
	5A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (residential mass wall)	RSMMeans 07 21 13.10	30,265	Area	\$ 0.0211	\$ 639		
	5A: U-0.076; R-11.3 (+ R-0.66)							
EEM 2	Enhanced fenestration						8,212	
Standard	Standard windows, U-0.39		13,068	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	13,068	Area	\$ 0.63	\$ 8,212		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						138,136	
Standard	Lighting per ASHRAE 90.1-2016		95,014	watts	\$ 6.75	\$ 641,345		
EEM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$ -	\$ 779,481		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						22,502	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMMeans D3040 134	6,311.43	cfm	\$ 3.565	\$ 22,502		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						6,810	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Eney 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 insulator		-		\$ -	\$ -		
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.	RSMMeans 07 22 16.10	6,462	Area	\$ 0.3400	\$ 2,197		
EEM 12	Exterior lighting power reduction						-	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	12,951	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						-	
Standard	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						-	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(3,555)	
Standard	Air-cooled chiller, 249 tons	RSMMeans 23 64 19.10	1	units	\$ 171,684	\$ 171,684		
EEM	Air-cooled chiller, 243 tons	RSMMeans 23 64 19.10	1	0	\$ 168,129	\$ 168,129		
ACA 2	Reduced capacity for heating equipment						(2,925)	
Standard	Hot water boiler, gas fired, 2484 MBH	RSMMeans D3020 130	1	units	\$ 82,642	\$ 82,642		
EEM	Hot water boiler, gas fired, 2379 MBH	RSMMeans D3020 130	1	0	\$ 79,717	\$ 79,717		
ACA 3	Reduced capacity for air handling equipment						(20,574)	
Standard	VAV w/reheat, 42865 cfm	RSMMeans D3040 134	1	units	\$ 429,021	\$ 429,021		
EEM	VAV w/reheat, 40789 cfm	RSMMeans D3040 134	1	units	\$ 408,447	\$ 408,447		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-	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	\$ -	\$ -		
Total							\$ 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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 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	\$ -	\$ -		
	6A: U-0.071; R-12.3							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	21,300	Area	\$ 0.5998	\$ 12,775		
EEM	6A: U-0.029; R-33.4 (+ R-3.4)							
EEM	Enhanced wall insulation (residential mass wall)	RSMeans 07 21 13.10	30,265	Area	\$ 0.0269	\$ 814		
	6A: U-0.067; R-13.1 (+ R-0.84)							
EEM 2	Enhanced fenestration						\$ 8,470	
Standard	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	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						\$ 138,136	
Standard	Lighting per ASHRAE 90.1-2016		95,014	watts	\$ 6.75	\$ 641,345		
EEM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$ -	\$ 779,481		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ 22,057	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,186.85	cfm	\$ 3.565	\$ 22,057		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 6,810	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy 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 insulator.		-	0	\$ -	\$ -		
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	6,462	Area	\$ 0.3400	\$ 2,197		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		12,951	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55	12,951	watts	\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL 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	\$ 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)	
Standard	Hot water boiler, gas fired, 2438 MBH	RSMeans D3020 130	1	units	\$ 81,357	\$ 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						\$ (20,154)	
Standard	VAV w/reheat, 42018 cfm	RSMeans D3040 134	1	units	\$ 420,623	\$ 420,623		
EEM	VAV w/reheat, 39984 cfm	RSMeans D3040 134	1	units	\$ 400,469	\$ 400,469		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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	\$ -	\$ -		
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	Enhanced insulation for roofs and walls						\$ 2,602	
Standard	Standard U-0.021, R-49 roof insulation (attic roof)		6,130	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 4A: U-0.064; R-13.4		2,460	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (attic roof) 4A: U-0.020; R-51.4 (+ R-2.35)	RSMMeans 07 22 16.10	6,130	Area	\$ 0.4145	\$ 2,541		
EEM	Enhanced wall insulation (nonresidential steel-frame wall) 4A: U-0.061; R-14.2 (+ R-0.77)	RSMMeans 07 21 13.10	2,460	Area	\$ 0.0246	\$ 61		
EEM 2	Enhanced fenestration						\$ 251	
Standard	Standard windows, U-0.37		508	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	508	Area	\$ 0.50	\$ 251		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 8,372	
Standard	Lighting per ASHRAE 90.1-2016		4,418	watts	\$ 6.75	\$ 29,820		
EEM	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$ -	\$ 38,192		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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			tons	\$ 1,031	\$ -		
EEM	n/a - does not apply to this building type			cfm	\$ 4	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 9,216	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$ 6.16	\$ 9,216		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	1,433	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~9% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (255)	
Standard	Packaged single-zone AC, 26.2 tons	RSMMeans 23 74 33.10	1	units	\$ 31,039	\$ 31,039		
EEM	Packaged single-zone AC, 26 tons	RSMMeans 23 74 33.10	1	units	\$ 30,784	\$ 30,784		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only) chargehub.com		2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 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						\$ 2,624	
Standard	Standard U-0.021, R-49 roof insulation (attic roof)		6,130	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall)		2,460	Area	\$ -	\$ -		
	5A: U-0.055; R-16.0							
EEM	Enhanced roof insulation (attic roof)	RSMMeans 07 22 16.10	6,130	Area	\$ 0.4145	\$ 2,541		
	5A: U-0.020; R-51.4 (+ R-2.35)							
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMMeans 07 21 13.10	2,460	Area	\$ 0.0336	\$ 83		
	5A: U-0.052; R-17.1 (+ R-1.05)							
EEM 2	Enhanced fenestration						\$ 291	
Standard	Standard windows, U-0.37		508	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	508	Area	\$ 0.57	\$ 291		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 8,372	
Standard	Lighting per ASHRAE 90.1-2016		4,418	watts	\$ 6.75	\$ 29,820		
EEM	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$ -	\$ 38,192		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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			tons	\$ 1,031	\$ -		
EEM	n/a - does not apply to this building type			cfm	\$ 4	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 9,216	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$ 6.16	\$ 9,216		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	1,433	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~9% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (268)	
Standard	Packaged single-zone AC, 26.3 tons	RSMMeans 23 74 33.10	1	units	\$ 31,156	\$ 31,156		
EEM	Packaged single-zone AC, 26.1 tons	RSMMeans 23 74 33.10	1	units	\$ 30,887	\$ 30,887		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ -	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	0	\$ -	\$ -		
EEM			-	outlets	\$ 1,300	\$ -		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 5,475	
Standard	Standard U-0.021, R-49 roof insulation (attic roof)		6,130	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall)		2,460	Area	\$ -	\$ -		
	6A: U-0.049; R-17.5							
EEM	Enhanced roof insulation (attic roof)	RSMeans 07 22 16.10	6,130	Area	\$ 0.8732	\$ 5,353		
EEM	6A: U-0.019; R-53.9 (+ R-4.95)							
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13.10	2,460	Area	\$ 0.0496	\$ 122		
EEM	6A: U-0.047; R-19.1 (+ R-1.55)							
EEM 2	Enhanced fenestration						\$ 278	
Standard	Standard windows, U-0.35		508	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.33	PNNL CE ANALYSIS	508	Area	\$ 0.55	\$ 278		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 8,372	
Standard	Lighting per ASHRAE 90.1-2016		4,418	watts	\$ 6.75	\$ 29,820		
EEM	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$ -	\$ 38,192		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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			tons	\$ 1,031	\$ -		
EEM	n/a - does not apply to this building type			cfm	\$ 4	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ 9,216	
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$ -	\$ -		
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$ 6.16	\$ 9,216		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	Area	\$ 0	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		1,433	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (258)	
Standard	Packaged single-zone AC, 25.3 tons	RSMeans 23 74 33.10	1	units	\$ 30,079	\$ 30,079		
EEM	Packaged single-zone AC, 25.1 tons	RSMeans 23 74 33.10	1	units	\$ 29,821	\$ 29,821		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ -	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com		outlets	\$ 1,300	\$ -		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 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		
EEM 2	Enhanced fenestration						\$ 1,740	
Standard	Standard windows, U-0.38		3,318	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318	Area	\$ 0.52	\$ 1,740		
EEM 3	Air leakage testing for mid-sized buildings						\$ 8,500	
Standard	Not Required		-	units	\$ -	\$ -		
EEM	Testing required	BET, LLC	1	units	\$ 8,500	\$ 8,500		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ 71,679	
Standard	Lighting per ASHRAE 90.1-2016		39,536	watts	\$ 6.75	\$ 266,868		
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$ -	\$ 338,548		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ 17,767	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	4,983.57	cfm	\$ 3.565	\$ 17,767		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,596	
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	4,694	Area	\$ 0.3400	\$ 1,596		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,619	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ 177,744	\$ -		
ACA 2	Reduced capacity for heating equipment						\$ 133	
Standard	Hot water boiler, gas fired, 302 MBH	RSMeans D3020 130	1	units	\$ 21,475	\$ 21,475		
EEM	Hot water boiler, gas fired, 306 MBH	RSMeans D3020 130	1	0	\$ 21,608	\$ 21,608		
ACA 3	Reduced capacity for air handling equipment						\$ (15,955)	
Standard	VAV AHU, 33818 cfm	RSMeans D3040 134	1	units	\$ 339,376	\$ 339,376		
EEM	VAV AHU, 32207 cfm	RSMeans D3040 134	1	units	\$ 323,421	\$ 323,421		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 6,187	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		14,782	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 5A: U-0.055; R-16.0		13,402	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 5A: 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) 5A: U-0.052; R-17.1 (+ R-1.05)	RSMeans 07 21 13.10	13,402	Area	\$ 0.0336	\$ 450		
EEM 2	Enhanced fenestration						\$ 1,972	
Standard	Standard windows, U-0.38		3,318	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318	Area	\$ 0.59	\$ 1,972		
EEM 3	Air leakage testing for mid-sized buildings						\$ 3,200	
Standard	Not Required		-	units	\$ -	\$ -		
EEM	Testing required	BET, LLC	1	units	\$ 3,200	\$ 3,200		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ 71,679	
Standard	Lighting per ASHRAE 90.1-2016		39,536	watts	\$ 6.75	\$ 266,868		
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$ -	\$ 338,548		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ 18,375	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	5,154.07	cfm	\$ 3.565	\$ 18,375		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,596	
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	4,694	Area	\$ 0.3400	\$ 1,596		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,764	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ 177,744	\$ -		
ACA 2	Reduced capacity for heating equipment						\$ 102	
Standard	Hot water boiler, gas fired, 364 MBH	RSMeans D3020 130	1	units	\$ 23,223	\$ 23,223		
EEM	Hot water boiler, gas fired, 368 MBH	RSMeans D3020 130	1	0	\$ 23,325	\$ 23,325		
ACA 3	Reduced capacity for air handling equipment						\$ (16,585)	
Standard	VAV AHU, 34983 cfm	RSMeans D3040 134	1	units	\$ 350,923	\$ 350,923		
EEM	VAV AHU, 33309 cfm	RSMeans D3040 134	1	units	\$ 334,338	\$ 334,338		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 17,962	
Standard			-	0	\$ -	\$ -		
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						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 104,489	

**2020 NYStretch
 OUTPATIENT HEALTHCARE - 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 wall:						\$ 9,530	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		14,782	Area	\$ -	\$ -		
Standard	Standard wall insulation (nonresidential steel-frame wall) 6A: U-0.049; R-17.5		13,402	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	14,782	Area	\$ 0.5998	\$ 8,866		
EEM	Enhanced wall insulation (nonresidential steel-frame wall) 6A: U-0.047; R-19.1 (+ R-1.55)	RSMeans 07 21 13.10	13,402	Area	\$ 0.0496	\$ 665		
EEM 2	Enhanced fenestration						\$ 1,831	
Standard	Standard windows, U-0.36		3,318	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.34	PNLL CE ANALYSIS	3,318	Area	\$ 0.55	\$ 1,831		
EEM 3	Air leakage testing for mid-sized buildings:						\$ 3,200	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type	BET, LLC	1	0	\$ 3,200	\$ 3,200		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling unit						\$ 71,679	
Standard	Lighting per ASHRAE 90.1-2016		39,536	watts	\$ 6.75	\$ 266,868		
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$ -	\$ 338,548		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting contro						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ 18,212	
Standard	VAV fans: 0.00130 bhp/cfm					\$ -		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	5,108.16	cfm	\$ 3.565	\$ 18,212		Costed as increased system size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy contro						\$ -	
Standard	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	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipmen						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reductor						\$ 1,596	
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	4,694	Area	\$ 0.3400	\$ 1,596		
EEM 12	Exterior lighting power reductor						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,764	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drive:						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipmen						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3					\$ -		
EEM			-	units	\$ 177,744	\$ -		
ACA 2	Reduced capacity for heating equipmen						\$ 94	
Standard	Hot water boiler, gas fired, 366 MBH	RSMeans D3020 130	1	units	\$ 23,274	\$ 23,274		
EEM	Hot water boiler, gas fired, 369 MBH	RSMeans D3020 130	1	0	\$ 23,368	\$ 23,368		
ACA 3	Reduced capacity for air handling equipmen						\$ (12,806)	
Standard	VAV AHU, 34305 cfm	RSMeans D3040 134	1	units	\$ 344,205	\$ 344,205		
EEM	VAV AHU, 33012 cfm	RSMeans D3040 134	1	units	\$ 331,399	\$ 331,399		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirement						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of space						\$ 17,962	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)					\$ -		
EEM		chargehub.com	14	outlets	\$ 1,300	\$ 17,962		
ACA 6	Solar-ready zone per Appendix CA of 2018 IEC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 111,298	

**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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						22,863	
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$ -	\$ -		
	4A: U-0.037; R-32.2 (+ R-2.2)							
Standard	Standard wall insulation (metal building)		26,687	Area	\$ -	\$ -		
	4A: U-0.060; R-15.3							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	49,495	Area	\$ 0.3881	\$ 19,208		
	4A: U-0.035; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMMeans 07 21 13.10	26,687	Area	\$ 0.1370	\$ 3,655		
	4A: U-0.048; R-19.5 (+ R-4.28)							
EEM 2	Enhanced fenestration						100	
Standard	Standard windows, U-0.38		190	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	190	Area	\$ 0.53	\$ 100		
EEM 3	Air leakage testing for mid-sized buildings						17,000	
Standard	Not Required		-	units	\$ -	\$ -		
EEM	Testing required	Vidaris	1	units	\$ 17,000	\$ 17,000		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						-	
Standard	Lighting per ASHRAE 90.1-2016		24,400	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	18,689	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	Reduce fan power allowances						-	
Standard	n/a - does not apply to this building type		-		\$ 1,031	\$ -		
EEM	n/a - does not apply to this building type		-		\$ 4	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						-	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	Area	\$ 0	\$ -		
EEM 12	Exterior lighting power reduction						-	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	4,100	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~8% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						-	
Standard	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						-	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - applies to IECC path only		-		\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						-	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 2	Reduced capacity for heating equipment						-	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						(2,999)	
Standard	PSZ AHU, CAV, 3390 cfm	RSMMeans 23 74 33.10	1	units	\$ 16,691	\$ 16,691		
EEM	PSZ AHU, CAV, 2543 cfm	RSMMeans 23 74 33.10	1	units	\$ 13,692	\$ 13,692		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces						2,600	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	0 outlets	\$ -	\$ -		
EEM			2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-		\$ -	\$ -		
EEM			-		\$ -	\$ -		
Total							\$ 39,565	

**2020 NYStretch
WAREHOUSE - 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						\$ 20,019	
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$ -	\$ -		
	5A: U-0.037; R-32.2 (+ R-2.2)							
Standard	Standard wall insulation (metal building)		26,687	Area	\$ -	\$ -		
	5A: U-0.050; R-18.6							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	49,495	Area	\$ 0.3881	\$ 19,208		
	5A: U-0.035; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMMeans 07 21 13.10	26,687	Area	\$ 0.0304	\$ 811		
	5A: U-0.048; R-19.5 (+ R-0.95)							
EEM 2	Enhanced fenestration						\$ 103	
Standard	Standard windows, U-0.38		190	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	190	Area	\$ 0.54	\$ 103		
EEM 3	Air leakage testing for mid-sized buildings						\$ 6,400	
Standard	Not Required		-	units	\$ -	\$ -		
EEM	Testing required	Vidaris	1	units	\$ 6,400	\$ 6,400		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		24,400	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	18,689		\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ -	
Standard	CV fans: 0.00094 bhp/cfm				\$ 1,031	\$ -		
	VAV fans: 0.00130 bhp/cfm							
EEM	CV fans: 0.00088 bhp/cfm				\$ 4	\$ -		
	VAV fans: 0.00100 bhp/cfm							
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ 0	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	5,101	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~8% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ 177,744	\$ -		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ (1,274)	
Standard	PSZ AHU, CAV, 2755 cfm	RSMMeans 23 74 33.10	1	units	\$ 14,442	\$ 14,442		
EEM	PSZ AHU, CAV, 2394 cfm	RSMMeans 23 74 33.10	1	units	\$ 13,167	\$ 13,167		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 4,338	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	0	\$ -	\$ -		
EEM			3	outlets	\$ 1,300	\$ 4,338		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 30,496	
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$ -	\$ -		
	6A: U-0.031; R-33.4 (+ R-3.4)							
Standard	Standard wall insulation (metal building)		26,687	Area	\$ -	\$ -		
	6A: U-0.050; R-18.6							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	49,495	Area	\$ 0.5998	\$ 29,685		
	6A: U-0.028; R-33.4 (+ R-3.4)							
EEM	Enhanced wall insulation (nonresidential mass wall)	RSMMeans 07 21 13.10	26,687	Area	\$ 0.0304	\$ 811		
	6A: U-0.048; R-19.5 (+ R-0.95)							
EEM 2	Enhanced fenestration						\$ 105	
Standard	Standard windows, U-0.36		190	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.34	PNNL CE ANALYSIS	190	Area	\$ 0.55	\$ 105		
EEM 3	Air leakage testing for mid-sized buildings						\$ 6,400	
Standard	Not Required		1	units	\$ -	\$ -		
EEM	Testing required	Vidaris	1	units	\$ 6,400	\$ 6,400		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		24,400	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient	HBL	18,689		\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-		\$ -	\$ -		
EEM	n/a - IECC only		-		\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-		\$ -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -		
EEM 7	Reduce fan power allowances						\$ -	
Standard	CV fans: 0.00094 bhp/cfm				\$ 1,031	\$ -		
	VAV fans: 0.00130 bhp/cfm							
EEM	CV fans: 0.00088 bhp/cfm				\$ 4	\$ -		
	VAV fans: 0.00100 bhp/cfm							
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ -	
Standard	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ 0	\$ -		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	RSMMeans 26 51 13.55	5,101	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~8% more efficient	RSMMeans 26 51 13.55			\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ -	
Standard	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						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ 177,744	\$ -		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ (2,024)	
Standard	PSZ AHU, CAV, 2882 cfm	RSMMeans 23 74 33.10	1	units	\$ 14,891	\$ 14,891		
EEM	PSZ AHU, CAV, 2310 cfm	RSMMeans 23 74 33.10	1	units	\$ 12,867	\$ 12,867		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 4,338	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	0	\$ -	\$ -		
EEM			3	outlets	\$ 1,300	\$ 4,338		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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	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	\$ -	\$ -		
	4A: U-0.064; R-13.4							
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)							
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	29,112	Area	\$ 0.0246	\$ 717		
	4A: U-0.061; R-14.2 (+ R-0.77)							
EEM 2	Enhanced fenestration						\$ 6,679	
Standard	Standard windows, U-0.39		12,383	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	12,383	Area	\$ 0.54	\$ 6,679		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ -	
Standard	Lighting per ASHRAE 90.1-2016		60,160	watts	\$ -	\$ -		
EEM	Reduced LPDs, ~20% more efficient	HBL	57,804	watts	\$ -	\$ -		No cost assumed for this building type
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	High-efficiency SHW						\$ -	
Standard	Hot water boiler with 80% thermal efficiency		-		\$ -	\$ -		
EEM	Hot water boiler with 94% thermal efficiency		-		\$ -	\$ -		
EEM 10	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		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,270	
Standard	Standard wall insulator		-		\$ -	\$ -		
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						\$ -	
Standard	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	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 10,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	\$ 10,000	\$ 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	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (2,551)	
Standard	PTAC, 105 tons	RSMeans D3050 255	1	units	\$ 179,837	\$ 179,837		
EEM	PTAC, 104 tons	RSMeans D3050 255	1	units	\$ 177,287	\$ 177,287		
ACA 2	Reduced capacity for heating equipment						\$ (469)	
Standard	Hot water boiler, gas fired, 1076 MBH	RSMeans D3020 130	1	units	\$ 43,188	\$ 43,188		
EEM	Hot water boiler, gas fired, 1059 MBH	RSMeans D3020 130	1	0	\$ 42,719	\$ 42,719		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ 5,255	
Standard	Opaque wall with U-0.061		-	0	\$ -	\$ -		
EEM	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						\$ 2,600	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)		-	0	\$ -	\$ -		
EEM		chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
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**

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						\$ 4,252	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (residential steel-frame wall)		8,435	Area	\$ -	\$ -		
Standard	5A: U-0.055; R-16.0		29,112	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck)	RMeans 07 22 16.10	8,435	Area	\$ 0.3881	\$ 3,274		
EEM	Enhanced wall insulation (residential steel-frame wall)	RMeans 07 21 13.10	29,112	Area	\$ 0.0336	\$ 978		
EEM	5A: U-0.052; R-17.1 (+ R-1.05)							
EEM 2	Enhanced fenestration						\$ 9,755	
Standard	Standard windows, U-0.39		12,383	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	12,383	Area	\$ 0.79	\$ 9,755		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ -	
Standard	Lighting per ASHRAE 90.1-2016	HBL	60,160	watts	\$ -	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient		57,804	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,270	
Standard	Standard wall insulator		-		\$ -	\$ -		
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.	RMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	n/a - not modeled for this building type	RMeans 26 51 13.55	-		\$ -	\$ -		
EEM	n/a - not modeled for this building type	RMeans 26 51 13.55	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 10,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	\$ 10,000	\$ 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	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (4,679)	
Standard	PTAC, 106 tons	RMeans D3050 255	1	units	\$ 180,632	\$ 180,632		
EEM	PTAC, 103.2 tons	RMeans D3050 255	1	units	\$ 175,954	\$ 175,954		
ACA 2	Reduced capacity for heating equipment						\$ (771)	
Standard	Hot water boiler, gas fired, 1073 MBH	RMeans D3020 130	1	units	\$ 43,089	\$ 43,089		
EEM	Hot water boiler, gas fired, 1045 MBH	RMeans D3020 130	1	0	\$ 42,318	\$ 42,318		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1,		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ 7,938	
Standard	Opaque wall with U-0.052		-	0	\$ -	\$ -		
EEM	Opaque wall with U-0.036, R-28.1 (+R-8.83)	RMeans 07 21 13.10	28,086	0	\$ 0.2826	\$ 7,938		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces						\$ 2,600	
Standard	208/240V 40 amp outlets (zones 5A and 6A only)		-	0	\$ -	\$ -		
EEM		chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	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						6,503	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (residential steel-frame wall)		8,435	Area	\$ -	\$ -		
Standard	6A: U-0.049; R-17.5		29,112	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMean 07 22 16.10	8,435	Area	\$ 0.5998	\$ 5,059		
EEM	6A: U-0.029; R-33.4 (+ R-3.4)							
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMean 07 21 13.10	29,112	Area	\$ 0.0496	\$ 1,444		
EEM	6A: U-0.044; R-19.1 (+ R-1.55)							
EEM 2	Enhanced fenestration						10,005	
Standard	Standard windows, U-0.38		12,383	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	12,383	Area	\$ 0.81	\$ 10,005		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						-	
Standard	Lighting per ASHRAE 90.1-2016		60,160	watts	\$ 6.75	\$ -		No cost assumed for this building type
EEM	Reduced LPDs, ~20% more efficient.	HLB	57,804	watts	\$ -	\$ -		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	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	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						1,270	
Standard	Standard wall insulator		-		\$ -	\$ -		
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.	RSMean 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
EEM 12	Exterior lighting power reduction						-	
Standard	n/a - not modeled for this building type	RSMean 26 51 13.55	-		\$ -	\$ -		
EEM	n/a - not modeled for this building type	RSMean 26 51 13.55	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						10,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	\$ 10,000	\$ 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	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(6,309)	
Standard	PTAC, 108 tons	RSMean D3050 255	1	units	\$ 183,620	\$ 183,620		
EEM	PTAC, 104 tons	RSMean D3050 255	1	units	\$ 177,311	\$ 177,311		
ACA 2	Reduced capacity for heating equipment						(1,006)	
Standard	Hot water boiler, gas fired, 1112 MBH	RSMean D3020 130	1	units	\$ 44,195	\$ 44,195		
EEM	Hot water boiler, gas fired, 1076 MBH	RSMean D3020 130	1	0	\$ 43,189	\$ 43,189		
ACA 3	Reduced capacity for air handling equipment						-	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1,		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						12,444	
Standard	Opaque wall with U-0.044		-	0	\$ -	\$ -		
EEM	Opaque wall with U-0.027, R-36.57 (+R-13.9)	RSMean 07 21 13.10	28,086	0	\$ 0.4431	\$ 12,444		
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces						2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
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	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments
EEM 1	Enhanced insulation for roofs and walls						\$ 4,397	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck,		8,435	Area	\$ -	\$ -		
Standard	Standard wall insulation (residential steel-frame wall)		45,603	Area	\$ -	\$ -		
	4A: U-0.064; R-13.4							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMMeans 07 22 16.10	8,435	Area	\$ 0.3881	\$ 3,274		
	4A: U-0.030; R-32.2 (+ R-2.2)							
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMMeans 07 21 13.10	45,603	Area	\$ 0.0246	\$ 1,124		
	4A: U-0.061; R-14.2 (+ R-0.77)							
EEM 2	Enhanced fenestration						\$ 20,165	
Standard	Standard windows, U-0.39		37,387	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	37,387	Area	\$ 0.54	\$ 20,165		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 15,786	
Standard	Lighting per ASHRAE 90.1-2016		13,612	watts	\$ 6.75	\$ 93,229		
EEM	Reduced LPDs, ~20% more efficient	HBL	11,473	watts	\$ -	\$ 109,015.58		Cost for retail area only
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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				\$ -	\$ -		
EEM	n/a - does not apply to this building type				\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	High-efficiency SHW						\$ -	
Standard	Natural gas water heaters, 1200 MBH, 90% thermal efficiency (as (3) 400MBH units)		3	each	\$ -	\$ -		
EEM	Natural gas water heaters, 1200 MBH, 94% thermal efficiency(as (3) 400MBH units)		3	each	\$ -	\$ -		
EEM 10	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		-		\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,270	
Standard	Standard wall insulator		-		\$ -	\$ -		
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.	RSMMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	n/a - not modeled for this building type	RSMMeans 26 51 13.55	-		\$ -	\$ -		
EEM	n/a - not modeled for this building type	RSMMeans 26 51 13.55	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 20,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$ 10,000	\$ 20,000		
EEM 14	ERV for apartment make-up air units						\$ -	
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (5,840)	
Standard	WSHP, 174 tons	RSMMeans D3050 240	1	units	\$ 492,590	\$ 492,590		
Standard	Closed circuit cooling tower, 140 tons	RSMMeans 23 65 133.10	1	units	\$ 109,749	\$ 109,749		
EEM	WSHP, 172 tons	RSMMeans D3050 240	1	units	\$ 487,823	\$ 487,823		
EEM	Closed circuit cooling tower, 138.2 tons	RSMMeans 23 65 133.10	1	units	\$ 108,676	\$ 108,676		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 58,379	

**2020 NYStretch
20 STORY HIGH-RISE APARTMENT - 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						\$ 4,806	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$ -	\$ -		
Standard	Standard wall insulation (residential steel-frame wall) 5A: U-0.055; R-16.0		45,603	Area	\$ -	\$ -		
EEM	Enhanced roof insulation (insulation entirely above deck) 5A: U-0.030; R-32.2 (+ R-2.2)	RSMMeans 07 22 16.10	8,435	Area	\$ 0.3881	\$ 3,274		
EEM	Enhanced wall insulation (residential steel-frame wall) 5A: U-0.052; R-17.1 (+ R-1.05)	RSMMeans 07 21 13.10	45,603	Area	\$ 0.0336	\$ 1,532		
EEM 2	Enhanced fenestration						\$ 29,452	
Standard	Standard windows, U-0.39		37,387	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	37,387	Area	\$ 0.79	\$ 29,452		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard	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						\$ 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	\$ -	\$ 109,016		Cost for retail area only
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						\$ -	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard	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		3	each	\$ -	\$ -		
EEM	n/a - does not apply to this building type		3	each	\$ -	\$ -		
EEM 10	High-efficiency commercial kitchen equipment						\$ -	
Standard	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -		
EEM 11	Thermal bridging reduction						\$ 1,270	
Standard	Standard wall insulation		-	0	\$ -	\$ -		
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.	RSMMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270		
EEM 12	Exterior lighting power reduction						\$ -	
Standard	n/a - not modeled for this building type	RSMMeans 26 51 13.55	-	0	\$ -	\$ -		
EEM	n/a - not modeled for this building type	RSMMeans 26 51 13.55	-	0	\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						\$ 20,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$ 10,000	\$ 20,000		
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	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						\$ -	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						\$ (5,884)	
Standard	WSHP, 172 tons	RSMMeans D3050 240	1	units	\$ 496,559	\$ 496,559		
Standard	Closed circuit cooling tower, 138 tons	RSMMeans 23 65 133.10	1	units	\$ 108,392	\$ 108,392		
EEM	WSHP, 169.8 tons	RSMMeans D3050 240	1	units	\$ 481,756	\$ 481,756		
EEM	Closed circuit cooling tower, 136.5 tons	RSMMeans 23 65 133.10	1	units	\$ 107,311	\$ 107,311		
ACA 2	Reduced capacity for heating equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						\$ -	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						\$ -	
Standard	n/a - does not apply to this building type		-	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						\$ 2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only) chargehub.com		2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						\$ -	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 68,030	

**2020 NYStretch
20 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						7,321	
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck)		8,435	Area	\$ -	\$ -		
Standard	Standard wall insulation (residential steel-frame wall)		45,603	Area	\$ -	\$ -		
	6A: U-0.049; R-17.5							
EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	8,435	Area	\$ 0.5998	\$ 5,059		
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	45,603	Area	\$ 0.0496	\$ 2,262		
	6A: U-0.044; R-19.1 (+ R-1.55)							
EEM 2	Enhanced fenestration						30,209	
Standard	Standard windows, U-0.38		37,387	Area	\$ -	\$ -		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	37,387	Area	\$ 0.81	\$ 30,209		
EEM 3	Air leakage testing for mid-sized buildings						-	
Standard	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						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	\$ -	\$ 109,016		Cost for retail area only
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						-	
Standard	n/a - IECC only		-	0	\$ -	\$ -		
EEM	n/a - IECC only		-	0	\$ -	\$ -		
EEM 6	Exterior lighting control						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	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				\$ -	\$ -		
EEM	n/a - does not apply to this building type				\$ -	\$ -		
EEM 8	Hotel guestroom HVAC vacancy control						-	
Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -		
EEM 9	High-efficiency SHW						-	
Standard	n/a - does not apply to this building type		3	each	\$ -	\$ -		
EEM	n/a - does not apply to this building type		3	each	\$ -	\$ -		
EEM 10	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		-		\$ -	\$ -		
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 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						-	
Standard	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	-		\$ -	\$ -		
EEM 13	Efficient elevator, regenerative drives						20,000	
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -		
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$ 10,000	\$ 20,000		
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	\$ -	\$ -		
EEM 15	Demand-based recirculated SHW controls						-	
Standard	n/a		-	0	\$ -	\$ -		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -		
ADDITIONAL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment						(9,656)	
Standard	WSHP, 166 tons	RSMeans D3050 240	1	units	\$ 471,779	\$ 471,779		
Standard	Closed circuit cooling tower, 134 tons	RSMeans 23 65 133.10	1	units	\$ 105,066	\$ 105,066		
EEM	WSHP, 163.5 tons	RSMeans D3050 240	1	units	\$ 463,897	\$ 463,897		
EEM	Closed circuit cooling tower, 131.3 tons	RSMeans 23 65 133.10	1	units	\$ 103,292	\$ 103,292		
ACA 2	Reduced capacity for heating equipment						-	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 3	Reduced capacity for air handling equipment						-	
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$ -	\$ -		
EEM			-	units	\$ -	\$ -		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements						-	
Standard	n/a - does not apply to this building type		-	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						2,600	
Standard			-	0	\$ -	\$ -		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC						-	
Standard			-	0	\$ -	\$ -		
EEM			-	0	\$ -	\$ -		
Total							\$ 67,531	

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