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

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

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

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

Table ES-1. Aggregate Summary of Results

	Construction Weight	Site 1	Energy [kBtu/f	t2/yr]	Source	Energy [kBtu	/ft2/yr]		Er	ergy C	Cost [\$/ft]	In F	cremental irst Cost	Simple Payback	
Prototype	[%]		NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.1	1-2016	NYS	NYStretch % Saving		\$/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

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

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

	Construction	Site E	energy [kBtu/	ft2/yr]	Source Energy [kBtu/ft2/yr]					Energy Cost		Inc. 1	First Cost	Simple Payback	
Prototype	Weight	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

	Construction	Site E	Energy [kBtu/i	ft2/yr]	Source	Energy [kBtu	ı/ft2/yr]			Energy	Cost		Inc. First Cost		Simple Payback
Prototype	Weight	90.1-2016	NYStretch*	% Savings	90.1-2016	NYStretch*	% Savings	90.1	1-2016	NYStre	tch*	% Savings		\$/ft2	years
Large Office	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	5.85	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.

Annual Energy Cost **10 Year Life Cycle Energy Cost** Net Savings over 10 Years Residual Construction Incremental Value Weight First Cost 90.1-2016 NYStretch 90.1-2016 Prototype NYStretch Savings Total at 10yrs [%] 242,215 \$ 25,162 \$ 4A Totals 253,616 \$ 2,365,240 \$ 2,259,659 \$ 105,581 83,955 \$ 46,788 \$ 70.9% \$ \$ 167,142 \$ 154,337 \$ 1,556,783 \$ 1,438,147 \$ 118,636 \$ 1,558,123 24,902 781,498.62 \$ 5A Totals 20.9% \$ \$ \$ 170,912 \$ 1,595,414 \$ 1,470,838 \$ 124,576 \$ 1,252,578 \$ \$ 6A Totals 8.2% \$ 157,469 \$ 30,782 617,704 \$ AGGREGATE 100.0% \$ 228,761 216,899 \$ 2,133,146 \$ 2,023,280 \$ 109,867 \$ 88,326 \$ 25,568 \$ 47,109 \$ VALUES

\$/sf

0.11

0.37

0.30

0.18

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

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

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

1 Cost Effectiveness Study

1.1 Background

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

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

DOE Prototype	Climate Zone: City (Weather file)
Large Office Building	
Stand-alone Retail	
Secondary School	CZ 4A: New York (USA_NY_New .York-
Large Hotel	J.F.Kennedy.Intl.A P.744860_TMY3.epw)
Full-service Restaurant	CZ 5A: Buffalo (USA NY Buffalo-
Outpatient Healthcare	Greater.Buffalo.Intl.AP.725280_TMY3.epw)
Warehouse	CZ 6A: Watertown (USA NY Watertown AP.726227 TMY3.epw)
10-Story High-rise Apartment	
20-Story High-rise Apartment	

Table 1. Prototypes and New York Climate Zones

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 ASHRAE90.1-2016 and 2020 NYStretch

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

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

Table 4. Life-Cycle Cost Analysis Parameters

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 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.

Prototype	CZ	Construction	Site 1	Energy [kBtu/f	t2/yr]	Source	Energy [kBtu	/ft2/yr]	Energy Cost						remental rst Cost	Simple Payback
		weight [%]	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.	1-2016	NYStretch		% Savings		\$/ft2	years
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	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
Restaurant	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	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
Apartment	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	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
Apartment	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 VALUE	s	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 5. Energy Savings and Simple Payback for By Building Type and Climate Zone

	Construction Weight	Site I	Site Energy [kBtu/ft2/yr]			Source Energy [kBtu/ft2/yr]			Energy Cost [\$/ft2]				In F	cremental First Cost	Simple Payback
Prototype	[%]	90.1-2016	NYStretch	% Savings	90.1-2016	NYStretch	% Savings	90.	1-2016	NY	Stretch	% 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 6. Energy Savings and Simple Payback by Building Type

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.

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

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

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 andNYStretch

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

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	NYStretch	ASHRAE 90.1 -2016								
(U-factor)										
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 Restaurant ³										
	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 Healthc	are									
	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	NYStretch	ASHRAE 90.1 -2016								
(U-factor)										
Large Hotel										
	CLIMATE ZONE 4	T								
Roofs: insulation entirely above deck	0.030	0.032								
Walls, above grade: mass (residential)	0.086	0.090								
	CLIMATE ZONE 5									
Roofs: insulation entirely above deck	0.030	0.032								
Walls, above grade: mass (residential)	0.076	0.080								
	CLIMATE ZONE 6									
Roofs: insulation entirely above deck	0.029	0.032								
Walls, above grade: mass (residential)	0.067	0.071								
Warehouse ⁴										
	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 S	School, Large Hotel, Full-Servic	ce Restaurant, Outpatient						
	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/ft ²)	NYStretch	NYStretch less 10%	90.1-2016
Large Office			
Office (building area method)	0.69	0.62	0.79
Stand-Alone Retail			
BOH (area w eighted average)	0.50	0.45	
Sales Area	1.06	0.95	1.22
Lobby ⁵	0.90	0.81	1.00
Display lighting - type 1,2,3 (area 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
Stairw ell	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</u> <u>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
Stairw ell	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 (w eighted 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 allow ance [Watts] ⁷	1,000	900	1,000
Outpatient Healthcare			
Conference/Meeting/Multipurpose	0.93	0.84	1.07
Corridor	0.58	0.52	0.792
Dining Area - cafeteria/fastfood	0.53	0.48	0.63
Healthcare Facility - nurse station	0.75	0.68	0.81
Healthcare Facility - patient room	0.45	0.41	0.62
Healthcare Facility - physical therapy	0.84	0.76	0.84
Healthcare Facility - recovery room	0.89	0.80	1.03
Healthcare Facility - exam/treatment	1.16	1.04	1.68
Healthcare Facility - imaging room	0.98	0.88	1.06
Healthcare Facility - operating room	1.87	1.68	2.17
Lobby - all other 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 protype building; these averages were developed by PNNL for the national analysis of ASHRAE 90.1-2016. Following the methodology used by PNNL's analysis of NYStretch, it is assumed there are no parking lots for prototypes in climate zone 4A. PNNL also excluded exterior lighting for 10-story and 20-story apartment prototypes as the majority of these buildings are in climate zone 4A and have no or limited exterior lighting.

At the time of this analysis, this measure is only included in the IECC overlay of the NYStretch draft. Vidaris included this measure in the analysis at NYSERDA's direction as the final version of the code is anticipated to include it in the ASHRAE path as well. Based on an analysis of typical parking lot lighting, it was determined that standard metal halide lamps could be used to achieve the LPD limits for NYStretch. As there is only a minimal reduction in façade and entryway lighting, it was assumed there is no incremental cost for this measure.

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

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

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

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

by Climate Zone and Building Type

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

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)

* Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

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

 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)

* Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

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

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)

* Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1 - 2016

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

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

Climate	ASHRAE	Energy Usage			Annual N	YS Energy Cost			Annual S	avin	gs	l	ncremental Firs	st Cost	Payback Period	Weighting
Zone	Standard	kWh	therms		Electricity	Gas	Total		Total		(\$/sf)		Total	(\$/sf)	(Years)	Factors
Outpatient He	althcare	40,843 squar	re 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 squar	re feet													
4A	90.1-2016	125,317	4,921	\$	18,484 \$	3,276 \$	21,760									
4A	NYStretch	109,025	4,189	\$	16,081 \$	2,788 \$	18,870	\$	2,890	\$	0.056	\$	53,254 \$	1.026	18.4	2.5%
5A	90.1-2016	125,589	8,115	\$	18,524 \$	5,402 \$	23,926									
5A	NYStretch	110,586	6,921	\$	16,311 \$	4,607 \$	20,919	\$	3,008	\$	0.058	\$	31,272 \$	0.602	10.4	3.8%
6A	90.1-2016	140,039	6,664	\$	20,656 \$	4,437 \$	25,092									
6A	NYStretch	120,967	5,805	\$	17,843 \$	3,865 \$	21,707	\$	3,385	\$	0.065	\$	39,118 \$	0.754	11.6	1.2%
10 Story High	0 Story Highrise Apt. 84,140 square feet		re feet													
4A	90.1-2016	486,453	24,164	\$	71,752 \$	16,086 \$	87,838									
4A	NYStretch	471,098	23,557	\$	69,487 \$	15,682 \$	85,168	\$	2,669	\$	0.032	\$	36,040 \$	0.428	13.5	21.9%
5A	90.1-2016	459,795	30,143	\$	67,820 \$	20,066 \$	87,886									
5A	NYStretch	444,061	29,030	\$	65,499 \$	19,325 \$	84,824	\$	3,062	\$	0.036	\$	32,095 \$	0.381	10.5	0.0%
6A	90.1-2016	458,814	30,223	\$	67,675 \$	20,119 \$	87,795									
6A	NYStretch	443,359	29,091	\$	65,395 \$	19,366 \$	84,762	\$	3,033	\$	0.036	\$	35,330 \$	0.420	11.6	0.0%
20 Story High	rise Apt	168,279 squar	re 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%
								4A	\$	0.077		\$	0.848	11.04	70.9%	
					Waightad Aver	and hy Climat	o 7ono		5A	\$	0.185		\$	1.808	9.76	20.9%
					weighted Avera	iges by climate	e 2011e		6A	\$	0.187		\$	1.962	10.48	8.2%
								Co	mbined	\$	0.109		\$	1.140	10.50	100.0%

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

Climate	ASHRAE	Energy Us	age	F	Energy Cost			1	0 yr Life Cycle	Energy Cost			հ	ncremental	Res	sidual Value	Net Savings	over 10 yr	Weighting
Zone	Standard	kWh	therms		Total	I	lectricity		Gas	Total		Savings		First Cost	А	t 10 Years	Total	Cost Index (\$/sf)	Factors
Large Office	•	497,337 s	quare feet																
4A	90.1-2016	7,404,873	45,821	\$	1,122,721	\$	10,070,256	\$	322,413	10,392,6	i9								
4A	NYStretch	7,090,011	46,458	\$	1,076,703	\$	9,642,061	\$	326,895	9,968,9	6\$	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	10,349,7	9								
5A	NYStretch	6,929,778	68,076	\$	1,067,460	\$	9,424,151	\$	479,012	9,903,1	3\$	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	10,389,6	19								
6A	NYStretch	6,932,525	72,462	\$	1,070,785	\$	9,427,887	\$	509,876	9,937,7	3\$	451,846	\$	148,621	\$	23,746	\$326,971	\$0.66	0.3%
Standalone F	Retail	24,630 s	quare feet																
4A	90.1-2016	262,889	1,981	\$	40,095	\$	357,516	\$	13,941 \$	371,4	7								
4A	NYStretch	220,589	2,102	\$	33,936	\$	299,990	\$	14,787 \$	314,7	7\$	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 \$	366,8	2								
5A	NYStretch	210,720	2,946	\$	33,042	\$	286,568	\$	20,728	307,2	6\$	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 \$	376,6	6								
6A	NYStretch	218,834	3,225	\$	34,425	\$	297,603	\$	22,691	320,2	3\$	56,383	\$	80,645	\$	21,594	(\$2,668)	(\$0.11)	2.6%
Secondary S	chool	210,357 s	quare feet										_						
4A	90.1-2016	1,753,599	18,055	\$	270,675	\$	2,384,806	\$	127,041	2,511,8	7								
4A	NYStretch	1,616,146	16,151	\$	249,133	\$	2,197,877	\$	113,642	2,311,5	0 \$	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	2,417,7	12								
5A	NYStretch	1,523,268	20,845	\$	238,559	\$	2,071,568	\$	146,676	2,218,2	4 \$	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	2,426,1	5								
6A	NYStretch	1,523,135	21,645	\$	239,071	\$	2,071,387	\$	152,302	2,223,6	9\$	202,456	\$	137,223	\$	55,849	\$121,082	\$0.58	1.1%
Large Hotel		121,813 s	quare feet																
4A	90.1-2016	1,587,057	45,330	\$	264,267	\$	2,158,318	\$	318,958	2,477,2	6								
4A	NYStretch	1,445,229	43,085	\$	241,853	\$	1,965,439	\$	303,163	2,268,6	2 \$	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	2,390,2	0								
5A	NYStretch	1,350,487	48,539	\$	231,509	\$	1,836,595	\$	341,543	2,178,1	8 \$	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	2,400,3	0								
6A	NYStretch	1,345,009	51,399	\$	232,605	\$	1,829,146	\$	361,668	2,190,8	3 \$	209,537	\$	182,079	\$	45,577	\$73,035	\$0.60	1.8%
Full Service	Restaurant	5,488 s	quare feet										_						
4A	90.1-2016	223,706	13,240	\$	41,811	\$	304,229	\$	93,165	397,3	3								
4A	NYStretch	190,350	12,252	\$	36,233	\$	258,867	\$	86,209	345,0	5 \$	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	400,0	5								
5A	NYStretch	183,745	14,691	\$	36,882	\$	249,883	\$	103,370 \$	353,2	3 \$	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	408,0	2								
6A	NYStretch	183,195	15,893	\$	37,601	\$	249,135	\$	111,830 \$	360,9	5\$	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

Climate	ASHRAE	Energy Us	age	ŀ	Energy Cost			10 yr Life Cy	0 yr Life Cycle Energy Cost Incremental Residua			Value	Net Savings	over 10 yr	Weighting				
Zone	Standard	kWh	therms		Total	F	lectricity	Gas		Total	Sav	ings		First Cost	At 10 Y	lears	Total	Cost Index (\$/sf)	Factors*
Outpatient H	lealthcare	40,843 s	quare feet																
4A	90.1-2016	1,032,065	10,408	\$	159,158	\$	1,403,556 \$	73,235	\$	1,476,791									
4A	NYStretch	964,334	10,684	\$	149,351	\$	1,311,446 \$	75,174	\$	1,386,620	\$	90,171	\$	126,695	\$	30,589	(\$5,934)	(\$0.15)	2.0%
5A	90.1-2016	1,004,067	11,865	\$	155,998	\$	1,365,482 \$	83,485	\$	1,448,966									
5A	NYStretch	937,570	12,183	\$	146,402	\$	1,275,049 \$	85,727	\$	1,360,775	\$	88,191	\$	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 s	quare feet																
4A	90.1-2016	125,317	4,921	\$	21,760	\$	170,425 \$	34,625	\$	205,049									
4A	NYStretch	109,025	4,189	\$	18,870	\$	148,269 \$	29,472	\$	177,741	\$	27,308	\$	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 Hig	ghrise Apt.	84,140 s	quare 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 Hig	ghrise Apt	168,279 s	quare 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%
																	4A	\$0.11	70.9%
								Weighted Average Savings by Climat					ings by Climate Zone				5A	\$0.37	20.9%
																	6A	\$0.30	8.2%
																	Combined	\$0.18	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 B)

* Negative Savings indicate that NYStretch results in higher energy use or cost relative to ASHRAE 90.1-2016

Appendix C

EEM 9 High-efficiency SHW

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

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

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

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

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

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

20 Story	' Highrise Apt	168,279	square feet	t					
							Annual I	ncremental	Payback
		Energy	Usage	Annual	NYS Energy	Cost	Savings	First Cost	Period
CZ	Description	kWh	therms	Electricity	Gas	Total	Total	Total	(Years)
4A	SHW 90% Eff.	1,152,409	40,277	\$169,980	\$26,813	\$196,793			
4A	SHW 94% Eff.	1,152,409	39,432	\$169,980	\$26,250	\$196,230	\$563	\$4,833	8.58
5A	SHW 90% Eff.	1,143,904	50,478	\$168,726	\$33,603	\$202,329			
5A	SHW 94% Eff.	1,143,904	49,577	\$168,726	\$33,003	\$201,729	\$600	\$3,795	6.33
6A	SHW 90% Eff.	1,138,529	50,857	\$167,933	\$33,856	\$201,789			
6A	SHW 94% Eff.	1,138,529	49,907	\$167,933	\$33,223	\$201,156	\$633	\$3,572	5.65

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

Appendix D.

Cost Estimates

	EEMI	2020 NYStretch LARGE OFFICE - 4A ncremental Cost Wor Prepared by Vidaris Ind 19-Jun-2019	r ksheet c.					
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		29.252	4.000	¢.	¢	\$ 16,034	
Stanuaru	Standard 0-0.002, R-30 root insulation (insulation entirely above deck) Standard wall insulation (nonresidential mass wall)		36,353	Area		\$ -		
Standard	4A: U-0.104; R-7.82		74,849	Area	s -	\$ -		
EEM	AA: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	38,353	Area	\$ 0.3881	\$ 14,884		
EEM	Enhanced wall insulation (nonresidential mass wall) 4A: U-0.099; R-8.30 (+ R-0.48)	RSMeans 07 21 13.10	74,849	Area	\$ 0.0154	\$ 1,150		
EEM 2	Enhanced fenestration		10.000			•	\$ 25,904	
EEM	Enhanced windows, U-0.38	PNNL CE ANALYSIS	49,899	Area	\$ 0.52	\$ 25,904		
EEM 3	Air leakage testing for mid-sized buildings						\$ -	
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type		-		s - s -	\$ - \$ -		
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units					Ŷ	\$-	
Standard	Lighting per ASHRAE 90.1-2016		392,896	watts	\$ 6.75	\$ -		No cost assumed for this
EEM 5	Reduced LPDs, ~20% more efficient Occupancy sensors and automatic lighting controls including egress lighting	HBL	308,846	watts	\$ -	\$ -	s .	buidling type
Standard	n/a - IECC only				\$ -	\$-	•	
EEM	n/a - IECC only		-		\$ -	\$ -	•	
Standard					\$ -	\$ -	•	
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	RSMeans 23 74 33.10	4.98	tons	\$ 1,031	\$ 5,137		Costed as increased system size for reduction in static
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	31,262	cfm	\$ 3.565	\$ 111,456		pressure
EEM 8	Hotel guestroom HVAC vacancy control						\$ -	
Standard FFM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016				s - s -	\$ - \$ -		
EEM 9	High-efficiency SHW				Ŭ	Ŷ	\$-	
Standard	n/a - does not apply to this building type		-		\$ - ¢	\$ -		
EEM 10	High-efficiency commercial kitchen equipment		-		3 -	φ -	\$ -	
Standard	n/a - does not apply to this building type		-		s -	\$ -		
EEM 11	Thermal bridging reduction		-		5 -	\$ -	\$ 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	17,406	watts	\$ -	\$-		No cost; parking lot can be mot with MH
EEM	Reduced LPDs, ~32% more efficient	RSMeans 26 51 13.55			s -	\$-		Inet with with
EEM 13	Efficient elevator, regenerative drives						\$ 120,000	
Standard FFM	Standard elevator motors, 30hp 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 15	Demand-based recirculated SHW controls	1			I		\$ -	
Standard			-		\$ - ¢	\$ -		
ADDITIONA		I	-		Ф -	φ -		
ACA 1	Reduced capacity for cooling equipment	0014			e 0:0.1.		\$ (32,749)	
Standard Standard	watercoolea chiller, 701 tons Coolina tower, 1602 tons	RSMeans 23 64 13.10 RSMeans 23 65 13.10	2	units units	\$ 318,147 \$ 184,539			
EEM	Watercooled chiller, 676 tons	RSMeans 23 64 13.10	2	units	\$ 308,568	\$ 617,136		
ACA 2	Cooling tower, 1543 tons Reduced capacity for heating equipment	RSMeans 23 65 13.10	2	units	\$ 177,744	\$ 355,488	\$ (12.832)	
Standard	Hot water boiler, gas fired, 8877 MBH	RSMeans D3020 130	1	units	\$ 261,867	\$ 261,867	· (12,032)	
EEM	Hot water boiler, gas fired, 8419 MBH Reduced expectity for air bandling equipment	RSMeans D3020 130	1	units	\$ 249,034	\$ 249,034	¢ (400.400)	
Standard	VAV with Reheat, 274885 cfm	RSMeans D3040 134	1	units	\$ 2,727,871	\$ 2,727,871	ə (133,102)	
EEM	VAV with Reheat, 261451 cfm	RSMeans D3040 134	1	units	\$ 2,594,768	\$ 2,594,768		
ACA 4 Standard	Increased insulation to account for PTAC openings, thermal bridging requirements n/a - does not apply to this building type		-		s -	\$ -	\$ -	
EEM	n/a - does not apply to this building type		-		\$ -	\$ -		
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces				s -	\$ -	\$ 2,600	
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	1				¢	\$ -	No Cost
EEM			-		s -	ۍ د ۲		NU COSE
						Total	\$ 104,894	
							,	

2020 NYStretch LARGE OFFICE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-19											
EEM	Description	Source of	Number of	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments			
EEM 1	Enhanced insulation for roofs and walls	Item Cost	EEM Units				\$ 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	\$ -	s -					
CCM.	Enhanced roof insulation (insulation entirely above deck)	DEMagan 07 22 16 10	20.252	A	¢ 0.2001	e 14.004					
	5A: U-0.030; R-32.2 (+ R-2.2)	N3Wearis 07 22 10.10	30,333	Alea	\$ 0.3001	φ 14,004					
EEM	5A: U-0.086; R-9.83 (+ R-0.52)	RSMeans 07 21 13.10	74,849	Area	\$ 0.0166	\$ 1,245					
EEM 2	Enhanced fenestration		40,800	4 100	¢	¢	\$ 26,344				
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 FFM	n/a - does not apply to this building type n/a - does not apply to this building type		-		s - s -	s - s -					
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units						\$ -				
Standard FFM	Lighting per ASHRAE 90.1-2016 Reduced LPDs. ~20% more efficient	HBI	392,896 308,846	watts	\$ 6.75 \$	\$- \$-	I I	No cost assumed for this building type			
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	1.02	000,010	indito	÷	÷	\$ -				
Standard	n/a - IECC only		-		\$ - \$	\$ - ¢					
EEM 6	Exterior lighting control		-		- -	• ·	\$ -				
Standard	n/a				\$ -	\$ -					
EEM 7	Reduce fan power allowances (based on improved fan efficiencies)		-			ۍ د د	\$ 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			
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	32,193	cfm	\$ 3.565	\$ 114,775		size for reduction in static pressure			
EEM 8	Hotel guestroom HVAC vacancy control					-	\$-				
Standard FFM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-		\$ - \$ -	\$ - \$ -					
EEM 9	High-efficiency SHW					-	\$ -				
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type		-		\$ - \$ -	\$ - \$ -					
EEM 10	High-efficiency commercial kitchen equipment				+	÷	\$ -				
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type				\$ - \$ -	\$ - \$ -					
EEM 11	Thermal bridging reduction				÷	Ŭ	\$ 2,448				
Standard	Standard wall insulation: Additional Paranet Insulation: Assume 12in at wall + 42in of paranet height + 12in wide paranet + 42in of				\$ -	\$ -					
EEM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	7,200	Area	\$ 0.3400	\$ 2,448					
EEM 12 Stondard	Exterior lighting power reduction	PSMoone 26 51 12 55	42 412	wotto	¢	¢	\$ -				
EEM	Reduced LPDs, ~32% more efficient	RSMeans 26 51 13.55	43,412	waus	\$ -	\$ - \$ -					
EEM 13	Efficient elevator, regenerative drives				<u>^</u>	¢	\$ 120,000				
EEM	Elevator motors, supp	Previous projects	- 12	each	\$ 10,000	\$ 120,000					
EEM 14	ERV for apartment makeup air units						\$-				
EEM	n/a - aiready included in 90.1-2016 n/a - aiready included in 90.1-2016		-		s - s -	s - s -					
EEM 15	Demand-based recirculated SHW controls				0	¢	\$-				
EEM	n/a - applies to IECC path only		-		\$ - \$ -	\$ - \$ -					
ADDITION	AL COST ADJUSTMENTS						¢ (40.000)				
Standard	Watercooled chiller, 683 tons	RSMeans 23 64 13.10	2	units	\$ 311,297	\$ 622,594	\$ (10,238)				
Standard	Cooling tower, 1560 tons	RSMeans 23 65 13.10	2	units	\$ 179,680	\$ 359,360					
EEM	Cooling tower, 1542 tons	RSMeans 23 64 13.10 RSMeans 23 65 13.10	2	units	\$ 308,303 \$ 177,556	\$ 616,605 \$ 355,112					
ACA 2	Reduced capacity for heating equipment	Dout Doute (22	_				\$ (44,204)				
Standard EEM	Hot water boiler, gas fired, 9963 MBH Hot water boiler, gas fired, 8386 MBH	RSMeans D3020 130 RSMeans D3020 130	1	units units	\$ 292,309 \$ 248,105	\$ 292,309 \$ 248,105					
ACA 3	Reduced capacity for air handling equipment					,	\$ (78,938)				
Standard FFM	VAV with Reheat, 276750 cfm VAV with Reheat, 268782 cfm	RSMeans D3040 134 RSMeans D3040 134	1	units	\$ 2,746,345 \$ 2,667,408	\$ 2,746,345 \$ 2,667,408					
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements			dinto		2,007,400	\$-				
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type			units units		\$ - \$ -					
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces	1		2.110			\$ 70,434				
Standard FFM	No charging stations, 325,080sf parking lot, 300sf per parking spot 208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	-	outlets	\$ - \$ 1300	\$ - \$ 70.434					
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	Jana Jonabiosini		0411010	,500		\$-				
Standard EEM			-		\$ - \$ -	\$ - \$ -					
						Total	\$ 222,002				

CETOutput<	2020 NYStretch LARGE OFFICE - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-19												
Hield Building and analysis of a set of a se	EEM	Description	Source of Item Cost	Number of FFM Units	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments				
ShareShareShareSSS <t< td=""><td>EEM 1</td><td>Enhanced insulation for roofs and walls</td><td></td><td></td><td></td><td></td><td></td><td>\$ 24,583</td><td></td></t<>	EEM 1	Enhanced insulation for roofs and walls						\$ 24,583					
Galance Bay Lighter Bay Lighter 	Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck) Standard well insulation (nonresidential mass well)		38,353	Area	\$ -	\$ -						
End Buttery for fully single status (signed status) (signe	Standard	6A: U-0.080; R-10.70		74,849	Area	\$-	\$ -						
Backward and watch monitory monitexpanily monitexpanily monitory monitory monitory monitory monit	EEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16.10	38,353	Area	\$ 0.5998	\$ 23,003						
Image: Process of the state of the	FEM	Enhanced wall insulation (nonresidential mass wall)	RSMeans 07 21 13 10	74 849	Area	\$ 0.021	\$ 1.581						
Should Should Annual PARCE AND 10 (1990) Annual PARCE AND 10 (1990)	EEM 2	6A: U-0.076; R-11.36 (+ R-0.66)	110/mcaria 07 21 13.10	14,043	Arca	ψ 0.021	÷ 1,301	¢ 26.427					
Ethol Interactive function (L.D.S. 2) Finance function (L.D.S. 2)	Standard	Standard windows, U-0.36		49,899	Area	\$-	\$-	÷ 20,101					
Name of the set of any of the set of the	EEM 2	Enhanced windows, U-0.34 Air lookage testing for mid sized building:	PNNL CE ANALYSIS	49,899	Area	\$ 0.52	\$ 26,137	e					
Elim or does not apply the building year No cost assumed for his last integration of the building year Elim Reacon L Din,20 more efficient Reacon L Din,20 more efficient No No <td< td=""><td>Standard</td><td>n/a - does not apply to this building type</td><td></td><td>-</td><td></td><td>\$-</td><td>\$-</td><td>•</td><td></td></td<>	Standard	n/a - does not apply to this building type		-		\$-	\$-	•					
Description Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	EEM 4	n/a - does not apply to this building type Reduced LPD for interior lighting, bith officers lights in dwelling unit		-		\$-	\$ -						
EIM Beakace UPs, -20% more dising equation (lying equation	Standard	Lighting per ASHRAE 90.1-2016		392,896	watts	\$-	\$-	• -	No and an used for this building type				
Base Base Base Base Base Base Base Base	EEM	Reduced LPDs, ~20% more efficient	HBL	308,846	watts	\$-	\$-		No cost assumed for this building type				
EM no. = IBCC only mo. = IBC only No. = IBC only </td <td>Standard</td> <td>occupancy sensors and automatic lighting controls including egress lightin n/a - IECC only</td> <td> </td> <td>-</td> <td></td> <td>\$-</td> <td>\$ -</td> <td>\$ -</td> <td></td>	Standard	occupancy sensors and automatic lighting controls including egress lightin n/a - IECC only		-		\$-	\$ -	\$ -					
International and interval and int	EEM	n/a - IECC only		-		\$-	\$ -	-					
EEM Restancena - IECC conv. alexal on instruction (biological)no IEC conv. alexal on instruction (biological)No IEENo IEE<	Standard	Exterior lighting contro		-		s -	s -	\$ -					
Bail of Books and Books (1985) Notice Int Books (1985) <th< td=""><td>EEM</td><td>n/a - IECC only; already included in NYS amendments to 90.1-2016</td><td></td><td>-</td><td></td><td>\$ -</td><td>\$ -</td><td></td><td></td></th<>	EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ -	\$ -						
Answer Of Mass 200703 big-big-big Oracle of Control big-big set of Control big set of Contro	EEM / Standard	Reduce ran power allowances (based on improved ran efficiencies)					\$	\$ 115,148					
Subtle Viruline Sub100 php/fm Sub100 php/fm Sub100 php/fm Sub100 php/fm Content as increased system reduction in static press EM Viruline Sub100 php/fm RSMaans D3040 134 30.865 frm \$ 3 5 100.000 Content as increased system reduction in static press EMM Note interscont Viruline Sub100 php/fm RSMaans D3040 134 30.865 frm \$ 3 5 . Content as increased system reduction in static press Static press Rs-ansaty included in 00.12016 RS . S . <td>Ctandard</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$</td> <td></td> <td></td>	Ctandard						\$						
EM CV bins: 0.0008 binpdm S 1.001 S 5.00 Contrastant pressure EM VM and part of subject for the binding type S	Standard	VA V TANS: U.UU1 3U BND/CTM					\$ -						
EAM VAV fam: 0.0010 bip/cfm VAV fam	EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	4.95	tons	\$ 1,03	\$ 5,107		Costed as increased system size for				
EAR Model questation MACE values for control S S C EAR Model questation MACE values for control S <td< td=""><td>EEM</td><td>VAV fans: 0.00100 bhp/cfm</td><td>RSMeans D3040 134</td><td>30,865</td><td>cfm</td><td>\$ 3.565</td><td>\$ 110,041</td><td></td><td>reduction in static pressure</td></td<>	EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	30,865	cfm	\$ 3.565	\$ 110,041		reduction in static pressure				
EAMMa- already included in 90 1-2016No. 2SSANo. 4StandardAdd- does not apply to this building typeIII<	EEM 8 Standard	Hotel guestroom HVAC vacancy control n/a - already included in 90.1-2016		-		s -	s -	\$ -					
EAR M Might-Intendency MW Might-Intendency MW S S C Might-Intendency MW Soundard Main Appe S S C EAR Main Hable-Efficiency commercial kitching ypo S S C EAR Main Hable-Efficiency commercial kitching ypo S S C EAM M Hable-Efficiency commercial kitching ypo S S C EAM M Might-Maintonin S S S C Standard Main Accoss not apply to this building ypo S S S C Standard Main Maintonin Standard Maintonin S S S C C Standard Maintonin Standard Maintonin S S S C C S S C C C C C C S S C C C C C C C C C C C C C C C C C C C<	EEM	n/a - already included in 90.1-2016		-		\$-	\$ -	-					
EEM Na - Oses not apply to this building type Image: Second apply to this building type I	EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type		-		\$-	\$ -	\$ -					
Ease 10 ingle-framework ingle-framework <td>EEM</td> <td>n/a - does not apply to this building type</td> <td></td> <td>-</td> <td></td> <td>\$-</td> <td>\$ -</td> <td></td> <td></td>	EEM	n/a - does not apply to this building type		-		\$-	\$ -						
EEM Iva - dee not apply to this building type I	EEM 10 Standard	High-efficiency commercial kitchen equipment n/a - does not apply to this building type		-		\$-	\$ -	5 -					
ELM 11 Informal bridging reduction S Z.448 Additional Parapet Insulation. Assume 12 in at wall + 22 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet height + 12 in wide parapet + 42 in of parapet + 42 in	EEM	n/a - does not apply to this building type		-		\$-	\$ -						
Additional Parapet Insulation: Assume 12 in at walt + 22m of parapet height i 12in wide parapet + 42m of parapet height in the parapet height in theight parapet height in the parapet height	EEM 11 Standard	Thermal bridging reduction Standard wall insulation				s -	s -	\$ 2,448					
Include Case of the total insultation (ref. 2016) Residue (ref. 2016) Residue (ref. 2017) Residue (ref. 2017) <thresidue (ref.="" 2017)<="" th=""></thresidue>	EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of parapet height to	RSMeans 07 22 16.10	7,200	Area	\$ 0.3400	\$ 2,448						
Sandard Lighting part ASH'AAE 90.1-2016 RSMeans 26 51 13.55 43,412 wits \$. S S S S <t< td=""><td>EEM 12</td><td>Exterior lighting power reduction</td><td></td><td></td><td></td><td></td><td></td><td>s -</td><td></td></t<>	EEM 12	Exterior lighting power reduction						s -					
EEM Reduced LPUS, ~11% more efficient (with regenerative drives) s <td< td=""><td>Standard</td><td>Lighting per ASHRAE 90.1-2016</td><td>RSMeans 26 51 13.55</td><td>43,412</td><td>watts</td><td>\$ -</td><td>\$ -</td><td></td><td></td></td<>	Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	43,412	watts	\$ -	\$ -						
Standard Standard elvator motors: 30hp each \$ \$ EEM EXendard divents: 30hp Previous projects 12 each \$ \$ EEM 14 EXP for apartment makeup air units 12 each \$ 10,000 \$ \$ EEM 16 relatedy included in 90.1-2016 \$	EEM 13	Efficient elevator, regenerative drives	RSMeans 26 51 13.55	-		\$ -	\$ -	\$ 120,000					
LEM 14 EValuation regenerative drives, 30 hp Previous projects 12 each \$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000 \$ \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - - \$ - - \$ - - \$ - - \$ -<	Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -						
Sandard n/a - already included in 90.1-2016 \$ </td <td>EEM 14</td> <td>Elevator motors with regenerative drives, 30 np ERV for apartment makeup air units</td> <td>Previous projects</td> <td>12</td> <td>eacn</td> <td>\$ 10,000</td> <td>\$ 120,000</td> <td>\$ -</td> <td></td>	EEM 14	Elevator motors with regenerative drives, 30 np ERV for apartment makeup air units	Previous projects	12	eacn	\$ 10,000	\$ 120,000	\$ -					
ELM Na* a life any finduided in 90.1-2016 s <td>Standard</td> <td>n/a - already included in 90.1-2016</td> <td></td> <td>-</td> <td></td> <td>\$ -</td> <td>\$ -</td> <td></td> <td></td>	Standard	n/a - already included in 90.1-2016		-		\$ -	\$ -						
Sandard n/a -applies to IECC path only \$ \$ \$ \$ \$	EEM 15	Demand-based recirculated SHW controls		-		\$ -	\$ -	\$ -					
EEM Ind a applies bit ECC pair lotity s	Standard			-		\$ -	\$ -						
ACA1 Reduced capacity for cooling equipment \$ (31,001) Standard Wattrooled chline, 633 tors RSMeans 23 64 13.10 2 units \$ 282,639 \$ 582,728 Standard Wattrooled chline, 633 tors RSMeans 23 64 13.10 2 units \$ 166,445 \$ 332,890 EEM Valexooled chline, 607 tors RSMeans 23 64 13.10 2 units \$ 166,445 \$ 332,890 EEM Cooling tower, 1495 tons RSMeans 23 65 13.10 2 units \$ 280,602 \$ 160,340 ACA 2 Reduced capacity for heating equipment RSMeans 23 65 13.10 2 units \$ 280,602 \$ 144,620 Standard How water bolier, gas fired, 9340 MBH RSMeans D3020 130 1 units \$ 275,064 \$ 275,064 \$ 275,064 \$ 275,064 \$ 275,064 \$ 2,729,760 \$ 163,754) Standard VAY with Reheet, 275076 cfm RSMeans D3040 134 1 units \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760	ADDITION	AL COST ADJUSTMENTS		-		ф -	\$ -						
Standard Control of liver, 144 for loss Control of li	ACA 1	Reduced capacity for cooling equipment	PSMoone 22 64 12 10	2	unito	\$ 202.620	\$ 595.279	\$ (31,001)					
EEM Watercooled chiller, 607 tons R5Means 23 64 13.10 2 units \$ 283,243 \$ 566,466 EEM Colling tower, 1392 tons R5Means 23 64 13.10 2 units \$ 160,340 \$ 320,680 ACA 2 reduced capacity for hasting equipment R5Means D3020 130 1 units \$ 289,692 \$ 289,692 \$ 289,692 \$ 289,692 \$ 163,754 ACA 3 Reduced capacity for air handling equipment R5Means D3020 130 1 units \$ 2,729,760 \$ 2,729,760 \$ \$ 2,729,760 \$ \$ - 0 \$ 2,729,760 \$ \$ - 0 \$ 2,729,760 \$ \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ - 0 \$ -	Standard	Cooling tower, 1445 tons	RSMeans 23 65 13.10	2	units	\$ 166,445	\$ 332,890						
Edit of Code in generating equipment Code in generating equipment Code in generating equipment S 100,940 S 20,960 S 20,960 (14,628) Standard Hot water boiler, gas fired, 934 MBH RSMeans D3020 130 1 units \$ 2729,760 S 275,064 S 277,064 S 2729,760 S 2,769,764 S 2729,760 S 2,769,764 S 2,729,760 S 3 2,920,900 S 3 3,920,900 S 3	EEM	Watercooled chiller, 607 tons	RSMeans 23 64 13.10	2	units	\$ 283,243	\$ 566,486						
Standard Hot water boiler, gas fired, 987 MBH MBH RSMeans D3020 130 1 units \$ 289,692 \$ 289,692 \$ 1 Units \$ 289,692 \$ 1 Units \$ 289,692 \$ 289,692 \$ 1 Units \$ 289,692 \$ 289,692 \$ 1 Units \$ 289,692 \$ 1 1 Units \$ 289,692 \$ 1 Units \$ 289,692 \$ \$ 1 1 Units \$ 289,692 \$ 1 1 Units \$ 275,064 \$ 275,064 \$ 275,0764 \$ 272,9760 \$ 2,279,760 \$ 2,279,760 \$ 2,279,760 \$ 2,279,760 \$ 2,266,006 \$ 1 1 Units \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006 \$ 2,566,006	ACA 2	Reduced capacity for heating equipment	Romeans 23 65 13.10	2	units	\$ 100,340	\$ 320,080	\$ (14,628)					
Let Inclusion guidance, gu	Standard EEM	Hot water boiler, gas fired, 9870 MBH Hot water boiler, gas fired, 9248 MBH	RSMeans D3020 130	1	units	\$ 289,692	\$ 289,692						
Standard VAV with Reheat, 275076 cfm RSMeans D3040 134 1 units \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,729,760 \$ 2,760,760 \$ 2,760,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ 2,769,760 \$ \$ 7 \$ \$ 7 \$ \$ 7 \$ 7 \$ 7	ACA 3	Reduced capacity for air handling equipment	Koweans D3020 130		units	\$ 213,00	\$ 213,004	\$ (163,754)					
ACA 4 Increased insulation to account for PTAC openings, themal bridging requirement s - 0 \$ - 5 Standard n/a - does not apply to this building type - 0 \$ - 0 ACA 5 Electric vehicle charging station capable parking lots for 5% of spaces - 0 \$ - 0	Standard	VAV with Reheat, 275076 cfm	RSMeans D3040 134 RSMeans D3040 134	1	units	\$ 2,729,760	\$ 2,729,760						
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	ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirement	Incomedits D3040 134		units	φ 2,000,000	φ 2,300,008	\$-					
ACA 5 Electric vehicle charging station capable parking lots for 5% of spaces \$ 70,434	Standard FEM	n/a - does not apply to this building type		-	0	\$ - \$	\$ - \$.						
	ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces	1		U		-	\$ 70,434					
Standard No charging stations, 325,000sf parking lot, 300sf per parking spot FEM 2008/2014/04 and on utilets (zones 5k and 6k and/v) chargehui hoom 54 outlets \$ 100 \$ 70.434	Standard FFM	No charging stations, 325,080sf parking lot, 300sf per parking spot 208/240V 40 amo outlets (zones 5A and 6A only)	chargebub com	- 54	outlete	\$ - \$ 1300	\$ -						
ACA 6 Solar-ready zone per Appendix CA of 2018 IECC 5 -	ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	Jonabioon	34	Galloud			\$-					
Standard - \$ - \$	Standard FFM					\$ - \$ -	\$ - \$ -						
Total \$ 149,368							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	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments			
EEM 1 Standard	Enhanced insulation for roofs and walls Standard U.0.023 R 20 roof insulation (insulation entirely above deely		24 692	Area	\$	-	s .	\$ 9,763				
Standard	Standard Wolldard (Insulation (Insulation (Insulation entitiely above deck) Standard wall insulation (nonresidential mass wall)		11 766	Area	¢		с -					
otandard	4A: U-0.104; R-7.82 Enhanced roof insulation (insulation entirely above deck)		11,700	Aica	Ψ		• -					
EEM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	24,692	Area	\$	0.3881	\$ 9,583					
EEM	AA: U-0.099; R-8.30 (+ R-0.48)	RSMeans 07 21 13.10	11,766	Area	\$	0.0154	\$ 181					
EEM 2	Enhanced fenestration		004	4.000	¢		¢	\$ 447				
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	904	Area	\$ \$	0.50	\$ - \$ 447					
EEM 3	Air leakage testing for mid-sized buildings	[0	¢		¢	\$-				
EEM	n/a - does not apply to this building type		-	0	\$	-	ş - Ş -					
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$ 59,518	Cost assumed to be			
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$	6.75	\$ 241,565		proportional to increased			
EEM	Reduced LPDs, ~25% more efficient	HBL	26,970	watts	\$	-	\$ 301,083.28		efficiency			
Standard	n/a - IECC only		-	0	\$	-	\$ -	· ·				
EEM	n/a - IECC only		-	0	\$	-	\$ -					
Standard	Exterior lighting control		-	0	\$	-	\$-	ъ -				
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -	¢ 000				
Standard	CV fans: 0.00094 bhp/cfm			tons			\$-	\$ 900	Costed as increased system			
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	0.93	tons	\$	1,031	\$ 960		size for reduction in static			
EEM 8	Hotel questroom HVAC vacancy control]			s -	pressure			
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -					
EEM 9	n/a - already included in 90.1-2016 High-efficiency SHW		-	0	\$	-	ş -	s -				
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -					
EEM 10	n/a - does not apply to this building type High-efficiency commercial kitchen equipment		-	0	\$	-	ş -	s -				
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -					
EEM 11	n/a - does not apply to this building type Thermal bridging reduction		-	0	\$	-	s -	s -				
Standard	n/a - does not apply to this building type		-	0	\$	-	ş -					
EEM 12	Exterior lighting power reduction		-	Area	\$	U	ş -	\$ -				
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,702	watts	\$	-	ş -					
EEM 13	Efficient elevator, regenerative drives	R3Means 20 51 13.55			Þ	-	ə -	\$ -				
Standard	n/a - does not apply to this building type		-	each	\$	-	\$ -					
EEM 14	ERV for apartment makeup air units		-	each	Þ	-	ə -	\$ -				
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ - e					
EEM 15	Demand-based recirculated SHW controls	/	-	0	Ψ	-	•	s -				
Standard FEM	n/a annual to IECC nath only		-	0	\$	-	\$ -					
ADDITION	AL COST ADJUSTMENTS			, in the second s	1 Y		Ŭ.		1			
ACA 1 Standard	Reduced capacity for cooling equipment Packaged single-zone AC, 56 tons	RSMeans 23 74 33 10	1	units	\$	72,373	\$ 72.373	\$ (2,100)				
EEM	Packaged single-zone AC, 53 tons	RSMeans 23 74 33.10	1	units	\$	70,273	\$ 70,273					
ACA 2 Standard	Reduced capacity for heating equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)	[-	units	\$	-	s -	ş -				
EEM			-	units	\$	-	\$ -					
ACA 3 Standard	Reduced capacity for air nandling equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -	5 -				
EEM			-	units	\$	-	\$ -					
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -	-				
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -	6 0.000				
Standard	Licence entrying station capable parking tots for 5% of spaces		-	0	\$	-	\$ -	2,000				
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300	\$ 2,600	\$				
Standard			-	0	\$	-	\$ -	-				
EEM			-	0	\$	-	S -	¢ 74.400				
							Total	φ /1,189	1			

2020 NYStretch STANDALONE RETAIL - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019											
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1 Standard	Enhanced insulation for roofs and walls Standard LL0 032 R-30 roof insulation (insulation entirely above deck		24 692	Area	\$		s .	\$ 9,778			
Standard	Standard vall insulation (nonresidential mass wall)		11 766	Aroa	¢		¢				
Stanuaru	5A: U-0.090; R-9.31		11,700	Aica	φ		φ -				
EEM	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	24,692	Area	\$	0.3881	\$ 9,583				
EEM	Enhanced wall insulation (nonresidential mass wall) 5A: U-0.086; R-9.83 (+ R-0.52)	RSMeans 07 21 13.10	11,766	Area	\$	0.0166	\$ 196				
EEM 2 Standard	Enhanced fenestration Standard windows 11-0.37		904	Area	\$		s .	\$ 517			
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	904	Area	\$	0.57	\$ 517				
EEM 3	Air leakage testing for mid-sized buildings			0	6		6	\$ -			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$ \$		s - \$ -				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	1						\$ 59,518			
Standard	Lighting per ASHRAE 90.1-2016		35,787	watts	\$	6.75	\$ 241,565		Cost assumed to be		
EEM	Reduced LPDs, ~20% more efficient	HBL	26,970	watts	\$	-	\$ 301,083		efficiency		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							s -	,		
Standard EEM	n/a - IECC only n/a - IECC only		-	0 0	\$ \$	-	\$ - \$ -				
EEM 6 Standard	Exterior lighting control			0	\$		\$ -	\$ -			
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	Ő	\$	-	\$-				
EEM 7	Reduce fan power allowances	1		tone			¢	\$ 780	Costed as increased system		
EEM	CV fans: 0.00094 bnp/cfm	PSMoone 22 74 22 10	0.76	tons	¢	1 021	\$ - \$ 790		size for reduction in static		
EEM 8	Hotel questroom HVAC vacancy control	Noivieans 25 74 55.10	0.70	tons	φ	1,031	\$ 700	۰. ۲	pressure		
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$-	•			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
EEM 9 Standard	High-efficiency SHW			0	\$		s -	\$ -			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-				
EEM 10 Stondard	High-efficiency commercial kitchen equipment			0	¢		ç	\$ -			
EEM	n/a - does not apply to this building type			0	\$		\$ -				
EEM 11	Thermal bridging reduction							s -			
Standard FEM	n/a - does not apply to this building type			0 Area	\$	-	\$ - \$ -				
EEM 12	Exterior lighting power reduction	J	- (Aica	φ	U	ф -	\$ -			
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	3,453	watts	\$	-	\$ -				
EEM 13	Reduced LPDs, ~11% more efficient Efficient elevator, regenerative drives	RSMeans 26 51 13.55			\$	-	\$ -	s -			
Standard	n/a - does not apply to this building type]	-	each	\$	-	\$-				
EEM 44	n/a - does not apply to this building type		-	each	\$	-	\$ -				
Standard	n/a - already included in 90.1-2016		-	0	\$		s -	-			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -	_			
EEM 15 Standard	Demand-based recirculated SHW controls			0	s		s -	s -			
EEM	n/a - applies to IECC path only		-	0	\$	-	\$-				
ADDITIONA	AL COST ADJUSTMENTS Reduced capacity for cooling equipment							\$ (6.479)			
Standard	Packaged single-zone AC, 53 tons	RSMeans 23 74 33.10	1	units	\$	69,354	\$ 69,354	\$ (0,473)			
EEM	Packaged single-zone AC, 46 tons	RSMeans 23 74 33.10	1	units	\$	62,875	\$ 62,875				
ACA 2 Standard	Reduced capacity for heating equipment (INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$		s -	s -			
EEM	,		-	units	\$	-	\$ -				
ACA 3 Standard	Reduced capacity for air handling equipment			units	\$		\$.	ş -			
EEM	INCLOCED WFACKAGED UNITS IN ACA I)		-	units	\$		\$ -				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements				0		¢	\$ -			
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$	-	ა - \$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			-				\$ 7,586			
Standard	208/2401/ 40 amp outlats (zones 54 and 64 only)	chargebub com	-	0 outlote	\$	-	\$ -				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	onargenub.com	0	oudets	φ	1,300	φ /,380	\$ -			
Standard			-	0	\$	-	\$ -				
EEM			-	0	\$		5 ·	¢ 74 704			
							i otal	э /1,/01			

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	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1 Standard	Enhanced insulation for roofs and walls Standard U.0.023 R 20 roof insulation (insulation antiraly above dealy		24 692	Area	\$		\$.	\$ 15,058			
Clandard	Standard vol. 022, Reso fool insulation (insulation entirely above deck, Standard wall insulation (nonresidential mass wall)		11 766	Area	÷		÷ -				
Stanuaru	6A: U-0.080; R-10.70		11,700	Alea	φ	-	÷ -				
EEM	6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 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)	RSMeans 07 21 13.10	11,766	Area	\$	0.0211	\$ 248				
EEM 2 Standard	Enhanced tenestration Standard windows, U-0.35		904	Area	\$		s -	\$ 496			
EEM	Enhanced windows, U-0.33	PNNL CE ANALYSIS	904	Area	\$	0.55	\$ 496				
EEM 3 Standard	Air leakage testing for mid-sized buildings			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		
EEM	Reduced LPDs, ~20% more efficient	HBL	26,970	watts	\$	-	\$ 301,083		efficiency		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							\$-			
Standard	n/a - IECC only			0	\$		\$ - \$ -				
EEM 6	Exterior lighting control		-	U	Ψ	-	ψ -	\$ -			
Standard	n/a n/a JECC anhu already included in NVS amandmente to 00.1.2016		-	0	\$	-	\$ -				
EEM 7	Reduce fan power allowances		-	U	Φ	-	ş -	\$ 936			
Standard	CV fans: 0.00094 bhp/cfm			tons			\$-		Costed as increased system		
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	0.91	tons	\$	1,031	\$ 936		pressure		
EEM 8	Hotel guestroom HVAC vacancy control			0	¢		<u>_</u>	\$ -			
EEM	n/a - already included in 90.1-2016			0	\$	-	s - \$ -				
EEM 9	High-efficiency SHW							\$-			
Standard	n/a - does not apply to this building type			0	\$		\$ - \$ -				
EEM 10	High-efficiency commercial kitchen equipment		-	0	φ	-	φ -	\$-			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -				
EEM 11	h/a - does not apply to this building type Thermal bridging reduction		-	U	2	-	\$ -	s -			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -				
EEM 12	n/a - does not apply to this building type Exterior lighting neuror reduction		-	Area	\$	0	\$-	¢			
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	3,453	watts	\$	-	\$-	ş -			
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55			\$	-	\$-				
Standard	n/a - does not apply to this building type		-	each	\$	-	s -	· ·			
EEM	n/a - does not apply to this building type		-	each	\$	-	\$ -				
EEM 14 Standard	ERV for apartment makeup air units		-	0	\$		\$	\$-			
EEM	n/a - already included in 90.1-2016		-	Ő	\$	-	\$-				
EEM 15	Demand-based recirculated SHW controls	T		0	¢		c.	\$ -			
EEM	n/a - applies to IECC path only		-	0	\$	-	s - \$ -				
ADDITIONA	L COST ADJUSTMENTS										
ACA 1 Standard	Reduced capacity for cooling equipment Packaged single-zone AC. 50 tons	RSMeans 23 74 33,10	1	units	S	66.677	\$ 66.677	\$ (2,543)			
EEM	Packaged single-zone AC, 48 tons	RSMeans 23 74 33.10	1	units	\$	64,134	\$ 64,134				
ACA 2 Standard	Reduced capacity for heating equipment			unite	\$		\$	\$-			
EEM			-	units	\$	-	\$ -				
ACA 3	Reduced capacity for air handling equipment			مقاجري	¢		¢	\$ -			
EEM	(INOLUGED WIFAUMOED UNITS IN ACA I)			units	\$	-	ş - \$ -				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements							\$-			
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type			0	\$	-	\$ - \$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			ÿ	÷			\$ 7,586			
Standard	200/2401/ 40 amp outlate (zanac 54 and 64 anh)	charaohub com	-	0 outlots	\$	-	\$ -				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	onargenub.com	0	oullets	φ	1,300	φ /,000	\$ -			
Standard			-	0	\$	-	\$ -				
CEM			-	U	\$	-	Total	¢ 01.0E4			
							TUIdi	φ 01,051			

2020 NYStretch SECONDARY SCHOOL - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019												
EEM	Description	Source of	Number of	Unit	Cost / Unit	Total Item	Total Incremental Cost	Notes / Comments				
EEM 1	Enhanced insulation for roofs and walls	item cost				COSL	\$ 50,747					
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (nonresidential steel-frame wall)		128,112	Area	\$ -	\$ -						
Standard	4A: U-0.064; R-13.4		41,755	Area	\$ -	\$ -						
EEM	AA: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	128,112	Area	\$ 0.3881	\$ 49,718						
EEM	Enhanced wall insulation (nonresidential steel-frame wall) 4A: U-0.061: R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	41,755	Area	\$ 0.0246	\$ 1,029						
EEM 2	Enhanced fenestration						\$ 12,004					
Standard EEM	Standard windows, U-0.39 Enhanced windows, U-0.37	PNNL CE ANALYSIS	22,484 22,484	Area Area	\$ - \$ 0.53	\$ - \$ 12.004						
EEM 3	Air leakage testing for mid-sized buildings			0		6	\$-					
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$ - \$ -	\$ -						
EEM 4 Stondard	Reduced LPD for interior lighting; high efficacy lights in dwelling units		157 769	watte	\$ 6.75		\$-	No cost assumed for this				
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$ -	\$ -		buidling type				
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting		-	0	\$.	s -	\$ -					
EEM	n/a - IECC only		-	0	\$ -	\$ -						
EEM 6 Standard	Exterior lighting control		-	0	\$ -	s -	\$ -					
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -						
EEM 7 Standard	Reduce fan power allowances (based on improved fan efficiencies)					s -	\$ 36,643					
Standard	VAV (ane: 0.00130 hbn/c/m					¢						
EEM		PSMoone 22 74 22 10	1.07	tone	¢ 1.021	¢ 2.022		Costed as increased system				
		RSMeans D2040 124	0.709	ofm	\$ 1,031	¢ 24.611		size for reduction in static				
EEM 8	Hotel guestroom HVAC vacancy control	Koweans D3040 134	9,700	CIIII	\$ 3.303	\$ 34,011	s -	pressure				
Standard	n/a - already included in 90.1-2016		-	0	\$ -	\$ -						
EEM 9	High-efficiency SHW		-	U	۵ -	\$ -	\$ -					
Standard FFM	n/a - does not apply to this building type		-	0	\$ - \$ -	\$ - \$ -						
EEM 10	High-efficiency commercial kitchen equipment			Ū	÷	Ŷ	\$ 14,280					
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings		0	\$ -	\$ -						
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Calculator	2,319	Area	\$ 6.16	\$ 14,280						
Standard	Standard wall insulation		-		\$-	\$-	\$ 7,344					
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 parimeter of roof	RSMeans 07 22 16.10	21,600	Area	\$ 0.3400	\$ 7,344						
EEM 12	Exterior lighting power reduction						\$-					
Standard EEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs. ~10% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	3,549	watts	\$ - \$ -	\$ - \$ -						
EEM 13	Efficient elevator, regenerative drives					C	\$ -					
EEM	n/a - does not apply to this building type		-	each	ъ - \$ -	\$ -						
EEM 14 Standard	ERV for apartment makeup air units			0	\$.	s -	\$ -					
EEM	n/a - already included in 90.1-2016		-	0	\$-	\$-	-					
EEM 15 Standard	Demand-based recirculated SHW controls		-	0	\$ -	\$-	ş -					
EEM	n/a - applies to IECC path only		-	0	\$-	\$-						
ACA 1	Reduced capacity for cooling equipment						\$ (5,166)					
Standard EEM	Air-cooled chiller, 308 tons Air-cooled chiller, 300 tons	RSMeans 23 64 19.10 RSMeans 23 64 19.10	1	units	\$ 206,960 \$ 201,794	\$ 206,960 \$ 201,794						
ACA 2	Reduced capacity for heating equipment						\$ (2,314)					
EEM	Hot water boiler, gas fired, 3237 MBH Hot water boiler, gas fired, 3155 MBH	RSMeans D3020 130	1	units	\$ 103,770	\$ 103,770						
ACA 3 Standard	Reduced capacity for air handling equipment	RSMeans D3040 124	1	units	\$ 646.510	\$ 646 510	\$ (20,574)					
EEM	VAV with Reheat, 62741 cfm	RSMeans D3040 134	1	units	\$ 625,945	\$ 625,945						
ACA 4 Standard	Increased insulation to account for PTAC openings, thermal bridging requirements n/a - does not apply to this building type		-	0	\$ -	s -	\$ -					
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -						
Standard	Electric vehicle charging station capable parking lots for 5% of spaces		-	0	\$ -	\$ -	ə 2,600					
EEM	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$ 1,300	\$ 2,600	s					
Standard			-	0	\$ -	\$ -	-					
EEM			-	0	\$ -	S -	¢ 05 564					
						rotar	φ 90,004					

2020 NYStretch SECONDARY SCHOOL - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019											
EEM	Description	Source of	Number of	Unit	Cost / Unit	Total Item	Total Incremental Cost	Notes / Comments			
EEM 1	Enhanced insulation for roofs and walls	item cost				CUSI	\$ 51,121				
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (nonresidential steel-frame wall)		128,112	Area	\$ -	\$ -					
Standard	5A: U-0.055; R-16.0		41,755	Area	\$ -	\$ -					
EEM	Enhanced root insulation (insulation entirely above deck) 5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	128,112	Area	\$ 0.388	\$ 49,71	3				
EEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13.10	41,755	Area	\$ 0.0336	\$ 1,40	3				
EEM 2	Enhanced fenestration						\$ 15,786				
Standard	Standard windows, U-0.39		22,484	Area	\$ -	\$ -	>				
EEM 3	Air leakage testing for mid-sized buildings	PININE CE AINALTSIS	22,404	Area	\$ 0.70	\$ 15,76	\$-				
Standard FEM	n/a - does not apply to this building type		-	0	\$ - \$ -	\$ - \$ -					
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		-	0	ψ -	φ -	\$-				
Standard FEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~20% more efficient	HBI	157,768	watts	\$ 6.7	\$ - \$ -		No cost assumed for this building type			
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	- IBC	121,200	Watto	Ť	Ŷ	\$ -				
Standard FFM	n/a - IECC only n/a - IECC only			0	\$ - \$ -	\$ - \$ -					
EEM 6	Exterior lighting control			Ū	, v	, v	\$-				
Standard FFM	n/a 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)	1					\$ 37,359				
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	2.01	tons	\$ 1,03	\$ 2,07)	Costed as increased system			
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	9,898	cfm	\$ 3.56	\$ 35,28)	pressure			
EEM 8	Hotel guestroom HVAC vacancy control			0	¢	e	\$-				
EEM	n/a - already included in 90.1-2010		-	0	\$ - \$ -	\$ -					
EEM 9 Standard	High-efficiency SHW		_	0	\$	\$	\$ -				
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -					
EEM 10 Standard	High-efficiency commercial kitchen equipment Standard efficiency fivers, dishwashers, ovens, and holding cabinets			0	\$ -	s -	\$ 14,280				
FFM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	2.319	Area	\$ 6.1	\$ 14.28)				
EEM 11	Thermal bridging reduction	Calculator	_,				\$ 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.	RSMeans 07 22 16.10	21,600	Area	\$ 0.340	\$ 7,34	L .				
EEM 12	Exterior lighting power reduction	D014	0.505		¢	C.	\$-				
EEM	Reduced LPDs, ~10% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	6,525	watts	\$ - \$ -	\$ -					
EEM 13	Efficient elevator, regenerative drives			eeeb	¢	e	\$-				
EEM	n/a - does not apply to this building type		-	each	\$ - \$ -	\$ -					
EEM 14 Standard	ERV for apartment makeup air units			0	\$	\$.	\$-				
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -					
EEM 15 Standard	Demand-based recirculated SHW controls		-	0	\$-	s -	\$ -				
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -					
ADDITIONA ACA 1	IL COST ADJUSTMENTS Reduced capacity for cooling equipment						\$ (30.626)				
Standard	Air-cooled chiller, 295 tons	RSMeans 23 64 19.10	1	units	\$ 198,75	\$ 198,75	5				
ACA 2	Air-cooled chiller, 243 tons Reduced capacity for heating equipment	RSMeans 23 64 19.10	1	units	\$ 168,123	\$ 108,12	\$ (192)				
Standard	Hot water boiler, gas fired, 3420 MBH	RSMeans D3020 130	1	units	\$ 108,879	\$ 108,87	2				
ACA 3	Reduced capacity for air handling equipment	INSIMEARS D3020 130	1	urlits	φ 108,68	ູຈ 108,68	\$ (21,624)				
Standard FEM	VAV with Reheat, 66152 cfm	RSMeans D3040 134	1	units	\$ 659,74	\$ 659,74	5				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	1.0mcans 00040 104		units	. 030,12	φ 030,12	\$ -				
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type			0	\$ - \$ -	\$ - \$ -					
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces	1	-	U			\$ 12,896				
Standard FFM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub com	- 10	0 outlets	\$ - \$ 1.30	\$ -	3				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC		10	00000		2,03	\$ -				
Standard 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 FFM Units	Unit	Cos	st / Unit	Total Item Cost	Total Incremental Cos	t Notes / Comments		
EEM 1	Enhanced insulation for roofs and walls	item oost	EEM ONITS				0031	\$ 78,90	7		
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) 64: IL0 029: B-33.4 (+ B-3.4)	RSMeans 07 22 16.10	128,112	Area	\$	0.5998	\$ 76,836				
FEM	Enhanced wall insulation (nonresidential steel-frame wall)	RSMeans 07 21 13 10	41 755	Area	s	0.0496	\$ 2071				
EEM 2	6A: U-0.047; R-19.1 (+ R-1.55) Enhanced fenestration				•		- ,	\$ 16.11	9		
Standard	Standard windows, U-0.37		22,484	Area	\$	-	\$ -				
EEM 3	Enhanced windows, U-0.34 Air leakage testing for mid-sized buildings	PNNL CE ANALYSIS	22,484	Area	\$	0.72	\$ 16,119	s -			
Standard	n/a - does not apply to this building type		-	0	\$	-	ş -				
EEM 4	n/a - does not apply to this building type Reduced LPD for interior lighting, bigh efficacy lights in dwelling units		-	0	\$	-	\$-	s .			
Standard	Lighting per ASHRAE 90.1-2016		157,768	watts	\$	6.75	ş -		No cost assumed for this		
EEM	Reduced LPDs, ~20% more efficient	HBL	127,266	watts	\$	-	\$-		buidling type		
Standard	n/a - IECC only			0	\$	-	\$-	· ·			
EEM	n/a - IECC only		-	0	\$	-	\$-				
EEM 6 Standard	Exterior lighting control		-	0	S	-	s -				
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$ -		-		
EEM 7 Stondord	Reduce fan power allowances (based on improved fan efficiencies)						r	\$ 36,86	4		
Stanuaru							ş -				
Standard					_		۵ - 		Control on increased system		
EEM	CV fans: 0.00088 bhp/cfm	RSMeans 23 74 33.10	1.99	tons	\$	1,031	\$ 2,054		size for reduction in static		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	9,764	cfm	\$	3.565	\$ 34,810		pressure		
EEM 8 Standard	Hotel guestroom HVAC vacancy control n/a - already included in 90.1-2016		-	0	S		s -	\$ -			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$ -				
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type		-	0	S		s -	\$ -			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -				
EEM 10 Standard	High-efficiency commercial kitchen equipment Standard efficiency fivers, dishwashers, ovens, and holding cabinets		-	0	\$		s -	\$ 14,28	0		
FFM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	2,319	Area	s	6.16	\$ 14.280				
EEM 11	Thermal bridging reduction	Calculator	_,		•		• • • • • • • •	\$ 7.34	4		
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	21,600	Area	\$	0.3400	\$ 7,344				
EEM 12	Exterior lighting power reduction							\$-			
Standard	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~10% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13 55	6,525	watts	\$	-	\$ - \$ -				
EEM 13	Efficient elevator, regenerative drives				Ŷ		÷	\$ -			
Standard FEM	n/a - does not apply to this building type			each	\$	-	\$ - \$ -				
EEM 14	ERV for apartment makeup air units			ouon	Ŷ		Ŷ	\$-			
Standard FEM	n/a - already included in 90.1-2016			0	\$	-	\$ - \$ -				
EEM 15	Demand-based recirculated SHW controls		_	0	Ψ	-	ψ -	\$ -			
Standard	n/a n/a - annlies to IECC nath only		-	0	\$	-	\$ - \$ -				
ADDITIONA	AL COST ADJUSTMENTS		_	0	Ψ	-	ψ -				
ACA 1 Standard	Reduced capacity for cooling equipment	PSMoone 22.64.10.10	1	unito	¢	150.005	\$ 150.005	\$ (3,51	9)		
EEM	Air-cooled chiller, 224 tons	RSMeans 23 64 19.10	1	units	\$	156,476	\$ 156,476				
ACA 2	Reduced capacity for heating equipment	DEMagna D2020 120	1	unite	¢	01 257	£ 01.257	\$ (2,93	5)		
EEM	Hot water boiler, gas fired, 2430 MBH	RSMeans D3020 130	1	units	\$	78,423	\$ 78,423				
ACA 3	Reduced capacity for air handling equipment	DeMagna Doorto 404			¢	654 550	6 054 550	\$ (22,04	4)		
EEM	VAV with Reheat, 63101 cfm	RSMeans D3040 134	1	units	\$	629,514	\$ 629,514				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	1		0	6		¢	\$ -			
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type			0	э \$		ş - \$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			0	6		ĉ	\$ 12,89	6		
Standard EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 10	U outlets	\$	- 1,300	» - \$ 12,896				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC			^	¢		¢	\$ -			
Standard 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	Number of	Unit	Co	ost / Unit	Total Item	Total Incremental Cost	Notes / Comments		
EEM 1	Enhanced insulation for roofs and walls	item oost		A	<u>_</u>		0031	\$ 8,770			
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck, Standard wall insulation (residential mass wall)		21,300	Area	\$		\$ - ¢				
Stanuaru	4A: U-0.090; R-9.31 Enhanced roof insulation (insulation entirely above deck)		50,205	Alea	φ		φ -				
EEM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	21,300	Area	\$	0.3881	\$ 8,266				
EEM	AA: U-0.086; R-9.83 (+ R-0.52)	RSMeans 07 21 13.10	30,265	Area	\$	0.0166	\$ 504				
EEM 2 Standard	Enhanced fenestration Standard windows 11-0 39		13.068	Area	s		\$ -	\$ 7,042			
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	13,068	Area	\$	0.54	\$ 7,042				
EEM 3 Standard	Air leakage testing for mid-sized buildings n/a - does not apply to this building type		-	0	\$	-	ş -	\$ -			
EEM	n/a - does not apply to this building type Reduced LPD for interior lighting: high efficacy lights in dwelling units		-	0	\$	-	\$-	\$ 138.136			
Standard	Lighting per ASHRAE 90.1-2016		95,014	watts	\$	6.75	\$ 641,345	* 100,100			
EEM 5	Reduced LPDs, ~20% more efficient Occupancy sensors and automatic lighting controls including egress lighting	HBL	74,550	watts	\$	-	\$ 779,481	s .			
Standard	n/a - IECC only		-	0	\$	-	ş -				
EEM 6	Exterior lighting control		-	0	\$	-	\$ -	\$ -			
Standard	n/a n/a LECC antic already included in NVS amondments to 90.1.2016		-	0	\$	-	\$ - ¢				
EEM 7	Reduce fan power allowances		-	0	φ	-	φ -	\$ 21,952			
Standard	VAV fans: 0.00130 bhp/cfm	DCMaana D2040 124	6 157 24	ofea	~	2 565	\$ -		size for reduction in static		
EEM 8	Hotel guestroom HVAC vacancy control	KSIMEaris D3040 134	6,157.34	Cim	φ	3.305	\$ 21,952	s -	pressure		
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -				
EEM 9	High-efficiency SHW		-	0	Þ	-	ş -	\$ -			
Standard FFM	n/a - does not apply to this building type			0	\$		\$ - \$ -				
EEM 10	High-efficiency commercial kitchen equipment	1			1.0			\$ 6,810			
Standard	Standard efficiency tryers, dishwashers, ovens, and holding cabinets	Energy Star Savings	-	0	Ş	-	\$ -				
EEM 11	Thermal bridging reduction	Calculator	1,100	Area	φ	0.10	\$ 0,010	\$ 2 197			
Standard	Standard wall insulation		-		\$	-	ş -	¥ 2,107			
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 Standard	Exterior lighting power reduction	PSMoone 26 51 12 55	12.051	wotto	¢		¢	\$ -			
EEM	Reduced LPDs, ~24% more efficient	RSMeans 26 51 13.55	12,501	waus	\$		\$-				
EEM 13 Standard	Efficient elevator, regenerative drives n/a - does not apoly to this building type			each	\$	-	s -	\$ -			
EEM 44	n/a - does not apply to this building type		-	each	\$	-	\$-				
Standard	n/a - already included in 90.1-2016		-	0	\$	-	ş -	\$ -			
EEM 15	n/a - already included in 90.1-2016 Demand-based recirculated SHW controls		-	0	\$	-	\$-	s .			
Standard			-	0	\$	-	ş -	-			
ADDITION	AL COST ADJUSTMENTS		-	U	\$	-	\$ -				
ACA 1 Standard	Reduced capacity for cooling equipment	RSMeans 23 64 19 10	1	units	\$	175 162	\$ 175 162	\$ (3,703)			
EEM	Air-cooled chiller, 249 tons	RSMeans 23 64 19.10	1	0	\$	171,459	\$ 171,459				
ACA 2 Standard	Reduced capacity for heating equipment Hot water boiler, gas fired, 2197 MBH	RSMeans D3020 130	1	units	\$	74,604	\$ 74.604	\$ (2,677)			
EEM	Hot water boiler, gas fired, 2101 MBH Reduced expectity for air bandling equipment	RSMeans D3020 130	1	0	\$	71,926	\$ 71,926	¢ (20.704)			
Standard	VAV w/reheat, 41891 cfm	RSMeans D3040 134	1	units	\$	419,364	\$ 419,364	φ (20,784)			
ACA 4	VAV w/reheat, 39793 cfm Increased insulation to account for PTAC openings, thermal bridging requirements	RSMeans D3040 134	1	units	\$	398,580	\$ 398,580	s -			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces		-	U	\$	-	ə -	\$ 2,600			
Standard FFM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 2	0 outlets	\$	-	\$ - \$ 2600				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC		2	00000	Ŷ	.,000	- 2,000	\$-			
Standard 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	Cos	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1 Standard	Enhanced insulation for roofs and walls		21 300	Area	\$		\$	\$ 8,905			
Standard	Standard G-0.052; K-50 fooi insulation (insulation entirely above deck,		30 265	Area	ş S		s -				
	5A: U-0.080; R-10.70 Enhanced roof insulation (insulation entirely above deck)		00,200				• • • • • • •				
EEM	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	21,300	Area	\$	0.3881	\$ 8,266				
EEM	5A: U-0.076; R-11.3 (+ R-0.66)	RSMeans 07 21 13.10	30,265	Area	\$	0.0211	\$ 639				
EEM 2 Standard	Enhanced fenestration Standard windows 1L0 30		13.068	Area	\$		¢ .	\$ 8,212			
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	13,068	Area	\$	0.63	\$ 8,212				
EEM 3 Stondard	Air leakage testing for mid-sized buildings			0	¢		ç	\$ -			
EEM	n/a - does not apply to this building type			0	\$		\$- \$-				
EEM 4 Stondard	Reduced LPD for interior lighting; high efficacy lights in dwelling units		05.014	watte	¢	6.75	\$ 641.24	\$ 138,136			
EEM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$	-	\$ 779,481				
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting							\$ -			
Standard FFM	n/a - IECC only n/a - IECC only			0	\$		\$- \$-				
EEM 6	Exterior lighting control			-				\$-			
Standard FEM	n/a n/a - IECC only: already included in NYS amendments to 90 1-2016			0	\$		\$ - \$ -				
EEM 7	Reduce fan power allowances			Ū	ļ		Ŷ	\$ 22,502			
Standard	VAV fans: 0.00130 bhp/cfm			_			\$ -		size for reduction in static		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,311.43	ctm	\$	3.565	\$ 22,502		pressure		
Standard	n/a - already included in 90.1-2016			0	\$	-	ş -	· ·			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$-	-			
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type			0	\$		s -	ş -			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-				
EEM 10 Stondard	High-efficiency commercial kitchen equipment			0	¢		ç	\$ 6,810			
Standard	Standard enciency rivers, dishwashers, ovens, and holding cabinets	Energy Star Savings	1 100	0	¢ ¢	-					
	Energy Star inversion distinguishers, overis, and holding cabinets	Calculator	1,106	Area	φ	0.10	\$ 0,010	0.407			
Standard	Standard wall insulation				\$	-	ş -	\$ 2,197			
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	6,462	Area	\$	0.3400	\$ 2,197				
EEM 12	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.							s -			
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	12,951	watts	\$	-	\$-				
EEM EEM 13	Reduced LPDs, ~11% more efficient Efficient elevator regenerative drives	RSMeans 26 51 13.55			\$	-	\$ -	s .			
Standard	n/a - does not apply to this building type		-	each	\$	-	\$-				
EEM 14	n/a - does not apply to this building type		-	each	\$	-	\$-	e			
Standard	n/a - already included in 90.1-2016		-	0	\$	-	ş -	÷ -			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
EEM 15 Standard	Demand-based recirculated SHW controls		-	0	\$	•	ş -	5 -			
EEM	n/a - applies to IECC path only		-	0	\$	-	\$-				
ADDITIONA ACA 1	AL COST ADJUSTMENTS Reduced capacity for cooling equipment							\$ (3.555)			
Standard	Air-cooled chiller, 249 tons	RSMeans 23 64 19.10	1	units	\$	171,684	\$ 171,684				
EEM	Air-cooled chiller, 243 tons Reduced capacity for beating equipment	RSMeans 23 64 19.10	1	0	\$	168,129	\$ 168,129	\$ (2.925)			
Standard	Hot water boiler, gas fired, 2484 MBH	RSMeans D3020 130	1	units	\$	82,642	\$ 82,642	• (1,010)			
EEM	Hot water boiler, gas fired, 2379 MBH Reduced capacity for air bandling equipment	RSMeans D3020 130	1	0	\$	79,717	\$ 79,717	\$ (20.574)			
Standard	VAV w/reheat, 42865 cfm	RSMeans D3040 134	1	units	\$	429,021	\$ 429,021	¥ (20,574)			
EEM	VAV w/reheat, 40789 cfm	RSMeans D3040 134	1	units	\$	408,447	\$ 408,447	¢			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -	•			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-				
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces		-	0	\$		s -	৯ 19,158			
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	15	outlets	\$	1,300	\$ 19,158				
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC			0	\$		s -	5 -			
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			
Standard	Standard U-0.032, R-30 roof insulation (insulation entirely above deck,		21,300	Area	\$	-	\$-	\$ 12,775				
Standard	Standard wall insulation (residential mass wall) 6A: U-0.071; R-12.3		30,265	Area	\$	-	\$-					
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029: R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	21,300	Area	\$	0.5998	\$ 12,775					
EEM	Enhanced wall insulation (residential mass wall)	RSMeans 07 21 13.10	30,265	Area	\$	0.0269	\$ 814					
EEM 2	Enhanced fenestration							\$ 8,470				
Standard FFM	Standard windows, U-0.37 Enhanced windows, U-0.35	PNNL CE ANALYSIS	13,068	Area	S S	- 0.65	\$ - \$ 8.470					
EEM 3	Air leakage testing for mid-sized buildings		10,000	,		0.00	• 0,110	\$-				
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$		\$ - \$ -					
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		05.014	wette	6	6.75	6 641 DAE	\$ 138,136				
EEM	Reduced LPDs, ~20% more efficient	HBL	74,550	watts	\$	-	\$ 779,481					
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting			0	S		s -	\$ -				
EEM	n/a - IECC only		-	Ő	ŝ	-	\$ -					
EEM 6 Standard	Exterior lighting control		-	0	S		s -	\$-				
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$-	* 00.057				
Standard	VAV fans: 0.00130 bhp/cfm						ş -	\$ 22,057	Costed as increased system			
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	6,186.85	cfm	\$	3.565	\$ 22,057		size for reduction in static pressure			
EEM 8 Standard	Hotel guestroom HVAC vacancy control			0	s		\$	\$-				
EEM	n/a - already included in 90.1-2016			0	ŝ		\$ -					
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type			0	S		s -	\$ -				
EEM	n/a - does not apply to this building type		-	0	ŝ	-	\$-					
Standard	High-efficiency commercial kitchen equipment Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	ş -	\$ 6,810				
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,106	Area	\$	6.16	\$ 6,810	\$ 2 197				
Standard	Standard wall insulation		-		\$	-	ş -	• 2,137				
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	DSMaana 26 51 12 55	12.051	welle	6		¢	\$ -				
EEM	Reduced LPDs, ~11% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13.55	12,951	watts	\$	-	s - \$ -					
EEM 13 Standard	Efficient elevator, regenerative drives			each	S		s -	\$ -				
EEM	n/a - does not apply to this building type		-	each	ŝ	-	\$-					
EEM 14 Standard	ERV for apartment makeup air units n/a - already included in 90.1-2016		-	0	\$	•	ş -	ş -				
EEM 45	n/a - already included in 90.1-2016		-	0	\$	-	\$-	*				
Standard	n/a		-	0	\$	-	ş -	· ·				
ADDITION	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$	-	\$-					
ACA 1	Reduced capacity for cooling equipment	D01400.04.40.40				150.005	6 450.005	\$ (3,519)				
EEM	Air-cooled chiller, 230 tons	RSMeans 23 64 19.10 RSMeans 23 64 19.10	1	0	\$ 1	156,476	\$ 159,995 \$ 156,476					
ACA 2 Standard	Reduced capacity for heating equipment	RSMeans D3020 130	1	unite	s	81 357	\$ 81.357	\$ (2,935)				
EEM	Hot water boiler, gas fired, 2333 MBH	RSMeans D3020 130	, 1	0	ŝ	78,423	\$ 78,423					
ACA 3 Standard	Reduced capacity for air handling equipment VAV w/reheat, 42018 cfm	RSMeans D3040 134	1	units	\$ 4	120,623	\$ 420,623	\$ (20,154)				
EEM	VAV w/reheat, 39984 cfm	RSMeans D3040 134	1	units	\$ 4	100,469	\$ 400,469	e				
Standard	n/a - does not apply to this building type		-	0	\$	-	\$-					
ACA 5	n/a - does not apply to this building type Electric vehicle charging station capable parking lots for 5% of spaces		-	0	\$	-	\$ -	\$ 19,158				
Standard			-	0	S	-	\$ -					
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	cnargehub.com	15	outlets	\$	1,300	ə 19,158	\$-				
Standard FEM				0	\$		\$ - \$ -					
	1	1		÷	Ť		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 Stondard	Enhanced insulation for roofs and walls		6 120	Area	c		¢	\$ 2,602			
Chandard	Standard 0-0.02 1, R-49 fool insulation (attic fool) Standard wall insulation (nonresidential steel-frame wall)		0,130	Area	~	-	о -				
Standard	4A: U-0.064; R-13.4 Enhanced roof insulation (attic roof)		2,400	Alea	\$	-	ə -				
EEM	4A: U-0.020; R-51.4 (+ R-2.35)	RSMeans 07 22 16.10	6,130	Area	\$ 0	.4145	\$ 2,541				
EEM	AA: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	2,460	Area	\$ 0	.0246	\$ 61				
EEM 2	Enhanced fenestration		500	A	0		¢	\$ 251			
EEM	Enhanced windows, U-0.37	PNNL CE ANALYSIS	508	Area	s S	- 0.50	\$ -				
EEM 3	Air leakage testing for mid-sized buildings	1		-			-	\$-			
Standard FFM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	S S	-	\$ - \$ -				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		1					\$ 8,372			
Standard FEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~20% more efficient	HBI	4,418	watts	S	6.75	\$ 29,820 \$ 38,102				
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	hbe	3,110	Watto	Ş	-	φ <u>30</u> ,132	\$ -			
Standard	n/a - IECC only		-	0	S	-	\$ -				
EEM 6	Exterior lighting control		-	U	3	-	ş -	\$ -			
Standard	n/a		-	0	S	-	ş -				
EEM 7	Reduce fan power allowances		-	U	3	-	s -	s -			
Standard	n/a - does not apply to this building type			tons	S	1,031	ş -				
EEM 8	n/a - does not apply to this building type Hotel guestroom HVAC vacancy control			cîm	5	4	\$ -	s -			
Standard	n/a - already included in 90.1-2016		-	0	S	-	ş -				
EEM 9	n/a - already included in 90.1-2016 High-efficiency SHW		-	0	\$	-	\$-	s -			
Standard	n/a - does not apply to this building type		-	0	\$	-	ş -	-			
EEM	n/a - does not apply to this building type High-afficiency commercial kitchen equipment		-	0	\$	-	\$ -	\$ 9.216			
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets		-	0	\$	-	\$-	\$ 3,210			
EEM	Energy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$	6.16	\$ 9,216	s			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$-	•			
EEM 42	n/a - does not apply to this building type		-	Area	\$	0	\$ -				
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,433	watts	\$	-	ş -	ə -			
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55			\$	-	\$ -				
Standard	n/a - does not apply to this building type			each	S	-	ş -	\$ -			
EEM	n/a - does not apply to this building type		-	each	\$	-	\$-				
EEM 14 Standard	ERV for apartment makeup air units n/a - already included in 90.1-2016		-	0	S	-	s -	\$ -			
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
Standard	n/a			0	S	-	ş -	\$ -			
EEM	n/a - applies to IECC path only		-	0	\$	-	\$-				
ACA 1	Reduced capacity for cooling equipment							\$ (255)			
Standard	Packaged single-zone AC, 26.2 tons	RSMeans 23 74 33.10	1	units	\$ 3	1,039	\$ 31,039				
ACA 2	Packaged single-zone AC, 26 tons Reduced capacity for heating equipment	RSMeans 23 74 33.10	1	units	\$ 3	0,784	\$ 30,784	s -			
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	ş -	-			
ACA 3	Reduced capacity for air handling equipment		-	units	\$	-	\$ -	s -			
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	\$	-	\$ -	\$ -			
Standard	n/a - does not apply to this building type		-	0	S	-	\$ -	_			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$ -	\$ 2,000			
Standard	Listente vennois sharging station capable parking iots IOF 5% of spaces		-	0	\$	-	\$ -	¥ 2,600			
EEM	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$	1,300	\$ 2,600	\$			
Standard			-	0	\$	-	\$ -	-			
EEM			-	0	\$	-	\$ - T •	¢			
							iotal	» 22,786			

	2020 NYStretch									
	EE	M Incremental Cost Worksh	eet							
		Prepared by Vidaris Inc.								
		13-301-2013								
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost	/ Unit	Total Item Cost	Total Incremental Cost	Notes / Comments	
EEM 1 Standard	Enhanced insulation for roofs and walls Standard J. 0.021, B-40 roof insulation (attic roof)		6 130	Area	s		s -	\$ 2,624		
Standard	Standard vall insulation (nonresidential steel-frame wall)		2,460	Δrea	¢	-	φ - ¢ _			
CEM .	5A: U-0.055; R-16.0 Enhanced roof insulation (attic roof)	DOM 07.00.40.40	2,100	A			• • • • • • •			
EEM	5A: U-0.020; R-51.4 (+ R-2.35)	RSMeans 07 22 16.10	6,130	Area	\$	0.4145	\$ 2,541			
EEM	5A: U-0.052; R-17.1 (+ R-1.05)	RSMeans 07 21 13.10	2,460	Area	\$	0.0336	\$ 83			
EEM 2 Standard	Enhanced fenestration Standard windows, U-0.37		508	Area	s	-	\$ -	\$ 291		
EEM	Enhanced windows, U-0.35	PNNL CE ANALYSIS	508	Area	ŝ	0.57	\$ 291			
EEM 3 Standard	Air leakage testing for mid-sized buildings			0	S	-	s -	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-			
EEM 4 Standard	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAE 90.1-2016		4.418	watts	S	6.75	\$ 29.820	\$ 8,372		
EEM	Reduced LPDs, ~20% more efficient	HBL	3,178	watts	\$	-	\$ 38,192			
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting			0	s		s -	\$ -		
EEM	n/a - IECC only		-	Ő	ŝ	-	\$-			
EEM 6 Standard	Exterior lighting control			0	s		s -	\$ -		
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	ŝ	-	\$-			
EEM 7 Standard	Reduce fan power allowances			tons	S	1.031	s -	\$ -		
EEM	n/a - does not apply to this building type			cfm	ŝ	4	\$-			
EEM 8 Standard	Hotel guestroom HVAC vacancy control			0	s		s -	\$-		
EEM	n/a - already included in 90.1-2016		-	Ő	ŝ	-	\$-			
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type			0	S		s -	\$-		
EEM	n/a - does not apply to this building type		-	Ő	\$	-	\$-			
EEM 10 Standard	High-efficiency commercial kitchen equipment Standard efficiency fryers, dishwashers, ovens, and holding cabinets			0	S		s -	\$ 9,216		
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	Energy Star Savings Calculator	1,497	Area	\$	6.16	\$ 9,216			
EEM 11 Standard	Thermal bridging reduction n/a - does not apply to this building type			0	S		s -	\$ -		
EEM	n/a - does not apply to this building type		-	Area	\$	0	\$-			
EEM 12 Standard	Exterior lighting power reduction	RSMeans 26 51 13 55	1.433	watts	S		s -	\$-		
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55	.,		\$	-	\$-			
EEM 13 Standard	Efficient elevator, regenerative drives			each	S		s -	\$-		
EEM	n/a - does not apply to this building type		-	each	\$	-	\$ -			
EEM 14 Standard	ERV for apartment makeup air units n/a - already included in 90.1-2016			0	S		s -	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	ŝ	-	\$-			
EEM 15 Standard	Demand-based recirculated SHW controls n/a		-	0	S	-	s -	ş -		
EEM	n/a - applies to IECC path only		-	0	Ş	-	\$-			
ADDITION/	AL COST ADJUSTMENTS Reduced capacity for cooling equipment							\$ (268)		
Standard	Packaged single-zone AC, 26.3 tons	RSMeans 23 74 33.10	1	units	Ş	31,156	\$ 31,156			
ACA 2	Reduced capacity for heating equipment	RSMeans 23 74 33.10	1	units	3	30,887	\$ 30,887	\$ -		
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	S	-	\$ - ¢			
ACA 3	Reduced capacity for air handling equipment		-	uritts	3		φ -	\$		
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	S	-	\$ - ¢			
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	3	-	ъ -	\$		
Standard	n/a - does not apply to this building type		-	0	S	-	\$ - ¢			
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces		-	J	9	-	ψ -	\$ -		
Standard	200/2401/ 40 amp outlats (zapas 54 and 64 anhu)	chargobub com	-	0 outlots	S	-	\$ - ¢			
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	chargenub.com	-	oudets	Ş	1,300	Ψ -	\$-		
Standard FEM			-	0	\$ S	-	\$ - \$ -			
		1		v	, v		Total	\$ 20.234		
1								,,		

	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	Cos	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1	Enhanced insulation for roofs and walls		0.400		•			\$ 5,475			
Standard	Standard U-0.021, R-49 root insulation (attic root) Standard well insulation (nonresidential steel-frame well)		6,130	Area	ş	•	\$ -				
Standard	6A: U-0.049: R-17.5		2,460	Area	\$	-	\$-				
EEM	Enhanced roof insulation (attic roof)	RSMeans 07 22 16 10	6 130	Area	¢	0.8732	\$ 5353				
	6A: U-0.019; R-53.9 (+ R-4.95)	11010102113 07 22 10.10	0,100	Aica	Ÿ	0.07.02	φ 0,000				
EEM	Ennanced wall insulation (nonresidential steel-frame wall) 6A: U-0.047: R-19.1 (+ R-1.55)	RSMeans 07 21 13.10	2,460	Area	\$	0.0496	\$ 122				
EEM 2	Enhanced fenestration							\$ 278			
Standard	Standard windows, U-0.35		508	Area	\$	-	\$ -				
EEM 2	Enhanced windows, U-0.33 Air lookage testing for mid sized buildings	PNNL CE ANALYSIS	508	Area	\$	0.55	\$ 278	c			
Standard	n/a - does not apply to this building type		-	0	\$	-	s -	-			
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	ſ	4 449	wette	C	6.75	£ 20.820	\$ 8,372			
Standard	Lighting per ASHRAE 90.1-2010 Reduced LPDs ~20% more efficient	HBI	4,418	watts	s c	6.75	\$ 29,820				
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	INDE	3,110	Wallo	Ŷ	-	φ 30,132	s -			
Standard	n/a - IECC only		-	0	\$	-	\$-				
EEM	n/a - IECC only		-	0	\$	-	\$-				
EEM 6 Standard	Exterior lighting control		-	0	S		s -	ş -			
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	ŝ	-	\$ -				
EEM 7	Reduce fan power allowances							\$-			
Standard	n/a - does not apply to this building type			tons	Ş	1,031	<u>s</u> -				
EEM 8	Hotel guestroom HVAC vacancy control			CITI	3	4	ъ -	s -			
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
EEM	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
EEM 9 Standard	High-efficiency SHW		-	0	S		\$	ş -			
EEM	n/a - does not apply to this building type		-	0	ŝ	-	\$-				
EEM 10	High-efficiency commercial kitchen equipment							\$ 9,216			
Standard	Standard efficiency fryers, dishwashers, ovens, and holding cabinets	Eporal Stor Sovings	-	0	\$	-	ş -				
EEM	Enegy Star fryers, dishwashers, ovens, and holding cabinets	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 Exterior lighting power reduction		-	Area	\$	0	\$ -	۰. ۱			
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	1,433	watts	\$	-	\$ -	, -			
EEM	Reduced LPDs, ~9% more efficient	RSMeans 26 51 13.55			\$	-	\$-				
EEM 13 Standard	Efficient elevator, regenerative drives			oach	c		ç	\$-			
FFM	n/a - does not apply to this building type			each	ŝ		\$ - \$				
EEM 14	ERV for apartment makeup air units		1		1.7		-	\$-			
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -				
EEM 15	n/a - already included in 90.1-2016		-	0	\$	-	\$ -	s			
Standard	n/a		-	0	S	-	s -				
EEM	n/a - applies to IECC path only		-	0	\$	-	\$ -				
ADDITION/	AL COST ADJUSTMENTS							¢ (250)			
Standard	Packaged single-zone AC, 25.3 tons	RSMeans 23 74 33 10	1	units	S	30.079	\$ 30.079	ə (250)			
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 FFM	(INCLUCED W/PACKAGED UNITS IN ACA 1)			units	5		ə - S -				
ACA 3	Reduced capacity for air handling equipment		-	unito	Ŷ	-	Ψ -	s -			
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -				
EEM	In the second for DTAD and the second for DTAD		-	units	\$	-	\$ -				
ACA 4 Standard	increased insulation to account for PTAC openings, thermal bridging requirements n/a - does not apply to this building type		-	0	S	-	s -	\$ -			
EEM	n/a - does not apply to this building type		-	õ	\$	-	\$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces							\$-			
Standard FEM	208/2401/ 40 amp outlets (zones 54 and 64 only)	chargebub com	-	0 outlets	5	- 1 300	5 - ¢				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	enargenus.com	-	outiets	Ŷ	1,500	ψ -	s -			
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	Co	ost / Unit	Total Item	Cost	Total Incremental Cost	Notes / Comments
Standard	Enhanced insulation for roots and walls Standard U-0.032, R-30 roof insulation (insulation entirely above deck) Charden in language insulation (and the start forms will)		14,782	Area	\$	-	\$	-	\$ 6,067	
Standard	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 Standard	Enhanced fenestration		2 219	Aroa	¢		¢		\$ 1,740	
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318	Area	\$	0.52	ֆ \$1	- ,740		
EEM 3 Standard	Air leakage testing for mid-sized buildings		-	units	S		s	-	\$ 8,500	
EEM	Testing required	BET, LLC	1	units	\$	8,500	\$ 8	,500		
EEM 4 Standard	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAF 90.1-2016		39,536	watts	S	6.75	\$ 266	868	\$ 71,679	
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$	-	\$ 338	,548		
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting		-	0	S		s	-	\$ -	
EEM	n/a - IECC only			0	\$	-	\$	-	•	
Standard	Exterior lighting control		-	0	\$		\$	-	s -	
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$	-	A 47 707	
Standard	VAV fans: 0.00130 bhp/cfm						\$	-	\$ 17,767	Costed as increased system
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	4,983.57	cfm	\$	3.565	\$ 17	,767		size for reduction in static pressure
EEM 8	Hotel guestroom HVAC vacancy control			0	¢		¢		\$ -	
EEM	n/a - aiready included in 90.1-2016		-	0	\$	-	\$ \$	-		
EEM 9 Standard	High-efficiency SHW		_	0	\$		ç	-	ş -	
EEM	n/a - does not apply to this building type		-	Ö	\$	-	\$	-		
EEM 10 Standard	High-efficiency commercial kitchen equipment		-	0	s		s	-	\$ -	
EEM	n/a - does not apply to this building type		-	0	\$	-	\$	-		
Standard	Standard wall insulation		-		\$		\$	-	\$ 1,596	
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16.10	4,694	Area	\$	0.3400	\$ 1	,596		
EEM 12	Exterior lighting power reduction								ş -	
Standard	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~9% more efficient	RSMeans 26 51 13.55 RSMeans 26 51 13 55	1,619	watts	\$	-	\$ ¢	-		
EEM 13	Efficient elevator, regenerative drives	1000000113 20 01 10.00			Ψ	-	Ψ		\$-	
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	each each	\$		\$ \$	-		
EEM 14	ERV for apartment makeup air units								ş -	
Standard EEM	n/a - aiready included in 90.1-2016 n/a - aiready included in 90.1-2016		-	0	\$	-	\$ \$	-		
EEM 15	Demand-based recirculated SHW controls			0	¢		¢		\$ -	
EEM	n/a - applies to IECC path only		-	0	\$	-	\$	-		
ADDITION/	AL COST ADJUSTMENTS Reduced canacity for cooling equipment								s -	
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$	-	•	
EEM	Reduced capacity for heating equipment		-	units	\$	177,744	\$	-	\$ 133	
Standard	Hot water boiler, gas fired, 302 MBH	RSMeans D3020 130	1	units	\$	21,475	\$ 21	,475		
ACA 3	Reduced capacity for air handling equipment	RSMeans D3020 130	1	0	\$	21,608	\$ 21	,608	\$ (15,955)	
Standard	VAV AHU, 33818 cfm	RSMeans D3040 134 RSMeans D3040 134	1	units	\$	339,376	\$ 339	376		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements	110000Caris 00040 104		units	φ	323,421	ψ 323	,721	\$ -	
Standard EEM	n/a - does not apply to this building type 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 EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	- 2	0 outlets	\$	- 1.300	\$ \$2	- ,600		
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC			0	¢		¢		\$ -	
EEM			-	0	\$	-	φ \$	-		
							Tot	al	\$ 94,127	

	2020 NYStretch OUTPATIENT HEALTHCARE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019									
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	ost / Unit	Total Item Cos	Total Incremental Cost	Notes / Comments	
EEM 1 Standard	Enhanced insulation for roots and walls Standard U-0.032, R-30 roof insulation (insulation entirely above deck) Standard W-10.032, (respectively above deck)		14,782	Area	\$	-	\$-	\$ 6,187		
Standard	Standard wan instalion (nonresidential steel-iname wan) 5A: U-0.055; R-16.0		13,402	Area	\$	-	\$-			
EEM	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 Standard	Enhanced fenestration Standard windows 11-0.38		3 318	Area	S		s -	\$ 1,972		
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	3,318	Area	\$	0.59	\$ 1,972			
EEM 3 Standard	Air leakage testing for mid-sized buildings Not Required		-	units	S	-	s -	\$ 3,200		
EEM	Testing required	BET, LLC	1	units	\$	3,200	\$ 3,200			
EEM 4 Standard	Lighting per ASHRAE 90.1-2016		39,536	watts	\$	6.75	\$ 266,868	\$ /1,6/9		
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$	-	\$ 338,548			
Standard	occupancy sensors and automatic lighting controls including egress lighting n/a - IECC only			0	\$		ş -	· ·		
EEM	n/a - IECC only		-	0	\$	-	\$-			
Standard	n/a			0	\$	-	ş -	· ·		
EEM 7	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$-	¢ 40.975		
Standard	VAV fans: 0.00130 bhp/cfm						\$-	ə 10,375	Costed as increased system	
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	5,154.07	cfm	\$	3.565	\$ 18,375		size for reduction in static pressure	
EEM 8	Hotel guestroom HVAC vacancy control			0	¢		¢	\$ -		
EEM	n/a - already included in 90.1-2016		-	0	\$	-	ş - Ş -			
EEM 9	High-efficiency SHW			0	¢		¢	\$ -		
EEM	n/a - does not apply to this building type		-	0	\$	-	ş - \$ -			
EEM 10 Standard	High-efficiency commercial kitchen equipment		_	0	¢		۶	\$ -		
EEM	n/a - does not apply to this building type		-	Ö	\$	-	\$ -			
EEM 11 Standard	Thermal bridging reduction Standard wall insulation				S		s -	\$ 1,596		
FFM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	RSMeans 07 22 16 10	4.694	Area	s	0.3400	\$ 1.596			
EEM 12	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.		.,		Ť		• .,•••	s -		
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,764	watts	\$	-	ş -			
EEM 13	Reduced LPDs, ~10% more efficient Efficient elevator, regenerative drives	RSMeans 26 51 13.55			\$	-	\$ -	\$ -		
Standard	n/a - does not apply to this building type		-	each	\$	-	ş -			
EEM 14	ERV for apartment makeup air units		-	each	2	-	\$ -	\$ -		
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$ -			
EEM 15	Demand-based recirculated SHW controls		-	0	φ		ş -	\$ -		
Standard	n/a n/a - annies to IECC nath only		-	0	\$ ¢		\$ - \$ -			
ADDITION	AL COST ADJUSTMENTS			0	Ψ	-	φ -			
ACA 1 Standard	Reduced capacity for cooling equipment		-	units	S		s -	\$ -		
EEM			-	units	\$	177,744	\$-			
ACA 2 Standard	Reduced capacity for heating equipment Hot water holler, gas fired, 364 MBH	RSMeans D3020 130	1	units	S	23,223	\$ 23.223	\$ 102		
EEM	Hot water boiler, gas fired, 368 MBH	RSMeans D3020 130	1	0	\$	23,325	\$ 23,325			
Standard	Reduced capacity for air handling equipment VAV AHU, 34983 cfm	RSMeans D3040 134	1	units	\$	350,923	\$ 350,923	ə (16,585)		
EEM	VAV AHU, 33309 cfm	RSMeans D3040 134	1	units	\$	334,338	\$ 334,338			
Standard	n/a - does not apply to this building type			0	\$	-	\$ -	•		
EEM	n/a - does not apply to this building type		-	0	\$	-	\$-	\$ 17.002		
Standard	Licence controls charging station capable parking lots for 5% of Spaces		-	0	\$	-	\$ -	+ 17,302		
ACA 6	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	14	outlets	\$	1,300	\$ 17,962	s		
Standard			-	0	\$	-	s -			
EEM			-	0	\$		s - Total	¢ 104.490		
							i Uldi	φ 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	C	ost / Unit	Total Item Cos	t Total Incremental Cost	Notes / Comments		
EEM 1 Standard	Enhanced insulation for roots and wall: Standard II-0.032 R-30 roof insulation (insulation entirely above deck)	1	14 782	Area	\$		s -	\$ 9,530			
Standard	Standard wall insulation (nonresidential steel-frame wall)		13,402	Area	¢		e				
Stanuaru	6A: U-0.049; R-17.5		13,402	Alea	Ŷ	-	<i>у</i> -				
EEM	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)	RSMeans 07 21 13.10	13,402	Area	\$	0.0496	\$ 665				
EEM 2	6A: U-0.047; R-19.1 (+ R-1.55) Enhanced fenestration							\$ 1.831			
Standard	Standard windows, U-0.36	1	3,318	Area	\$	-	\$-				
EEM 2	Enhanced windows, U-0.34 Air lookage testing for mid sized buildings	PNNL CE ANALYSIS	3,318	Area	\$	0.55	\$ 1,831	\$ 2.200			
Standard	n/a - does not apply to this building type	1	-	0	\$	-	\$-	φ 3,200			
EEM	n/a - does not apply to this building type	BET, LLC	1	0	\$	3,200	\$ 3,200				
EEM 4 Standard	Lighting per ASHRAF 90.1-2016	1	39.536	watts	S	6.75	\$ 266,868	\$ /1,6/9			
EEM	Reduced LPDs, ~20% more efficient	HBL	28,917	watts	\$	-	\$ 338,548				
EEM 5	Occupancy sensors and automatic lighting controls including egress lightin			0	6		¢	\$-			
Standard EEM	n/a - IECC only			0	\$	-	\$ - \$ -				
EEM 6	Exterior lighting contro							\$-			
Standard	n/a In/a JECC only: already included in NVS amendments to 00.1.2016		-	0	\$	-	\$ - ¢				
EEM 7	Reduce fan power allowances			0	\$	-	ş -	\$ 18,212			
Standard	VAV fans: 0.00130 bhp/cfm						\$ -		Costed as increased system		
EEM	VAV fans: 0.00100 bhp/cfm	RSMeans D3040 134	5,108.16	cfm	\$	3.565	\$ 18,212		pressure		
EEM 8	Hotel guestroom HVAC vacancy contro			0	6		¢	\$-			
EEM	n/a - already included in 90.1-2016			0	\$ \$	-	3 - S -				
EEM 9	High-efficiency SHW							\$-			
Standard FEM	n/a - does not apply to this building type			0	\$	-	\$ -				
EEM 10	High-efficiency commercial kitchen equipmen			0	ų.	-	у -	\$ -			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$-				
EEM 11	n/a - does not apply to this building type Thermal bridging reduction		-	0	\$	-	\$ -	\$ 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 parimeter 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	\$	-	ş -				
EEM 13	Efficient elevator, regenerative drives	RSMeans 26 51 13.55			\$	-	\$ -	\$ -			
Standard	n/a - does not apply to this building type		-	each	\$	-	\$ -				
EEM	n/a - does not apply to this building type		-	each	\$	-	\$ -	¢			
Standard	n/a - already included in 90.1-2016	1	-	0	\$	-	\$-	÷ -			
EEM	n/a - already included in 90.1-2016	I	-	0	\$	-	\$-				
Standard	Demand-based recirculated SHW controls	1	-	0	S	-	\$ -	\$ -	-		
EEM	n/a - applies to IECC path only			0	\$	-	\$-				
ADDITION	AL COST ADJUSTMENTS							e			
Standard	INCLUDED WITH AHU IN ACA 3	1	-	units	\$	-	\$-	÷ -			
EEM		I	-	units	\$	177,744	\$-				
ACA 2 Standard	Hot water boiler, gas fired, 366 MBH	RSMeans D3020 130	1	units	S	23.274	\$ 23.274	\$ 94	-		
EEM	Hot water boiler, gas fired, 369 MBH	RSMeans D3020 130	1	0	\$	23,368	\$ 23,368				
ACA 3 Standard	Reduced capacity for air handling equipmen	RSMeans D3040 134	1	units	\$	344 205	\$ 344.205	\$ (12,806)			
EEM	VAV AHU, 33012 cfm	RSMeans D3040 134	1	units	\$	331,399	\$ 331,399		<u> </u>		
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirement				0		•	\$ -			
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type			0	\$	-	» - \$-	+			
ACA 5	Electric vehicle charging station capable parking lots for 5% of space			-	Ť			\$ 17,962			
Standard	208/240\/ 40 amp outlets /zones 54 and 64 only)	chargebub com	- 14	0 outlete	\$	-	\$ -				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC		14	outiets	φ	1,000	φ 17,902	\$ -			
Standard			-	0	\$	-	ş -				
		1	-	U	3	-	Total	¢ 111 200			
							TUTAL	φ 111,290			

	2020 NYStretch WAREHOUSE - 4A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019										
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Co	st / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
Standard	Enhanced insulation for roots and walls Standard U-0.032, R-30 root insulation (metal building) 44. (L-0.037, R-32.2		49,495	Area	\$		\$ -	\$ <u>22,863</u>			
Standard	Standard wall insulation (metal building) 4A: U-0.060; R-15.3		26,687	Area	\$	-	\$-				
EEM	Enhanced roof insulation (insulation entirely above deck) 44: U-0.035; R-32.2 (+R-2.2)	RSMeans 07 22 16.10	49,495	Area	\$	0.3881	\$ 19,208				
EEM 2	AA: U-0.048; R-19.5 (+ R-4.28)	RSMeans 07 21 13.10	26,687	Area	\$	0.1370	\$ 3,655	¢ 100			
Standard FEM	Standard windows, U-0.38	PNNL CE ANALYSIS	190 190	Area	\$	- 0.53	\$ - \$ 100	• 100			
EEM 3 Standard	Air leakage testing for mid-sized buildings Not Required		-	units	s	-	\$ -	\$ 17,000			
EEM EEM 4	Testing required Reduced LPD for interior lighting; high efficacy lights in dwelling units	Vidaris	1	units	\$	17,000	\$ 17,000	\$ -			
Standard EEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs, ~20% more efficient	HBL	24,400 18,689	watts watts	\$ \$	6.75 -	\$- \$-		No cost assumed for this buidling type		
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting n/a - IECC only		-		\$	-	\$-	\$ -			
EEM EEM 6	n/a - IECC only Exterior lighting control		-		\$	-	\$-	\$ -			
Standard EEM	n/a n/a - IECC only; already included in NYS amendments to 90.1-2016		-		\$ \$	-	\$ - \$ -				
EEM 7 Standard	Reduce fan power allowances n/a - does not apply to this building type				\$	1,031	\$-	\$ -			
EEM EEM 8	n/a - does not apply to this building type Hotel guestroom HVAC vacancy control				\$	4	\$ -	\$ -			
Standard EEM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-		\$ \$		\$- \$-				
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type		-		\$	-	\$ -	\$ -			
EEM 10	n/a - does not apply to this building type High-efficiency commercial kitchen equipment		-		\$	-	\$ -	\$ -			
Standard EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-		\$ \$	-	\$ - \$ -				
EEM 11 Standard	Inermal bridging reduction n/a - does not apply to this building type for does not apply to this building type		-	A	\$	-	\$ -	\$ -			
EEM 12	Exterior lighting power reduction	DSMaana 26 51 12 55	-	Area	\$	U	\$ - ¢	\$ -			
EEM	Reduced LPDs, ~8% more efficient	RSMeans 26 51 13.55	4,100	waus	\$		\$ -				
Standard FEM	n/a - does not apply to this building type		-	each	\$	-	\$ - \$ -				
EEM 14 Standard	ERV for apartment makeup air units n/a - already included in 90.1-2016		-		s	-	s -	\$ -			
EEM EEM 15	n/a - already included in 90.1-2016 Demand-based recirculated SHW controls		-		\$	-	\$ -	\$ -			
Standard EEM	n/a n/a - applies to IECC path only		-		\$ \$	-	\$- \$-				
ADDITIONA ACA 1	AL COST ADJUSTMENTS Reduced capacity for cooling equipment							\$-			
Standard EEM	INCLUDED WITH AHU IN ACA 3		-	units units	\$	-	\$- \$-				
ACA 2 Standard	Reduced capacity for heating equipment INCLUDED WITH AHU IN ACA 3		-	units	\$	-	\$ -	\$ -			
ACA 3	Reduced capacity for air handling equipment	DSMaana 22 74 22 42	-	units	\$	-	\$ -	\$ (2,999)			
EEM	PSZ AHU, CAV, 2530 UIII PSZ AHU, CAV, 2543 cfm Increased insulation to account for PTAC openings, thermal bridding requirements	RSMeans 23 74 33.10	1	units	\$ \$	13,692	\$ 13,692	s			
Standard FFM	n/a - does not apply to this building type		-		\$		\$ - \$ -	-			
ACA 5 Standard	Electric vehicle charging station capable parking lots for 5% of spaces			0	\$		- S -	\$ 2,600			
EEM ACA 6	208/240V 40 amp outlets (zones 5A and 6A only) Solar-ready zone per Appendix CA of 2018 IECC	chargehub.com	2	outlets	\$	1,300	\$ 2,600	\$			
Standard EEM			-		\$	1	\$ - \$ -				
							Total	\$ 39,565			

	2020 NYStretch WAREHOUSE - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019										
EEM	Description	Source of	Number of EEM Units	Unit	Cost / Ur	nit T	otal Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1	Enhanced insulation for roofs and walls	item cost						\$ 20,019			
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$	- 3	\$-				
Standard	Standard wall insulation (metal building)		26 687	Area	c		¢ _				
otandard	5A: U-0.050; R-18.6		20,007	Arca	Ţ.		φ -				
EEM	5A: U-0.035; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	49,495	Area	\$ 0.38	381 9	\$ 19,208				
EEM	Enhanced wall insulation (nonresidential mass wall) 54: LL0 048: R-19 5	RSMeans 07 21 13.10	26,687	Area	\$ 0.03	304 \$	\$ 811				
EEM 2	Enhanced fenestration							\$ 103			
Standard FEM	Standard windows, U-0.38 Enhanced windows, U-0.36	PNNL CE ANALYSIS	190 190	Area	\$	54 9	\$- \$103				
EEM 3	Air leakage testing for mid-sized buildings			7000		.01 10	• 100	\$ 6,400			
Standard	Not Required	Vidarie	- 1	units	\$	- 2	\$- \$6400				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	Videns	1	unito	Ş 0,-		φ 0,400	\$-			
Standard FEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~20% more efficient	HBI	24,400	watts	\$ 6	.75	\$- \$-		No cost assumed for this building type		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	TIDE	10,009		Ş		φ -	\$ -	building type		
Standard	n/a - IECC only		-		S	-	\$-				
EEM 6	n/a - IECC only Exterior lighting control		-		5	- 2	\$-	\$ -			
Standard			-		S	- 3	\$-				
EEM 7	n/a - IECC only; already included in NYS amendments to 90.1-2016 Reduce fan power allowances		-		5	- :	\$ -	\$ -			
Standard	CV fans: 0.00094 bhp/cfm				\$ 1,0	031	s -				
	VAV fans: 0.00130 bhp/cfm CV fans: 0.00088 bhp/cfm										
EEM	VAV fans: 0.00100 bhp/cfm				\$	4 5	\$-				
EEM 8 Standard	Hotel guestroom HVAC vacancy control				s	-	s -	\$-			
EEM	n/a - already included in 90.1-2016		-		\$	- 5	\$-				
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type		-		s		s -	\$-			
EEM	n/a - does not apply to this building type		-		\$	- 5	\$-				
EEM 10 Standard	High-efficiency commercial kitchen equipment				s		s -	\$-			
EEM	n/a - does not apply to this building type		-		ŝ	- 9	\$-				
EEM 11 Standard	Thermal bridging reduction		-		s		s -	\$-			
EEM	n/a - does not apply to this building type		-		\$	0 5	\$-				
EEM 12 Standard	Exterior lighting power reduction	RSMeans 26 51 13 55	5 101	watts	s		s -	\$-			
EEM	Reduced LPDs, ~8% more efficient	RSMeans 26 51 13.55	0,707	Mallo	ŝ	- 9	\$-				
EEM 13 Standard	Efficient elevator, regenerative drives			each	c		\$	\$-			
EEM	n/a - does not apply to this building type		-	each	ŝ		\$-				
EEM 14 Standard	ERV for apartment makeup air units		-	0	s		۶., ۶	\$ -			
EEM	n/a - already included in 90.1-2016		-	Ő	ŝ	- 5	\$-				
EEM 15 Standard	Demand-based recirculated SHW controls	1	_	0	s		۶	\$-			
EEM	n/a - applies to IECC path only		-	Ő	s		\$-				
ADDITIONA	L COST ADJUSTMENTS Reduced capacity for cooling equipment							د			
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$	- 2	\$-	¥ -			
EEM	Reduced capacity for heating equipment		-	units	\$ 177,3	744 8	\$-	۹			
Standard	INCLUDED WITH AHU IN ACA 3		-	units	\$	- 2	\$-	¥ -			
EEM	Reduced capacity for air handling equipment		-	units	\$	- 5	\$-	\$ (1.274)			
Standard	PSZ AHU, CAV, 2755 cfm	RSMeans 23 74 33.10	1	units	\$ 14,4	142	\$ 14,442	(1,274)			
EEM	PSZ AHU, CAV, 2394 cfm	RSMeans 23 74 33.10	1	units	\$ 13,	167 5	\$ 13,167	¢			
Standard	n/a - does not apply to this building type		-	0	\$	- 1	\$ -	-			
EEM	n/a - does not apply to this building type		-	0	\$	- 5	\$-	¢ 4000			
Standard	Lieune venicie charging station capable parking lots for 5% of spaces		-	0	\$	- ;	ş -	4,338			
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	3	outlets	\$ 1,3	300 5	\$ 4,338	e			
Standard	Solar ready zone per Appendix CA of 2016 IEGC		-	0	s	- 2	\$ -	•			
EEM			-	0	\$	- 3	\$ -	A 00.555			
							Iotal	\$ 29,586			

	2020 NYStretch WAREHOUSE - 6A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 19-Jun-2019										
EEM	Description	Source of	Number of	Unit	Cost / L	Jnit T	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1	Enhanced insulation for roofs and walls	item cost						\$ 30,496			
Standard	Standard U-0.032, R-30 roof insulation (metal building)		49,495	Area	\$	-	\$-				
Standard	Standard wall insulation (metal building)		26 687	Area	c	_	۹				
otandard	6A: U-0.050; R-18.6 Enhanced roof insulation (insulation entirely above deck)		20,007	Area	Ť	-	φ -				
EEM	6A: U-0.028; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	49,495	Area	\$ 0.5	5998	\$ 29,685				
EEM	Enhanced wall insulation (nonresidential mass wall) 6A: U-0.048: R-19.5 (+ R-0.95)	RSMeans 07 21 13.10	26,687	Area	\$ 0.0	0304	\$ 811				
EEM 2	Enhanced fenestration							\$ 105			
Standard EEM	Standard windows, U-0.36 Enhanced windows, U-0.34	PNNL CE ANALYSIS	190 190	Area Area	S S	- 0.55	\$ - \$ 105				
EEM 3	Air leakage testing for mid-sized buildings				÷			\$ 6,400			
Standard FFM	Not Required Testing required	Vidaris	1	units units	\$ 6	- 400	\$ - \$ 6.400				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units							\$-			
Standard EEM	Lighting per ASHRAE 90.1-2016 Reduced LPDs. ~20% more efficient	HBL	24,400 18.689	watts	S	6.75	\$- \$-		No cost assumed for this buidling type		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting		,		Ŧ		-	\$-	3 /1		
Standard FEM	n/a - IECC only n/a - IECC only				S S	-	\$ - \$ -				
EEM 6	Exterior lighting control		-		, ,	-	\$	\$-			
Standard	n/a n/a - IECC only: already included in NVS amendments to 90 1-2016		-		S	-	\$ - \$				
EEM 7	Reduce fan power allowances	(ļ	-	\$	\$-			
Standard	CV fans: 0.00094 bhp/cfm VAV fans: 0.00130 bhp/cfm				\$ 1	,031	\$-				
FEM	CV fans: 0.00088 bhp/cfm				s	4	s -				
EEM 8	VAV fans: 0.00100 bhp/cfm Hotel guestroom HVAC vacancy control				Ť	·	÷	¢ .			
Standard	n/a - already included in 90.1-2016		-		\$	-	\$-	•			
EEM 9	n/a - already included in 90.1-2016 High-efficiency SHW		-		\$	-	\$-	s .			
Standard	n/a - does not apply to this building type				\$	-	\$-	•			
EEM FEM 10	n/a - does not apply to this building type High-efficiency commercial kitchen equipment		-		\$	-	\$-	s .			
Standard	n/a - does not apply to this building type		-		\$	-	\$-	•			
EEM	n/a - does not apply to this building type Thermal bridging reduction		-		\$	-	\$-	s .			
Standard	n/a - does not apply to this building type		-		S		\$ -	•			
EEM 12	n/a - does not apply to this building type Exterior lighting power reduction		-		\$	0	\$-	s -			
Standard	Lighting per ASHRAE 90.1-2016	RSMeans 26 51 13.55	5,101	watts	S	-	ş -				
EEM 13	Reduced LPDs, ~8% more efficient Efficient elevator, regenerative drives	RSMeans 26 51 13.55			\$	-	\$-	s -			
Standard	n/a - does not apply to this building type		-	each	s	-	\$ -				
EEM 14	n/a - does not apply to this building type ERV for apartment makeup air units		-	each	\$	-	\$-	\$ -			
Standard	n/a - already included in 90.1-2016		-	0	S	-	ş -				
EEM 15	n/a - already included in 90.1-2016 Demand-based recirculated SHW controls		-	U	5	- 1	\$ -	\$ -			
Standard	n/a		-	0	S	-	\$ -				
ADDITIONA	AL COST ADJUSTMENTS		-	U	3	-	\$ -				
ACA 1	Reduced capacity for cooling equipment				0		<u>_</u>	\$-			
EEM	INCLUDED WITH AHU IN ACA 3			units	\$ 177	,744	s - \$ -				
ACA 2	Reduced capacity for heating equipment			unite	e		¢	\$-			
EEM	INCLUDED WITH AND IN ACA 3		-	units	\$	-	\$ -				
ACA 3	Reduced capacity for air handling equipment	DSM0000 22 74 22 40		unite	E 14	901	£ 14.001	\$ (2,024)			
EEM	PSZ AHU, CAV, 2002 UIII PSZ AHU, CAV, 2310 cfm	RSMeans 23 74 33.10	1	units	\$ 14	,867	\$ 12,867				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements			0	c		c	\$-			
EEM	n/a - does not apply to this building type		-	0	s	-	ş - \$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			0	s	_	ç	\$ 4,338			
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	3	outlets	\$ 1	,300	\$ 4,338				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC			0	c	1	c	\$-			
EEM			-	0	Ş	-	ş -				
							Total	\$ 39,315			

	2020 NYStretch											
	10 STORY HIGH-RISE APARTMENT - 4A											
	Prepared by Vidaris Inc.											
		19-Jun-2019	s mo.									
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-trame wall) 44: II-0.064: R-13.4		29,112	Area	\$-	s -						
FEM	Enhanced roof insulation (insulation entirely above deck)	RSMeans 07 22 16 10	8 4 3 5	Δισο	\$ 0.3881	\$ 3.274						
22.00	4A: U-0.030; R-32.2 (+ R-2.2) Enhanced wall insulation (residential steel-frame wall)		0,100	7000	• 0.0001	• •,271						
EEM	4A: U-0.061; R-14.2 (+ R-0.77)	RSMeans 07 21 13.10	29,112	Area	\$ 0.0246	\$ 717						
EEM 2 Standard	Enhanced fenestration Standard windows 1.6.39		12 383	Area	\$	\$	\$ 6,679					
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			0	•	6	\$ -					
EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	s - s -	3 - S -						
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units				-	-	\$ -					
Standard FFM	Lighting per ASHRAE 90.1-2016 Reduced LPDs ~20% more efficient	HBI	60,160 57,804	watts	\$ - \$ -	\$ - \$ -		No cost assumed for this builling type				
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting	1102	01,001	natio	÷	÷	\$ -					
Standard	n/a - IECC only		-	0	\$ -	\$-						
EEM 6	n/a - IECC only Exterior lighting control		-	0	\$ -	5 -	s -					
Standard	n/a		-	0	\$-	\$-						
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$-	\$ -	¢ .					
Standard	n/a - does not apply to this building type				\$ -	\$-	• -					
EEM	n/a - does not apply to this building type				\$ -	s -	•					
Standard	n/a - already included in 90.1-2016		-		\$ -	s -	\$ -					
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -	-					
EEM 9 Standard	High-efficiency SHW Hot water boiler with 80% thermal efficiency		-		\$.	s -	\$-					
EEM	Hot water boiler with 94% thermal efficiency		-		\$ -	\$ -						
EEM 10 Standard	High-efficiency commercial kitchen equipment				¢	¢	\$ -					
EEM	n/a - does not apply to this building type				\$ -	\$ -						
EEM 11	Thermal bridging reduction						\$ 1,270					
Standard	Standard wall insulation: Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of				5 -	ъ -						
EEM	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270						
EEM 12 Standard	Exterior lighting power reduction n/a - not modeled for this building type	RSMeans 26 51 13 55	-		s -	s -	\$-					
EEM	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$ -	\$ -						
EEM 13 Standard	Efficient elevator, regenerative drives		-	each	\$	\$	\$ 10,000					
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	\$ 10,000	\$ 10,000						
EEM 14	ERV for apartment makeup air units			0	0	0	\$ -					
Standard EEM	n/a - aiready included in 90.1-2016 n/a - aiready included in 90.1-2016			0	s - s -	\$ - \$ -						
EEM 15	Demand-based recirculated SHW controls			_			\$-					
Standard FFM	n/a - applies to IECC path only			0	\$ - \$ -	\$ - \$ -						
ADDITION	AL COST ADJUSTMENTS			Ű.	, v	Ų		1				
ACA 1 Standard	Reduced capacity for cooling equipment	RSMeans D3050 255	1	unite	\$ 179,837	\$ 179,837	\$ (2,551)					
EEM	PTAC, 103 tons	RSMeans D3050 255	1	units	\$ 177,287	\$ 177,287						
ACA 2	Reduced capacity for heating equipment	D014			40.400	¢ (0.400	\$ (469)					
EEM	Hot water boller, gas fired, 1076 MBH Hot water boller, gas fired, 1059 MBH	RSMeans D3020 130 RSMeans D3020 130	1	Units 0	\$ 43,188	\$ 43,188 \$ 42,719						
ACA 3	Reduced capacity for air handling equipment						\$ -					
Standard FFM	(INCLUCED W/PACKAGED UNITS IN ACA 1)			units units	\$ - \$ -	ş - S -						
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	Gritto	-		\$ 5,255					
Standard	Opaque wall with U-0.061	DSMoone 07 21 12 10	-	0	\$ -	\$ -						
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces	1100WEaris 07 21 13.10	20,000	U	v 0.1671	ອ ວ,235	\$ 2,600					
Standard	200/2401/40 amp sutlate (same EA and SA anh.)	ah arachub aam	-	0	\$ -	\$ -						
	Solar-ready zone per Appendix CA of 2018 IECC	chargenub.com	2	outlets	\$ 1,300	⇒ 2,600	s -					
Standard			-	0	\$ -	\$ -						
EEM			-	0	\$ -	S ·	¢ 06 775					
						TOTAL	⇒ ∠0,//5					

	2020 NYStretch										
	EBM Incremental Cost Worksheet										
		Prepared by Vidaris Ir	nc.								
		19-Jun-2019									
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments			
EEM 1 Standard	Enhanced insulation for roofs and walls		8.435	Area	\$	\$ _	\$ 4,252				
Standard	Standard vol. 22, 11 Series installation (installation entirely above deck), Standard wall insulation (residential steel-frame wall)		29 112	Area	\$ -	\$ -					
	5A: U-0.055; R-16.0 Enhanced roof insulation (insulation entirely above deck)		20,112			• • • • • • • •					
EEM	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 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)	RSMeans 07 21 13.10	29,112	Area	\$ 0.0336	\$ 978					
EEM 2	Enhanced fenestration		10 202	4.000	¢	¢	\$ 9,755				
EEM	Enhanced windows, U-0.36	PNNL CE ANALYSIS	12,383	Area	\$ 0.79	\$ 9,755					
EEM 3 Standard	Air leakage testing for mid-sized buildings			0	\$ _	s .	\$ -				
EEM	n/a - does not apply to this building type			0	\$-	\$ -					
EEM 4 Standard	Reduced LPD for interior lighting; high efficacy lights in dwelling units		60 160	watts	\$ -	s -	\$ -	No cost assumed for this			
EEM	Reduced LPDs, ~20% more efficient	HBL	57,804	watts	\$ -	\$ -		builling type			
EEM 5 Standard	Occupancy sensors and automatic lighting controls including egress lighting		-	0	\$	\$	\$ -				
EEM	n/a - IECC only		-	0	\$ -	\$ -					
EEM 6 Stondord	Exterior lighting control			0	¢	¢	\$-				
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$ -	\$ -					
EEM 7 Standard	Reduce fan power allowances	1			\$	s -	\$ -				
EEM	n/a - does not apply to this building type				\$ -	\$ -					
EEM 8 Standard	Hotel guestroom HVAC vacancy control		-		\$	s -	\$-				
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -					
EEM 9 Standard	High-efficiency SHW n/a - does not apply to this building type		-		\$ -	s -	\$ -				
EEM	n/a - does not apply to this building type		-		\$ -	\$ -					
EEM 10 Standard	High-efficiency commercial kitchen equipment n/a - does not apply to this building type		-		\$-	ş -	ş -				
EEM	n/a - does not apply to this building type		-		\$ -	\$ -	4 070				
Standard	Standard wall insulation		-		\$ -	\$ -	\$ 1,270				
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of parapet height to reaf dock. 9 ft of total insulation of P 4 2/in for antire parimeter of reaf	RSMeans 07 22 16.10	3,735	Area	\$ 0.3400	\$ 1,270					
EEM 12	Exterior lighting power reduction						\$-				
Standard FEM	n/a - not modeled for this building type	RSMeans 26 51 13.55 RSMeans 26 51 13 55	-		\$ - \$ -	\$ - \$ -					
EEM 13	Efficient elevator, regenerative drives	11010102010110.00	_		ų -	φ -	\$ 10,000				
Standard FFM	Standard elevator motors, 30hp Elevator motors with regenerative drives, 30 hp	Previous projects	- 1	each each	\$ -	\$ - \$ 10.000					
EEM 14	ERV for apartment makeup air units	i revieue projecto		ouon	• 10,000	• 10,000	\$-				
Standard EEM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-	0	\$ - \$ -	\$ - \$ -					
EEM 15	Demand-based recirculated SHW controls	1		-			\$-				
EEM	n/a - applies to IECC path only		-	0	\$ - \$ -	\$ -					
ADDITION	AL COST ADJUSTMENTS						¢ (4.670)				
Standard	PTAC, 106 tons	RSMeans D3050 255	1	units	\$ 180,632	\$ 180,632	\$ (4,679)				
EEM	PTAC, 103.2 tons Padured capacity for beating equipment	RSMeans D3050 255	1	units	\$ 175,954	\$ 175,954	\$ (771)				
Standard	Hot water boiler, gas fired, 1073 MBH	RSMeans D3020 130	1	units	\$ 43,089	\$ 43,089	• (11)				
EEM	Hot water boiler, gas fired, 1045 MBH Reduced capacity for air bandling equipment	RSMeans D3020 130	1	0	\$ 42,318	\$ 42,318	s .				
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1,		-	units	\$ -	ş -					
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	\$ -	\$ -	\$ 7.938				
Standard	Opaque wall with U-0.052		-	0	\$ -	\$ -					
ACA 5	Opaque wall with U-0.036, R-28.1 (+R-8.83) Electric vehicle charging station capable parking lots for 5% of spaces	RSMeans 07 21 13.10	28,086	0	\$ 0.2826	\$ 7,938	\$ 2.600				
Standard			-	0	\$ -	\$ -					
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	cnargenub.com	2	outlets	\$ 1,300	\$ 2,600	\$				
Standard				0	\$ - ¢	\$ - ¢					
	1	L	-	U	φ -	Total	\$ 30.364				
L						10.01	Ψ 00,004				

	2020 NYStretch										
	10 STORT HIGH-RISE APARTMENT - 6A EEM Incremental Cost Worksheet										
		Prepared by Vidaris In	C.								
		19-Jun-2019									
EEM	Description	Source of	Number of	Unit	Cost / I	Jnit	Total Item	Total Incremental Cost	Notes / Comments		
		Item Cost	EEM Units				Cost				
EEM 1 Standard	Enhanced insulation for roofs and walls Standard U-0.032, R-30 roof insulation (insulation entirely above deck		8,435	Area	\$		\$-	\$ 6,503			
Standard	Standard wall insulation (residential steel-frame wall)		29.112	Area	\$	-	\$ -				
	6A: U-0.049; R-17.5 Enhanced roof insulation (insulation entirely above deck)		0.107								
EEM	6A: U-0.029; R-33.4 (+ R-3.4)	R5Means 07 22 16.10	8,435	Area	\$ (J.5998	\$ 5,059				
EEM	6A: U-0.044; R-19.1 (+ R-1.55)	RSMeans 07 21 13.10	29,112	Area	\$ (0.0496	\$ 1,444				
EEM 2	Enhanced fenestration		10 202	4.00	¢		¢	\$ 10,005			
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	T	1	0	¢		¢	\$-			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type			0	э \$	-	s - \$ -				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	T	60.460	wette	¢	6.75	¢	\$-	No cost cosumed for this		
EEM	Reduced LPDs, ~20% more efficient	HBL	57,804	watts	\$	-	s - \$ -		building type		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting			0	^		¢	\$ -			
EEM	n/a - IECC only n/a - IECC only		-	0	э \$	-	s - \$ -				
EEM 6	Exterior lighting control			0	¢		ĉ	\$-			
EEM	n/a n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	\$- \$-				
EEM 7	Reduce fan power allowances						ĉ	\$-			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type				\$	-	\$ - \$ -				
EEM 8	Hotel guestroom HVAC vacancy control				^		¢	\$-			
Standard EEM	n/a - already included in 90.1-2016 n/a - already included in 90.1-2016		-		\$	-	\$- \$-				
EEM 9	High-efficiency SHW				•		ĉ	\$-			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type				э \$	-	s - \$ -				
EEM 10	High-efficiency commercial kitchen equipment				¢		¢	\$-			
EEM	n/a - does not apply to this building type		-		\$	-	ş - \$ -				
EEM 11 Standard	Thermal bridging reduction				\$		¢	\$ 1,270			
EEM	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	PSMoone 07 22 16 10	2 725	Area	¢ ¢	- 2400	¢ -				
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSIMeans 07 22 16.10	3,735	Area	\$ (J.3400	\$ 1,270	*			
Standard	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	ş -	ə -			
EEM 12	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$-	\$ 10.000			
Standard	Standard elevator motors, 30hp		-	each	\$	-	\$-	\$ 10,000			
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	1	each	\$ 1	10,000	\$ 10,000	s .			
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$-				
EEM	n/a - already included in 90.1-2016 Demand-based recirculated SHW controls		-	0	\$	-	\$ -	s .			
Standard	n/a		-	0	\$	-	ş -				
ADDITION.	n/a - applies to IECC path only AL COST ADJUSTMENTS		-	0	\$	-	\$ -				
ACA 1	Reduced capacity for cooling equipment		1					\$ (6,309)			
Standard EEM	PTAC, 108 tons PTAC. 104 tons	RSMeans D3050 255 RSMeans D3050 255	1	units	\$ 18	33,620 77.311	\$ 183,620 \$ 177,311				
ACA 2	Reduced capacity for heating equipment	5014 50000 (00						\$ (1,006)			
Standard EEM	Hot water boiler, gas fired, 1112 MBH Hot water boiler, gas fired, 1076 MBH	RSMeans D3020 130 RSMeans D3020 130	1	Units 0	\$ 4	44,195 43,189					
ACA 3	Reduced capacity for air handling equipment			unito	¢		¢	\$ -			
EEM	(INVLODED W/PACAGED UNITS IN ACA 1,			units	\$	-	φ - \$ -				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements			0	¢		¢	\$ 12,444			
EEM	Opaque wall with U-0.027, R-36.57 (+R-13.9)	RSMeans 07 21 13.10	28,086	0	\$ (0.4431	\$ 12,444				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces			0	s		ç	\$ 2,600			
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$	1,300	\$ 2,600				
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC			0	s		\$	\$ -			
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 Standard	Enhanced insulation for roofs and walls Standard II-0.032 R-30 roof insulation (insulation entirely above deck		8,435	Area	s -	\$ -	\$ 4,397				
Standard	Standard wall insulation (residential steel-frame wall)		45 603	Area	\$	\$					
otandard	4A: U-0.064; R-13.4		40,000	Alca	v -	φ -					
EEM	4A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 07 22 16.10	8,435	Area	\$ 0.3881	\$ 3,274					
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	45,603	Area	\$ 0.0246	\$ 1,124					
EEM 2	4A: U-0.061; R-14.2 (+ R-0.77) Enhanced fenestration]				\$ 20.165				
Standard	Standard windows, U-0.39		37,387	Area	\$ -	\$-					
EEM 2	Enhanced windows, U-0.37	PNNL CE ANALYSIS	37,387	Area	\$ 0.54	\$ 20,165	*				
Standard	n/a - does not apply to this building type		-	0	s -	\$-	-				
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -					
EEM 4 Standard	Reduced LPD for interior lighting; high efficacy lights in dwelling units Lighting per ASHRAF 90 1-2016		13,812	watts	\$ 6.75	\$ 93.229	\$ 15,786				
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						s -				
Standard FFM	n/a - IECC only n/a - IECC only			0	s - s -	s - s -					
EEM 6	Exterior lighting control			_			\$-				
Standard	n/a n/a JECC only: already included in NVS amondments to 00.1.2016		-	0	\$ - ¢	\$ - ¢					
EEM 7	Reduce fan power allowances	1		0	3 -	ş -	\$ -				
Standard	n/a - does not apply to this building type				s -	\$ -					
EEM 8	n/a - does not apply to this building type Hotel questroom HVAC vacancy control				\$ -	\$ -	s .				
Standard	n/a - already included in 90.1-2016				\$ -	ş -	•				
EEMO	n/a - already included in 90.1-2016		-		\$ -	\$ -	*				
Standard	Natural gas water heaters, 1200 MBH, 90% thermal efficiency (as (3) 400MBH units)		3	each	s -	s -	ə -				
EEM	Natural gas water heaters, 1200 MBH, 94% thermal efficiency(as (3) 400MBH units)		3	each	\$ -	\$ -	_				
EEM 10 Standard	High-efficiency commercial kitchen equipment n/a - does not apply to this building type				s -	s -	\$ -				
EEM	n/a - does not apply to this building type		-		s -	\$-					
EEM 11 Standard	Thermal bridging reduction				s .	\$	\$ 1,270				
	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	DEMagna 07 22 16 10	2 725	A	¢ 0.2400	¢ 1.070					
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	Nomeans 07 22 10.10	3,733	Aica	\$ 0.3400	φ 1,270					
Standard	n/a - not modeled for this building type	RSMeans 26 51 13.55			s -	\$-	\$ -				
EEM	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		s -	\$ -					
EEM 13 Standard	Efficient elevator, regenerative drives Standard elevator motors, 30hp			each	s .	s -	\$ 20,000				
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$ 10,000	\$ 20,000					
EEM 14	ERV for apartment makeup air units			0	c	¢	\$-				
EEM	n/a - already included in 90.1-2016		-	0	s -	s - \$ -					
EEM 15	Demand-based recirculated SHW controls	1				-	s -				
EEM	n/a - applies to IECC path only			0	s - s -	s - s -					
ADDITIONA	L COST ADJUSTMENTS		1								
ACA 1 Standard	Reduced capacity for cooling equipment WSHP_174 tons	RSMeans D3050 240	1	units	\$ 492 590	\$ 492.590	\$ (5,840)				
Standard	Closed circuit cooling tower, 140 tons	RSMeans 23 65 133.10	1	units	\$ 109,749	\$ 109,749					
EEM	WSHP, 172 tons	RSMeans D3050 240	1	units	\$ 487,823	\$ 487,823					
ACA 2	Reduced capacity for heating equipment	Romeans 23 05 133.10	1	units	\$ 108,676	\$ 100,070	\$ -				
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	s -	ş -					
	Reduced capacity for air handling equipment		-	units	ъ -	ə -	s <u>-</u>				
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)			units	s -	\$ -					
	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	ş -	\$-	\$				
Standard	n/a - does not apply to this building type		-	0	s -	\$-					
EEM	n/a - does not apply to this building type		-	0	s -	\$ -	\$ 0.000				
Standard	Lieune venicie enarging station capable parking lots for 5% of spaces		-	0	\$ -	\$ -	\$ 2,600				
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600					
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC] - [0	s -	s -	\$ -				
EEM			-	Ő	ş -	\$ -					
						Total	\$ 58,379				

2020 NYStretch 20 STORY HIGH-RISE APARTMENT - 5A EEM Incremental Cost Worksheet Prepared by Vidaris Inc. 10- http://010											
19-JUN-2019											
EEM	Description	Source of Item Cost	Number of EEM Units	Unit	Cost	: / Unit	Total Item Cost	Total Incremental Cost	Notes / Comments		
EEM 1 Standard	Enhanced insulation for roofs and walls Standard J.J.0.032, P-30 roof insulation (insulation entirely above deck		8 435	Area	\$		s .	\$ 4,806			
Standard	Standard wall insulation (residential steel-frame wall)		45 603	Area	s		s .				
	5A: U-0.055; R-16.0 Enhanced roof insulation (insulation entirely above deck)						• • • • • • • • • • • • • • • • • • • •				
EEM	5A: U-0.030; R-32.2 (+ R-2.2)	RSMeans 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)	RSMeans 07 21 13.10	45,603	Area	\$	0.0336	\$ 1,532				
EEM 2	Enhanced fenestration		07.007	4	•		<u>^</u>	\$ 29,452			
EEM	Enhanced windows, U-0.39	PNNL CE ANALYSIS	37,387 37,387	Area	\$ \$	0.79	\$ - \$ 29,452				
EEM 3	Air leakage testing for mid-sized buildings			0	¢		¢	\$ -			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type		-	0	\$ \$	-	» - Տ -				
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units		12.012	wette	¢	6.75	¢ 02.220	\$ 15,786			
EEM	Reduced LPDs, ~20% more efficient	HBL	13,612	watts	\$ \$	-	\$ 93,229 \$ 109,016		Cost for retail area only		
EEM 5	Occupancy sensors and automatic lighting controls including egress lighting						•	\$-			
EEM	n/a - IECC only n/a - IECC only		-	0	\$		s - s -				
EEM 6	Exterior lighting control							\$ -			
EEM	n/a - IECC only; already included in NYS amendments to 90.1-2016		-	0	\$	-	s - s -				
EEM 7	Reduce fan power allowances				•		¢	s -			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type				\$		s - s -				
EEM 8	Hotel guestroom HVAC vacancy control				0		¢	s -			
EEM	n/a - aiready included in 90.1-2016 n/a - aiready included in 90.1-2016		-		\$ \$		» - Տ -				
EEM 9	High-efficiency SHW						•	s -			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type		3	each each	\$	-	s - s -				
EEM 10	High-efficiency commercial kitchen equipment						¢	\$-			
EEM	n/a - does not apply to this building type n/a - does not apply to this building type				\$		s - s -				
EEM 11	Thermal bridging reduction				0		¢	\$ 1,270			
Standard	Additional Parapet Insulation: Assume 12in at wall + 42in of parapet height + 12in wide parapet + 42in of	DEMages 07 00 16 10	-	A	\$	-	ې د د 1070				
	parapet height to roof deck. 9 ft of total insulation of R-4.2/in for entire perimeter of roof.	RSIMeans 07 22 10.10	3,735	Area	¢	0.3400	ş 1,270				
Standard	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$-	· ·			
EEM 42	n/a - not modeled for this building type	RSMeans 26 51 13.55	-		\$	-	\$-	¢ 20.000			
Standard	Standard elevator motors, 30hp		-	each	\$	-	\$-	\$ 20,000			
EEM 44	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$	10,000	\$ 20,000				
Standard	n/a - already included in 90.1-2016		-	0	\$	-	\$-	· ·			
EEM 15	n/a - already included in 90.1-2016		-	0	\$	-	\$-	s .			
Standard	n/a		-	0	\$	-	\$-	•			
	n/a - applies to IECC path only		-	0	\$	-	\$-				
ACA 1	Reduced capacity for cooling equipment						_	\$ (5,884)			
Standard Standard	WSHP, 172 tons Closed circuit cooling tower, 138 tons	RSMeans D3050 240 RSMeans 23 65 133 10	1	units	\$ 4 \$ 1	108 392	\$ 486,559 \$ 108,392				
EEM	WSHP, 169.8 tons	RSMeans D3050 240	1	units	\$ 4	481,756	\$ 481,756				
EEM	Closed circuit cooling tower, 136.5 tons Reduced capacity for heating equipment	RSMeans 23 65 133.10	1	units	\$ 1	107,311	\$ 107,311	s .			
Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$-				
ACA 3	Reduced capacity for air handling equipment		-	units	\$	-	5 -	s <u>-</u>			
Standard	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	\$	-	\$ -				
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	units	\$		s -	\$			
Standard	n/a - does not apply to this building type		-	0	\$	-	\$ -				
ACA 5	Electric vehicle charging station capable parking lots for 5% of spaces		-	U	\$	-	ə -	\$ 2,600			
Standard	209/2401/40 amp outlats (zapas 54 and 64 aph)	chargohub com	-	0 outlate	\$	- 1 200	\$ -				
ACA 6	Solar-ready zone per Appendix CA of 2018 IECC	chargenub.com	2	outlets	\$	1,300	¢ 2,000	\$-			
Standard FEM				0	\$		\$ - \$.				
		1	-	U	Ψ	-	Total	\$ 68.030			
L											

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		0.405	A	0		\$ 7,321		
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		45,603	Area	\$ -	\$-			
EEM	Enhanced roof insulation (insulation entirely above deck) 6A: U-0.029; R-33.4 (+ R-3.4)	RSMeans 07 22 16.10	8,435	Area	\$ 0.5998	\$ 5,059			
EEM	Enhanced wall insulation (residential steel-frame wall)	RSMeans 07 21 13.10	45,603	Area	\$ 0.0496	\$ 2,262			
EEM 2	Enhanced fenestration						\$ 30,209		
Standard	Standard windows, U-0.38		37,387	Area	\$ -	\$ -			
EEM 3	Enhanced windows, U-0.35 Air leakage testing for mid-sized buildings	PNNL CE ANALYSIS	37,387	Area	\$ 0.81	\$ 30,209	۰. ۲		
Standard	n/a - does not apply to this building type		-	0	s -	\$ -	• -		
EEM	n/a - does not apply to this building type		-	0	\$ -	\$ -			
EEM 4	Reduced LPD for interior lighting; high efficacy lights in dwelling units	1	10.010				\$ 15,786		
Standard	Lighting per ASHRAE 90.1-2016		13,812	watts	\$ 6.75	\$ 93,229		Cost for retail area only	
EEM	Reduced LPDs, ~20% more efficient	HBL	11,473	watts	\$ -	\$ 109,016			
EEM 5 Standard	occupancy sensors and automatic lighting controls including egress lighting			0	\$ -	\$ -	ə -		
EEM	n/a - IECC only		-	0	s -	\$ -			
EEM 6	Exterior lighting control						\$-		
Standard	n/a n/a JECC only: already included in NVS amondments to 00.1.2016		-	0	S -	\$ - ¢			
EEM 7	Reduce fan power allowances		-	0	3 -	\$ -	s -		
Standard	n/a - does not apply to this building type				\$-	\$-			
EEM	n/a - does not apply to this building type				\$ -	\$-	•		
EEM 8 Standard	hotel guestroom HVAC vacancy control				s -	s -	ş -		
EEM	n/a - already included in 90.1-2016		-		\$ -	\$ -			
EEM 9	High-efficiency SHW					-	ş -		
Standard FEM	n/a - does not apply to this building type		3	each	s - s -	\$ - \$			
EEM 10	High-efficiency commercial kitchen equipment		,	Cach		ψ -	s -		
Standard	n/a - does not apply to this building type		-		\$ -	\$ -			
EEM	n/a - does not apply to this building type		-		\$ -	\$-	¢ 1 270		
Standard	Standard wall insulation		-		s -	s -	\$ 1,270		
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 RSMoone 26 51 13 55	-		\$ - ¢	\$ - ¢			
EEM 13	Efficient elevator, regenerative drives	Koweans 20 51 15.55	-		3 -	\$ -	\$ 20,000		
Standard	Standard elevator motors, 30hp		-	each	\$ -	\$ -			
EEM	Elevator motors with regenerative drives, 30 hp	Previous projects	2	each	\$ 10,000	\$ 20,000	e		
Standard	n/a - already included in 90.1-2016		-	0	s -	s -	, .		
EEM	n/a - already included in 90.1-2016		-	0	\$ -	\$ -			
EEM 15 Standard	Demand-based recirculated SHW controls			0	s	\$	\$		
EEM	n/a - applies to IECC path only		-	0	\$ -	\$ -			
ADDITION	AL COST ADJUSTMENTS								
ACA 1	Reduced capacity for cooling equipment	DSMaana D2050 240	1	unite	¢ 471 770	£ 474 770	\$ (9,656)		
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 Standard	(INCLUDED W/PACKAGED UNITS IN ACA 1)		-	units	s -	s -	•		
EEM			-	units	s -	\$ -			
ACA 3	Reduced capacity for air handling equipment	1					\$-		
Standard FFM	(INCLUCED W/PACKAGED UNITS IN ACA 1)		-	units	s - s -	\$ - \$ -			
ACA 4	Increased insulation to account for PTAC openings, thermal bridging requirements		-	unito	-		\$-		
Standard	n/a - does not apply to this building type		-	0	ş -	\$ -			
	n/a - coes not apply to this building type Electric vehicle charging station canable parking lots for 5% of spaces		-	0	ş -	ъ -	\$ 2.600		
Standard	aloute formere enarging station expanse parking role for 076 of spaces		-	0	\$ -	\$ -	- 2,000		
EEM	208/240V 40 amp outlets (zones 5A and 6A only)	chargehub.com	2	outlets	\$ 1,300	\$ 2,600			
ACA 6 Standard	Solar-ready zone per Appendix CA of 2018 IECC		-	0	\$ -	\$ -	ə -		
EEM			-	0	\$ -	\$ -			
						Total	\$ 67,531		

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