

Yukon Electricity Conservation and Demand Management Potential Review (CPR 2011)

Commercial Sector - Appendices

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Submitted to: Yukon Energy, Yukon Electrical Company, Government of Yukon

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Appendix A

Background-Section 3: Base Year Electricity Use

Introduction

Appendix A provides additional detailed information related to the generation of the Commercial sector Base Year profile. The appendix discusses the following:

- Sub sector descriptions
- Sales data analysis
- CEEAM archetype summaries existing buildings.

A1 Sub Sector Descriptions

Exhibit A 1 presents brief descriptions of the Commercial sub sectors. Detailed building archetype profiles for each sub sector are provided in Appendix A 3 (Existing buildings) and Appendix C 3 (New buildings).

Sub Sector	Definition	Examples of Building Types				
Office	Buildings used for office or public administration.	Municipal Office, Government Office Building, Private Office Buildings				
Food Retail	Retail store that primarily sells food items and has a significant refrigeration load.	Supermarket				
Non-Food Retail	Retail store which primarily sells non- food items	"Big box" store, strip mall, enclosed mall unit				
Hotel/Motel	Hotel or motel building.					
Healthcare	Buildings used for providing multiple accommodations for short- or long-term care residents.	Hospital, Nursing Homes, Nursing Stations				
Recreation Centre	Community centres, typically incorporating arenas or curling rink. May include support facilities such as a community hall.	Hockey Arena, curling rink				
Education	Buildings whose primary function is education. Typically characterized by seasonably variable occupancy.	Elementary or secondary schools, Universities, Colleges.				
Restaurant	Full service or quick service restaurant					
Warehouse / Wholesale	Typically metal-clad building with high ceilings and predominantly high-bay lighting.					
Other General Service Building	Commercial, institutional, manufacturing or light industrial buildings which do not fit the above categories	Service garages, religious buildings, theaters, prisons, light manufacturing, placer mines.				
Non-Building	Structures for which electricity is primarily used by unique equipment.	Telephone exchange, microwave repeater station.				

Exhibit A 1 Sub sector Descriptions

Sub Sector	Definition	Examples of Building Types			
Street Lighting	Street lighting	n/a			
Parking Lot Plug	Outdoor receptacles provided in parking lots for use with block heaters	n/a			

A2 Sales Data Analysis

This section outlines the methodology for the allocation of the sales data provided by YEC and YECL to the Commercial sub sectors identified above.

Both YEC and YECL provided sales data to ICF Marbek. These data included monthly consumption for accounts grouped by Standard Industrial Classification (SIC) code, rate class and supply type. These sales data were sorted using these three categories, resulting in an aggregated sales data figure (and number of accounts) for each unique combination of sub sector (using SIC code data), region (using supply type data) and ownership (government/non-government, using rate class data). Because the three diesel regions have relatively few commercial accounts, it was agreed that instead of reporting at the sub sector level, data and results would be reported in the following aggregate categories: General Service Buildings, Non-buildings and Street Lighting. Government and non-government customers are tracked separately.

Exhibit A 2, below, describes how SIC codes were mapped to the sub sector definitions given above. The available SIC code information did not allow the Food Retail and Non-food Retail sub sectors to be distinguished from each other. Instead, YEC and YECL staff manually identified individual accounts associated with food retail buildings.

SIC Code	SIC Sub Sector	Description	CPR Subsector Assignment
11010	Single Family/Row	Overhead	Residential
11020	Single Family/Row	Underground	Residential
11030	Detached Garage	Detached Garage	Residential
12010	Mobile	Overhead	Residential
12020	Mobile	Underground	Residential
13010	Apartment/Bulk	Overhead	Residential
13020	Apartment/Bulk	Underground	Residential
14010	Apartment Suite	Overhead	Residential
14020	Apartment Suite	Underground	Residential
21010	Hospital	General Hospitals	Healthcare
21020	Hospital	Nursing Homes, Seniors Homes	Healthcare
21090	Hospital	Other	Healthcare
22010	Education	Elementary Schools	Education
22020	Education	High Schools	Education
22030	Education	Post Secondary Schools	Education
22090	Education	Other	Education
23010	Retail Independent	Stores - independent	Retail

Exhibit A 2 Sales Data Subsector Assignments

SIC Code	SIC Sub Sector	Description	CPR Subsector Assignment
23020	Retail Independent	Shopping Centre - common service meter	Retail
23090	Retail Independent	Shopping Centre - bulk meter	Retail
23110	Automotive	Service stations	Other General Service Buildings
23120	Automotive	Car dealerships	Other General Service Buildings
23130	Automotive	Parking lot plug ins	Parking Lot Plug
23190	Automotive	Other	Other General Service Buildings
24010	Wholesale	Farm implement and equipment	Warehouse / Wholesale
24020	Wholesale	Lumber and building materials	Warehouse / Wholesale
24090	Wholesale	Other	Warehouse / Wholesale
24110	Warehouse	Grain elevators, seed cleaning plants	Warehouse / Wholesale
24120	Warehouse	Transportation Vehicle Storage	Warehouse / Wholesale
24190	Warehouse	Other	Warehouse / Wholesale
25010	Office	Less than 3 storey	Office
25020	Office	More than 3 storey	Office
26010	Transportation/Communications	Transportation	Other General Service Buildings
26020	Transportation/Communications	Communications	Non-Buildings
26030	Utilities/Defense	Utilities	Non-Buildings
26040	Utilities/Defense	Defense	Non-Buildings
26090	Utilities/Defense	Other	Non-Buildings
27010	Accommodations and Food Services	Hotel	Hotel / Motel
27020	Accommodations and Food Services	Motel	Hotel / Motel
27030	Accommodations and Food Services	Restaurant	Restaurant
27090	Accommodations and Food Services	Other	Restaurant
28010	Community, Recreational, Social and Religious Centres	Curling rinks	Recreation Centres
28020	Community, Recreational, Social and Religious Centres	Arenas (Rec centres)	Recreation Centres
28030	Community, Recreational, Social and Religious Centres	Motion picture theatres	Other General Service Buildings
28040	Community, Recreational, Social and Religious Centres	Community Halls	Other General Service Buildings
28090	Community, Recreational, Social and Religious Centres	Other	Other General Service Buildings
29010	Miscellaneous	Cathodic protection and rectifiers	Non-Buildings
29030	Miscellaneous	Construction: apt/condo	Other General Service Buildings
29032	Miscellaneous	Common service apartment	Residential
29040	Miscellaneous	Construction: non-resid.	Other General Service Buildings
29041	Miscellaneous	Construction: non-resid. Temporary	Other General Service Buildings
29050	Miscellaneous	Construction trades	Other General Service Buildings

		-	CPR Subsector Assignment
29051	Miscellaneous	Welding shops	Other General Service Buildings
29060	Miscellaneous	Unoccupied space	Non-Buildings
29070	Miscellaneous	Small oilfield service	Other General Service Buildings
29080	Miscellaneous	Penitentiary/jail	Other General Service Buildings
29090	Miscellaneous	Other	Non-Buildings
29091	Miscellaneous	Large company farm	Other General Service Buildings
31010 Resid	ential Street Lighting	Overhead	Street Lighting
31020 Resid	ential Street Lighting	Underground	Street Lighting
32010 High	way Street Lighting	Overhead	Street Lighting
32020 High	way Street Lighting	Underground	Street Lighting
67010	Industrial	Sawmills	Other General Service Buildings
67510	Industrial	Cement	Other General Service Buildings
68090	Industrial	Other Mining	Other General Service Buildings
69090	Industrial	Other Manufacturing	Other General Service Buildings
81010 5	Sentinel Lighting	Overhead	Street Lighting
81020 5	Sentinel Lighting	Underground	Street Lighting

A3 CEEAM Archetype Summaries – Existing Buildings

This section includes summary profiles of the nine new building archetypes constructed for this study. Exhibit C 12 presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Sub Sector	Page #
Office	A – 6
Food Retail	A – 11
Non-food Retail	A – 16
Hotel / Motel	A – 21
Healthcare	A – 26
Education	A – 31
Restaurant	A – 36
Recreation Centres	A – 41
Warehouse / Wholesale	A – 46
Terms Used in Building Profiles	A – 51

Exhibit A 3 Table of Contents - Existing CEEAM Building Profiles

			COMMER	CIAL SECTOR BUIL	DING PROFI	LE			
EXISTING BUILDINGS:	SIZE:			VINTAGE:			REGION:		
Office Baseline	< 40,000 ft2						Yukon		
CONSTRUCTION									
	_		-						
Wall U value (W/m ² .°C) 0.38	8 W/m².°C	0.07	Btu/hr.ft ² .°F		Typical Bui	ilding Size	1,394 m ²	2 15,000 ft ²	
Roof U value (W/m ² .°C) 0.29	9 W/m².°C	0.05	Btu/hr.ft ² .°F		Typical Fo	otprint (m²)	697 m ²	2 7,500 ft ²	
Glazing U value (W/m ² .°C) 3.30	0 W/m².°C	0.58	Btu/hr.ft ² .°F		Footprint A	spect Ratio (L:W)	1		
						onditioned Space	100%		
	-					onditioned Space	45%		
Window/Wall Ratio (WIWAR) (%) 0.38 Shading Coefficient (SC) 0.58					Typical # S	Exterior Zone	2		
	5					por Height (m)	3.7 m	12.0 ft	
VENTILATION SYSTEM, BUILDING CONTRO	DLS & INDOOR CONDI	TIONS							
Ventilation System Type			CAV	CAVR DDM	1Z DDMZVV	VAV VAV	R IU 100% O.A	TOTAL	
	System Pres	ent (%)	75%			25%		100%	
	Min. Air Flow					60%			
	(Minimum Th	rottled Air Vo	olume as Perce	ent of Full Flow)					
Occupancy or People Density	2	6 m²/persor	h	274 ft²/persor	h		%OA 9.87%		
Occupancy Schedule Occ. Period	90			211 10,0000					
Occupancy Schedule Unocc. Period									
Fresh Air Requirements or Outside Air		8 L/s.perso	n	16 CFM/per	son				
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Freeb A	r Control Type	= "2" enter % FA. to	he right:				
(1 = mixed air control, 2 = Fixed fresh air, 3 100				= "3" enter Make-up		and operation	L/s.m ²	CFM/ft ²	
(,						operation (%)		
Sizing Factor		1							
Total Air Circulation or Design Air Flow	2.	98 L/s.m ²		0.59 CFM/ft ²		0	-ii+ (4000(-OA)		0514/62
Infiltration Rate	0	70 L/s.m ²		0.14 CFM/ft ²		Separate Make-up a	n occupied period	L/s.m ²	CFM/ft ²
(air infiltration is assumed to occur during unocc		10 1/3.111		0.14 01 10/10			n unoccupied period	50%	
hours only if the ventilation system shuts down)							· · <u> </u>		
Economizer	Incidence of Use	Entha	alpy Based	Dry-Bulb Based 100%	Total 100%	Summor	y of Design Parameters]	
	Switchover Point		KJ/kg.	18 °C	10078		sign Cooling Load	282,237	
			Btu/lbm	64.4 °F			ne Sensible Load	189,275	
			T.				r enthalpy	28.2 Btu/lbm	
Controls Type	System Present (%)		HVAC	Room			e air enthalpy	23.4 Btu/lbm	
	All Pneumatic		Equipment	Controls		Specific vo Design C	olume of air at 55F & 100% R	13.2 ft³/lbm 8,805	
	DDC/Pneumatic						circulation or Design air	2.98 l/s.m ²	
	All DDC								
	Total (should add-up to	100%)							
		Pro	portional	PI / PID Tot	al				
Control mode	Control Mode		portional	11/110					
		Fixed	Discharge	Reset					
	Control Strategy								
Indoor Design Conditions			1	Room		Supply A	ir		
indeer besign conditions	Summer Temperature		24		.2 °F	14 °C	57.2 °F		
	Summer Humidity (%)		50%			98%			
	Enthalpy				2 Btu/lbm	54.5 KJ/kg.	23.4 Btu/lbm		
	Winter Occ. Temperatu Winter Occ. Humidity	e	21		.8 °F	15 °C 45%	59 °F		
	Enthalpy				8 Btu/lbm	45.5 KJ/kg.	19.6 Btu/lbm		
	Winter Unocc. Tempera	ture			.8 °F				
	Winter Unocc. Humidity		30%						
	Enthalpy		50	KJ/kg. 21.	5 Btu/lbm				
Damper Maintenance			Incidence	Frequency					
			(%)	(years)					
	Control Arm Adjustment								
	Lubrication Blade Seal Replacemer	ht .							
	Didde Ocal Replacemen	n							
				-					
Air Filter Cleaning	Changes/Year			1					
				Incidence	of Annual Ro	oom Controls Mainte	anance		
Incidence of Annual HVAC Controls Maintenand	ce			Incluence	UI AIIIUaI Ku		endrice		
				_					
	Annual Maintenance Ta	sks	Incidence			Annual Maintenance	Tasks	Incidence	
	Collibration of Transmitt	070	(%)	+		Inconcetion/Calibration	on of Room Thermost	(%)	
	Calibration of Transmitt Calibration of Panel Ga			+		Inspection/Calibratio	on of Room Thermostat		
	Inspection of Auxiliary E			1		Inspection of Auxilia			
	Inspection of Control De			1		Inspection of Control	Devices (Valves,		
					l	(Dampers, VAV Bo	xes)		

		COMMERC	CIAL SECTOR BUILDIN	IG PROFILE								
EXISTING BUILDINGS: Office Baseline	SIZE: < 40,000 ft2		VINTAGE:				EGION: ukon					
LIGHTING GENERAL LIGHTING Light Level		5 ft-candles										
Floor Fraction (GLFF) Connected Load	0.90 14.2 W/m ² 1.	3 W/ft ²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3200 5560 90% 15%	Light Level (Lux) % Distribution Weighted Average	450	500 100%	650					Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	0.7 0.65	0.7 0.65	50% 0.6 0.75	0.6 0.80	T8 Elec 50% 0.6 0.80	MH 0.6 0.55	HPS 0% 0.6 0.55	5 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50	72	84	88	65	90	EUI	kWh/ft².yr	4.4
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10	5 ft-candles									MJ/m².yr	171
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	3200 5560 95%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 40%	400 40%	500 10%				Total 100% 350		
Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice	30%	System Present (%)	INC 50% 0.7	CFL 50% 0.7	T12 0.6	T8 0.6	MH 0.6	HPS 0.6	Other 0.6	TOTAL 100.0%	-	
Interval Relamping Strategy & Incidence	years Group Spot	LLF Efficacy (L/W)	0.65 15	0.65 50	0.75 72	0.80 84	0.55 65	0.55 90	0.55 90			
of Practice HIGH BAY LIGHTING				EUI = Load X	Hrs. X SF	X GLFF				EUI	kWh/ft².yr MJ/m².yr	1.5 56
Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles		Flo	or fraction o	check: sh	nould = 1.0	0	1.00]		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500	700	1000				Total	1 1 1 1	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	0.7 0.5	0.7 0.65	0.6 0.75	T8 0.6 0.80	0.6	MH 0.6 0.55	0.6 0.55		-	
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50	72	84	88	65	90	EUI	kWh/ft².yr	
TOTAL LIGHTING						0	verall LP	16.09 V	V/m²	EUI TOTAL	MJ/m².yr . kWh/ft².yr MJ/m².yr	5.9 227
OFFICE EQUIPMENT & PLUG LOA	DS											
Equipment Type	Computers	Monitors	Printers	Copiers	3	Serve	rs	Plug	Loads	-		
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.9 1.9 W/m ² 0.2 W/ft ²	51 0.9 1.8 W/m ² 0.2 W/ft ²	100 0.15 0.6 W/m ² 0.05 W/ft ²	200 0.1 0.8 W/r 0.07 W/f		217 0.06 0.5 W 0.05 W		1.5 V 0.14 V	V/m² V/ft²			
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	80% 50% 2000 6760	80% 50% 2000 6760	80% 50% 2000 6760	80% 50% 2000 6760		100% 100% 2000 6760	-	80% 50% 2500 6260				
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m ² 3.8 W/m ²	0.5 W/ft ² 0.4 W/ft ²						Compute	er Equipmen	+ = 1 11	kWh/ft².yr	2.77
Usage during occupied period Usage during unoccupied period	100% 66%							Compute	Plug Loads		MJ/m ² .yr kWh/ft ² .yr MJ/m ² .yr	107.44 0.72 27.70
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fossil Fuel Share:	5.0%	Electricity Fuel Share:	95.0%	EUI	I kV	sil Fuel EU Vh/ft².yr J/m².yr	l 0.1 5.0		AI EUI	Electric EUI kWh/ft².yr MJ/m².yr	0.1
REFRIGERATION Provide description below:			_									
Lunch room/cafeteria/restaurant										EUI	kWh/ft².yr MJ/m².yr	0.1 4.0
										EUI	kWh/ft².yr MJ/m².yr	0.5

			COMMER		OR BUILDI	NG PROFI	ILE						
EXISTING BUILDINGS: Office Baseline	SIZE: < 40,000	ft2		VINTAGE	:				REGION: Yukon				
SPACE HEATING]
Heating Plant Type					Fossil Fuel			Ele	ctric				
5				Bo Stan.		Packaged Unit	A/A HP		H/R Chiller	Resistance	Total		
		System Present (%)		30%	30%	10%				10%	100%		
		Eff./COP Performance (1 / Eff.)		75% 1.33		75%			4.50 0.22	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	96.7 W/m ² 739 MJ/m ² .yr		Btu/hr.ft² kWh/ft².yr								ſ	All Electric EUI	
Electric Fuel Share	30.0%	Fossil Fuel Share	70.0%	Ι								kWh/ft².yr	13.8
Boiler Maintenance	Annual M	aintenance Tasks		Incidence]						l	MJ/m².yr	534
	Fire Side	Inspection		(%) 75%	-							Fossil Fuel EUI kWh/ft².yr	24.7
	Water Si	de Inspection for Scale Buil	dup	100%	-						l	MJ/m².yr	958
	Inspectio	n of Controls & Safeties n of Burner		100% 100%							[Market Composite E	
	Flue Gas	Analysis & Burner Set-up		90%								kWh/ft².yr MJ/m².yr	21.5 831
SPACE COOLING													
A/C Plant Type			Centrifugal	Chillers	WSHP	Recip.	Blad DV	Absorption	n Chillers	Total			
		System Present (%)	Standard	HE 25.0%		Chiller	Pkgd. DX 75.0%	VV. Π.	CW	100.0%			
		COP	4.7	5.4	3.5	3.5	2.6	0.9		1001070			
		Performance (1 / COP) (kW/kW)	0.21	0.19	0.29	0.29	0.38	1.11	1.00				
		Additional Refrigerant Related Information											
		Related mormation											
Control Mode		Incidence of Use	Fixed	Reset]								
		Chilled Water	Setpoint		-								
		Condenser Water											
Setpoint		Chilled Water Condenser Water	7	°C	44.6 86								
		Supply Air	14.0		57.2								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	59 W/m² 51.5 MJ/m².yr	19 Btu/hr.ft² 1.3 kWh/ft².yr	638	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	less than 2	900 hrs/ye	ar)		
A/C Saturation	75.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0%	Gas Fuel Share		Ι									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge U	nit	(%)	(years)								
		oupling, Shaft Sealing and											
	Condens	er Tube Cleaning											
		Analysis rent Testing											
		hemical Oil Analysis										All Electric EUI	
												kWh/ft².yr MJ/m².yr	0.6 22
Cooling Tower/Air Cooled Condense	r Maintenan Annual M	aintenance Tasks		Incidence (%)	Frequency (years)							Natural Gas EUI	
		n/Clean Spray Nozzles		(/0]	yoursy							kWh/ft².yr	
	Megger M										l	MJ/m².yr	
	Inspect/V	erify Operation of Controls										Market Composite E kWh/ft².yr	UI 0.6
												MJ/m².yr	22
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	el SHW Tank	1	1		Boiler	1			Fossil		Elec. Res.	
Service not water Plant Type	System F	Present (%) 50%					1	Fuel Share		50%		50%	
Service Hot Water load (MJ/m ² .yr)	Eff./COP 22.8	0.65				0.75	J	Blended E	fficiency	0.65		0.91	
(Tertiary Load)				· · ·	II Electric El	1	1		occil Evel E		ſ	Markat Companity 5	
Wetting Use Percentage	90%				All Electric EU kWh/ft ² .yr	0.6			bssil Fuel El kWh/ft².yr	0.9		Market Composite E kWh/ft ² .yr	0.8
					MJ/m².yr	25			MJ/m².yr	35		MJ/m².yr	30.0

	COMMEF	RCIAL SECTOR BUILDING PROFILE		
EXISTING BUILDINGS:	SIZE:	VINTAGE:	REGION:	
Office	< 40,000 ft2		Yukon	
Baseline				
HVAC FANS & PUMPS				
SUPPLY FANS			Ventilation and Exhaust Fan Operation & Cor	ntrol
			Ventilation Fan Exhaust Fan	_
	0 L/s.m ² 0.59 CFM/ft ² 00 Pa 2.0 wg	Control	Fixed Variable Fixed Variable Flow Flow	
System Static Pressure CAV 50 System Static Pressure VAV 50		Incidence of Use	75% 25% 100%	-
Fan Efficiency 529		Operation	Continuou Scheduled Continuous Scheduled	1
Fan Motor Efficiency 85%	%			
Sizing Factor 1.00		Incidence of Use	50% 50% 50% 50%	~
	.4 W/m ² 0.31 W/ft ² 4 W/m ² 0.31 W/ft ²	Comments:		
	5 W/II- 0.01 W/I	Commonito.		
EXHAUST FANS			μ	
	0 L/s.washroom 212 CFM/washro 3 L/s.m ² 0.06 CFM/ft ²	om		
	3 L/s.m² 0.06 CFM/ft² 1 L/s.m² 0.02 CFM/ft²			
Total Building Exhaust 0.4				
Exhaust System Static Pressure 25	50 Pa 1.0 wg			
Fan Efficiency 40%	%			
Fan Motor Efficiency 80%				
Sizing Factor 1.0 Exhaust Fan Connected Load 0.1				
Exhaust Fan Connected Load 0.	3 W/III			
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump and Cooling Tower/Condenser Fans)			
Conductor Free Device Drow	0.020 100/000			
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	0.020 kW/kW Condenser) 1.17 W/m²	0.07 kW/Ton 0.11 W/ft ²		
(Cooling Tower/Evap. Condensel/ All Cooled C	ondensery	0.11 Wite		
Condenser Pump				
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton		
Pump Design Flow per unit floor area	0.003 L/s.m ²	0.005 U.S. gpm/ft ²		
Pump Head Pressure Pump Efficiency	90 kPa	30 ft		
Pump Motor Efficiency	90%			
Sizing Factor	1.0			
Pump Connected Load	0.57 W/m ²	0.05 W/ft ²		
CIRCULATING PUMP (Heating & Cooling)				
Circolar into romin (ricating & cooming)				
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²		U.S. gpm/Ton	
Pump Head Pressure	150 kPa	50 ft	-	
Pump Efficiency	55%			
Pump Motor Efficiency Sizing Factor	90%			
Pump Connected Load	0.5 0.4 W/m ²	0.04 W/ft ²		
·				
Supply Fan Occ. Period Supply Fan Unocc. Period	3500 hrs./year 5260 hrs./year			
Supply Fan Unocc. Period Supply Fan Energy Consumption	5260 hrs./year 17.0 kWh/m².yr			
Supply Fair Energy Consumption	11.0 (01011.)			
Exhaust Fan Occ. Period	3500 hrs./year			
Exhaust Fan Unocc. Period	5260 hrs./year			
Exhaust Fan Energy Consumption	1.9 kWh/m².yr			
Condenser Pump Energy Consumption	0.2 kWh/m².yr			
Cooling Tower /Condenser Fans Energy Consul				
Circulating Pump Yearly Operation	5000 hrs./year			
Circulating Pump Energy Consumption	1.7 kWh/m².yr			
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency		
Falls and Fullips Maintenance	Alfilial manifestance rasks	(%) (years)		
	Inspect/Service Fans & Motors			
	Inspect/Adjust Belt Tension on Fan Belts			
	Inspect/Service Pump & Motors			EUI kWh/ft².yr 2.0

EXISTING BUILDINGS: Office Baseline	ice < 40,000 ft2		COMMERCIAL SECT VINTAGE:	AL SECTOR BUILDING PROFILE IINTAGE:				
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		17.4 kWh/ft².yr 675.7 MJ/m².yr		Fossil Fue	17.8 kWh/ft².yr	688.7 MJ/r	m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	l Fuel	
GENERAL LIGHTING	4.4	170.6		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	1.5	56.5	SPACE HEATING	4.1	160.1	17.3	670.9	
HIGH BAY LIGHTING			SPACE COOLING	0.4	16.2			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.3	12.5	0.5	17.5	
HVAC FANS & PUMPS	2.0	76.1	FOOD SERVICE EQUIPMENT	0.1	3.8	0.0	0.3	
REFRIGERATION	0.1	4.0						
MISCELLANEOUS	0.5	20.0						
COMPUTER EQUIPMENT	2.8	107.4						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

				COMMER		OR BUILD	NG PROF	ILE							
EXISTING BUILDINGS: Food Retail Baseline	SIZE:				VINTAGE	:				REGION Yukon	:				
CONSTRUCTION															
	_			۲								-			
	3 W/m².°C			Btu/hr.ft ² .°				uilding Size			2,788			000 ft ²	
	9 W/m².°C			Btu/hr.ft ² .°				potprint (m ²			2,788	8 m²	30,	000 ft ²	
Glazing U value (W/m ² .°C) 3.30) W/m².°C		0.58	Btu/hr.ft ² .°	F			Aspect Rat onditioned			100%	1			
								conditioned			45%				
Window/Wall Ratio (WIWAR) (%) 0.06							Defined a	s Exterior 2				_			
Shading Coefficient (SC) 0.69	9						Typical #	Stories loor Height	(m)		4.6	1 6 m	- 1	5.0 ft	
								loor rieigni	. ()		4.0			5.0 II	
VENTILATION SYSTEM, BUILDING CONTRO	DLS & IND	OOR CONDITI	DNS												
Ventilation System Type				CAV	CAVR	DDMZ	DDMZVV	VAV	/ VAVR	: I	U 100% O./	Α ΤΟΤ	AL		
		System Preser		100%				500				10	0%		
		Min. Air Flow ((Minimum Thro		olume as Pe	rcent of Fu	I Flow)		50%	D			_			
						_						_			
Occupancy or People Density Occupancy Schedule Occ. Period		45	m²/persor	۱	484	ft²/person				%OA	27.28%	6			
Occupancy Schedule Occ. Period		9076	-												
Fresh Air Requirements or Outside Air		35	L/s.perso	n	74	CFM/perso	n								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1	lf Fresh Ai	r Control Ty	ne – "2" er	ter % FA. to	the right:			T					
(1 = mixed air control, 2 = Fixed fresh air, 3 100						iter Make-up		tion and op	eration	0	5 L/s.m ²	0	0.10 CFM/ft	2	
O'-ing Franks										509	% operation	ı (%)]	
Sizing Factor Total Air Circulation or Design Air Flow		1.5	L/s.m ²		0.56	CFM/ft ²									
_						_		Separate	Make-up ai				L/s.m ²		CFM/ft ²
Infiltration Rate (air infiltration is assumed to occur during unocc	uniod	0.70	L/s.m ²		0.14	CFM/ft ²			Operation Operation				0% 0%		
hours only if the ventilation system shuts down)	upieu								Operation	lanoccupi	eu penou		0 /8		
	r							т							
Economizer	Incidence	of Use	Enthal	by Based	Dry-Bi 100%	ulb Based	Total 100%		Summary	of Design	Parameter	\$			
	Switchov			KJ/kg.		°C	100 /	,	Peak Des			680,8	97		
				Btu/lbm	64.4	°F			Peak Zon		Load	241,3			
Controls Type	System F	resent (%)		HVAC	Room	1			Room air Discharge		pv		3.2 Btu/lbm 3.4 Btu/lbm		
	-			Equipment	Controls				Specific volu	ume of air at	55F & 100%	r 1	3.2 ft³/lbm		
	All Pneum DDC/Pne								Design CF		or Design ai	11,2 ir 2.85			
	All DDC	anado							rotar air o	inculation	or Designa	1 2.00	/ //3.111		
	Total (sho	ould add-up to 10	0%)]									
			Prop	ortional	PI / PID	Total	1								
Control mode	Control N	lode													
	Control S	trategy	Fixed E	Discharge	Reset										
	Control O	lialegy				1	J								
Indoor Design Conditions					Room		1		Supply Air						
		Temperature Humidity (%)		22	°C	71.6	۰F	14		57.	2 °F				
	Enthalpy				KJ/kg.		Btu/lbm		5 KJ/kg.		4 Btu/lbm				
		c. Temperature			°C	71.6	°F	15		5	9°F				
	Enthalpy	c. Humidity		30%	KJ/kg.	22.8	Btu/lbm	45%	5 KJ/kg.	19.0	6 Btu/lbm				
	Winter Ur	locc. Temperatu	re	21	°C	69.8			J			-			
	Winter Ur Enthalpy	locc. Humidity		30%	KJ/kg.	21.5	Btu/lbm								
	стару				NJ/Kg.	21.5	Dialom								
	,				-	-									
Damper Maintenance				(%)	Frequency (years)	′									
		rm Adjustment													
	Lubricatio	n al Replacement													
	Diaue Se	arreplacement			1										
Ais Filter Olecuie -	0			r	1										
Air Filter Cleaning	Changes/	Year													
		_				Incidence o	f Annual R	oom Contr	ols Mainter	nance]			
Incidence of Annual HVAC Controls Maintenand	e	1													
	Annual M	aintenance Task	s	Incidence	1			Annual Ma	aintenance	Tasks		Incider	nce		
				(%)								(%)			
		n of Transmitter			4						n Thermosta	at	_		
		n of Panel Gaug n of Auxiliary De			1				n of PE Swi n of Auxiliar			+	_		
		n of Control Dev]			Inspection	n of Control	Devices					
								(Dampers	s, VAV Boxe	es)					

EXISTING BUILDINGS: Food Retail Baseline	SIZE:		REGION: Yukon	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.45	3.5 ft-candles		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 100% 20%	Light Level (Lux) 300 500 700 1000 % Distribution 100%		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL T12 ES T8 Mag System Present (%) 50% 50% CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 Efficacy (L/W) 15 50 72 84	50% 0% 0.6 0.7 0.6 0.80 0.55 0.55	TOTAL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot		E	EUI kWh/ft².yr 3.0 MJ/m².yr 116
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10	5.6 W/ft ²	'	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 100% 20%	Light Level (Lux) 300 500 700 1000 % Distribution 100%		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL T12 ES T8 Mag System Present (%) 75% 25% CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 Efficacy (L/W) 15 50 72 84	0.6 0.6 0.6 0.80 0.55 0.55	100.0%
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLF		EUI kWh/ft².yr 3.0 MJ/m².yr 115
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.45	5.5 ft-candles Floor fraction check:		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 100% 20%	Light Level (Lux) 300 500 700 1000 % Distribution 100%		Total 100% 500 TOTAL
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 112 CO 12 CO 10 mag CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 Efficacy (L/W) 15 50 72 84	95% 5% 0.6 0.6 0.6 0.80 0.55 0.55	100.0%
Relamping Strategy & Incidence of Practice	Group Spot		E	EUI kWh/ft².yr 5.1 MJ/m².yr 197
TOTAL LIGHTING			Overall LP 22.55 W/m ² E	UI TOTAL kWh/ft².yr 11 MJ/m².yr 428
OFFICE EQUIPMENT & PLUG LOA	DS			
Equipment Type Measured Power (W/device) Density (device/occupant)	Computers 55 0.65	Monitors Printers Copiers Ser 51 100 200 217 0.65 0.01 0.01 0.03		
Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.8 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	0.7 W/m ² 0.0 W/m ² 0.0 W/m ² 0.1	W/m ² 1.5 W/m ² W/ft ² 0.14 W/ft ² 90% 50% 4100	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.9 W/m ²	0.3 W/ft ² to see notes (cells with red indicator in upper right cornel 0.2 W/ft ²	r, type "SHIFT F2"	
Usage during occupied period Usage during unoccupied period	100% 58%		Computer Equipment E	MJ/m².yr 34.0
FOOD SERVICE EQUIPMENT Provide description below:	Fossil Fuel Share:	EUI	ossil Fuel EUI kWh/ft².yr 2.6 MJ/m².yr 100.0	Ali Electric EUI EUI kWh/tł².yr 1.5 MJ/m².yr 60.0
REFRIGERATION Provide description below: Commercial refrigeration display case	25		Ē	EUI kWh/ft².yr <u>31.0</u> MJ/m².yr <u>1200.0</u>
MISCELLANEOUS			 [E	EUI kWh/ft².yr <u>0.3</u> MJ/m².yr 10

EXISTING BUILDINGS: Food Retail Baseline	SIZE:		COMMER	CIAL SECT	or Buildin	ng profi	LE		REGION: Yukon				
SPACE HEATING													
				1	Feedil Fuel		1	Flag	advi a				
Heating Plant Type						Packaged	A/A HP	Elec W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)		Stan. 15%	High 15%	Units 50%		10%		10%	100%		
		Eff./COP Performance (1 / Eff.)		75% 1.33	80% 1.25	75% 1.33	1.70 0.59	3.00 0.33	4.50 0.22	1.00 1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	58.3 W/m ² 772 MJ/m ² .yr		Btu/hr.ft² kWh/ft².yr								ſ	All Electric EUI	
Electric Fuel Share	20.0%	Fossil Fuel Share	80.0%]	Other fuel Sh	nare					-	kWh/ft².yr	14.0
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence							l	MJ/m².yr	542
		Inspection		(%) 75%							-	Fossil Fuel EUI kWh/ft².yr	26.3
		e Inspection for Scale Build of Controls & Safeties	lup	100% 100%							Į	MJ/m².yr	1017
	Inspection	of Burner Analysis & Burner Set-up		100% 90%							-	Market Composite El kWh/ft².yr	UI 23.8
	i lao eao	anayolo a Bamor Cot ap		0070								MJ/m².yr	922
SPACE COOLING													
A/C Plant Type													
			Centrifugal Standard		Screw Chillers	Recip. Chiller	Pkgd. DX	Absorption W. H.	Chillers CW	Total			
		System Present (%) COP	4.7	5.4	4.4	3.6	100.0% 2.6	0.9	1	100.0%			
		Performance (1 / COP) (kW/kW)	0.21		0.23	0.28	0.38	1.11	1.00				
		Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint										
		Condenser Water											
				1									
Setpoint		Chilled Water Condenser Water	30	°C °C	44.6 86	°F							
		Supply Air	14.0	°C	57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	72 W/m² 24.1 MJ/m².yr	23 Btu/hr.ft ² 0.6 kWh/ft ² .yr	529	ft²/Ton									
Sizing Factor	1.00		Operation (occ. period	4000	hrs/year	Note value	cannot be	less than 2,	900 hrs/ye	ar)		
A/C Saturation	65.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0%	Gas Fuel Share]									
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence (%)	Frequency								
		ontrol, Safeties & Purge Un		(70)	(years)								
	Megger N		searings										
	Condense Vibration	r Tube Cleaning Analysis											
		ent Testing emical Oil Analysis									1	All Electric EUI	
	Lobeer of			1							-	kWh/ft².yr	0.3
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks			Frequency						l r	MJ/m².yr	11
	Inspection	/Clean Spray Nozzles		(%)	(years)						ļ	Natural Gas EUI kWh/ft².yr	
	Inspect/Set Megger N	ervice Fan/Fan Motors										MJ/m².yr	
		erify Operation of Controls										Market Composite El kWh/ft².yr MJ/m².yr	UI 0.3 11
SERVICE HOT WATER													
Service Hot Water Plant Type	Fossil Fue	I SHW Avg. Tank		1		Boiler	ſ			Fossil	[]	Elec. Res.	
	System P	resent (%) 55%				5%		Fuel Share		60%		40%	
Service Hot Water load (MJ/m ² .yr)	Eff./COP 45.5	0.65	I	I		0.75		Blended Ef	nciency	0.66		0.91	
(Tertiary Load)					II Electric EU				ssil Fuel EL		[Market Composite EL	
Wetting Use Percentage	20%				kWh/ft².yr MJ/m².yr	1.3 50			kWh/ft².yr MJ/m².yr	1.8 69		kWh/ft².yr MJ/m².yr	1.6 61.5

		COMMER	CIAL SECTOR BUILDING PROFILE		
EXISTING BUILDINGS: Food Retail Baseline	SIZE:		VINTAGE:	REGION: Yukon	
HVAC FANS & PUMPS					
SUPPLY FANS				Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan	
System Design Air Flow	2.9 L/s.m ²	0.56 CFM/ft ²	Control	Fixed Variable Fixed Variable	
System Static Pressure CAV	500 Pa	2.0 wg		Flow Flow	
System Static Pressure VAV Fan Efficiency	500 Pa 60%	2.0 wg	Incidence of Use Operation	100% 100% ContinuousScheduledContinuousScheduled	
Fan Efficiency Fan Motor Efficiency	80%		Operation	Continuous scheduled on unique scheduled	
Sizing Factor	1.00		Incidence of Use	50% 50% 50% 50%	
Fan Design Load CAV Fan Design Load VAV	3.0 W/m ² 3.0 W/m ²	0.28 W/ft ² 0.28 W/ft ²	Comments:		
	3.0 10/11	0.20	Commenta.		
EXHAUST FANS				<u></u>	
Washroom Exhaust	100 L/s.wash	hroom 212 CFM/wash	h		
Washroom Exhaust Washroom Exhaust per gross unit area	100 L/s.wash 0.1 L/s.m ²	hroom 212 CFM/wash 0.01 CFM/ft ²	nroom		
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²			
Total Building Exhaust	0.2 L/s.m ²	0.03 CFM/ft ²			
Exhaust System Static Pressure	250 Pa	1.0 wg			
Fan Efficiency Fan Motor Efficiency	25% 75%				
Sizing Factor	1.0				
Exhaust Fan Connected Load	0.2 W/m ²	0.02 W/ft ²			
AUXILIARY COOLING EQUIPMENT ((Condenser Pump	and Cooling Tower/Condenser Fans)	,		
		0.000			
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air (Cooled Condenser)	0.020 kW/kW 1.43 W/m ²	0.07 kW/Ton 0.13 W/ft ²		
Condenser Pump					
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton		
Pump Design Flow per unit floor area Pump Head Pressure		0.004 L/s.m ² kPa	0.006 U.S. gpm/ft ² ft		
Pump Efficiency		50%	n n		
Pump Motor Efficiency		80%			
Sizing Factor		1.0	14//6/2		
Pump Connected Load		W/m ²	W/ft ²		
CIRCULATING PUMP (Heating & Co	oling)				
Pump Design Flow @ 5 °C (10 °F) de	T ette	0.003 L/s.m ²	0.0045 U.S. gpm/ft ² 2.4	4U.S. gpm/Ton	
Pump Head Pressure	ild i	100 kPa	50 ft	10.5. gpm r sh	
Pump Efficiency		50%			
Pump Motor Efficiency Sizing Factor		<u>80%</u> 0.8			
Sizing Factor Pump Connected Load		0.8 0.6 W/m ²	0.06 W/ft ²		
Current For One Daried		5000 bro (voor			_
Supply Fan Occ. Period Supply Fan Unocc. Period		5000 hrs./year 3760 hrs./year			
Supply Fan Energy Consumption		20.4 kWh/m².yr			ļ
Exhaust Fan Occ. Period		5000 hrs./year			
Exhaust Fan Unocc. Period		3760 hrs./year			ļ
Exhaust Fan Energy Consumption		1.6 kWh/m².yr			
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy		kWh/m².yr 0.1 kWh/m².yr			
Circulating Pump Yearly Operation		7000 hrs./year			
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	i -	3.9 kWh/m².yr			
Fans and Pumps Maintenance		Maintenance Tasks	Incidence Frequency (%) (years)		
		Service Fans & Motors			
		Adjust Belt Tension on Fan Belts Service Pump & Motors	+	EUI kWh/ft².	.vr 2.4
	inspect/a	service Fullip & Motors			

EXISTING BUILDINGS: Food Retail Baseline	COMMERCIAL SECT SIZE: VINTAGE:				NG PROFILE		REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		51.9 kWh/ft².yr 2,008.7 MJ/m².yr		Fossil Fue	23.6 kWh/ft².yr	915.0 MJ	/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	Fuel	
GENERAL LIGHTING	3.0	116.5		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	3.0	114.7	SPACE HEATING	2.8	108.3	21.0	813.5	
HIGH BAY LIGHTING	5.1	196.7	SPACE COOLING	0.2	7.4			
OTHER PLUG LOADS	0.8	32.5	SERVICE HOT WATER	0.5	20.0	1.1	41.5	
HVAC FANS & PUMPS	2.4	93.7	FOOD SERVICE EQUIPMENT	0.6	24.0	1.5	60.0	
REFRIGERATION	31.0	1,200.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.9	34.0						
ELEVATORS OUTDOOR LIGHTING	1.3	50.9						

				COMMER	CIAL SECT		DING PROP	FILE						
EXISTING BUILDINGS:	SIZE:				VINTAGE	:				REGION	l:			
Non Food Retail Baseline										Yukon				
CONSTRUCTION												-		
		г		-								_		
	38 W/m².°C	-		Btu/hr.ft ² .				uilding Size			929			00 ft ²
Roof U value (W/m ² .°C) 0.2	29 W/m ² .°C	_	0.05	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²	[:])		929	9 m²	10,0	00 ft ²
Glazing U value (W/m ² .°C) 3.3	30 W/m².°C	L	0.58	Btu/hr.ft ² .	°F			Aspect Rat				5		
								onditioned			100%			
Window/Wall Ratio (WIWAR) (%) 0.	10							onditioned s Exterior 2			45%	6		
	75						Typical #		-0110			1		
· · · · · · · · · · · · · · · · · · ·							Floor to F	loor Height	(m)		4.5	5 m	14	4.8 ft
VENTILATION SYSTEM, BUILDING CONTR	ROLS & IND	OOR CONDITIO	NS											
Ventilation System Type		Custom Dresent	(0/)	CAV 100%		DDM		VAV	VAVF	R 1	U 100% O.			
		System Present Min. Air Flow (%		100%	•			50%			-	100	%	
		(Minimum Throt		olume as P	ercent of Fu	III Flow)		007	1	1				
												_		
Occupancy or People Density			m²/persoi	n	269	ft²/person				%OA	12.53%	6		
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period		90%												
Fresh Air Requirements or Outside Air		8	L/s.perso	n	16	CFM/pers	on							
	era 1, 2 or 3)				ype = "2" e			- 11		349				
(1 = mixed air control, 2 = Fixed fresh air, 3 10	0% fresh air)		If Fresh A	ir Control T	ype = "3" e	nter Make-u	ıp Air Ventila	ation and o	peration		.5 L/s.m ²		10 CFM/ft ²	
Sizing Factor		0.75								50.	% operation	1 (70]		J
Total Air Circulation or Design Air Flow			L/s.m ²		0.47	CFM/ft ²								
_								Separate	Make-up a				L/s.m ²	CFM
Infiltration Rate		0.42	L/s.m ²		0.08	CFM/ft ²			Operation			50		
(air infiltration is assumed to occur during unor hours only if the ventilation system shuts down									Operation	1 unoccupi	ed period	50	%	
nours only if the ventilation system shuts down	9													
Economizer			Enthalp	y Based	Dry-Bu	lb Based	Total	T						
	Incidence				100%		100%	5			Parameter			
	Switchov	er Point		KJ/kg.		°C	_		Peak Des			198,37		
				Btu/lbm	64.4	۴		1	Peak Zon Room air		Load	135,16	2 2 Btu/lbm	
Controls Type	System F	resent (%)		HVAC	Room				Discharge		py		4 Btu/lbm	
	-,			Equipmen							55F & 100%		.2 ft³/lbm	
	All Pneum								Design C			6,28		
	DDC/Pne All DDC	umatic							l otal air d	circulation	or Design a	air 2.39	l/s.m ²	
		ould add-up to 100	0%)											
						1	_							
			Propo	ortional	PI / PID	Tota	I							
Control mode	Control N	lode	Fixed D	ischarge	Reset		_							
	Control S	trategy	T IAEG D	lacharge	Reset									
		57												
Indoor Design Conditions		_			Room		- T		Supply Ai		_	_		
		Temperature Humidity (%)		21	°C	69.8	8°F	14	°C	57	.2 °F			
	Enthalpy	Humidity (%)			KJ/kg.	28.2	Btu/lbm		5 KJ/kg.	23.4	4 Btu/lbm			
		c. Temperature			°C		B °F	15			9 °F	-		
	Winter Oo	c. Humidity		30%	1		_	45%	ò		_			
	Enthalpy				KJ/kg.	22.8		45.5	5 KJ/kg.	19.	6 Btu/lbm			
		nocc. Temperature nocc. Humidity	e	30%	°C	69.8	°F							
	Enthalpy	iocc. maintaity			KJ/kg.	21.5	Btu/lbm							
				1	-	1								
Damper Maintenance				Incidence (%)	Frequency (years)									
	Control A	rm Adjustment		(70)	(years)									
	Lubricatio													
	Blade Se	al Replacement												
Air Filter Cleaning	Changes/	Year			1									
				L	-							_		
		-				Incidence of	of Annual R	oom Contr	ols Mainter	nance				
Incidence of Annual HVAC Controls Maintenau	nce													
		aintenance Tasks		Incidence	1				aintenance	Tasks		Incident	e.	
		antenance rasks		(%)				/ TILIUCII IVIà		1 0.010		(%)		
	Calibratio	n of Transmitters		,,	1			Inspectior	n/Calibratio	n of Roon	n Thermosta			
		n of Panel Gauge			4				n of PE Sw				4	
		n of Auxiliary Devi			-				n of Auxiliar					
	inspection	n of Control Devic	JC2	1	L				n of Contro , VAV Box		vaives,			
								Lounders	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					

EXISTING BUILDINGS: Non Food Retail Baseline	SIZE:	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Yukon	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 0.80 14.2 W/m ²	16.5 ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) 400 500 600 1000 % Distribution 25% 50% 25% Weighted Average INC CFL T12 ES T8 Mag T8 Elec MH T5 H	Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 50% 50% CU 0.7 0.6 0.6 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.55 0.5	100.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 5.1 MJ/m².yr 197
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 4 0.10 60.4 W/m²	16.5 ft-candles 5.6 W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) 300 500 700 1000 % Distribution 30% 40% 30% Weighted Average INC CFL T12 ES T8 Mag T8 Elec MH T5 H	Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 75% 25% 0 0 0 CU 0.7 0.7 0.6 0.6 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.55 0.5	% 100.0% 6
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLFF	EUI kWh/ft².yr 2.7 MJ/m².yr 105
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	500.00 Lux 0.10 22.7 W/m ²	I6.5 ft-candles Floor fraction check: should = 1.00 1.0 2.1 W/ft² 1.00	0
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) 300 500 700 1000 % Distribution 30% 40% 30% Weighted Average Image: CFL T12 ES T8 Mag T8 Elec MH T5 H	Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 90% 10 CU 0.7 0.7 0.6 0.6 0.6 0 LLF 0.65 0.65 0.75 0.80 0.80 0.55 0.5	% 100.0% 6
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 1.0 MJ/m².yr 39
TOTAL LIGHTING		Overall LP 17.38 W/m ²	EUI TOTAL kWh/ft².yr 8.8 MJ/m².yr 342
OFFICE EQUIPMENT & PLUG LOA	ADS		
Equipment Type	Computers	Monitors Printers Copiers Servers Plug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.18 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	51 100 200 217 0.18 0.01 0.01 0.02 0.4 W/m² 0.0 W/m² 0.1 0.0 W/t² 0.00 W/t² 0.1 0.0 W/t² 0.00 W/t² 0.1 90% 90% 100% 90% 90% 50% 50% 50% 100% 50% 2000 2000 2000 4100 6760 6760 6760 4660	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.0 W/m ²	0.2 W/ft ² to see notes (cells with red indicator in upper right corner, type "SHIFT F2" 0.1 W/ft ²	
Usage during occupied period Usage during unoccupied period	100% 59%	Computer Equipme Plug Loa	MJ/m ² .yr 20.81
FOOD SERVICE EQUIPMENT Provide description below: Small restaurants, food courts, kitche	Fossil Fuel Share: nettes	Electricity Fuel Share: 100.0% Fossil Fuel EUI EUI KWh/ft².yr 0.4 MJ/m².yr 15.0	All Electric EUI EUI kWh/ft².yr 0.3 MJ/m².yr 10.0
REFRIGERATION Provide description below:			EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
MISCELLANEOUS			EUI kWh/ft².yr 0.3 MJ/m².yr 10

EXISTING BUILDINGS: Non Food Retail Baseline	SIZE:		COMMER	CIAL SEC VINTAGE	for Build :	ING PROF	ILE		REGION: Yukon				
SPACE HEATING													
Heating Plant Type					Fossil Fuel			Elec	tric				
				Bo Stan.	oilers High	Packaged Units	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Prese	nt (%)	10%	5%	65%	1 70	10%		10%	100%		
		Eff./COP Performance	(1 / Eff.)	75%		75% 1.33	1.70 0.59	3.00 0.33	4.50 0.22	1.00 1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	75.9 W/m ² 577 MJ/m ² .yr		24.1 Btu/hr.ft ² 14.9 kWh/ft ² .yr	r							_	All Electric EUI	
Electric Fuel Share	20.0%	Fossil Fuel Sh	are 80.0%	6							-	kWh/ft².yr	10.6
Boiler Maintenance	Annual N	aintenance Task	s	Incidence	1							MJ/m².yr	411
	Fire Side	Inspection		(%) 75%	-						_	Fossil Fuel EUI kWh/ft².yr	19.8
	Water Si	de Inspection for		100%								MJ/m².yr	766
		on of Controls & Son of Burner	Safeties	100%								Market Composite E	UI
	Flue Gas	Analysis & Bur	ner Set-up	90%								kWh/ft².yr MJ/m².yr	17.9 695
SPACE COOLING													
A/C Plant Type		System Prese COP Performance (kW/kW) Additional Ref Related Inform	Standard nt (%) 4.1 (1 / COP) 0.2 rigerant	8 5.4		Recip. Chiller 3.7 0.27	Pkgd. DX 100.0% 2.6 0.38	0.9	CW CW 1.00	Total 100.0%			
Control Mode		Incidence of U Chilled Water Condenser Wa	Setpoint	Reset		1		<u> </u>		<u> </u>			
Setpoint		Chilled Water Condenser Wa Supply Air	ater 30	э. С Э.С	44.6 86 57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	63 W/m ² 42.6 MJ/m ² .yr	. 20	Btu/hr.ft ² 605 kWh/ft ² .yr	ft²/Ton									
Sizing Factor	1.00												
A/C Saturation (Incidence of A/C)	65.0%												
Electric Fuel Share	100.0%	Gas Fuel Shar	e										
Chiller Maintenance	Annual M	laintenance Task	s	Incidence	Frequency	1							
	Inspect C Megger I Condens Vibration Eddy Cu		ealing and Bearings	(%)	(years)						F	All Electric EUI	
Cooling Tower/Air Cooled Condense					Frequency]						kWh/ft².yr MJ/m².yr	0.3 10
	Inspect/S Megger I	on/Clean Spray N Service Fan/Fan I Motors /erify Operation	Motors	(%)	(years)	-						Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr	0.3
												MJ/m².yr	10
DOMESTIC HOT WATER													
Service Hot Water Plant Type		uel SHW Present (%)	Avg. Tank 70%			Boiler		Fuel Share		Fossil 70%	E	Elec. Res. 30%	
	Eff./COF		0.65			0.75		Blended Ef		0.65		0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	17.3												
Wetting Use Percentage	90%			,	All Electric El kWh/ft².yr MJ/m².yr	ال 0.5 19			ssil Fuel E kWh/ft².yr MJ/m².yr	UI 0.7 27		Market Composite E kWh/ft².yr MJ/m².yr	UI 0.6 24.3

		CIAL SECTOR BUILDING PROFILE		
EXISTING BUILDINGS:	SIZE:	VINTAGE:	REGION:	
Non Food Retail			Yukon	
Baseline				
HVAC FANS & PUMPS				
SUPPLY FANS				an & Oantral
SUPPLY FANS			Ventilation and Exhaust Fan Operati Ventilation Fan Exhaust F	
System Design Air Flow 2.4	L/s.m ² 0.47 CFM/ft ²	Control		ariable
	Pa 1.6 wg	Control		Flow
	Pa 1.6 wg	Incidence of Use	100% 100%	FIOW
Fan Efficiency 60%			Continuous Scheduled Continuous Sch	hadulad
Fan Motor Efficiency 88%		Operation	ContinuousscheduledContinuoussch	ieduled
Sizing Factor 1.00	-	Incidence of Use	50% 50% 50%	50%
Fan Design Load CAV 1.8	W/m ² 0.17 W/ft ²	Incidence of Use	50% 50% 50%	50%
Fan Design Load VAV 1.8	W/m ² 0.17 W/ft ²	Comments:		
Tan Design Load VAV	0.17 W/I	Commenta.		
EXHAUST FANS				I
Washroom Exhaust 50	L/s.washroom 106 CFM/was	shroom		
	L/s.m ² 0.02 CFM/ft ²			
Other Exhaust (Smoking/Conference) 0.1				
Total Building Exhaust 0.2				
	Pa 1.0 wg			
Fan Efficiency 25%				
Fan Motor Efficiency 75%				
Sizing Factor 1.0				
	W/m ² 0.03 W/ft ²			
	0.03 W/I			
AUXILIARY COOLING EQUIPMENT (Condense	er Pump and Cooling Tower/Condenser Fans)		
Average Condenser Fan Power Draw	0.020 kW/kW	0.07 kW/Ton		
(Cooling Tower/Evap. Condenser/ Air Cooled Co		0.12 W/ft ²		
(
Condenser Pump				
Pump Design Flow	L/s.KW	U.S. gpm/Ton		
Pump Design Flow per unit floor area	L/s.m ²	U.S. gpm/ft ²		
Pump Head Pressure	45 kPa	15 ft		
Pump Efficiency	50%	10 11		
Pump Motor Efficiency	80%			
Sizing Factor	1.0			
Pump Connected Load	W/m ²	W/ft ²		
CIRCULATING PUMP (Heating & Cooling)				
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²	0.0040 U.S. gpm/ft ² 2.4	U.S. gpm/Ton	
Pump Head Pressure	kPa	ft	51	
Pump Efficiency	50%			
Pump Motor Efficiency	80%			
Sizing Factor	0.8			
Pump Connected Load	W/m ²	W/ft ²		
Supply Fan Occ. Period	5500 hrs./year			
Supply Fan Unocc. Period	3260 hrs./year			
Supply Fan Energy Consumption	12.9 kWh/m ² .yr			
Exhaust Fan Occ. Period	5500 hrs./year			
Exhaust Fan Unocc. Period	3260 hrs./year			
Exhaust Fan Energy Consumption	2.0 kWh/m ² .yr			
Condenser Pump Energy Consumption	kWh/m².yr			
Cooling Tower /Condenser Fans Energy Consum	nption 0.1 kWh/m².yr			
Circulating Pump Yearly Operation	7000 hrs./year			
Circulating Pump Energy Consumption	kWh/m².yr			
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency		
		(%) (years)		
	Inspect/Service Fans & Motors			
	Inspect/Adjust Belt Tension on Fan Belts			
	Inspect/Service Pump & Motors			EUI kWh/ft².yr 1.4
				MJ/m ² .vr 54.1

EXISTING BUILDINGS: Non Food Retail Baseline	COMMERCIAL SECT SIZE: VINTAGE:				NG PROFILE		REGION: Yukon		
EUISUMMARY									
TOTAL ALL END-USES:	Electricity:		15.6 kWh/ft².yr 605.1 MJ/m².yr		Fossil Fue	16.3 kWh/ft ² .yr	631.5 MJ	I/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	Fossi	l Fuel		
GENERAL LIGHTING	5.1	197.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr		
ARCHITECTURAL LIGHTING	2.7	105.2	SPACE HEATING	2.1	82.3	15.8	612.9		
HIGH BAY LIGHTING	1.0	39.4	SPACE COOLING	0.2	6.5				
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.1	5.7	0.5	18.6		
HVAC FANS & PUMPS	1.4	54.1	FOOD SERVICE EQUIPMENT	0.3	10.0				
REFRIGERATION	0.4	15.0							
MISCELLANEOUS	0.3	10.0							
COMPUTER EQUIPMENT	0.5	20.8							
ELEVATORS/ESCALATORS									
OUTDOOR LIGHTING	0.9	33.9							

		C		TOR BUILDING PRO	FILE		
EXISTING BUILDINGS: Hotel/Motel	SIZE: < 40,000 ft2		VINTAGE	:		REGION: Yukon	
Baseline	< 40,000 ft2					rukon	
CONSTRUCTION							
Wall U value (W/m ² .°C)	0.38 W/m ² .°C	0.07 B	tu/hr.ft².°F	Typical E	Building Size	1,859 m ²	20,000 ft ²
Roof U value (W/m ² .°C)	0.29 W/m ² .°C	0.05 B	tu/hr.ft².°F	Typical F	ootprint (m ²)	929 m ²	10,000 ft ²
Glazing U value (W/m ² .°C)	3.30 W/m ² .°C	0.58 B	tu/hr.ft².°F	Footprint	Aspect Ratio (L:W)	4	
					Conditioned Space	100%	
	0.00				Conditioned Space	45%	
Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC)	0.28			Typical #	as Exterior Zone	2	
	0.07				Floor Height (m)	3.2 m	10.5 ft
VENTILATION SYSTEM, BUILDING CON	ITROLS & INDOOR CO	ONDITIONS					
Ventilation System Type			CAV CAVE	DDMZ DDMZV	V VAV VAV	/R IU 100% O.A TO	DTAL
	System	n Present (%)	90%	1	10%		00%
		r Flow (%)			60%		
	(Minimu	um Throttled Air Volu	me as Percent of F	ull Flow)			
Occupancy or People Density		46 m ² /person	495	ft²/person		%OA 7.93%	
Occupancy Schedule Occ. Period		50%	400	nt/pel3011		1.3070	
Occupancy Schedule Unocc. Period		80%					
Fresh Air Requirements or Outside Air		8 L/s.person	16	CFM/person			
Fresh Air Control Type *(e	enter a 1, 2 or 3)	1 If Eroob Air C	Control Type - "2"	enter % FA. to the right		15%	
(1 = mixed air control, 2 = Fixed fresh air, 3				enter Make-up Air Vent			0.10 CFM/ft ²
		in ricon and	Sonator Type = 0			50% operation (%)	
Sizing Factor		1		_			
Total Air Circulation or Design Air Flow		2.06 L/s.m ²	0.40	0 CFM/ft ²			
Infiltration Rate		1.00 L/s.m ²	0.20	CFM/ft ²	Separate Make-up		L/s.m ² CFM/ft ²
(air infiltration is assumed to occur during u	noccupied	1.00 L/S.M-	0.20	CFIWI/IL			50%
hours only if the ventilation system shuts do					oporau		0070
					_		
Economizer		Enthalpy E		ulb Based Tota			
	Incidence of Use Switchover Point		100%			ry of Design Parameters esign Cooling Load 238,	677
	Switchover Point		J/kg. 18 tu/lbm 64.4	3°C		esign Cooling Load 238, one Sensible Load 174,	
		5	01.				28.2 Btu/lbm
Controls Type	System Present (HVAC Room]			23.4 Btu/lbm
		E	quipment Controls	_			13.2 ft³/lbm
	All Pneumatic DDC/Pneumatic			_	Design (CFM 8, circulation or Design air 2.0	.099 06 l/s.m²
	All DDC			-	i otai ai	circulation of Designal 2.0	50 13.11
	Total (should add-	up to 100%)					
Control mode	Control Mode	Proporti	ional PI / PID	Total			
Control mode	Control Mode	Fixed Disc	charge Reset				
	Control Strategy						
					1		
Indoor Design Conditions	o	t	Room	74.0 05	Supply / 14 °C		
	Summer Tempera Summer Humidity		22 °C 50%	71.6 °F	100%	57.2 °F	
	Enthalpy	(70)	65.5 KJ/kg.	28.2 Btu/lbm		23.4 Btu/lbm	
	Winter Occ. Temp		21 °C	69.8 °F	15 °C	59 °F	
	Winter Occ. Humic	dity	30%		45%	10.0 0. //	
	Enthalpy Winter Unocc. Ter	mperature	53 KJ/kg. 15 °C	22.8 Btu/lbm 59 °F	45.5 KJ/kg.	19.6 Btu/lbm	
	Winter Unocc. Hur		30%	53 1			
	Enthalpy		50 KJ/kg.	21.5 Btu/lbm			
					÷		
Demner Meintenener		·····	anidanan Erramu	7			
Damper Maintenance		Ir	(%) (years)	/			
	Control Arm Adjus	stment	(years)	1			
	Lubrication						
	Blade Seal Replace	cement					
Air Filter Cleaning	Changes/Year						
, and the cloaning	onangoo, roar						
				Incidence of Annual	Room Controls Maint	enance	
Incidence of Annual HVAC Controls Mainte	enance						
	Annual Maintenand		aidanaa		Annual Maintenanc	e Tasks Incide	2222
	Annual Maintenand	Le rasks If	ncidence (%)		Annual Maintenanc	e lasks Incide	
	Calibration of Tran	nsmitters	, , , , ,		Inspection/Calibrati	on of Room Thermostat	
	Calibration of Pan	el Gauges			Inspection of PE S	witches	
	Inspection of Auxil				Inspection of Auxili		
	Inspection of Cont	trol Devices				ol Devices (Valves,	
1					(Dampers, VAV Bo	1465)	

EXISTING BUILDINGS: Hotel/Motel Baseline	SIZE: < 40,000 ft2		REGION: Yukon
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.25] ft-candles] W/tt²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 85% 15%	Light Level (Lux) 200 300 400 500 % Distribution 50% 50% 50% Weighted Average INC CFL T12 ES T8 Mag	Total 100% 450 T8 Elec MH HPS TOTAL
Fixture Cleaning: Incidence of Practice Interval	years	INC OFL 112 E3 10 May System Present (%) 50% 50% 50 50 12 10 May 11 May 10 May	10 Elec. Min HFS 101AL 50% 100.0% 0.0 0.6 0.6 0.80 0.55 0.55 88 65 90 0
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 1.3 MJ/m².yr 50
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.75] ft-candles]W/ft²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) 100 125 150 300 % Distribution 25% 50% 25% Weighted Average INC CFL T12 ES T8 Mag	Total 100% 125 T8 Elec MH HPS TOTAL
Fixture Cleaning: Incidence of Practice Interval	years	Intel of the left o	10 10 10 10 0.6 0.6 0.6 0.6 0.6 0.80 0.55 0.55 88 65 90 0<
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLFF	EUI kWh/ft2.yr 2.3 MJ/m2.yr 90
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load		ft-candles Floor fraction check: s	should = 1.00 1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 700 1000 % Distribution 100%	Total 100% 300 T8 Elec MH HPS TOTAL
Fixture Cleaning: Incidence of Practice Interval	years	No. 0% 0% CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 Efficacy (LW) 15 50 72 84	100% 0% 100.0% 0.6 0.6 0.6 0.80 0.55 0.55 88 65 90
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING		(EUI TOTAL kWh/ft².yr 3.6 MJ/m².yr 141
OFFICE EQUIPMENT & PLUG LOA	DS		
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	Computers 55 0.3 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	Monitors Printers Copiers Serv 51 100 200 217 0.3 0.05 0.033 0.02 0.3 W/m² 0.1 W/m² 0.1 W/m² 0.1 0.00 W/t² 0.01 W/t² 0.01 W/t² 0.01 90% 90% 90% 100% 50% 50% 50% 100% 2000 2000 2000 2500 6760 6760 6760 6260	N/m ² 1.5 W/m ²
Total end-use load (occupied period)	2.0 W/m ²	0.2 W/ft ² to see notes (cells with red indicator in upper right corner,	
Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period	1.0]W/m² 100% 48%	0.1 W/ft²	Computer Equipment EUI KWh/ft².yr 0.55 MJ/m².yr 21.19 Plug Loads EUI KWh/ft².yr 0.49 MJ/m².yr 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fossil Fuel Share:	EUI	ssii Fuel EUI Ali Electric EUI Wh/ft².yr 2.6 KJ/m².yr 100.0 MJ/m².yr 50.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	\$	EUI kWh/ft².yr 0.8 MJ/m².yr 30.0
MISCELLANEOUS			EUI KWh/ft².yr 0.3 MJ/m².yr 10

	0.75		COM	MERCIAL SEC		ING PROF	ILE						
EXISTING BUILDINGS: Hotel/Motel Baseline	SIZE: < 40,000	ft2		VINTAG	E:				REGION: Yukon				
SPACE HEATING													
Heating Plant Type				-	Fossil Fuel				ctric	I =	_		
				Stan.	loilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller				
		System Preser Eff./COP	nt (%)	509			1.70	3.00	4.50	20% 1.00	100%		
		Performance ((kW/kW)	(1 / Eff.)	1.3	3 1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	90.4 W/m² 635 MJ/m².yr	<u></u>	28.7 Btu/h 16.4 kWh/			1	1	1	1	1	·	All Electric EUI	
Electric Fuel Share	20.0%	Fossil Fuel Sha	are 8	0.0%							-	kWh/ft².yr	16.4
Boiler Maintenance	Annual M	laintenance Task	s	Incidenc	е							MJ/m².yr	635
	Water Si	Inspection de Inspection for n of Controls & S		(%) 759 1009	6							Fossil Fuel EUI kWh/ft².yr MJ/m².yr	22.1 855
	Inspectio	n of Burner		1009	6						F	Market Composite E	
	Flue Gas	Analysis & Burr	iei Sel-up	909	10							kWh/ft².yr MJ/m².yr	20.9 811
SPACE COOLING													
A/C Plant Type													
			Centre Stand	rifugal Chillers dard HE	Screw Chillers	Recip. Chiller	Pkgd. DX	Absorption W. H.	n Chillers CW	Total			
		System Preser		0.0%			80.0%			100.0%			
		COP Performance ((1 / COP)	4.7 5. 0.21 0.1									
		(kW/kW) Additional Refr	iderant										
		Related Inform											
Control Mode		Incidence of U	se Fixed Setp										
		Chilled Water		Jinit	_								
		Condenser Wa	iter										
Setpoint		Chilled Water Condenser Wa	iter	7 °C 30 °C		°F							
		Supply Air		14.0 °C	57.2	1.e							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	38 W/m ² 32.3 MJ/m ² .yr		Btu/hr.ft ²	1006 ft²/Ton									
Sizing Factor	1.00		Oper	ation (occ. peri	o 3000	hrs/year	Note value	e cannot be	less than 2	2,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	65.0%												
Electric Fuel Share	100.0%	Gas Fuel Share	e										
Chiller Maintenance	Annual M	laintenance Task	s	Incidenc	e Frequency	1							
	Inspect (Control, Safeties	& Purge Unit	(%)		-							
	Inspect C Megger I	Coupling, Shaft Se	ealing and Bearin	gs									
	Condens	er Tube Cleaning				-							
		Analysis				-							
	Spectroc	hemical Oil Analy]						All Electric EUI kWh/ft².yr MJ/m².yr	0.3 13
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	laintenance Task	s	Incidenc (%)	e Frequency (years)						Г	Natural Gas EUI	
		n/Clean Spray N		(70)	(years)	1					F	kWh/ft².yr	
	Megger I										L	MJ/m².yr	
	Inspect/V	/erify Operation of	of Controls									Market Composite E kWh/ft².yr MJ/m².yr	EUI 0.3 13
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	iel SHW	Avg. Tank			Boiler	T			Fossil		Elec. Res.	
		Present (%)	65% 0.65			20%		Fuel Share Blended E		85% 0.67		15% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	236.6		0.03	I			ני						=111
Wetting Use Percentage	80%				All Electric E kWh/ft ² .yr MJ/m ² .yr	JI 6.7 260	-	F	ossil Fuel E kWh/ft².yr MJ/m².yr	UI 9.1 351	-	Market Composite E kWh/ft².yr MJ/m².yr	<u>EUI</u> 8.7 337.6

COMMERCIAL SECTOR BUILDING PROFILE											
EXISTING BUILDINGS: Hotel/Motel Baseline	SIZE: < 40,000 ft2	VINTAGE:	REGION: Yukon								
HVAC FANS & PUMPS											
SUPPLY FANS				st Fan Operation & Co	ntrol						
System Design Air Flow 2.1	L/s.m ² 0.40 CFM/ft ²	Control	Ventilation Fan Fixed Variable	Exhaust Fan Fixed Variable							
System Static Pressure CAV 338		Control	Flow	Flow							
System Static Pressure VAV 338	8 Pa 1.4 wg	Incidence of Use	100%	100%							
Fan Efficiency 45%		Operation	Continuou: Scheduled	Continuous Scheduled							
Fan Motor Efficiency 80% Sizing Factor 1.00		Incidence of Use	50% 50%	50% 50%							
Fan Design Load CAV 1.9		Incidence of Ose	50% 50%	50% 50%							
Fan Design Load VAV 1.9		Comments:									
EXHAUST FANS											
Washroom Exhaust 100	L/s.washroom 212 CFM/wa	ashroom									
Washroom Exhaust per gross unit area 0.2	L/s.m ² 0.04 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0.1											
Total Building Exhaust 0.3 Exhaust System Static Pressure 250											
Fan Efficiency 25%											
Fan Motor Efficiency 75%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.4	W/m ² 0.04 W/ft ²										
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tower/Condenser Fan	s)									
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	0.024 kW/kW 0.88 W/m ²	0.08 kW/Ton 0.08 W/ft ²									
Condenser Pump											
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton									
Pump Design Flow per unit floor area	0.002 L/s.m ²	0.003 U.S. gpm/ft ²									
Pump Head Pressure Pump Efficiency	50% kPa	ft									
Pump Motor Efficiency	80%										
Sizing Factor	1.0										
Pump Connected Load	W/m ²	W/ft ²									
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T	0.002 L/s.m ²	0.0024 U.S. gpm/ft ² 2.4	4 U.S. gpm/Ton								
Pump Head Pressure	100 kPa	33 ft									
Pump Efficiency	50%										
Pump Motor Efficiency Sizing Factor	80%										
Pump Connected Load	0.3 W/m ²	0.03 W/ft ²									
•											
Oversty For Over Barlad	0500 has to as										
Supply Fan Occ. Period Supply Fan Unocc. Period	3500 hrs./year 5260 hrs./year										
Supply Fan Energy Consumption	11.8 kWh/m².yr										
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period	3500 hrs./year 5260 hrs./year										
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	2.6 kWh/m².yr										
	2.0 1000										
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consun	nption 0.2 kWh/m².yr										
Circulating Pump Yearly Operation	5000 hrs./year										
Circulating Pump Energy Consumption	1.3 kWh/m².yr										
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency (%) (years)									
	Inspect/Service Fans & Motors										
	Inspect/Adjust Belt Tension on Fan Belts										
	Inspect/Service Pump & Motors				EUI kWh/ft².yr 1.5 MJ/m².yr 57.2						

EXISTING BUILDINGS: Hotel/Motel Baseline	COMMERCIAL SECTO SIZE: VINTAGE: < 40,000 ft2				ING PROFILE		REGION: Yukon			
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		12.6 kWh/ft².yr 486.3 MJ/m².yr		Fossil Fue	27.3 kWh/ft².yr	1,057.6 MJ/m ²	².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	I Fuel			
GENERAL LIGHTING	1.3	50.4	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr			
ARCHITECTURAL LIGHTING	2.3	90.5	SPACE HEATING	3.3	127.0	17.7	684.0			
HIGH BAY LIGHTING			SPACE COOLING	0.2	8.5					
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	1.0	39.0	7.7	298.6			
HVAC FANS & PUMPS	1.5	57.2	FOOD SERVICE EQUIPMENT	0.3	12.5	1.9	75.0			
REFRIGERATION	0.8	30.0								
MISCELLANEOUS	0.3	10.0								
COMPUTER EQUIPMENT	0.5	21.2								
ELEVATORS	0.1	3.9								
OUTDOOR LIGHTING	0.4	17.0								

			CON	IMERCIAL SE		DING PRO	FILE				
EXISTING BUILDINGS: Healthcare	SIZE:			VINTAG	E:			REGION: Yukon			
Baseline											
CONSTRUCTION											
Mall Liveline (M/m2.8C)	W/m².°C		0.07 Btu/h	412 OF		Turnianal Du	ilding Cine	_	8,829 m²	95,000 ft ²	
							uilding Size				
	W/m².°C		0.05 Btu/h				ootprint (m ²)		1,750 m ²	18,830 ft ²	
Glazing U value (W/m ² .°C) 3.30	W/m².°C		0.58 Btu/hr	.ft² .°⊢			Aspect Ratio (L:W) onditioned Space		100%		
							onditioned Space		45%		
Window/Wall Ratio (WIWAR) (%) 0.15	1						s Exterior Zone				
Shading Coefficient (SC) 0.65						Typical # 3			3		
						Floor to F	loor Height (m)	L	3.7 m	12.0 ft	
VENTILATION SYSTEM, BUILDING CONTROL	LS & IND	OOR CONDITI	ONS								
					-					7	
Ventilation System Type		System Preser		CAV CAVI 80%	R DDMZ	DDMZVV	20%	/R IU10	00% O.A TOTAL 100%		
		Min. Air Flow (00%			50%		100%	4	
			ottled Air Volume a	as Percent of F	full Flow)	1					
		-	. .								
Occupancy or People Density			m²/person	323	ft²/person			%OA	41.33%		
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period		90% 75%									
Fresh Air Requirements or Outside Air			L/s.person	106	CFM/perso	n					
								····		,	
	a 1, 2 or 3)		If Fresh Air Cont					15%			
(1 = mixed air control, 2 = Fixed fresh air, 3 100%	% fresh air)		If Fresh Air Cont	rol Type = "3"	enter Make-up	o Air Ventila	ation and operation	0.5 L	/s.m ² 0.10 peration (%)	CFM/ft ²	
Sizing Factor		3						50%[0]	eration (%)	J	
Total Air Circulation or Design Air Flow		4.03	L/s.m ²	0.7	9 CFM/ft ²						
					_		Separate Make-up				M/ft ²
Infiltration Rate	mind	0.70	L/s.m ²	0.14	CFM/ft ²			on occupied period			
(air infiltration is assumed to occur during unoccu hours only if the ventilation system shuts down)	Ibiea						Operation	on unoccupied peri	iod 50%	1	
Economizer			Enthalpy Base		ulb Based	Total]				
	Incidence			1009		100%		ry of Design Parar			
	Switchove	er Point	KJ/kg. Btu/lb		8 °C 4 °F			esign Cooling Load			
	L		Diano		-			ir enthalpy		Btu/lbm	
Controls Type	System F	resent (%)	HV					ge air enthalpy		Btu/lbm	
			Equip	ment Controls	1			olume of air at 55F &		2 ft³/lbm	
	All Pneum DDC/Pne				-		Design Total ai	c r circulation or Des	25,148 sign air fk 4.03	Vs.m ²	
	All DDC	dificatio					i otal al		ight an fix fixed	, in the second s	
	Total (sho	ould add-up to 10	00%)								
	-		Descritions	PI / PID	Tetel	٦					
Control mode	Control N	lode	Proportional	PI/PID	Total						
	Control II	1040	Fixed Dischar	ge Reset							
	Control S	trategy									
la de se De siens O se ditis es				Deere			Quanta	a :		г	
Indoor Design Conditions	Summer	Temperature		Room 24 °C	75.2	°F	Supply / 14 °C	57.2 °F	-		
		Humidity (%)		50%	10.2	. ·	100%	0112			
	Enthalpy			65.5 KJ/kg.		Btu/lbm	54.5 KJ/kg.	23.4 B			
		c. Temperature		23 °C 30%	73.4	°F	15 °C	59 °I	-		
	Enthalpy	c. Humidity		53 KJ/kg.	22.8	Btu/lbm	45% 45.5 KJ/kg.	19.6 B	tu/lbm		
		nocc. Temperatu	re	23 °C	73.4		inter intering.				
		nocc. Humidity		30%		- 					
	Enthalpy			50 KJ/kg.	21.5	Btu/lbm				_	
Damper Maintenance			Incide	ence Frequence	У						
			(%) (years)							
	Control A Lubricatio	rm Adjustment			-						
		al Replacement			-						
			1								
Air Filter Cleaning	Changes/	Year									
					Incidence o	f Annual R	oom Controls Maint	enance			
Incidence of Annual HVAC Controls Maintenance	е	٦			11010010000	i / ii iidda i i					
		-	r							-	
	Annual M	aintenance Task					Annual Maintenanc	e Tasks	Incidence	1	
	Calibratio	n of Transmitter	(%)			Inspection/Calibrat	on of Room Thor	(%)	-	
		n of Panel Gaug					Inspection of PE S		nostat	1	
	Inspection	n of Auxiliary De	vices				Inspection of Auxili	ary Devices		1	
	Inspection	n of Control Dev	ices				Inspection of Cont		3,		
							(Dampers, VAV Bo	oxes)]	

EXISTING BUILDINGS: Healthcare Baseline	SIZE:	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Yukon	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.90	1] ft-candles 2] W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 90% 30%	Light Level (Lux) 200 300 400 500 Total % Distribution 50% 50% 100% 100% 45 Weighted Average INC CFL T12 ES T8 Hag T8 Elec MH HPS TOTA	D
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 40% 60% 0% 100.09 CU 0.7 0.7 0.6 0.6 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.55 0.55 Efficacy (L/W) 15 50 72 84 88 65 90	
Relamping Strategy & Incidence of Practice	Group Spot	EUI	kWh/ft².yr 5.6 MJ/m².yr 216
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10] ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 85%	Light Level (Lux) 200 300 400 500 Total % Distribution 50% 50% 100% 100% 35 Weighted Average 35 35 35 35 INC CFL T12 ES T8 Elec MH HPS TOTAL	D
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 40% 60% 1000 1000 1000 CU 0.7 0.7 0.6 0.6 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.55 0.55 Efficacy (L/W) 15 50 72 84 88 65 90	
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLFF	kWh/ft².yr 2.1 MJ/m².yr 80
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load		Ift-candles Floor fraction check: should = 1.00 1.00 W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 100%	Light Level (Lux) 200 300 500 700 Total % Distribution 50% 50% 1009 1009 1009 Weighted Average 25 25 25 1009 100	D
Fixture Cleaning: Incidence of Practice Interval	years	Involution of the involution of	
Relamping Strategy & Incidence of Practice	Group Spot	EUI	kWh/ft².yr MJ/m².yr
TOTAL LIGHTING		Overall LPD 14.25 W/m ²	L kWh/ft².yr 7.6 MJ/m².yr 296
OFFICE EQUIPMENT & PLUG LOA	DS		
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	Computers 54.55 0.48 0.9 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	Monitors Printers Copiers Servers Plug Loads 51 100 200 217 0.48 0.02 0.02 0.04 0.1 W/m² 0.1 W/m² 0.3 W/m² 3.85 W/m² 0.1 W/t² 0.01 W/t² 0.01 W/t² 0.3 W/m² 3.85 W/m² 90% 90% 100% 90% 50% 50% 50% 2000 2000 2000 2600 4100 4660	
Total end-use load (occupied period) Total end-use load (unocc. period)	5.4 W/m² 2.2 W/m²	0.5 W/ft ² to see notes (cells with red indicator in upper right corner, type "SHIFT F2" 0.2 W/ft ² Computer Equipment	kWh/ft².yr 1.1
Usage during occupied period Usage during unoccupied period	100% 40%	Plug Loads EUI	MJ/m².yr 43.1 kWh/ft².yr 1.7 MJ/m².yr 67.3
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Fossil Fuel Share:	75.0% Electricity Fuel Share: 25.0% Fossil Fuel EUI A EUI kWh/t².yr 3.1 EUI EUI EUI	II Electric EUI kWh/tt².yr 2.1 MJ/m².yr 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	EUI	kWh/ft².yr 0.4 MJ/m².yr 15.0
MISCELLANEOUS		EUI	kWh/ft².yr 0.3 MJ/m².yr 10

EXISTING BUILDINGS: Healthcare Baseline	COMMERCIAL SECTOR BUILDING PROFILE SIZE: VINTAGE: REGION: Yukon											
SPACE HEATING												
Heating Plant Type			Fossil Fuel			FI	ectric					
nearing Fiant Type			Boilers	Packaged	A/A HP		H/R Chiller	Resistance	Total			
		System Present (%)	Stan. High			5%		5%				
		Eff./COP Performance (1 / Eff.)	75% 80% 1.33 1.25		1.70		4.50	1.00 1.00				
		(kW/kW)										
Peak Heating Load Seasonal Heating Load	43.0 W/m ² 1644 MJ/m ² .yr	13.6 Btu/hr.ft 42.4 kWh/ft².										
(Tertiary Load)		42.4	y.									
Sizing Factor	1.00									All Electric EUI		
Electric Fuel Share	10.0%	Fossil Fuel Share 90.0								kWh/ft².yr MJ/m².yr	30.7 1188	
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence (%)							Fossil Fuel EUI		
		Inspection le Inspection for Scale Buildup	75%							kWh/ft².yr MJ/m².yr	53.4 2070	
	Inspection	n of Controls & Safeties	100%							Market Composite E		
		Analysis & Burner Set-up	90%							kWh/ft².yr	51.2	
										MJ/m².yr	1982	
SPACE COOLING												
A/C Plant Type		Centrifu	gal Chillers Screw	Recip.	Direct DY	Absorption	n Chillers	Total	1			
		Standar System Present (%)		Chiller	Pkgd. DX 50.0%	W. H.	CW	100.0%	-			
		COP 4	1.7 5.4 4.4		2.7	0.9			-			
		Performance (1 / COP) 0. (kW/kW)	21 0.19 0.23	0.28	0.37	1.11	1.00		-			
		Additional Refrigerant Related Information										
Control Mode		Incidence of Use Fixed Setpoin	Reset									
		Chilled Water										
		Condenser Water										
Setpoint		Chilled Water	7 °C 44.6									
			0°C 86	°F °F								
Peak Cooling Load	76 W/m²		16 ft²/Ton									
Seasonal Cooling Load (Tertiary Load)	23.8 MJ/m².yr	0.6 kWh/ft².yr	<u>-</u> ,									
	4.00	Que e est		h (N		1 (h 0.0	00				
Sizing Factor	1.00	Operation	on (occ. perio 3000	nrs/year	note valu	e cannot be	less than 2,9	iuu nrs/year	r)			
A/C Saturation (Incidence of A/C)	65.0%											
Electric Fuel Share	100.0%	Gas Fuel Share	7									
Chiller Maintenance		aintenance Tasks	Incidence Frequency	1								
		ontrol, Safeties & Purge Unit	(%) (years)	-								
	Inspect C	oupling, Shaft Sealing and Bearings		-								
		er Tube Cleaning		-								
	Vibration Eddy Cur	Analysis rent Testing										
	Spectroch	nemical Oil Analysis]						All Electric EUI kWh/ft².yr	0.3	
Cooling Tower/Air Cooled Condense		aintenance Tasks	Incidence Frequency	1						MJ/m².yr	12	
Cooling TowerAir Cooled Condense			(%) (years)	-						Natural Gas EUI		
	Inspect/S	n/Clean Spray Nozzles ervice Fan/Fan Motors		-						kWh/ft².yr MJ/m².yr		
	Megger M Inspect/V	lotors erify Operation of Controls								Market Composite E		
										kWh/ft².yr MJ/m².yr	0.3 12	
DOMESTIC HOT WATER												
	Fossil Fue	el SHW Avg. Tank		Boiler		[Fossil		Elec. Res.		
Service Hot Water Plant Type	System P	Present (%) 20%		70%		Fuel Share		90%		10%		
Service Hot Water load (MJ/m ² .yr)	Eff./COP 118.3	0.65		0.75		Blended E	fficiency	0.73		0.91		
(Tertiary Load)			All Electric El	JI		F	Fossil Fuel El	JI	1 1	Market Composite E	UI	
Wetting Use Percentage	50%		kWh/ft².yr MJ/m².yr	3.4 130			kWh/ft ² .yr MJ/m ² .yr	4.2 163		kWh/ft².yr MJ/m².yr	4.1 159.3	
L			wo/m.yr	100		1		100	1	//////.yi		

EXISTING BUILDINGS: Healthcare Baseline	SIZE:	COMME	RCIAL SECTOR BUILDING PROFILE VINTAGE:	REGION: Yukon	
HVAC FANS & PUMPS					
SUPPLY FANS System Design Air Flow	4.0 L/s.m ²	0.79 CFM/ft ²	Control	Ventilation and Exhaust Fan Operation & 0 Ventilation Fan Exhaust Fan Fixed Variable Fixed Varial	
System Static Pressure CAV System Static Pressure CAV Fan Efficiency Fan Motor Efficiency Sizing Factor Fan Design Load CAV Fan Design Load VAV	8.0 D3.11 875 Pa 875 Pa 52% 85% 1.00 8.0 8.0 W/m²	0.74) W/ft ²	Incidence of Use Operation Incidence of Use Comments:	Flow Flow 80% 20% 100% Continuous Scheduled Continuous Schedu	/
EXHAUST FANS					
Washroom Exhaust Washroom Exhaust per gross unit are Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wasł 0.1 L/s.m² 0.5 L/s.m² 0.6 L/s.m² 250 Pa 25% 75% 1.0 0.8	212 CFM/was 0.02 CFM/tl² 0.10 CFM/tl² 0.12 CFM/tl² 1.0 wg 0.08 W/tl²	shroom		
AUXILIARY COOLING EQUIPMENT (Condenser Pump	and Cooling Tower/Condenser Fans)		
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air (Cooled Condenser)	0.024 kW/kW 1.84 W/m²	0.09 0.17 W/t²		
Condenser Pump					
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 Us.KW 0.004 Us.m ² 100 kPa 50% 80% 1.0 1.01 W/m ²	3.0 U.S. gpm/Ton 0.006 U.S. gpm/ft² 33 ft 0.09 W/ft²		
CIRCULATING PUMP (Heating & Co	oling)				
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	lta T	0.003 L/s.m ² 100 kPa 50% 80% 0.8 0.7 W/m ²	0.0048 U.S. gpm/ft ² 2.	₄]U.S. gpm/Ton	
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		4000 hrs./year 4760 hrs./year 51.4 kWh/m².yr			
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		4000 hrs./year 4760 hrs./year 6.2 kWh/m².yr			
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy		0.8 kWh/m².yr 0.2 kWh/m².yr			
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000 hrs./year 4.4 kWh/m².yr			
Fans and Pumps Maintenance		laintenance Tasks	Incidence Frequency (%) (years)		
		ervice Fans & Motors djust Belt Tension on Fan Belts			
	Inspect/S	ervice Pump & Motors			EUI kWh/ft².yr 5.8

EXISTING BUILDINGS: Healthcare Baseline	S	SIZE:	COMMERCIAL SEC VINTAGE:		Ding Profil	E R Y		
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		22.2 kWh/ft².yr 859.3 MJ/m².yr		Fossil Fue	54.2 kWh/ft ² .yr	2,099.5 M	IJ/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fossi	l Fuel	
GENERAL LIGHTING	5.6	216.3	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	2.1	79.7	SPACE HEATING	3.1	118.8	48.1	1,863.2	
HIGH BAY LIGHTING			SPACE COOLING	0.2	7.9			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	0.3	13.0	3.8	146.3	
HVAC FANS & PUMPS	5.8	226.5	FOOD SERVICE EQUIPMENT	0.5	20.0	2.3	90.0	
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	1.1	43.1						
ELEVATORS	0.2	7.7						
OUTDOOR LIGHTING	0.9	33.9						

			COMMER	CIAL SECT	OR BUILD	NG PROF	ILE					
EXISTING BUILDINGS: Education	SIZE:			VINTAGE:					REGION: Yukon			
Baseline									TUKON			
CONSTRUCTION												
	_								. <u> </u>	_		
Wall U value (W/m ² .°C) 0.38	8 W/m².°C	0.07	Btu/hr.ft ² .°F			Typical Bu	ilding Size		3,067	m²	33,000	ft²
Roof U value (W/m ² .°C) 0.30) W/m².°C	0.05	Btu/hr.ft ² .°F			Typical Fo	otprint (m ²)		1,533	m²	16,500	ft²
) W/m².°C	0.58	Btu/hr.ft ² .°F				Aspect Ratio	o (L:W)	2	1		
]				onditioned S		100%			
	_						onditioned S		50%]		
Window/Wall Ratio (WIWAR) (%) 0.28							s Exterior Zo	one		1		
Shading Coefficient (SC) 0.68	3					Typical # S		()	2		44.5	0
						FIGOL TO FI	oor Height ((m)	3.5	Jm	11.5	π
VENTILATION SYSTEM, BUILDING CONTRO	LS & INDOOR CO	NDITIONS										
				0.11/0	00147							
Ventilation System Type	Suster	n Present (%)	CAV 100%	CAVR	DDMZ	DDMZVV	VAV	VAVR	IU 100% O.A	TOTAL 100%		
		r Flow (%)	100 /0							100 %		
		um Throttled Air Vo	lume as Perce	ent of Full Fl	ow)					1		
										1		
Occupancy or People Density		14 m²/persor	1	151	ft²/person				%OA 23.59%]		
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period		90%										
Fresh Air Requirements or Outside Air		7.5 L/s.perso	n	16	CFM/persor	ı						
	a 1, 2 or 3)		r Control Type						10%			
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fresh A	r Control Type	= "3" enter	Make-up Aiı	Ventilation	n and opera	ation	0.5 L/s.m ²		CFM/ft ²	
Sizing Factor	[1							50% operation	(70)		
Total Air Circulation or Design Air Flow		2.27 L/s.m ²		0.45	CFM/ft ²							
	·						Separate N	Make-up air	unit (100% OA)		L/s.m ²	CFM/ft ²
Infiltration Rate		0.30 L/s.m ²		0.06	CFM/ft ²				occupied period	50%		
(air infiltration is assumed to occur during unoco	cupied							Operation	unoccupied period	50%		
hours only if the ventilation system shuts down)												
Economizer		Entha	lpy Based	Drv-Bul	b Based	Total	1					
	Incidence of Use	20%	,,	80%		100%		Summary of	of Design Parameters			
	Switchover Point		KJ/kg.	20				Peak Desi	gn Cooling Load	689,754		
			Btu/lbm	68	°F				e Sensible Load	317,244		
Output Tana	D	0()	10/40	Deres				Room air e			Btu/lbm	
Controls Type	System Present	%)	HVAC Equipment	Room Controls					air enthalpy me of air at 55F & 100% F		Btu/lbm ft³/lbm	
	All Pneumatic		35%	90%				Design CF		14,758		
	DDC/Pneumatic		55%						rculation or Design ai		l/s.m ²	
	All DDC		10%	10%								
	Total (should add	up to 100%)	100%	100%								
		Pro	ortional	PI / PID	Total							
Control mode	Control Mode	FIG	ontional	FI/FID	Total							
		Fixed	Discharge	Reset								
	Control Strategy											
	-		1	_			r					
Indoor Design Conditions	Summer Temper	turo	24	Room °C	75.2	°E		Supply Air		т		
	Summer Tempera Summer Humidity		24 50%		/5.2	F	14	°C	57.2 °F			
	Enthalpy	x -7		KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4 Btu/lbm			
	Winter Occ. Temp		22		71.6		15		59 °F]		
	Winter Occ. Humi	dity	30%			D. #	45%					
	Enthalpy Winter Unocc. Te	mperature	53 19	KJ/kg. °C	22.8 66.2	Btu/lbm °⊏	45.5	KJ/kg.	19.6 Btu/lbm	J		
	Winter Unocc. Hu		30%		00.2	г						
	Enthalpy	many		KJ/kg.	21.5	Btu/lbm						
					5		•					
Damper Maintenance				Frequency								
	Control Arm Adju	stment	(%)	(years)								
	Lubrication											
	Blade Seal Repla	cement										
	0			1								
Air Filter Cleaning	Changes/Year		4]								
					Incidence of	Annual R	oom Contro	ols Mainten	ance 100.0%	1		
Incidence of Annual HVAC Controls Maintenand	ce 100%								100.070			
	_		1	1								
	Annual Maintenar	ice Tasks	Incidence				Annual Ma	intenance -	Tasks	Incidence		
	Calibration of Tra	smitters	(%)				Increation	/Calibratic-	of Room Thermostat	(%) 100%		
	Calibration of Tra Calibration of Par		100%					of PE Swite		100%		
	Inspection of Aux	liary Devices	10070	1				of Auxiliary				
	Inspection of Con	trol Devices]			Inspection	of Control	Devices (Valves,			
	-	-	-				(Dampers,	VAV Boxe	s)	L		

EXISTING BUILDINGS: Education Baseline	SIZE:	СОММЕ	RCIAL SECTOR BUILDI VINTAGE:	NG PROFILE	REGION: Yukon		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.80	0.0 ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 10%	Light Level (Lux) % Distribution Weighted Average	300 40%	500 70 60% CFL T12 ES		Total 100% 420 T5 HO TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL T12 ES 409 0.7 0.6 0.65 0.75 50 72	60% 60% 0.6 0.6 0.6 0.80 0.80 0.55	0.6 0.55 90	
Relamping Strategy & Incidence of Practice	Group Spot						kWh/ft².yr 2.1 MJ/m².yr 80
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10	t.4 ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 10%	Light Level (Lux) % Distribution Weighted Average	300 65%	500 700 35%		Total 100% 370	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	INC 50% 0.7 0.65 15	CFL T12 ES 50% 0.7 0.65 0.75 50 72	0.6 0.6 0.6 0.80 0.80 0.55	T5 HO TOTAL 100.0% 0.6 0.55 90	
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)		EUI = Load X Hrs.)		EUI	kWh/ft².yr 0.8 MJ/m².yr 31
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.10	.9 ft-candles .3 W/ft ²			ction check: should = 1.00	1.00	MiJ/IIF.yi 31
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 10%	Light Level (Lux) % Distribution Weighted Average	300 100%	500 700		Total 100% 300	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL T12 ES 0.7 0.6 0.65 0.75 50 72	90% 0.6 0.6 0.6 0.80 0.80 0.55	T5 HO TOTAL 10% 100.0% 0.6 0.55 90 90	
Relamping Strategy & Incidence of Practice	Group Spot						kWh/ft².yr 0.3 MJ/m².yr 12
TOTAL LIGHTING					Overall LP 12.44 W/		kWh/ft².yr 3 MJ/m².yr 123
OFFICE EQUIPMENT & PLUG LOAI							
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	Signal Signal<	Monitors	Printers 100 0.02 0.1 W/m ²	200 0.02 0.3 W/m ²	Servers Plug Lc 217	'm²	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.1 W/ft ² 90% 25% 2000 6760	0.1 W/ft ² 90% 25% 2000 6760	0.01 W/ft ² 90% 25% 2000 6760	0.03 W/ft ² 90% 25% 2000 6760	0.01 W/ft² 0.09 W/ 100% 100% 50% 2000 2000 6760 6760	ft ²	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m ² 1.0 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells with	red indicator in uppe	er right corner, type "SHIFT F2"	Equipment EUI	kWh/ft².yr 0.61
Usage during occupied period Usage during unoccupied period	100% 40%					Plug Loads EUI	MJ/m ² .yr 23.80 kWh/ft ² .yr 0.50 MJ/m ² .yr 19.37
FOOD SERVICE EQUIPMENT Provide description below: Cooking	Fossil Fuel Share:	50.0%	Electricity Fuel Share:	50.0%	Fossil Fuel EUI EUI kVIh/ft².yr 0.8 MJ/m².yr 30.0	EUI	Electric EUI kWh/ft².yr 0.5 MJ/m².yr 20.0
REFRIGERATION Provide description below: Coolers, freezers, pop machines]		50		kWh/ft².yr 0.3 MJ/m².yr 10.0
MISCELLANEOUS							kWh/ft².yr 0.1 M.l/m².yr 5

			COMMER	RCIAL SECT	OR BUILDI	NG PROF	ILE						
EXISTING BUILDINGS: Education Baseline	SIZE:			VINTAGE:					REGION: Yukon				
SPACE HEATING													
Heating Plant Type					Fossil Fuel			Elect	tric				
						Packaged Unit	A/A HP	W. S. HP H		Resistance	Total		
		System Present (%) Eff./COP		40%	40% 80%	10% 75%	1.70	5% 3.00	4.50	5% 1.00	100%	100%	
		Performance (1 / Eff.)		1.33	1.25	1.33	0.59		4.50	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load	55.2 W/m ² 658 MJ/m ² .yr	17.	5 Btu/hr.ft ² 0 kWh/ft ² .yr										
(Tertiary Load) Sizing Factor	1.00		_										
Electric Fuel Share		Fossil Fuel Share	00.0%	٦							F	All Electric EUI	17.0
	10.0%		90.0%	-								kWh/ft².yr MJ/m².yr	658
Boiler Maintenance		laintenance Tasks		Incidence (%)								Fossil Fuel EUI	
		Inspection de Inspection for Scale Bu	ildup	75% 100%								kWh/ft².yr MJ/m².yr	21.2 822
		on of Controls & Safeties		100% 100%								Market Composite E	UI
		Analysis & Burner Set-up)	90%								kWh/ft².yr MJ/m².yr	21.0 814
SPACE COOLING												Morrit .yi	
A/C Plant Type			Centrifugal C		Screw	Recip.	Pkgd. DX	Gas Co		Total			
		System Present (%)	Standard 5.0%		Chillers	Chiller	95.0%	Absorption	Engine	100.0%			
		COP Performance (1 / COP)	4.7	5.4	4.4 0.23	3.6 0.28		0.9	1.8 0.56				
		(kW/kW)	0.21	0.10	0.20	0.20	0.00		0.00				
		Additional Refrigerant Related Information											
Control Mode		Incidence of Use	Fixed Setpoint	Reset									
		Chilled Water Condenser Water	100%										
				11									
Setpoint		Chilled Water	6 35		42.8 95								
		Condenser Water Supply Air	14.0		95 57.2								
Peak Cooling Load	66 W/m ²	21 Btu/hr.ft ^a		ft²/Ton									
Seasonal Cooling Load (Tertiary Load)	46.1 MJ/m².yr	1.2 kWh/ft².y	/r										
Sizing Factor	1.00		Operation (o	cc. period)	3000	hrs/vear	Note value	e cannot be l	ess than 2.	900 hrs/vea	r)		
A/C Saturation	5.0%		oporduori (o	oo. ponou) [0000	ino, your				000 110,900	.,		
(Incidence of A/C)	5.0%												
Electric Fuel Share	100.0%	Gas Fuel Share]									
Chiller Maintenance	Annual N	Maintenance Tasks		Incidence	Frequency								
	Inspect (Control. Safeties & Purge L	Init	(%)	(years) 2								
	Inspect 0 Megger I	Coupling, Shaft Sealing and	d Bearings										
	Condens	er Tube Cleaning											
	Eddy Cu	n Analysis rrent Testing											
	Spectroc	hemical Oil Analysis										All Electric EUI kWh/ft ² .yr	0.6
Cooling Tower/Air Cooled Condense	r Maintenanc Annual N	Naintenance Tasks		Incidence	Frequency							MJ/m².yr	21
		on/Clean Spray Nozzles		(%)	(years)							Natural Gas EUI kWh/ft².yr	
	Inspect/S	Service Fan/Fan Motors										MJ/m².yr	
	Megger I Inspect/\	Verify Operation of Controls	6									Market Composite E	
												kWh/ft².yr MJ/m².yr	0.6 21
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil F	uel SHW Boiler		Tank r Heater	Cnd. Boiler	Cnd. Water				Fossil		lec. Res.	
in the second		Present (%)		50%	90%	90%		Fuel Share	loionc	50%		50% 100%	
Service Hot Water load (MJ/m ² .yr)	40.0	/5	/0	65%	90%	90%	I	Blended Eff	степсу	0.65		0.91	
(Tertiary Load)					II Electric EU]		ssil Fuel El			Market Composite E	
Wetting Use Percentage	80%				kWh/ft².yr MJ/m².yr	1.1 44			kWh/ft².yr MJ/m².yr	1.6 62		kWh/ft².yr MJ/m².yr	1.4 52.7

		COMME	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:	RE	GION:					
Education				Yuk	kon					
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation and				rol		
	1		-	Ventilation			aust Fan			
	L/s.m ²	0.45 CFM/ft ²	Control		riable	Fixed	Variable			
System Static Pressure CAV 250		1.0 wg			Flow		Flow	_		
System Static Pressure VAV 250		1.0 wg	Incidence of Use	100%		100%		_		
Fan Efficiency 55%			Operation	Continous Sch	heduledC	ontinuous	Scheduled			
Fan Motor Efficiency 85%										
Sizing Factor 1.00			Incidence of Use	50%	50%	50%	50%			
Fan Design Load CAV 1.2		0.11 W/ft ²								
Fan Design Load VAV 1.2	W/m ²	0.11 W/ft ²	Comments:							
EXHAUST FANS										
	۳									
Washroom Exhaust 100		212 CFM/washr	oom							
Washroom Exhaust per gross unit are 0.1		0.03 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²								
Total Building Exhaust 0.2		0.05 CFM/ft ²								
Exhaust System Static Pressure 250	Pa	1.0 wg								
Fan Efficiency 25%	4									
Fan Motor Efficiency 75%	4									
Sizing Factor 1.0										
Exhaust Fan Connected Load 0.3	W/m ²	0.03 W/ft ²								
AUXILIARY COOLING EQUIPMENT (Condense	or Pump and Cool	ing Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.003 kW/kW	0.01 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Con	ndenser)	0.19 W/m ²	0.02 W/ft ²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.005 U.S. gpm/ft ²							
Pump Head Pressure		kPa	ft							
Pump Efficiency		60%								
Pump Motor Efficiency		85%								
Sizing Factor		1.0								
Pump Connected Load		W/m ²	W/ft ²							
		,								
CIRCULATING PUMP (Heating & Cooling)										
				_						
Pump Design Flow @ 5 °C (10 °F) delta T		0.003 L/s.m ²		4 U.S. gpm/Ton						
Pump Head Pressure		30 kPa	10 ft							
Pump Efficiency		60%								
Pump Motor Efficiency		85%								
Sizing Factor		1.0								
Pump Connected Load		0.2 W/m ²	0.02 W/ft ²							
Supply Fan Occ. Period		2200 hrs./year								
Supply Fan Unocc. Period		6560 hrs./year								
Supply Fan Energy Consumption		6.7 kWh/m².yr								
	·									
Exhaust Fan Occ. Period		2200 hrs./year								
Exhaust Fan Unocc. Period		6560 hrs./year								
Exhaust Fan Energy Consumption		1.7 kWh/m².yr								
	L									
Condenser Pump Energy Consumption		kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consum	ption	0.0 kWh/m².yr								
,	· •									
Circulating Pump Yearly Operation		7000 hrs./year								
Circulating Pump Energy Consumption		1.1 kWh/m².yr								
g the start star	L	,								
Fans and Pumps Maintenance	Annual Maintena	nce Tasks	Incidence Frequency							
			(%) (years)							
	Inspect/Service F	ans & Motors								
		It Tension on Fan Belts	+							
	Inspect/Service P		+					EUI	kWh/ft².yr	0.9
									MJ/m².yr	34.2

EXISTING BUILDINGS: Education Baseline	:	SIZE:	COMMERCIAL SEC VINTAGE		NG PROFILE		REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:	:	8.3 kWh/ft².yr 322.7 MJ/m².yr		Fossil Fue	20.3 kWh/ft².yr	785.4 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fossi	Fuel	
GENERAL LIGHTING	2.1	79.5		kWh/ft2.yr	MJ/m².yr	kWh/ft2.yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	0.8	31.4	SPACE HEATING	1.7	65.8	19.1	739.6	
HIGH BAY LIGHTING	0.3	12.1	SPACE COOLING	0.03	1.1			
OTHER PLUG LOADS	0.5	19.4	DOMESTIC HOT WATER	0.6	22.0	0.8	30.8	
HVAC FANS & PUMPS	0.9	34.2	FOOD SERVICE EQUIPMENT	0.3	10.0	0.4	15.0	
REFRIGERATION	0.3	10.0						
MISCELLANEOUS	0.1	5.0						
COMPUTER EQUIPMENT ELEVATORS	0.6	23.8						
OUTDOOR LIGHTING	0.2	8.5						

			COMMERCIAL SI	ECTOR BUILDING PRO	OFILE		
EXISTING BUILDINGS:	SIZE:		VINTA	GE:		REGION:	
Restaurant Baseline	All					Yukon	
CONSTRUCTION							
	-		-				
Wall U value (W/m ² .°C) 0.38	W/m².°C	0.07	Btu/hr.ft² .°F	Typical I	Building Size	372 m²	4,000 ft ²
Roof U value (W/m ² .°C) 0.29	W/m².°C	0.05	Btu/hr.ft ² .°F	Typical I	Footprint (m ²)	372 m²	4,000 ft ²
Glazing U value (W/m ² .°C) 3.30	W/m².°C	0.58	Btu/hr.ft ² .°F	Footprin	nt Aspect Ratio (L:W)	1	
					Conditioned Space	100%	
Window/Wall Ratio (WIWAR) (%) 0.15	т				Conditioned Space as Exterior Zone	40%	
Shading Coefficient (SC) 0.85					# Stories	1	
	-				Floor Height (m)	4.5 m	14.8 ft
VENTILATION SYSTEM, BUILDING CONTRO		CONDITIONS					
VENTILENTION STOTEM, BUILDING CONTING		CONDITIONS					
Ventilation System Type			CAV CA	VR DDMZ DDMZV	/V VAV VAVR	IU 100% O.A TOTA	
		tem Present (%)	60%			40% 609	%
		Air Flow (%)	olume as Percent of F	II Flow)	10%		
	(IVIII)		nume as reicent of r	un riow)			
Occupancy or People Density		50 m²/persor	า 5	38 ft²/person		%OA 7.24%	
Occupancy Schedule Occ. Period		90%					
Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		17 L/s.perso	n	36 CFM/person			
TreamAir Nequirements of Outside Air	L	17 L/3.pei30		So Ci Miperson			
	a 1, 2 or 3)			enter % FA. to the right:]	40%	
(1 = mixed air control, 2 = Fixed fresh air, 3 1009	6 fresh air)	If Fresh A	r Control Type = "3" e	nter Make-up Air Ventilat	tion and operation		0 CFM/ft ²
Sizing Easter		1.2				50% operation (%)	i
Sizing Factor Total Air Circulation or Design Air Flow		4.70 L/s.m ²	0	.92 CFM/ft ²			
· · · · · · · · · · · · · · · · · · ·	L			<u></u>	Separate Make-up air	unit (100% OA)	2 L/s.m ² 0.39 CFM/ft ²
Infiltration Rate		0.30 L/s.m ²	0.	06 CFM/ft ²		occupied period 50°	
(air infiltration is assumed to occur during unoccu hours only if the ventilation system shuts down)	pied				Operation	unoccupied period 50°	%
nours only if the ventilation system shuts down)							
Economizer		Entha	lpy Based Dry	-Bulb Based Tota	al		
	Incidence of Us			0% 100		of Design Parameters	
	Switchover Poir	nt	KJ/kg.	18 °C		gn Cooling Load 361,90	
			Btu/lbm 6	4.4 °F	Room air e	e Sensible Load 66,272	2 2 Btu/lbm
Controls Type	System Present	t (%)	HVAC Roor	n			4 Btu/lbm
			Equipment Contro	ols	Specific volu	me of air at 55F & 100% R 13	.2 ft³/lbm
	All Pneumatic			0%	Design CF		
	DDC/Pneumatic All DDC	C	30% 10% 1	0%	l otal air ci	rculation or Design air 4.70	l/s.m ²
	Total (should ac	dd-up to 100%)		0%			
		• /					
		Prop	ortional PI / PI	D Total			
Control mode	Control Mode	Fixed	Discharge Reset				
	Control Strategy		Discharge Reset	-			
Indoor Design Conditions			Room		Supply Air		
	Summer Tempe Summer Humid		24 °C 50%	75.2 °F	15 °C 100%	59 °F	
	Enthalpy	nty (76)	65.5 KJ/kg.	28.2 Btu/lbm		23.4 Btu/lbm	
	Winter Occ. Ter	mperature	22 °C	71.6 °F	20 °C	68 °F	
	Winter Occ. Hur	midity	30%		45%		
	Enthalpy Winter Unocc. 1	Tomporatura	53 KJ/kg. 22 °C	22.8 Btu/lbm 71.6 °F	45.5 KJ/kg.	19.6 Btu/lbm	
	Winter Unocc. H		30%	71.0 F			
	Enthalpy		50 KJ/kg.	21.5 Btu/lbm			
							_
Damper Maintenance			Incidence Freque	nov			
			Incidence Freque (%) (year				
	Control Arm Ad	ljustment					
	Lubrication						
	Blade Seal Rep	blacement					
Air Filter Cleaning	Changes/Year		4				
			·			105	
Incidence of Annual HVAC Controls Maintenance	e 100%			Incidence of Annual	Room Controls Mainten	ance 100.0%	
Controls Maintenance	3 100%						
	Annual Maintena	ance Tasks	Incidence		Annual Maintenance T	Tasks Incidence	_
			(%)			(%)	
	Calibration of T		4000			of Room Thermostat 100	16
	Calibration of P	anel Gauges uxiliary Devices	100%		Inspection of PE Swit Inspection of Auxiliary		-
	Inspection of Co				Inspection of Control		-
	· · ·				(Dampers, VAV Boxe		
1							

EXISTING BUILDINGS: Restaurant Baseline	SIZE: Ali		COMMER	RCIAL SECT VINTAGE:	or Buildin	ig profili	E		REGION: Yukon					
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 0.50 10.0 W/m ²	-] ft-candles] W/ft²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%		Light Level (Lux) % Distribution Weighted Average		400 100%	500 CFL	700 T12 ES	1000 T8 Mag	T8 Elec	MH	HPS	Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years		System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	20% 0.6 0.75 72	0.6 0.80 82	80% 0.6 0.80 88	0.6 0.55 65	0% 0.6 0.55 90			
Relamping Strategy & Incidence of Practice	Group Sp	ot		1								EUI	kWh/ft².yr	2.2
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 0.50 36.3 W/m ²] ft-candles]W/ft²										MJ/m².yr	86
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%		Light Level (Lux) % Distribution Weighted Average		300 100%	500	700	1000				Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years		System Present (%) CU LLF Efficacy (L/W)		INC 75% 0.7 0.65 15	CFL 25% 0.7 0.65 50	T12 ES 0.6 0.75 72	T8 Mag 0.6 0.80 82	T8 Elec 0.6 0.80 88	MH 0.6 0.55 65	HPS 0% 0.6 0.55 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Sp	ot		i	F	UI = Load	X Hrs X						kWh/ft².yr MJ/m².yr	8.0 310
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux	-] ft-candles]W/ft²			_		on check: s		00	1.00			0.0
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%		Light Level (Lux) % Distribution Weighted Average		300 100%	500 CFL	700 T12 ES	1000 T8 Mag	T8 Elec	MH	HPS	Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years		System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	0% 0.6 0.55 90	0.0%		
Relamping Strategy & Incidence of Practice	Group Sp	ot						·	·				kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING								(Overall LP	23.16 W/m	2	EUI TOTAL	kWh/ft².yr MJ/m².yr	10 396
OFFICE EQUIPMENT & PLUG LOA	ADS													
Equipment Type	Cor	nputers	Monitors	Print	ters	Copie	rs	Serv	ers	Plug Load	ds			
Measured Power (W/device) Density (device/occupant) Connected Load		55 0.36 0.4 W/m ² 0.0 W/ft ²	51 0.36 0.4 W/m ² 0.0 W/ft ²	100 0.01 0.0 V 0.00 V		W	//m² //ft²	0.01	N/m² N/ft²	1.15 W/m 0.11 W/ft ²				
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		90% 50% 2000 3760	90% 50% 2000 6760	90% 50% 2000 6760		90% 50% 2000 6760	-	100% 100% 2000 6760	-	90% 50% 4100 4660				
Total end-use load (occupied period) Total end-use load (unocc. period)		1.9 W/m ² 1.1 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes	s (cells with re	ed indicator	in upper ri	ight corner,	type "SHIF					
Usage during occupied period Usage during unoccupied period		00% 59%								Computer Eo	quipmen ıg Loads	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.49 18.95 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below: Cooking	Fossi	Fuel Share:	75.0%	Electricity F	uel Share:	25.0%	E	EUI k	ssil Fuel EL Wh/ft².yr MJ/m².yr	II 23.2 900.0		EUI	Electric EUI kWh/ft².yr MJ/m².yr	16.8 650.0
REFRIGERATION Provide description below: Walk-ins, reach ins, fridges etc												EUI	kWh/ft².yr	9.0
													MJ/m².yr	9.0 350.0
MISCELLANEOUS													kWh/ft².yr MJ/m².yr	0.3 10

		со	MMERCIAL SEC	TOR BUILD	ING PROF	ILE						
EXISTING BUILDINGS: Restaurant Baseline	SIZE: All		VINTAG					EGION: ukon				
SPACE HEATING												
Heating Plant Type				Fossil Fuel				Electric				
rieaung rianit type				Boilers	Packaged	A/A HP	W. S. HP H	/R Chiller Res	istance	Total		
		System Present (%)	Stan. 259	High %	Unit 60%		5%		10%	100%	100%	
		Eff./COP Performance (1 / Eff.)	759		70%			80% 1.25	1.00			
		(kW/kW)	1.0	1.20	1.40		1.00	1.20	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	91.0 W/m ² 1973 MJ/m ² .yr	28.9 Btu/hr. 50.9 kWh/ft								Г	All Electric EUI	
Electric Fuel Share	15.0%	Oil Fuel Share	85.0%								kWh/ft².yr	39.3
Boiler Maintenance	Annual M	aintenance Tasks	Incidenc	e							MJ/m².yr	1523
	Fire Side	Inspection	(%)	%							Fossil Fuel EUI kWh/ft².yr	71.3
	Water Sid	le Inspection for Scale Buildup	100	%							MJ/m².yr	2763
	Inspection	n of Controls & Safeties	100								Market Composite	EUI
	Flue Gas	Analysis & Burner Set-up	909	%							kWh/ft².yr MJ/m².yr	70.3 2722
SPACE COOLING												
A/C Plant Type		Centri	fugal Chillers	Screw	Recip.	Dired DV	Gas Co	oling T	otal			
		Standa System Present (%)		Chillers	Chiller	Pkgd. DX 100.0%	Absorption	Engine	00.0%			
		COP	4.7 5.			2.6	6 0.9	1.8	00.078			
		Performance (1 / COP) (kW/kW)	0.21 0.1	9 0.23	0.28	0.38	3 1.11	0.56				
		Additional Refrigerant										
		Related Information										
Control Mode		Incidence of Use Fixed	Reset	٦								
Control mode		Setpoi	int									
		Chilled Water Condenser Water	100% 100%	-								
		L										
Setpoint		Chilled Water	6 °C	42.8								
		Condenser Water Supply Air	35 °C 15.0 °C		°F °F							
Peak Cooling Load	285 W/m ²	90 Btu/hr.ft ²			1.							
Seasonal Cooling Load (Tertiary Load)	40.4 MJ/m ² .yr	1.0 kWh/ft².yr	<u>133</u> ft²/Ton									
Sizing Factor	1.00	Opera	tion (occ. period) 3000	hrs/year	Note value	e cannot be le	ss than 2,900	hrs/year)			
A/C Saturation	65.0%				-							
(Incidence of A/C)	00.070											
Electric Fuel Share	100.0%	Gas Fuel Share										
Chiller Maintenance	Annual M	aintenance Tasks	Incidenc	e Frequency	1							
			(%)	(years)								
		ontrol, Safeties & Purge Unit oupling, Shaft Sealing and Bearing	1009 s	% 2								
	Megger M	lotors er Tube Cleaning			-							
	Vibration	Analysis										
		rent Testing nemical Oil Analysis			-					Г	All Electric EUI	
		,			1						kWh/ft².yr	0.5
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		e Frequency	1					L 	MJ/m².yr	19
	Inspection	VClean Spray Nozzles	(%)	(years)	-					⊢	Natural Gas EU kWh/ft².yr	I
		ervice Fan/Fan Motors		-	1					L	MJ/m².yr	
		erify Operation of Controls									Market Composite	
											kWh/ft².yr MJ/m².yr	0.5 19
												.0
DOMESTIC HOT WATER		Standard	Tank	Cnd.	Water	<u> </u>						
Service Hot Water Plant Type	Fossil Fu	el SHW Boiler Tank resent (%) 10%		Boiler	Heater	4	Fuel Share	F	ossil 85%	E	Elec. Res. 15% 100%	
	Eff./COP	75%	60% 655		90%	,	Blended Effi	ciency	0.66		0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	400.0		_			_						
Wetting Use Percentage	10%			All Electric El kWh/ft ² .yr	JI 11.3	-		sil Fuel EUI Wh/ft².yr	15.6	F	Market Composite kWh/ft ² .yr	EUI 15.0
weating use reicentage	10%			MJ/m².yr	440			iJ/m².yr	15.6 604		MJ/m².yr	15.0 579.7

		COMMER	CIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:		REGION:					
Restaurant Baseline	All				Yukon					
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS							ration & Contr	ol		
			0		ion Fan		ust Fan			
System Design Air Flow 4.7 System Static Pressure CAV 40	′L/s.m² 0 Pa	0.92 CFM/ft ² 1.6 wg	Control	Fixed	Variable	Fixed	Variable Flow			
System Static Pressure VAV 40		1.6 wg 1.6 wg	Incidence of Use	100%	Flow	100%	FIOW			
Fan Efficiency 529		1.0 Wg	Operation	Continous	Scheduled		Scheduled			
Fan Motor Efficiency 80%										
Sizing Factor 1.00			Incidence of Use	50%	50%	50%	50%			
	5 W/m ²	0.42 W/ft ²	0							
Fan Design Load VAV 4.5	5 W/m ²	0.42 W/ft ²	Comments:							
EXHAUST FANS										
Washroom Exhaust 100) L/s.wash		oom							
Washroom Exhaust per gross unit area 0.5	5 L/s.m ²	0.11 CFM/ft ²								
	L/s.m ²	0.02 CFM/ft ²								
Total Building Exhaust 0.6 Exhaust System Static Pressure 25	6 L/s.m ² 0 Pa	0.13 CFM/ft ² 1.0 wg								
Fan Efficiency 25%		1.0 Wg								
Fan Motor Efficiency 729										
Sizing Factor 1.0										
Exhaust Fan Connected Load 0.	9 W/m²	0.08 W/ft ²								
AUXILIARY COOLING EQUIPMENT (Condens		and Cooling Towar(Condensor Fons)								
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump a	ind Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.022 kW/kW	0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	6.30 W/m ²	0.59 W/ft ²							
Condenser Pump										
Burne Basim Flow										
Pump Design Flow Pump Design Flow per unit floor area		0.053 L/s.KW 0.015 L/s.m ²	3.0 U.S. gpm/Ton 0.022 U.S. gpm/ft ²							
Pump Head Pressure		kPa	0.022 0.3. gpm//-							
Pump Efficiency		60%								
Pump Motor Efficiency		85%								
Sizing Factor		1.0								
Pump Connected Load		W/m ²	W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T		0.012 L/s.m ²	0.0181 U.S. gpm/ft ² 2.4	U.S. gpm/7	Fon					
Pump Head Pressure		kPa	ft							
Pump Efficiency		60%								
Pump Motor Efficiency Sizing Factor		<u>85%</u> 1.0								
Pump Connected Load		1.0 W/m²	W/ft ²							
Supply Fan Occ. Period		3900 hrs./year								
Supply Fan Unocc. Period		4860 hrs./year								
Supply Fan Energy Consumption		28.6 kWh/m².yr								
Exhaust Fan Occ. Period		3900 hrs./year								
Exhaust Fan Unocc. Period		4860 hrs./year								
Exhaust Fan Energy Consumption		5.6 kWh/m ² .yr								
Condenser Pump Energy Consumption		kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consu	mption	0.2 kWh/m².yr								
Circulating Pump Yearly Operation		7000 hrs./year								
Circulating Pump Teany Operation		kWh/m².yr								
g the g the g the g the g										
Fans and Pumps Maintenance	Annual M	laintenance Tasks	Incidence Frequency							
			(%) (years)							
		ervice Fans & Motors	<u> </u>							
		djust Belt Tension on Fan Belts ervice Pump & Motors	<u>↓ </u>					EUI	kWh/ft².yr	3.2
	inspect/S		<u>I I I I I I I I I I I I I I I I I I I </u>					201	M.I/m ² vr	3.2 124.0

EXISTING BUILDINGS: Restaurant Baseline		SIZE: All	COMMERCIAL SECT VINTAGE		ng profili	-	REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		38.8 kWh/ft².yr 1,503.0 MJ/m².yr		Fossil Fue	91.3 kWh/ft².yr	3,537.4 MJ/m ² .yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	Fuel	
GENERAL LIGHTING	2.2	85.8		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	8.0	309.8	SPACE HEATING	5.9	228.4	60.6	2,348.6	
HIGH BAY LIGHTING			SPACE COOLING	0.3	12.4			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	1.7	65.9	13.3	513.8	
HVAC FANS & PUMPS	3.2	124.0	FOOD SERVICE EQUIPMENT	4.2	162.5	17.4	675.0	
REFRIGERATION	9.0	350.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.5	18.9						
ELEVATORS								
OUTDOOR LIGHTING	2.8	110.3						

			С	OMMER		OR BUILD	ING PROF	ILE						
EXISTING BUILDINGS: Rec Centre	SIZE:				VINTAGE:	Existing				REGION: Yukon				
Baseline										TUKON				
CONSTRUCTION														
			0.07		-						0.000	1.		1.00
Wall U value (W/m ² .°C) Roof U value (W/m ² .°C)	0.38 W/m ² .°C 0.29 W/m ² .°C	-		Btu/hr.ft ² .°				uilding Size			2,323		25,000	
		-		Btu/hr.ft².°				otprint (m ²)			2,323	m²	25,000	π²
Glazing U value (W/m ² .°C)	3.30 W/m ² .°C		0.58 B	Btu/hr.ft ² .°	F			Aspect Rati onditioned			100%			
								onditioned			50%			
Window/Wall Ratio (WIWAR) (%)	0.05							s Exterior Z	one			-		
Shading Coefficient (SC)	0.80						Typical # :	oor Height	(m)		6.1	m	19.9	ft
							1.001.001	oorrioigin	()		0.1]	10.0	
			_											
VENTILATION SYSTEM, BUILDING CO	NTROLS & IND	OOR CONDITION	S											
Ventilation System Type				CAV	CAVR	DDM2	DDMZVV	VAV	VAVR	IL	J 100% O.A	TOTAL]	
		System Present (%)	100%								100%	1	
		Min. Air Flow (%) (Minimum Throttle	od Air Volu	mo oo Br	roont of Eu			50%				1		
					ICENI OI FU									
Occupancy or People Density			n²/person		538	ft²/person				%OA	15.77%]		
Occupancy Schedule Occ. Period		90%												
Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		10	/s.person		21	CFM/perso	n							
			-											
	enter a 1, 2 or 3)					nter % FA. t					1 /2 2	0.40		
(1 = mixed air control, 2 = Fixed fresh air, 3	3 100% fresh air)	IT	Fresh Air (Control 1	/pe = "3" er	nter Make-u	p Air Ventila	ation and op	peration		5 L/s.m ² operation		CFM/ft ²	
Sizing Factor		1								007	Toperation	(70)		i
Total Air Circulation or Design Air Flow		1.27 L/	/s.m²		0.25	CFM/ft ²						r	т	
Infiltration Rate		0.70 L/	/c m2		0.14	CFM/ft ²		Separate I	Make-up air Operation			50%	L/s.m ²	CFM/ft ²
(air infiltration is assumed to occur during	unoccupied	0.70 L	/5.111-		0.14	CFIVI/It-			Operation			50%		
hours only if the ventilation system shuts d	own)												-	
Economizer			Enthalpy	Pacad	Dry Pu	lb Based	Total	т						
Economizer	Incidence		Entraipy	Daseu	100%		100%		Summary	of Desian	Parameters			7
	Switchove			(J/kg.	18	°C		t	Peak Desi	gn Cooling	Load	235,980		
			В	8tu/lbm	64.4	°F		1	Peak Zone		Load	134,178	Dt. //har	
Controls Type	System P	resent (%)		HVAC	Room				Room air e Discharge		v		Btu/lbm Btu/lbm	
	Cyclonin	1000in (70)		quipment	Controls				Specific volu				ft³/lbm	
	All Pneum								Design CF		- De si en si	6,242	1/2	
	DDC/Pnet All DDC	Imatic							Total air ci	irculation c	r Design al	r 1.27	l/s.m ²	
		uld add-up to 100%	6)											
			-				-							
Control mode	Control M	ode	Proport	tional	PI / PID	Total								
	Condition		Fixed Dise	charge	Reset									
	Control St	rategy												
Indoor Design Conditions					Room			1	Supply Air				т	
Indoor Design Conditions	Summer T	emperature	-	22	°C	71.6	°F	13	°C		۴F]		
	Summer H	lumidity (%)		50%			-	100%			-			
	Enthalpy Winter Oc	c. Temperature			KJ/kg. ℃	28.2	Btu/lbm	54.5 16	KJ/kg. °C		Btu/lbm °F			
		c. Humidity	-	30%	U	00.0	<u>'</u>	45%		00.0				
	Enthalpy			53	KJ/kg.	22.8			KJ/kg.	19.6	Btu/lbm]		
		occ. Temperature occ. Humidity	-	16 30%	°C	60.8	۶°F							
	Enthalpy	OCC. Humany	-		KJ/kg.	21.5	Btu/lbm							
					2								-	
Damper Maintenance			Б	neidenee	Frequency									
			"	(%)	(years)									
		m Adjustment												
	Lubrication	n I Replacement												
	Diade 388	a replacement												
			-											
Air Filter Cleaning	Changes/	Year	L											
						Incidence o	f Annual R	oom Contro	ols Mainten	ance		1		
Incidence of Annual HVAC Controls Maint	enance]									·			
	A	intenenes Tast		a a i al c				A mm : - 1 * *	intens 7	Feely		Indiates	т	
	Annual Ma	aintenance Tasks	"	ncidence (%)				Annual Ma	intenance 1	IdSKS		Incidence (%)		
		n of Transmitters		, /*/					/Calibratior		Thermosta		1	
		n of Panel Gauges							of PE Swit				ł	
		of Auxiliary Device							of Auxiliary of Control		/alves		+	
	mapecilui	Control Device:	~						VAV Boxe		awoo,		1	
												•	-	

EXISTING BUILDINGS: Rec Centre Baseline	SIZE:		COMMER	CIAL SECTOR B VINTAGE:Existin		9 PROFIL	E		REGION: Yukon				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 0.20 13.6 W/m ²] ft-candles] W/ft²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 90% 15%		Light Level (Lux) % Distribution Weighted Average		300	500 100% CFL	700 T12 ES	1000	T8 Elec	MH T5	Total 100% 500 HO TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	_	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	T8 Mag 0.6 0.80 84	0.6 0.80 88	0.7	HO TOTAL 100.0% 0.6 55 90		
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr MJ/m².yr	1.0 37
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 0.05 28.6 W/m ²] ft-candles]W/ft²								I		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%		Light Level (Lux) % Distribution Weighted Average		300 INC	300 100%	700	1000	T8 Elec	мн т5	Total 100% 300 HO TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	_	System Present (%) CU LLF Efficacy (L/W)		50% 0.7 0.65 15	CFL 50% 0.7 0.65 50	0.6 0.75 72	T8 Mag 0.6 0.80 84	0.6 0.80 88	0.6 0.55 0	HO TOTAL 100.0% 0.6 55 90		
Relamping Strategy & Incidence of Practice	Group Spot				EU	II = Load	X Hrs. X S	SF X GLFF	-		EUI	kWh/ft².yr MJ/m².yr	0.5 20
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 0.75 13.6 W/m ²] ft-candles]W/ft²			F	loor fractic	on check: :	should = 1.0	0 1	.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 90% 15%		Light Level (Lux) % Distribution Weighted Average		200 25%	300 50% CFL	400 25% T12 ES	T8 Mag	T8 Elec	MH T5	Total 100% 300 HO TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	_	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	90% 1 0.6 0.55 0	0% 100.0% 0.6 55 90		
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr MJ/m².yr	3.6 139
TOTAL LIGHTING									Overall LP	4.16 W/m ²	EUI TOTAL	. kWh/ft².yr MJ/m².yr	5.1 196
OFFICE EQUIPMENT & PLUG LOA	T												
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	0 90' 50' 200 676	55 55 1.1 W/m ² 0.0 W/ft ² % %	Monitors 51 0.05 0.1 W/m² 90% 50% 2000 6760	Printers Printers W/m ² W/m ² W/ft ² 90% 2000 6760 to see notes (cells		90% 50% 2000 6760	//m² //ft²	100% 100% 2000 6760	W/m² W/ft²	Plug Loads 1 W/m ² 0.09 W/ft ² 90% 25% 3500 5260			
Total end-use load (unocc. period)	0	.3 W/m²	0.0 W/ft ²		5 with red	maioator		gin corrier,		omputer Equipm	nent EUI	kWh/ft².yr	0.05
Usage during occupied period Usage during unoccupied period	100' 30'									Plug Lo	ads EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	1.96 0.41 16.07
FOOD SERVICE EQUIPMENT	Fossil Fu	uel Share:	10.0%	Electricity Fuel Sh	nare:	90.0%	E	EUI I	ssil Fuel EU kWh/ft².yr MJ/m².yr	0.6	EUI	Electric EUI kWh/ft².yr MJ/m².yr	0.6 25.0
REFRIGERATION Provide description below: Ice plant and auxiliaries				Artificial Ice Satur	ation	60.0%					EUI	kWh/ft².yr MJ/m².yr	8.0 309.9
MISCELLANEOUS											EUI	kWh/ft².yr MJ/m².yr	0.3 10

EXISTING BUILDINGS: Rec Centre Baseline	SIZE:		С		CIAL SECT VINTAGE	OR BUILD	ING PROF	ILE		REGION: Yukon				
SPACE HEATING														
Heating Plant Type						Fossil Fuel			Ele	ctric				
					Bo Stan.	ilers High	Packaged Units	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Preser	nt (%)		25%	22%	50%	4.70	0.00	4.50	3%	100%		
		Eff./COP Performance (kW/kW)	(1 / Eff.)		75% 1.33	90% 1.11	75% 1.33	1.70 0.59	3.00 0.33	4.50 0.22	1.00 1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	60.0 W/m ² 578 MJ/m ² .yr			8tu/hr.ft² Wh/ft².yr								F	All Electric EUI	
Electric Fuel Share	3.0%	Oil Fuel Share		97.0%]								kWh/ft².yr	14.9
Space Heat Saturation	70.0% Annual N	laintenance Task	s		Incidence]						L	MJ/m².yr	578
(Incidence of SPC HT)	Water Si Inspection	e Inspection de Inspection for in of Controls & S in of Burner		p	(%) 75% 100% 100%								Fossil Fuel EUI kWh/ft².yr MJ/m².yr Market Composite I	19.1 741
		Analysis & Burr	ner Set-up		90%								kWh/ft².yr MJ/m².yr	19.0 736
SPACE COOLING														
A/C Plant Type						r-						r		
			S	Centrifugal Standard	Chillers HE	Screw Chillers	Recip. Chiller	Pkgd. DX	Absorption W. H.	n Chillers CW	Total			
		System Preser COP	nt (%)	4.7	5.4	4.4	3.6	100.0%	0.9	1	100.0%			
		Performance (kW/kW) Additional Refu Related Inform	rigerant	0.21	0.19	0.23								
						1						L		
Control Mode		Incidence of U Chilled Water Condenser Wa	S	ixed Setpoint	Reset									
		Condenser Wa				J								
Setpoint		Chilled Water Condenser Wa Supply Air	iter		°C °C °C	44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	30 W/m² 13.5 MJ/m².yr		Btu/hr.ft ² kWh/ft ² .yr	1271	ft²/Ton									
Sizing Factor	1.00		С	Operation	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	5.0%													
Electric Fuel Share	100.0%	Gas Fuel Shar	e]									
Chiller Maintenance	Inspect C Inspect C	laintenance Task Control, Safeties Coupling, Shaft S	& Purge Unit	arings	Incidence (%)	Frequency (years)								
	Megger I Condens	Motors er Tube Cleaning	1											
	Vibration	Analysis	1											
		rrent Testing hemical Oil Analy	/sis										All Electric EUI	
						_	1						kWh/ft².yr MJ/m².yr	0.1 4
Cooling Tower/Air Cooled Condense					Incidence (%)	Frequency (years)						Г	Natural Gas EUI	<u> </u>
		n/Clean Spray N Service Fan/Fan N											kWh/ft².yr MJ/m².yr	
	Megger I												Market Composite I kWh/ft².yr MJ/m².yr	EUI 0.1 4
DOMESTIC HOT WATER														
Service Hot Water Plant Type	Fossil Fu		Avg. Tank				Boiler	I			Fossil	E	Elec. Res.	
		Present (%)	70% 0.65	-			20% 0.75	-	Fuel Share Blended E		90% 0.67		10% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	90.0 Incider	nce of Heat recr'y recr'y load share	20%		۱ ۸	II Electric El		1		ossil Fuel E			Market Composite	FUI
Wetting Use Percentage	50%	or y load share	3073			kWh/ft ² .yr MJ/m ² .yr	2.6 99			kWh/ft ² .yr MJ/m ² .yr	3.5 134		kWh/ft².yr MJ/m².yr	3.4 130.4

		CIAL SECTOR BUILDING PROFILE		
EXISTING BUILDINGS: Rec Centre Baseline	SIZE:	VINTAGE: Existing	REGION: Yukon	
HVAC FANS & PUMPS				
SUPPLY FANS		V	entilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan	
System Design Air Flow 1.3	L/s.m ² 0.25 CFM/ft ²	Control F	ixed Variable Fixed Variable	
	0 Pa 1.2 wg		Flow Flow	
	D Pa 1.2 wg	Incidence of Use	100% 100%	
Fan Efficiency 60% Fan Motor Efficiency 80%		Operation C	ontinuou Scheduled Continuous Scheduled	
Sizing Factor 1.00		Incidence of Use	50% 50% 50%	
Fan Design Load CAV 0.8	8 W/m ² 0.07 W/ft ²			
Fan Design Load VAV 0.8	W/m ² 0.07 W/ft ²	Comments:		
EXHAUST FANS				
Washroom Exhaust 100 Washroom Exhaust per gross unit area 0.1	L/s.washroom 212 CFM/was L/s.m ² 0.02 CFM/ft ²	shroom		
Other Exhaust (Smoking/Conference) 0.1				
Total Building Exhaust 0.2				
Exhaust System Static Pressure 250				
Fan Efficiency 25%				
Fan Motor Efficiency 75% Sizing Factor 1.0				
	2 W/m ² 0.02 W/ft ²			
ALIXII JARX COOLING EQUIRMENT (Condens	ser Pump and Cooling Tower/Condenser Fans)		
AUXILIART COULING EQUITIMENT (CONDENS	ser i unip and cooling i owen/condenser i ans	<i>)</i>		
Average Condenser Fan Power Draw	0.020 kW/kW	0.07 kW/Ton		
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser) 0.60 W/m ²	0.06 W/ft ²		
Condenser Pump				
Duran Danian Flaur	0.050 1 /- 1014			
Pump Design Flow Pump Design Flow per unit floor area	0.053 L/s.KW 0.002 L/s.m ²	3.0 U.S. gpm/Ton 0.002 U.S. gpm/ft ²		
Pump Head Pressure	kPa	ft		
Pump Efficiency	50%	<u>_</u>		
Pump Motor Efficiency	80%			
Sizing Factor Pump Connected Load	1.0 W/m²	W/ft ²		
CIRCULATING PUMP (Heating & Cooling)				
Pump Design Flow @ 5 °C (10 °F) delta T	0.001 L/s.m ²		.S. gpm/Ton	
Pump Head Pressure Pump Efficiency	50 kPa 50%	17 ft		
Pump Motor Efficiency	80%			
Sizing Factor	0.8			
Pump Connected Load	0.1 W/m ²	0.01 W/ft ²		
Supply Fan Occ. Period	3500 hrs./year			
Supply Fan Unocc. Period Supply Fan Energy Consumption	5260 hrs./year 4.9 kWh/m².yr			
Supply Pan Energy Consumption	4.9 KWIVIIIyi			
Exhaust Fan Occ. Period	3500 hrs./year			ļ
Exhaust Fan Unocc. Period	5260 hrs./year			
Exhaust Fan Energy Consumption	1.5 kWh/m².yr			ļ
Condenser Pump Energy Consumption	kWh/m².yr			
Cooling Tower /Condenser Fans Energy Consur				
Circulating Rump Voorly Operation	5000 hrs 6/200			ļ
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000 hrs./year 0.6 kWh/m².yr			
chousing runp Energy Consumption	0.0 KWWWW			ļ
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency		ļ
	Inchast/Sorvice Fore & Maters	(%) (years)		ļ
	Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	+ + +		
	Inspect/Service Pump & Motors		EUI kWh/ft².yr 0).7
	· · ·	·		5.4

EXISTING BUILDINGS: Rec Centre Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		ING PROFILE	-	REGION: Yukon	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		13.49 kWh/ft².yr 522.7 MJ/m².yr		Fossil Fue	16.2 kWh/ft ² .yr	626.3 M.	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	l Fuel	
GENERAL LIGHTING	0.96	37.2		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	0.51	19.9	SPACE HEATING	0.31	12.1	13.0	503.3	
HIGH BAY LIGHTING	3.59	139.1	SPACE COOLING	0.01	0.2			
OTHER PLUG LOADS	0.41	16.1	DOMESTIC HOT WATER	0.26	9.9	3.1	120.5	
HVAC FANS & PUMPS	0.66	25.4	FOOD SERVICE EQUIPMENT	0.58	22.5	0.1	2.5	
REFRIGERATION	4.80	185.9						
MISCELLANEOUS	0.26	10.0						
COMPUTER EQUIPMENT	0.05	2.0						
ELEVATORS								
OUTDOOR LIGHTING	1.10	42.4						

Water Table Output Hama Display Disp					COMMER	CIAL SECT		ING PROF	ILE							
Baseline (Construction) Construction Construction <thconstruction< th=""> Construction Con</thconstruction<>	EXISTING BUILDINGS:	SIZE:				VINTAGE	:				REGION					
Construction Very Law (WeV) Image: WeV C											YUKON					
Red U Have (Nm ² C) <u>0.8</u> Wint ² C <u>0.95</u> But <i>VH</i> ² , <i>F</i> Type of Fourier (w) <u>2.80</u> m ² <u>0.95</u> <u>0.95</u> <u>0.95</u> 0.95 0.95 <td>CONSTRUCTION</td> <td></td> <td>-</td> <td></td> <td></td> <td>-</td>	CONSTRUCTION												-			-
Red U Have (Nm ² C) <u>0.8</u> Wint ² C <u>0.95</u> But <i>VH</i> ² , <i>F</i> Type of Fourier (w) <u>2.80</u> m ² <u>0.95</u> <u>0.95</u> <u>0.95</u> 0.95 0.95 <td></td> <td></td> <td></td> <td>1</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td>				1	-								_			
Status (viuer (c) 3.30 [Winer C) 0.31 [Bith Y IP * Product Product Status (viuer (c)																
Marcardon Ratio (MURAIS) (n)	Roof U value (W/m ² .°C)	0.29 W/m ² .°C		0.05	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²))		2,788	3 m²	30,0	00 ft ²	
	Glazing U value (W/m ² .°C)	3.30 W/m².°C		0.58	Btu/hr.ft ² .	°F							1			
Window Mit (160) 000 <td></td>																
Shading Certificer (S0) B Typical Policy (n) Image of the state of the sta	Window/Wall Ratio (W/IWAR) (%)	0.05										45%	6			
North Starten, Bulk David Controls 4. Boood Controls Vertration System Type Description Name Display Display Display Operation Display Display Display Display Display Display Display Operation Display Display <thdisplay< th=""> Display Display<</thdisplay<>										one			1			
Vertilation System Type Impatted Protects(1) COAC								Floor to F	loor Height	(m)		6.1	m	19	9.9 ft	
Vertilation System Type Impatted Protects(1) COAC																
Vertilation System Type Impatted Protects(1) COAC	VENTILATION SYSTEM, BUILDING CONT	TROLS & IND	OOR CONDITIC	ONS												-
Battern Presert (h) 100% 100% Oncepany of Propie Density Occupany of Density Density Occupany o	,															
Imit Ari Prov (%) 90% Oringeng of Regist Density 100% Oringeng Stedek Uroc: Period 100% Decayary Stedek Uroc: Period 100% Freih Ari Engementer 100% Step Aria 100% Freih Ari Engementer 00% Step Aria 100% Step Aria 100% Step Aria 00%	Ventilation System Type			. (0()			DDM2	DDMZVV	VAV	VAVR	2 II	J 100% O.				
(Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f Tul Flags) (Minimum Trutteida V Valuma se Persion f (Minimum Trutteida V Valuma se Persion f Ull frags) (Minimum Trutteida V Valuma se Persion f (Minimum Trutteida V Valuma se Persion f Ull frags) (Minimum Trutteida V Valuma se Persion f (Minimum Trutteida Valuma se Persion f Ull frags) (Minimum Trutteida Valuma se Persion f (Minimum Trutteida Valuma se Persion Valuma se Persion f (Minimum Trutteida Valuma se Persi					100%				50%				100	%		
Concernence 0.0 0.00 0.00 0.00 0.00 Concernence 0.0 0.00 0.00 0.00 0.00 0.00 Start Pack 1000 0.00 0.00 0.00 0.00 0.00 0.00 Start Pack 1000 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Start Pack 1000 1000 1000 1000 0.00					olume as P	ercent of Fu	III Flow)	1	0070	1	1	1				
Occupany Strends Cor. Priod Teal At Department of Outlack Arit 90% Priod Arithmic To Charles Arit 11 Freed Ar Control Type - 12° enter NEA. to the right Teal Arit Control Type - 12° enter NEA. to the right Teal Arit Control Type - 12° enter NEA. to the right Teal Arit Control Type - 12° enter NEA. to the right Teal Arit Conculation or Design Ar Flow 030 UL m²													_			
Conjuny Strekde Unice, Fred Mark Image Mark Requirements of Charles Mark Image Mark Requirements of Charles Mark Fresh Ar Requirements of Charles Mark Image Mark Requirements				m²/perso	n	1076	ft²/person				%OA	21.95%	6			
Treat Ar Requirements or Obtaind Arif 20 Ly person 50 CFMuperson March Moreout Organ Law (rest 1 2 or 3) 11 Fried Ar Control Type = * "or enter Make-up Ar Vortilizion and operation (b) 500 Lum* 500 String Factor Total Ar Contaction Obtaign Ar Flow 11.1 U.k.m* 0.20 CFMUP Separate Make-up Ariv (100% O.0) 001			90%													
Fresh Air Control Type	Fresh Air Requirements or Outside Air		25	L/s.perso	n	53	CFM/perse	on								
(1 - model ari control, 2 = Fleed freeh air, 3 100% freeh air) iii Freeh Ari Control Type = "3" enter Make-up Ari Verifiation and operation 0.50 Lu.m" 0.10 CPMMP Storg Factor 0.10 Lu.m" 0.20 Us.m" 0.20 OPMMP 0.00 OPMMP 0.00 OPMMP Storg Factor 0.00 Us.m" 0.11 OPMMP 0.02 OPMMP 0.00 OPMM																
Sing Factor Total AF Croade for or Design AF Row											<u> </u>					
Starting relation Total AC Clinication on Design AP Devi 1 0 <td>(1 = mixed air control, 2 = Fixed fresh air, 3</td> <td>100% fresh air)</td> <td></td> <td>It Fresh A</td> <td>Ir Control T</td> <td>ype = "3" e</td> <td>nter Make-u</td> <td>p Air Ventil</td> <td>ation and op</td> <td>peration</td> <td></td> <td></td> <td></td> <td>10 CFM/ft²</td> <td></td> <td></td>	(1 = mixed air control, 2 = Fixed fresh air, 3	100% fresh air)		It Fresh A	Ir Control T	ype = "3" e	nter Make-u	p Air Ventil	ation and op	peration				10 CFM/ft ²		
Total AF Closation or Design AF Pow 1.12 Us m ² 0.22 CPMP ⁴ Separate Male up at runt (100% OA) Us m ² CPMP ⁴ Initiation Rate 0.20 Us m ² 0.21 CPMP ⁴ 0.12 CPMP ⁴ Operation occupied period 000	Sizing Factor		1								50%		1 (70)		J	
Initiation Rate 0.70 U.s.m ² 0.14 CPMMP Separate Make-up air unit (1005 OA) 0.05 <td>Total Air Circulation or Design Air Flow</td> <td></td> <td>1.14</td> <td>L/s.m²</td> <td></td> <td>0.22</td> <td>CFM/ft²</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td>	Total Air Circulation or Design Air Flow		1.14	L/s.m ²		0.22	CFM/ft ²							_		
giar Influences	_								Separate I						C	CFM/ft ²
bours only if the vertilation system shuts down! Incidence of Use in the vertilation system shuts down! Economizer Incidence of Use in the vertilation system shuts down! Incidence of Use in the vertilation system shuts down! Controls Type System Present (%) ENV (%) Edu/(*P) System Present (%) ENV (%) Edu/(*P) Discharge all of the vertilation of Sistem and the the system shuts down! Controls Type System Present (%) Environme Control 242.28 Bultum Discharge all of the system and the system shuts down! Control mode Operating from the vertilation of Design All of the system and the system shuts down! 13.2 Hibbit mode Control mode Control Mode Preportional for the system and the system shuts down! 13.2 Hibbit mode Control mode Control Mode Preportional for the system shuts down! 13.2 Hibbit mode Indoor Design Conditions Summer Fundicity (%) Softs 22.2 Bultum 19.2 Size(X/All in the system 4/2 Size(0.70	L/s.m ²		0.14	CFM/ft ²									
Economizer indicatege of Usis in transpondence in transpondenc										Operation	unoccupie	ea perioa	50	%		
Indexce of Use 100% 100% 100% Switchover Point 4.38 million 100% 100% Switchover Point 8.18 million 6.44 million Peak Zone Sensible Load 14.46.29 Controls Type All Present (%) HVAC Room Peak Zone Sensible Load 14.46.29 All Posturation Control mode All Posturation 0.728 12.19 kmillion 0.728 Control mode Control Mode Proportional P/ / PID Total 0.728 11.1 kmillion 0.728 Indoor Design Conditions Summer Temperature 200 C 71.6 million 55.4 / % 11.1 kmillion 0.728 Indoor Design Conditions Summer Temperature 200 C 71.6 million 55.4 / % 10.00 kmillion 0.728 11.1 kmillion 10.00 kmillion 10.00 kmillion 10.00 kmillion 0.728 11.1 kmillion 10.00 kmillion 10		,														
Switchover Point But/km 18/1C But/km 287,734 Controls Type System Present (%) HVAC Room Room all enthalpy 28.2 But/km Discharge all enthalpy 28.2 But/km But/km Room all enthalpy 28.2 But/km Control Type System Present (%) Equipmed Controls Room all enthalpy 28.2 But/km Discharge all enthalpy 28.4 But/km But/km But/km But/km But/km Control mode Control Mode Preportional P1/PD Total Total Total Skippy Air Skippy Air Indoor Design Conditions Summer Temperature 20'C 11/8 'F Skippy Air Skippy Air Skippy Air Indoor Design Conditions Summer Temperature 20'C 00.8 'F Skippy Air Skippy Air Skippy Air Indoor Design Conditions Summer Temperature 20'C 00.8 'F Skippy Air Skippy A	Economizer			Enthalp	y Based		lb Based									
Controls Type Index 164 (F) Peak Zong Sensible Load 144.629 Controls Type System Present (%) HVAC Room Room all enthalpy 22.2 Butlbm DDC Preventatic Importantic Importantic Importantic Importantic Room								100%								
Controls Type System Present (%) Equipment Controls All Pheumatic DOC/Precmatic DOC/Precmatic All Pheumatic Doc/Precmatic Prepetition Doc/Precmatic Prepetitio		Switchove	er Point					-								
Controls Type System Present (%) HVAC Room Discharge air enhalty 2.34. Bluthen All Pre-unatic Discharge air enhalty 2.34. Bluthen Speciel volume at all SP 8 10% 6,728 Discharge air enhalty 2.34. Bluthen Discharge air enhalty 2.34. Bluthen Speciel volume at all SP 8 10% 6,728 Discharge air enhalty 2.34. Bluthen Discharge air enhalty 2.34. Bluthen Speciel volume at all SP 8 10% 6,728 Control Mode Proportional P1 / P1D Total Indoor Design Conditions Summer Temperature 221°C Total Wirter Oc. Hundity 50% 1/4 131°C 55.41°F Wirter Oc. Hundity 50% 1/4 22.81 Burber Wirter Oc. Hundity 30% 455 569 °F Wirter Oc. Hundity 30% 1/4 455 161 °C 569 °F Wirter Oc. Hundity 30% 1/4 22.81 Burber 455 10.81 Damper Maintenance Incidence Frequency (%) (%) (%) (%) (%) Lubrication Insidence of Annual HVAC Controls Maintenance Incidence of Annual Maintenance Incidence of Annual Maintenance Incidence Indence of Annual HVAC Control					Dtu/IDITI	04.4			1			Luau	<i>y</i> -			
All Preumatic BC/Preumatic 6.728 Doc 11.14 Vis.m ² Total air circulation or Design air 1.14 Vis.m ² Control mode <u>Preoportional</u> P1 / PID <u>Total</u> Indoor Design Conditions <u>Summer Temperature</u> <u>2000</u> <u>7.16</u> °F <u>3100</u> <u>5.64</u> °F Indoor Design Conditions <u>Summer Temperature</u> <u>2000</u> <u>7.16</u> °F <u>3100</u> <u>5.64</u> °F Writer Occ. <u>1.14</u> <u>9.05</u> <u>5.64</u> °F <u>5.64</u> °F <u>1.14</u> <u>9.05</u> <u>1.000</u> <u>1.0000</u> <u>1.00000</u> <u>1.00000</u> <u>1.00000</u> <u>1.00000000</u> <u>1.000000000000000000000000000000000000</u>	Controls Type	System P	resent (%)		HVAC					Discharge	air enthal		23.	4 Btu/lbm		
DDC/Pneumatic					Equipmen	t Controls						55F & 100%				
Al DDC												r Design a				
Control Mode Proportional PI / PID Total Control Mode Fibed Discharge Reset Indoor Design Conditions Summer Temperature Summer Temperature Sum			anddo							rotar ar o	in ould thom to	n Boolgira		Voint		
Control mode Control Mode Fixed Discharge Reset indoor Design Conditions Summer Temperature 22° 71.6 °F 13°C 55.4 °F Summer Humidity (%) 50% KMg, 28.2 Burlbm 50% KJ/kg, 23.4 Burlbm Wirrer Occ. Temperature 21°C 66.5 KJ/kg, 22.8 Burlbm 54.5 KJ/kg, 23.4 Burlbm Wirrer Occ. Humidity 30% 66.8 °F 15.6 KJ/kg, 13.6 Burlbm Wirrer Uncc. Femperature 21 °C 66.8 °F 13.6 Burlbm 56.8 FF Wirrer Uncc. Humidity 30% 606.8 °F 13.6 Burlbm 66.8 °F Damper Maintenance Incidence Frequency 606.8 °F 13.6 Burlbm 13.6 Burlbm Lubrication Incidence Frequency 606.8 °F Incidence 608.9 °F 13.6 Control Arm Adjustment Incidence Incidence 60.8 °F Incidence Incidence Incidence Incidence Incide		Total (sho	ould add-up to 10	0%)												
Control mode Control Mode Fixed Discharge Reset indoor Design Conditions Summer Temperature 22° 71.6 °F 13°C 55.4 °F Summer Humidity (%) 50% KMg, 28.2 Burlbm 50% KJ/kg, 23.4 Burlbm Wirrer Occ. Temperature 21°C 66.5 KJ/kg, 22.8 Burlbm 54.5 KJ/kg, 23.4 Burlbm Wirrer Occ. Humidity 30% 66.8 °F 15.6 KJ/kg, 13.6 Burlbm Wirrer Uncc. Femperature 21 °C 66.8 °F 13.6 Burlbm 56.8 FF Wirrer Uncc. Humidity 30% 606.8 °F 13.6 Burlbm 66.8 °F Damper Maintenance Incidence Frequency 606.8 °F 13.6 Burlbm 13.6 Burlbm Lubrication Incidence Frequency 606.8 °F Incidence 608.9 °F 13.6 Control Arm Adjustment Incidence Incidence 60.8 °F Incidence Incidence Incidence Incidence Incide				Data	a atta a a l		T - 4 - 1	7								
Indoor Design Conditions Indoor Design Conditions Image: Summer Temperature indication of the state of	Control mode	Control M	ode	Ргоро	ortional	PI/PID	Iotal									
Indoor Design Conditions Room Summer Temperature 221°C 71.6] *F 131°C 55.4] *F Summer Humidity (%) 50% 65.5 KJ/kg, 228.2] Btu/bm 54.5 KJ/kg, 223.4] Btu/bm Winter Occ. Temperature 21°C 69.8] *F 15°C 50% 45% Winter Occ. Temperature 21°C 69.8] *F 15°C 58 100% Winter Occ. Temperature 21°C 69.8] *F 45% 19.6 Btu/bm Winter Occ. Temperature 21°C 69.8] *F 45% 19.6 Btu/bm Winter Unocc. Temperature 21°C 68.8] *F 45% 19.6 Btu/bm Damper Maintenance Incidence Frequency 68.8 *F 45% 19.6 Btu/bm Air Filter Cleaning Control Arm Adjustment 1 100		Condorna	000	Fixed D	Discharge	Reset		1								
Summer Temperature 22°C 71.6 *F 13°C 55.4 *F Summer Humidity (%) 50% 100% 100% 100% 100% 100% Winter Occ. Temperature 21°C 68.3 *F 15°C 59°F Winter Occ. Temperature 21°C 68.3 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 50°S Winter Unocc. Humidity 30% 23.6 Bulbm 45.5 K.Jkg. 19.6 Bulbm Damper Maintenance Incidence Incidence Frequency Control Arm Adjustment (%) (years) Lubrication Indidate Incidence Frequency Air Filter Cleaning Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance (%) Inspection of Room Thermostat Incidence of Annual Maintenance Tasks Incidence (%) Calibration of Transmitters (%) Inspection of		Control S	trategy													
Summer Temperature 22°C 71.6 *F 13°C 55.4 *F Summer Humidity (%) 50% 100% 100% 100% 100% 100% Winter Occ. Temperature 21°C 68.3 *F 15°C 59°F Winter Occ. Temperature 21°C 68.3 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 59°F Winter Occ. Temperature 21°C 68.8 *F 15°C 50°S Winter Unocc. Humidity 30% 23.6 Bulbm 45.5 K.Jkg. 19.6 Bulbm Damper Maintenance Incidence Incidence Frequency Control Arm Adjustment (%) (years) Lubrication Indidate Incidence Frequency Air Filter Cleaning Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance (%) Inspection of Room Thermostat Incidence of Annual Maintenance Tasks Incidence (%) Calibration of Transmitters (%) Inspection of	lada a Dasian Osmittiana					Deere				Oursels Ali	-					
Summer Humidity (%) 50% 100% 100% 22.1 Btu/Ibm Enthalpy 65.5 KJ/kg. 22.2 Btu/Ibm 45.5 KJ/kg. 23.4 Btu/Ibm Winter Occ. Humidity 30% 30% 45.5 KJ/kg. 19.6 Btu/Ibm Winter Unocc. Humidity 30% 69.8 °F 45.5 KJ/kg. 19.6 Btu/Ibm Winter Unocc. Humidity 30% 21.°C 69.8 °F 45.5 KJ/kg. 19.6 Btu/Ibm Damper Maintenance Incidence Frequency (%) (years) (years) (years) Lubrication Incidence Frequency (%) (years) (years) (years) Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Tasks Incidence Calibration of Transmitters (%) Inspection of Acuilary Devices Inspection of Acuilary Devices Inspection of Acuilary Devices Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Aux	Indoor Design Conditions	Summer	Femperature		22		71.6	۰F	13			4 °F	٦			
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Winter Occ. Humidity 30% 45% 45% Enthaloy 53 KJ/kg. 22.8 Btu/bm 45.5 KJ/kg. 19.6 Btu/bm Winter Unocc. Humidity 30% 21.5 Btu/bm 19.6 Btu/bm Damper Maintenance Incidence Frequency (%) (years) Lubrication (%) (years) 21.5 Btu/bm Air Filter Cleaning Control Arm Adjustment (%) (years) Incidence of Annual HVAC Controls Maintenance Incidence Incidence of Annual Room Controls Maintenance Annual Maintenance (%) Incidence (%) Inspection of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices																
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Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg. Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment 1 Lubrication 1 Blade Seal Replacement 1 Incidence of Annual HVAC Controls Maintenance Incidence Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Incidence of Annual Room Controls Maintenance (%) Incidence of Annual Room Controls Maintenance (%) Inspection of Transmitters Incidence Inspection of Auxiliary Devices Inspection of Control Devices (Valves, Inspect			occ. Temperatur	е					40.0	rto/ttg.	15.0	Dianom				
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Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters (%) Inspection of Axuiliary Devices Inspection of Axuiliary Devices																
Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters (%) Inspection of Axuiliary Devices Inspection of Axuiliary Devices	Damper Maintenance				Incidence	Frequency										
Lubrication Blade Seal Replacement Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices																
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Calibration of Panel Gauges Inspection of PE Switches Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices (Valves,		Calibratio	n of Transmitters	1	(%)	+			Inspection	Calibration	n of Room	Thermost		-		
Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices					1	1						montoald		-		
		Inspection	of Auxiliary Dev	rices]			Inspection	of Auxiliar	y Devices		1			
(Dampers, VAV Boxes)		Inspection	of Control Devi	ces								Valves,				
									Uampers,	, VAV BOX	es)					

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE:	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:	REGION: Yukon
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.15	?] ft-candles]] W/ft²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 90% 15%	Light Level (Lux) 300 500 700 100 % Distribution 50% 50% 100 Weighted Average INC CFL T12 ES T8 Max	100% 400
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) TO Mail CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.72 84 Efficacy (LW) 15 50 72 84	50% 100.0% 0.6 0.7 0.6 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 0.6 MJ/m².yr 22
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.05) ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 90% 15%	Light Level (Lux) 300 300 700 1000 % Distribution 100%	100% 300
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 50% 712 714 714	0.6 0.6 0.6 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLI	EUI KWh/ft².yr 0.5 FF MJ/m².yr 18
HIGH BAY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.80	ft-candles Floor fraction checks W/ft ²	should = 1.00 1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 100% 15%	Light Level (Lux) 200 300 400 % Distribution 25% 50% 25% Weighted Average	Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL T12 ES T8 May System Present (%)	90% 10% 100.0% 0.6 0.6 0.6 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 4.2 MJ/m².yr 161
TOTAL LIGHTING			Overall LP 13.94 W/m ² EUI TOTAL kWh/ft ² .yr 5.2 MJ/m ² .yr 202
OFFICE EQUIPMENT & PLUG LOA	ADS		
Equipment Type	Computers	Monitors Printers Copiers Se	rvers Plug Loads
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	54.55 0.59 0.3 W/m ² 0.0 W/ft ² 90% 50% 2000 6760		B I 1 W/m² 1 1 W/m² 0.09 1 W/t² 0.09 6 90% 25% 0 3500 3500
Total end-use load (occupied period) Total end-use load (unocc. period)	1.7 W/m² 0.7 W/m²	0.2 W/ft ² to see notes (cells with red indicator in upper right correct 0.1 W/ft ²	er, type "SHIFT F2"
Usage during occupied period Usage during unoccupied period	100% 44%		Computer Equipment EUI kWh/ft².yr 0.46 MJ/m².yr 17.72 Plug Loads EUI kWh/ft².yr 0.41 MJ/m².yr 16.07
FOOD SERVICE EQUIPMENT	Fossil Fuel Share:	Electricity Fuel Share: 100.0% EUI	All Electric EUI KWh/ft².yr 0.1 MJ/m².yr 5.0
REFRIGERATION Provide description below: Process			EUI kWh/ft².yr 1.8 MJ/m².yr 70.0
MISCELLANEOUS			EUI kWh/ft².yr 0.3 MJ/m².yr 10

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE:		с		CIAL SEC VINTAGE	tor Build	ING PROF	ILE		REGION: Yukon				
SPACE HEATING														
Heating Plant Type						Fossil Fuel				ctric				
					Br Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Preser Eff./COP	nt (%)		25%	20%	50%	1.70	3.00	4.50	5% 1.00	100%		
		Performance (1 / Eff.)		75% 1.33			0.59			1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load)	62.6 W/m ² 562 MJ/m ² .yr	<u>(KW/KW)</u>	19.8 14.5 k	itu/hr.ft² Wh/ft².yr										
Sizing Factor	1.00		_	05.00/	1							F	All Electric EUI	
Electric Fuel Share	5.0%	Fossil Fuel Sha		95.0%		,							kWh/ft².yr MJ/m².yr	14.5 562
Boiler Maintenance	Fire Side Water Sid Inspection Inspection	e Inspection for of Controls & S	Scale Buildup Safeties	p	Incidence (%) 75% 100% 100% 100% 90%								Fossil Fuel EUI kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	19.6 760 UI 19.4 750
SPACE COOLING														
A/C Plant Type		System Preser COP Performance ((kW/kW) Additional Refr Related Inform	S 1 / COP) igerant	entrifugal tandard 4.7 0.21	I Chillers HE 5.4 0.19			Pkgd. DX 100.0% 2.6 0.38		CW 1	Total			
Control Mode		Incidence of Us Chilled Water Condenser Wa	S	ixed etpoint	Reset									
Setpoint		Chilled Water Condenser Wa Supply Air	ter	7 30 13.0		44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	30 W/m ² 9.6 MJ/m ² .yr		Btu/hr.ft ² kWh/ft ² .yr	1251	ft²/Ton									
Sizing Factor	1.00		0	peration	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	5.0%													
Electric Fuel Share	100.0%	Gas Fuel Share	e []									
Chiller Maintenance	Inspect Cc Inspect Cc Megger M Condense Vibration / Eddy Curr	r Tube Cleaning	& Purge Unit ealing and Be	arings	Incidence (%)	Frequency (years)						F	All Electric EUI kWh/ft2.yr	0.1
Cooling Tower/Air Cooled Condense	Inspection Inspect/Se Megger M	/Clean Spray No ervice Fan/Fan M	ozzles Notors		Incidence (%)	Frequency (years)							MJ/m².yr Natural Gas EUI kWh/t².yr MJ/m².yr Market Composite E kWh/t².yr MJ/m².yr	3
DOMESTIC HOT WATER														
Service Hot Water Plant Type	Fossil Fue System P Eff./COP		Avg. Tank 85% 0.65				Boiler 0.75	Į	Fuel Share Blended E		Fossil 85% 0.65	E	Elec. Res. 15% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	18.2					-						· · · ·		
Wetting Use Percentage	90%					All Electric E kWh/ft².yr MJ/m².yr	JI 0.5 20		Fo	bssil Fuel E kWh/ft².yr MJ/m².yr	UI 0.7 28		Market Composite E kWh/ft².yr MJ/m².yr	UI 0.7 26.8

		COMMER	RCIAL SECTOR BUILDING PROFILE						
EXISTING BUILDINGS:	SIZE:		VINTAGE:		EGION:				
Warehouse/Wholesale				Y	ukon				
Baseline									
HVAC FANS & PUMPS									
				Mandlada					
SUPPLY FANS			[Ventilation an Ventilation		st Fan Operation & Co Exhaust Fan	ontroi		
System Design Air Flow 1	1 L/s.m ² 0.2	22 CFM/ft ²	Control		ariable	Fixed Variable			
		2 wg	Control	Fixed V	Flow	Flow			
		2 wg	Incidence of Use	100%	FIUW	100%			
Fan Efficiency 60		z wy	Operation		chodulod	Continuous Scheduled			
Fan Motor Efficiency 80			Operation	Continuouso	crieduleu	Continuous Scheduled			
Sizing Factor 1.0			Incidence of Use	50%	50%	50% 50%			
		07 W/ft ²	Incidence of Ose	50%	50%	50% 50%			
Fan Design Load VAV 0.		07 W/ft ²	Comments:						
	0.0	VV/IC	Comments.						
EXHAUST FANS									
EXHAUST TANS									
Washroom Exhaust 10	0 L/s.washroom	212 CFM/wa	shroom						
	1 L/s.m ²	0.01 CFM/ft ²							
	1 L/s.m ²	0.02 CFM/ft ²							
	.2 L/s.m ²	0.03 CFM/ft ²							
	50 Pa	1.0 wg							
Fan Efficiency 25		1.0 Wg							
Fan Motor Efficiency 75									
	0								
	0.2 W/m ² 0.0	02 W/ft ²							
Exhaust Fair Connected Load	0.2 W/IIF 0.0	JZ VV/II-							
AUXILIARY COOLING EQUIPMENT (Conder	ser Pump and Cooling To	ower/Condenser Fans	5)						
			·)						
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton						
(Cooling Tower/Evap. Condenser/ Air Cooled	Condenser)	0.60 W/m ²	0.06 W/ft ²						
(g									
Condenser Pump									
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton						
Pump Design Flow per unit floor area		0.002 L/s.m ²	0.002 U.S. gpm/ft ²						
Pump Head Pressure		kPa	ft						
Pump Efficiency		50%							
Pump Motor Efficiency		80%							
Sizing Factor		1.0							
Pump Connected Load		1.0 W/m ²	W/ft ²						
amp connected Load		VV/11	Witt						
CIRCULATING PUMP (Heating & Cooling)									
Pump Design Flow @ 5 °C (10 °F) delta T	0.00)1 L/s.m ²	0.0019 U.S. gpm/ft ² 2.4	U.S. gpm/To	on				
Pump Head Pressure		50 kPa	17 ft	Jote: gpint to					
Pump Efficiency	50								
Pump Motor Efficiency	80								
Sizing Factor	0.0								
Pump Connected Load		.1 W/m²	0.01 W/ft ²						
i anp connocioù zoad									
Supply Fan Occ. Period	350	0 hrs./year							
Supply Fan Unocc. Period	526	60 hrs./year							
Supply Fan Energy Consumption	4	.4 kWh/m².yr							
Exhaust Fan Occ. Period	350	0 hrs./year							
Exhaust Fan Unocc. Period		60 hrs./year							
Exhaust Fan Energy Consumption		.4 kWh/m².yr							
	· · · ·	. ,							
Condenser Pump Energy Consumption		kWh/m².yr							
Cooling Tower /Condenser Fans Energy Const	umption 0	.0 kWh/m².yr							
g									
Circulating Pump Yearly Operation	500	0 hrs./year							
Circulating Pump Energy Consumption		.6 kWh/m².yr							
g =									
Fans and Pumps Maintenance	Annual Maintenance Ta	sks	Incidence Frequency						
			(%) (years)						
	Inspect/Service Fans &	Motors							
	Inspect/Adjust Belt Tens		+						
	Inspect/Service Pump &		1 1				EUI	kWh/ft ² .yr	0.6
	Linepoor contract unip u							MJ/m ² .vr	23.1

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		NG PROFILE		REGION: Yukon			
EUI SUMMARY										
TOTAL ALL END-USES:	Electricity:		10.1 kWh/ft².yr 391.1 MJ/m².yr		Fossil Fue	19.3 kWh/ft ² .yr	745.9 MJ/m	h².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fossi	I Fuel			
GENERAL LIGHTING	0.6	22.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr			
ARCHITECTURAL LIGHTING	0.5	18.3	SPACE HEATING	0.7	28.1	18.6	722.1			
HIGH BAY LIGHTING	4.2	161.3	SPACE COOLING	0.0	0.2					
OTHER PLUG LOADS	0.4	16.1	DOMESTIC HOT WATER	0.1	3.0	0.6	23.8			
HVAC FANS & PUMPS	0.6	23.1	FOOD SERVICE EQUIPMENT	0.1	4.0					
REFRIGERATION	1.8	70.0								
MISCELLANEOUS	0.3	10.0								
COMPUTER EQUIPMENT	0.5	17.7								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's
	exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per
	degree Fahrenheit (BTU/hr. f ^{2.o} F) through walls, roofs
	and windows. The U-value is the reciprocal of the R-
	value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear
Window-to-wall ratio	glass Defines the ratio of window to insulated exterior wall area
General lighting	Defines the lighting types that are used within the main
General lighting	areas of a building, e.g., for a School, the area is
	classrooms and the lighting type is fluorescent; for a
	Food Retail store, the main area is the retail floor.
LPD	Lighting power density expressed in terms of W/ft ²
Lux	The amount of visible light per square meter incident on
	a surface (lumen/m ²)
Inc	Incandescent lamps
CFL	Compact fluorescent lamps
T12	T12 fluorescent lamps with magnetic ballasts
T8	T8 fluorescent lamps with electronic ballasts
MH	Metal halide lamps
HPS	High-pressure sodium lamps
HID	High-intensity discharge lighting includes both MH and
	HPS
Secondary lighting	Defines the lighting types that are used within the
, , , ,	secondary areas of a building, e.g., for a School, the
	secondary areas are corridors, lobbies, foyers, etc.,
Tertiary lighting	Defines the lighting types that are used within special
	purpose areas of a building, e.g., for a School, the
	tertiary area is a gymnasium.
Outdoor lighting	Defines the outdoor lighting including parking lot and
	façade
Overall LPD	The total floor weighted LPD that includes general,
	secondary, tertiary, and outdoor.
Fans	Defines mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
space heating	Defines the mix of heating equipment types found within
ACUD	the stock of buildings
ASHP	Air-source heat pump
WSHP	Water-source heat pump
Resistance	Electric resistance heating equipment including boilers
Netwol.coc	and baseboard heaters
Natural gas	Natural gas heating equipment including packaged
Capace cooling	rooftop units and boilers
Space cooling	Defines the mix of cooling equipment types found within the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance
Centinugai	of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a
CERTITIE	performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
	Direct expansion cooling equipment that use small
DX	

Appendix B

Background-Section 4: Base Year Peak Load

Introduction

Appendix B provides additional detailed information related to each of the major steps employed in the generation of the Commercial sector Base Year peak loads. The discussion is organized as follows:

- Overview of peak load methodology
- Segmentation of commercial buildings
- Detailed results.

B1 Overview of Peak Load Profile Methodology

As noted in the main text, development of the electric peak load estimates employs four specific factors as outlined below:

- Monthly Usage Allocation Factor: This factor represents the percent of annual electric energy usage that is allocated to each month. This set of monthly fractions (percentages) reflects the seasonality of the load shape, whether a facility, process or end use, and is dictated by weather or other seasonal factors. In decreasing order of priority, this allocation factor can be obtained from either: (a) monthly consumption statistics from end-use load studies; (b) monthly seasonal sales (preferably weather normalized) obtained by subtracting a "base" month from winter and summer heating and cooling months; or (c) heating or cooling degree days on an appropriate base.
- Weekend to Weekday Factor: This factor is a ratio that describes the relationship between weekends and weekdays, reflecting the degree of weekend activity inherent in the facility or end use. This may vary by month or season. Based on this ratio, the average electric energy per day type can be computed from the corresponding monthly electric energy.
- Peak Day Factor: This factor reflects the degree of daily weather sensitivity associated with the load shape, particularly heating or cooling; it compares a peak (e.g., hottest or coldest) day to a typical weekday in that month.
- Per Unit Hourly Factor: The relationship of load among different hours of the day for each day type (weekday, weekend day, peak day) and for each month reflects the operating hours of the electric equipment or end use within commercial facilities by sub sector. For example, for lighting, this would be affected by time of day, season (affected by daylight), and room type, where applicable. For the Base Year, lighting is treated on an aggregate basis by total facility.

The four factors (sets of ratios) defined above provide the basis for converting annual energy to any hourly demand specified including the grouping of hours used in the three peak periods defined in this study. Exhibit B 1, below, illustrates how each of the above four factors is applied sequentially to a known annual energy value to produce a peak load value, defined as a specific peak period. In the example, Peak Period 1 (annual system peak hour) is used.

Exhibit B 1 Illustrative Application of Annual Energy to Peak Period Value Factors

Peak Period 1 (annual system peak hour) is computed based on the December peak day at 6 pm. The Yukon peak is assumed to occur in December, although the model allows for a January peak, as well.

The following steps are required:

- **Step 1**: The monthly usage allocation factor for December is applied to the annual energy use to calculate December energy use.
- Step 2: The average weekday in December is calculated based on the formula shown below, which adjusts the average day type use to reflect any difference in typical weekend use versus typical weekday use.
- 1/[Days in Month * (5/7 + 2/7 * Wkend Ratio)]
- Step 3: The peak day factor is then applied to the average weekday electric energy use to determine the peak day use (as defined by Yukon Energy).
- Step 4: The peak hour is then calculated based on allocating the peak day use according to the per unit hourly load factor for a peak winter (December) day, using the percentage of use in that hour versus the daily usage for the December peak day.

It should be noted that the methodology shown in Exhibit B 1 produces aggregate diversified average loads for all customers or end uses in the defined sub sector.

Exhibit B 2 provides a specific numeric example for the calculation of peak hour demand (kW) under the Peak Period 1 definition. The example presented in Exhibit B 2 is for space heating use in Offices. The example shows how the annual consumption of 10,000 kWh can be converted to a peak demand value for Peak Period 1 by the calculation of a corresponding hours-use value.

Exhibit B 2 Sample Hours-Use Calculation for Office Electric Space Heating

Peak Period 1: 6 pm Winter Peak (December) =

Annual kWh * Mo. Allocation (Dec.) * 1/(Days in Month * (5/7 + 2/7 * Wkend Ratio)) * Peak Day Factor * Pk Hour % Daily kWh

6 pm Winter Peak = <u>10,000</u> [Annual kWh] * <u>14.75%</u> [Mo. Allocation] * 1/(31 * (5/7 + 2/7 * <u>1.0</u> [Dec. Wkend Ratio Calc])) * <u>1.39</u> [Dec. Peak Day Factor] * <u>0.04105</u> [Pk Hour % Day kWh] = <u>3.098</u> kW

Hours-use Factor =10,000 [annual kWh] / 2.3755 [6pm Winter Peak] = 4,210 [Peak Period 1 Hours Use, in Red on Ex B5, LL Code 2022]

This means that any applicable Office annual space heating kWh can be converted to demand at winter peak hour (6 pm) by dividing by 4,210.

For other peak periods, different sets of hours are used, with calculations corresponding to the above steps. The resulting relationship between annual use and peak can be defined in terms of an hours-use factor, the ratio of the annual energy to the peak, for each of the three defined peak periods.

B2 Segmentation of Commercial Buildings

The Commercial sector segmentation used to generate the electric peak load profiles is the same as that used for electric energy use. That is, there is a load profile that corresponds to each combination of sub sector and end use.

Exhibit B 3 shows the Commercial sub sectors and end uses that were addressed.

Exhibit B 3 Commercial Segmentation Used for Electric Peak Load Calculations

Sub sectors (Office, Food Retail, Non-Food Retail, Hotel/Motel, Health, Education, Restaurant, Warehouse/Wholesale, Recreation Centres)

End uses (general lighting, outdoor lighting, architectural lighting, street lighting, space heating, space cooling, food service equipment, domestic hot water, refrigeration, computers/plug load)

Exhibit B 4 describes the assumptions and data sources for each of the four load profile factors that were used to develop the corresponding hours-use factors. To produce a demand for combination of sub sector and end use, the corresponding annual energy is divided by the hours-use factor for each of the three peak periods for the applicable load shape. For certain end uses that are assumed to have no usage during the winter months (e.g., cooling) the hours-use values are considered infinite (noted by 1E+15), resulting in virtually zero demand when divided into annual energy.

Load Shape #	End Use Montl Breakd		Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2001	General lighting – Office	RG&E Office lighting	App. 0.50 RG&E Office lighting	1.0 Assumed	Office lighting - RG&E 1991 Study ¹
2002	General lighting – Non- food Retail	RG&E Retail lighting	RG&E Retail lighting	1.0 Assumed	RG&E Retail lighting
2003	General lighting – Food Retail	RG&E Grocery lighting	RG&E Grocery lighting	1.0 Assumed	RG&E Grocery lighting
2004	General lighting – Hotel/Motel	RG&E Hotel/Motel lighting	RG&E Hotel/Motel lighting	1.0 Assumed	RG&E Hotel/Motel lighting
2005	General lighting – Health	RG&E Hospital/Long- term Care lighting	RG&E Hospital/Long- term Care lighting	1.0 Assumed	RG&E Hospital/Long- term Care lighting
2006	General lighting – Education	RG&E College lighting	RG&E College lighting	1.0 Assumed	RG&E College lighting

Exhibit B 4 Commercial End Use Load Shape Parameters

¹ Rochester Gas & Electric Company; 1991 DSM Evaluation Report Load Shape working papers.

Yukon Electricity Conservation and Demand Management Potential Review (CPR 2011) Commercial Sector Appendices

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2007	General lighting – Restaurant	RG&E Full- serve Restaurant lighting	RG&E Full- serve Restaurant lighting	1.0 Assumed	RG&E Full-serve Restaurant lighting
2008	General lighting – Warehouse	RG&E Warehouse lighting	RG&E Warehouse lighting	1.0 Assumed	RG&E Warehouse lighting
2009	General lighting – Small Office and Other Commercial	RG&E Office lighting	RG&E Office lighting (modified) ²	1.0 Assumed	RG&E Office lighting (modified)
2010	General lighting – Small Non-food Retail	RG&E Small Non-food Retail lighting	RG&E Non- food Retail lighting (modified)	1.0 Assumed	RG&E Non-food Retail lighting (modified)
2011	Architectural lighting – Office & Education	Architectural lighting model	1.0 Assumed	1.0 Assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2012	Architectural lighting – Retail & Restaurant	Architectural lighting model	1.0 Assumed	1.0 Assumed	Architectural lighting model 6 am-10 pm 100%, 50% evening, 10% overnight
2013	Architectural lighting – Health & Warehouse	Architectural lighting model	1.0 Assumed	1.0 Assumed	Architectural lighting model 6 am-10 pm 100%, 80% evening, 50% overnight
2014	Architectural lighting – all other	Architectural lighting model	1.0 Assumed	1.0 Assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2015	Refrigeration – Restaurant, Hotel, Health	RG&E Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration
2016	Refrigeration – Food Retail	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration
2017	Refrigeration – Warehouse / Wholesale	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration
2018	Refrigeration – Education	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration
2019	Refrigeration – all Other Commercial	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration
2020	Streetlighting	Based on dusk-to-dawn lighting model	1.0 Assumed	1.0 Assumed	Dusk-to-dawn model, average Whitehorse sunrise/ sunset
2021	Outdoor lighting	Based on outdoor lighting model	1.0 Assumed	1.0 Assumed	Outdoor lighting model, with RG&E 1991 study factors (0.55 overnight, 0.1 day, 1.0 eve.)

² Modifications for per-unit load shapes for Small Office and Small Non-food Retail reduced overnight loads by 50% after 6 pm (Office) and after 9 pm (Non-food Retail).

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2022	Space heating – Office	10-year average Whitehorse HDD ³	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 Study for Office Space Heating
2023	Space heating – Retail Food/Non-Food	10-year average Whitehorse HDD	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Retail Space heating
2024	Space heating – Hotel/ Health	10-year average Whitehorse HDD	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Hospital/Long-term care space heating
2025	Space heating – School / University	10-year average Whitehorse HDD	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for School space heating
2026	Space heating – Restaurant	10- year average Whitehorse HDD	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for total Restaurant space heating
2027	Space heating – all Other Commercial	10-year average Whitehorse HDD	1.0 Assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Commercial space heating
2028	Food service equipment – Restaurant	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking
2029	Food service equipment – Hotel / Health	RG&E total Hospital/Long- term Care cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long-term Care cooking
2030	Food service equipment – Food Retail	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking
2031	Food service equipment – School/University	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2032	Food service equipment – all Other Commercial	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2033	Domestic hot water (DHW) – Restaurant	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat
2034	Domestic hot water (DHW) – Hotel / Health	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat
2035	DHW – Food Retail and Non-Food Retail	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat
2036	DHW – School / University	RG&E School water heat	RG&E School water heat	RG&E School water heat	RG&E School water heat
2037	DHW – all Other Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial

³ Heating degree days on an 18°C base for period 2001 - 2010 for the Whitehorse weather station.

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2038	Space cooling – All Commercial	10-year average CDD	RG&E total Commercial (app. 0.74 – 0.82)	RG&E 1991 study for Commercial space cooling	RG&E 1991 study for Commercial space cooling
2039	Computer, plug load	RG&E Office lighting	RG&E Office lighting	1.0 Assumed	RG&E Office lighting
2040	Elevators	NYC subways	NYC subways (0.7881)	1.0 Assumed	NYC subways (6 am-6 pm), arch Office lighting (6 pm –6 am)
2041	Engine Block Heaters	10-yr average Whitehorse HDD	1.0 assumed	10-yr average Whitehorse HDD	Flat, average 7.9 hrs/day for 90 days ⁴

Data Sources

As noted, class load profiles by rate class and end uses and, where applicable, valid sub sector segments of those rate classes and end uses, were the preferred source for load profile factors. For monthly breakdowns, sales data were available for many sub sectors and were used wherever possible, as indicated above. The principal sources used for other factors were:

- Rochester Gas & Electric 1991 load study RG&E conducted a detailed end-use load and modeling study of residential and commercial end uses to support its DSM program portfolio and provided these results as backup in its regulatory filings for several years.
- Data from the Yukon can be used to substitute for the above sources as it becomes available. The LOADLIB model is designed to make the process of updating any load profile component straightforward. A sample (Office general lighting) of the tables and graphic outputs of the LOADLIB model, with 10,000 annual kWh used for illustrative purposes is provided at the end of this appendix.
- As indicated, class load profiles by rate class and, where applicable, valid subs segments of those rate classes (e.g., usage level strata), were to be used to calibrate class total hourly load profiles.

Exhibit B 5 shows the distinct hour-use values developed for each combination of peak period, sector, sub sector and end use employed in this study, as generated from the applicable load shape.

The hours-use value represents the divisor to convert annual energy (e.g., MWH) to that peak period demand. For example, dividing the annual electricity consumed for space heating in Offices (LL Code 2022), the hours-use value for Peak Period 1 (i.e., 4,210) will convert annual MWH to demand at the annual system peak hour (6 pm).

⁴ Ontario Power Authority – OPA Measures and Assumptions List (prescriptive) as of January 31, 2010; 1,450 watts at 7.9 hours/day x 90 days.

LL Sector		SubSector	Region	End Use	End Use	Hours Use Values					
Code	Туре	Subsector	Kegion	Laid Cse	Sub	Measure	Peak1	Peak2	Peak3		
2001	Com	Large Office	All	General Lighting	All	Base	5,582	6,187	6,489		
2002	Com	Non-Food Retail	All	General Lighting	All	Base	4,898	5,192	10,774		
2003	Com	Food Retail	All	General Lighting	All	Base	6,590	6,761	7,802		
2004	Com	Hotel/Motel	All	General Lighting	All	Base	6,618	6,918	7,065		
2005	Com	Hospital/Long Term Care	All	General Lighting	All	Base	7,877	7,561	6,751		
2006	Com	School/University	All	General Lighting	All	Base	5,672	5,681	7,575		
2007	Com	Restaurant	All	General Lighting	All	Base	6,985	6,918	11,851		
2008	Com	Warehouse/Wholesale	All	General Lighting	All	Base	5,112	5,706	4,747		
2009	Com	Small Office/Other Comm.	All	General Lighting	All	Base	4,831	6,671	5,595		
2010	Com	Small Non-Food Retail	All	General Lighting	All	Base	4,360	4,598	9,542		
2011	Com	Office and School	All	Architectural Lighting	All	Base	6,053	8,070	6,053		
2012	Com	Retail and Restaurant	All	Architectural Lighting	All	Base	6,778	6,778	6,778		
2013	Com	Health and Warehouse	All	Architectural Lighting	All	Base	7,874	7,874	7,874		
2014	Com	All Other	All	Architectural Lighting	All	Base	6,053	8,070	6,053		
2015	Com	Restaurant/ Hotel/ Health	All	Refrigeration	All	Base	7,783	7,775	8,188		
2016	Com	Food Retail	All	Refrigeration	All	Base	8,806	8,739	9,158		
2017	Com	Warehouse/Wholesale	All	Refrigeration	All	Base	7,339	6,999	7,511		
2018	Com	School/University	All	Refrigeration	All	Base	6,341	10,658	11,242		
2019	Com	All Other	All	Refrigeration	All	Base	8,003	7,924	8,492		
2020	Com	Streetlighting	All	Streetlighting	All	Base	3,901	4,792	3,674		
2021	Com	All	All	Outdoor Lighting	All	Base	2,976	3,571	5,032		
2022	Com	Office	All	Space Heating	All	Base	4,210	4,754	2,645		
2023	Com	Retail Food and Non-Food	All	Space Heating	All	Base	3,165	3,183	2,354		
2024	Com	Hotel, Hospital/Long Term Care	All	Space Heating	All	Base	3,464	3,880	3,161		
2025	Com	School/University	All	Space Heating	All	Base	4,533	5,302	2,245		
2026	Com	Restaurant	All	Space Heating	All	Base	3,639	4,353	2,697		
2027	Com	All Other	All	Space Heating	All	Base	3,660	4,019	2,728		
2028	Com	Restaurant	All	Food Service Equip.	All	Base	4,771	5,004	7,186		
2029	Com	Hotel, Hospital/Long Term Care	All	Food Service Equip.	All	Base	5,067	6,134	4,521		
2030	Com	Retail Food	All	Food Service Equip.	All	Base	11,361	12,159	5,951		
2031	Com	School/University	All	Food Service Equip.	All	Base	165,008	61,915	2,211		
2032	Com	All Other	All	Food Service Equip.	All	Base	165,008	61,915	2,211		
2033	Com	Restaurant	All	Domestic Hot Water	All	Base	5,139	5,483	8,196		
2034		Hotel, Hospital/Long Term Care	All	Domestic Hot Water	All	Base	5,571	5,984	7,909		
2035	Com	Retail Food and Non-Food	All	Domestic Hot Water	All	Base	13,538	8,120	21,754		
2036	Com	School/University	All	Domestic Hot Water	All	Base	1.E+15	24,610	6,349		
2037	Com	All Other	All	Domestic Hot Water	All	Base	5,571	5,984	7,909		
2038	Com	All	All	Space Cooling	All	Base	1.E+15	1.E+15	1.E+15		
2039	Com	All	All	Computer, Plug Load	All	Base	5,582	6,187	6,489		
2039	Com	All	All	Elevators	All	Base	4,769	6,217	4,552		
2040	Com	All	All	Engine Block Heaters	All	Base	1,493	1,194	1.E+15		

Exhibit B 5 Commercial Sector Load Shape Hours-Use Values

Since YEC and YECL do not conduct regular class or end-use load analysis studies, there are no actual total (or sub sector) end-use load profiles upon which to calibrate the load profile models developed for this study. End-use data collection has not been performed. Summing all end use consumption would produce a total commercial daily load profile, but the Yukon class load profile to which it would be compared would still only be a statistical estimate and not an actual, in the same way that the annual kWh energy sales would be for the calibration of total annual kWh. The best option for calibrating Yukon-specific load profile parameters is the weather-sensitive loads, since that is the most area-specific.

Since separately metered space heating end-use load data were not available, normal weather for the past 10 years was used to determine monthly allocations, and weekend/weekday ratios were developed from similar studies for another winter-peaking Canadian utility.

For peak day factors, the past 10 years of average versus peak weather conditions (in heating degree days) was analyzed for Whitehorse to determine typical peak day factors for normal weather. The resulting peak day factors ranged from about 1.2 to 1.5 for winter months. For non weather-sensitive end uses, a factor of 1.0 was assumed, absent specific load study data.

B4 Detailed Results

Exhibit B 6, Exhibit B 7 and Exhibit B 8 show hydro region peak demand by sub sector and end use for each of the three peak periods identified for this study.

Note:

- The results shown in the following exhibits are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.
- Zeros that appear in the following exhibits should be read as small but non-zero numbers. Actual values of zero are shown as a dash (-).

Exhibit B 6 Commercial Sector Base Year (2010) Hydro Region, Period 1 - Peak Hour Demand, by Sub Sector and End Use (MW)

Sub Sector	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Food Service Equipment	Refrigeration	Elevators	Miscellaneous	Street Lighting	Non Buildings	Block Heater	Grand Total
Office	1.1	0.3	-	0.2	1.3	0.0	0.5	0.1	0.7	0.2	0.0	0.0	0.0	0.1	-	-	-	4.6
Food Retail	0.1	0.1	0.2	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.7	-	0.0	-	-	-	1.4
Non-food Retail	0.9	0.4	0.2	0.3	0.6	0.0	0.3	0.0	0.1	0.1	0.0	0.0	-	0.0	-	-	-	3.0
Hotel / Motel	0.1	0.2	-	0.1	0.6	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	-	-	-	1.6
Healthcare	0.1	0.1	-	0.1	0.2	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	-	-	0.8
Education	0.6	0.2	0.1	0.1	0.7	0.0	0.3	0.0	0.2	0.2	0.0	0.1	-	0.0	-	-	-	2.5
Recreation Centres	0.1	0.0	0.4	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	-	0.0	-	-	-	1.2
Restaurant	0.1	0.2	-	0.2	0.3	0.0	0.1	0.1	0.0	0.0	0.2	0.2	-	0.0	-	-	-	1.4
Warehouse / Wholesale	0.2	0.1	1.2	0.2	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.4	-	0.1	-	-	-	2.8
Other General Service	1.5	0.6	0.2	0.4	1.3	0.0	0.5	0.1	0.5	0.3	0.0	0.1	0.0	0.1	-	-	-	5.6
Street lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	0.9
Non-Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	2.2
Parking Lot Plug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2
Grand Total	4.8	2.3	2.1	1.8	5.5	0.0	2.2	0.4	1.8	1.1	0.3	1.8	0.1	0.6	0.9	2.2	0.2	28.2

Exhibit B 7 Commercial Sector Base Year (2010) Hydro Region, Period	I 2 - Annual System Peak, by Sub Sector and End Use (MW)
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Sub Sector	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Food Service Equipment	Refrigeration	Elevators	Miscellaneous	Street Lighting	Non Buildings	Block Heater	Grand Total
Office	1.0	0.2	-	0.2	1.2	0.0	0.4	0.1	0.6	0.2	0.0	0.0	0.0	0.1	-	-	-	4.0
Food Retail	0.1	0.1	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.7	-	0.0	-	-	-	1.4
Non-food Retail	0.9	0.4	0.2	0.2	0.6	0.0	0.2	0.0	0.1	0.1	0.0	0.0	-	0.0	-	-	-	2.8
Hotel / Motel	0.1	0.2	-	0.1	0.5	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	-	-	-	1.4
Healthcare	0.2	0.1	-	0.1	0.2	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	-	-	0.7
Education	0.6	0.2	0.1	0.1	0.6	0.0	0.3	0.0	0.2	0.1	0.0	0.0	-	0.0	-	-	-	2.3
Recreation Centres	0.1	0.0	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	-	0.0	-	-	-	1.1
Restaurant	0.1	0.2	-	0.2	0.3	0.0	0.1	0.1	0.0	0.0	0.2	0.2	-	0.0	-	-	-	1.3
Warehouse / Wholesale	0.1	0.1	1.1	0.2	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.4	-	0.1	-	-	-	2.5
Other General Service	1.4	0.5	0.1	0.3	1.1	0.0	0.5	0.1	0.5	0.2	0.0	0.1	0.0	0.1	-	-	-	4.9
Street lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	0.7
Non-Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	2.2
Parking Lot Plug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
Grand Total	4.5	1.9	1.9	1.5	4.9	0.0	2.1	0.4	1.6	0.9	0.3	1.9	0.1	0.4	0.7	2.2	0.3	25.6

Food Service Equipment **HVAC Fans and Pumps Architectural Lighting Computer Equipment High-bay Lighting** Other Plug Loads **Outdoor Lighting General Lighting Space Heating** Space Cooling Miscellaneous Street Lighting **Non Buildings** Water Heating Refrigeration **Block Heater Grand Total** Elevators **Sub Sector** Office 0.9 0.3 0.1 2.1 0.0 0.4 0.1 0.6 0.2 0.1 0.0 0.0 0.2 5.0 ----Food Retail 0.1 0.1 0.1 0.2 0.0 0.0 0.0 0.0 1.4 0.1 0.1 0.0 0.0 0.7 --_ -Non-food Retail 0.4 0.4 0.1 0.2 0.8 0.0 0.1 0.0 0.1 0.1 0.0 0.0 -0.1 2.3 ---Hotel / Motel 1.5 0.1 0.2 -0.1 0.6 0.0 0.1 0.1 0.1 0.1 0.0 0.1 0.0 0.0 ---Healthcare 0.2 0.1 -0.0 0.2 0.0 0.2 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.8 ---Education 0.5 0.2 3.2 0.2 0.1 0.1 1.3 0.0 0.2 0.2 0.2 0.2 0.0 0.0 --_ -**Recreation Centres** 1.3 0.1 0.0 0.4 0.1 0.1 0.0 0.1 0.0 0.0 0.0 0.1 0.3 -0.0 ---Restaurant 0.0 0.2 0.2 0.0 1.3 -0.1 0.4 0.0 0.1 0.0 0.0 0.0 0.1 ----Warehouse / Wholesale 0.2 0.1 1.3 0.1 0.4 0.0 0.2 0.0 0.1 0.1 0.1 0.3 0.1 3.0 ----**Other General Service** 1.3 0.6 0.1 0.2 5.9 0.2 2.1 0.0 0.5 0.1 0.5 0.3 0.1 0.1 0.0 ---Street lighting 1.0 1.0 ------------**Non-Buildings** 2.2 2.2 ----------------Parking Lot Plug 0.0 -0.0 ---------------**Grand Total** 3.8 2.3 2.1 8.3 0.4 0.8 1.8 2.2 0.0 28.9 1.1 0.0 1.9 1.5 1.2 0.1 0.6 1.0

Exhibit B 8 Base Year (2010) Hydro Region, Period 3, Annual Morning System Peak, by Sub Sector and End Use (MW)

B5 Sample LOADLIB Output

The following exhibits provide sample LOADLIB load shape library outputs, with Office space heating (LL Code 2022) as the example, assuming 10,000 annual kWh.

	OFFICE - HE	-						
ENERGY PROFILE SUMMARY:				SPHOFFRGE	-BCLMYE		2022	
2022	ANNUAL USE:	1000	kWH	PEAK HR(s)	18	17		
		1000		PK MONTH(s)	12	7		
			AVERAGE	AVERAGE	NON-COIN	COIN		
	MONTHLY	PEAK DAY	WEEKDAY	WEEKEND	PEAK	PEAK		
	USAGE	USAGE	USAGE	USAGE	DEMAND	DEMAND	SEAS	
	450	7.0	5.0	5.0	0.4400	0.0400	14/	
JAN				5.0		0.2180		
FEB						0.2130		
MAR						0.1868		
APR						0.1371		
MAY JUN				1.7		0.0000		
JUL	20			0.9		0.0000		
AUG	20					0.0000		
SEP	50			1.7		0.0243		
OCT	80					0.0473		
NOV	120					0.1553		
DEC	120			4.0		0.1333		
DLC	140	0.0			0.0720	0.2010	••	
	OFFICE - HEAT							
	ANNUAL STATI							
	AVERAGE DEMA	ND			kW DEMAND			
	PEAK DEMAND			0.4463	kW	0.7439	kW	
	NON-COIN LOAD			25.58%				
	NON-COIN PEAK	HOURS USE		2241			hrs/yr	
						3.68	hrs/day	
	COINCIDENT P	EAK STATIS	TICS:		Den	nand Factor	60.0%	
	WINTER COINCIDE	NT PEAK		0.2375	kW			
	6	PM in DEC						
	ANNUAL COINCIE	ENCE FACTOR		53.22%				
	PEAK DAY COIN	CIDENCE FACTO)R	49.32%				
	COIN PEAK LOAD) FACTOR		48.06%				
	COIN PEAK HOU	RS USE		4210				
	SUMMER COINCID			0.0000	k/M		*	
		PM in JUL		0.0000			*	
				#N1/A			~	
	COIN PEAK HOUI	KS USE		#N/A				
	Appuel Deals Llaura	Zo 10p Maskel	v / Non Holidour	0704	houro	040	dovo	
	Annual Peak Hours				hours	249	days	
		Peak Energy Percent Peak			kWH			
		Fercent Peak		42.2%				
		Peak 1	Peak 2	Peak 3				
	SPHOFFRGE-BCLMY E	4,210					HRS USE	
			Win Pk H17-20	Dec Pk Hr8-9			1 I (0 00E	
		hours use	hours use	hours use				
	Average Demands	0.2375	0.2104	0.3780				

Exhibit B 9 Commercial Sector LOADLIB Output – Summary Page

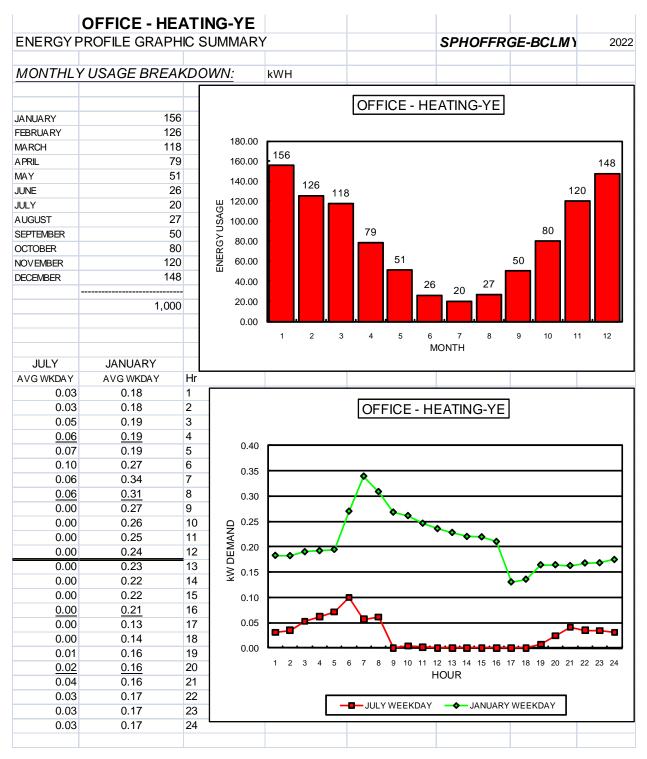


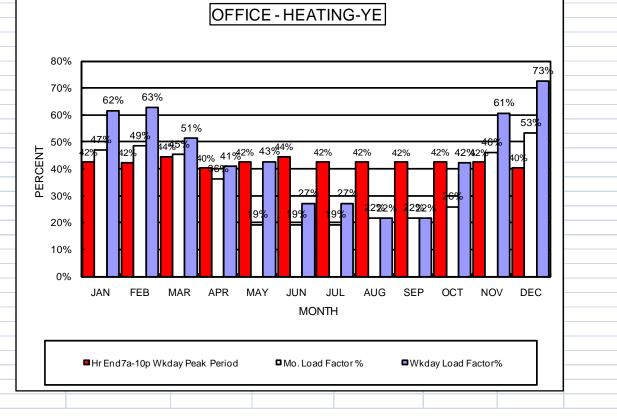
Exhibit B 10 Commercial Sector LOADLIB Output – Page 2

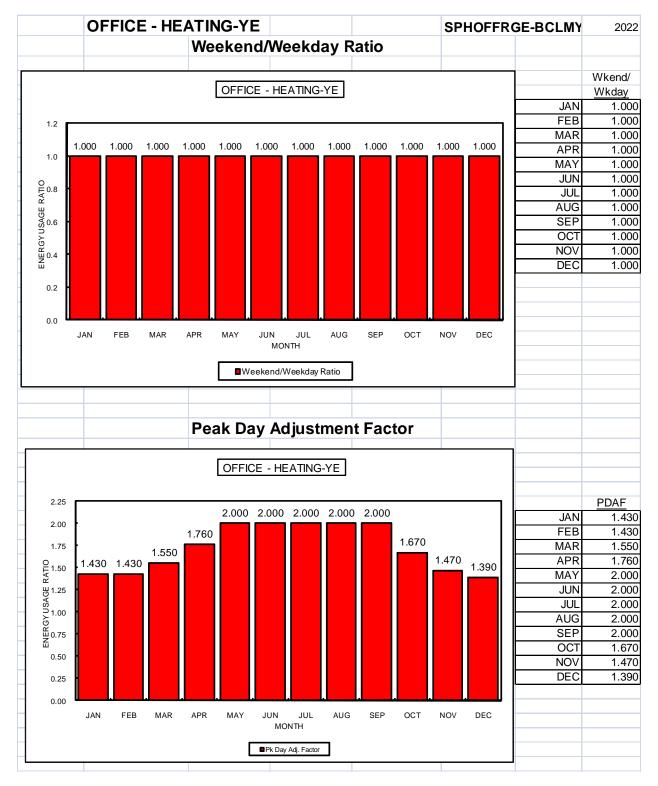
EAK MO	OFFICE - HE	ROFILE GRAP	HIC SUMMARY		SPHOFFRO	GE-BCLM	202
,							0
		PEAK MONTH	OF: DEC				
HOUR	PEAKDAY	WEEKDAY	WEEKEND		PEAK DAY	WEEKDAY	WEEKEND
1			0.16	13	0.33	0.22	0.2
2			0.16	14	0.31	0.21	0.2
3			0.17	15	0.31	0.21	0.2
4			0.16 0.17	16 17	0.30	0.20	0.2
5			0.17	17	0.23	0.13	0.1
7			0.21	10	0.24	0.14	0.1
8			0.23	20	0.27	0.10	0.1
9			0.25	20	0.23	0.17	0.1
10			0.24	22	0.22	0.17	0.1
11	0.3		0.23	23	0.19	0.16	0.1
12	0.3	5 0.23	0.23	24	0.20	0.17	0.1
		l	OFFICE - HE/	ATING	G-YE		
	0.40	(OFFICE - HE	ATINO	B-YE]
	0.40	[OFFICE - HE	ATINO	G-YE		
) ø		ATINO	S-YE		
	0.35			ATINC	G-YE		
	0.35				G-YE		
	0.35			ATINC	G-YE		
	0.35 0.30 Q 0.25			ATINC	S-YE		
	0.35			ATINC	S-YE		
	0.35 0.30 Q 0.25 WH 0.20 M 0.15			ATINC	G-YE		
	0.35 0.30 0.25 0.20 0.15 0.10 0.05				S-YE		
	0.35 0.30 Q 0.25 W 0.20 Q 0.15 0.10			13 14 15	5-YE	9 20 21 22	23 24

Exhibit B 11 Commercial Sector LOADLIB Output – Page 3

	OFFICE - HEA	ATING-YE			SPHOFFRGE-	BCLMYE	2022
		BILLING PAR	AMETERS A	VALYSIS			
	kWH	kW	Monthly	Weekday	Hr End7a-10p \	Nkday Peak I	Period
	Monthly kWh	Month Pk kW	Load Factor	Load Factor	<u>Peak kWh</u>	<u>Off-Peak</u>	Peak %
JAN	156	0.446	46.9%	61.6%	66	90	42.5%
FEB	126	0.385	48.5%	62.8%	53	73	42.2%
MAR	118	0.350	45.3%	51.3%	52	65	44.5%
APR	79	0.302	36.1%	40.8%	32	47	40.3%
MAY	51	0.358	19.2%	42.6%	22	29	42.5%
JUN	26	0.190	19.2%	27.1%	12	15	44.5%
JUL	20	0.141	19.2%	27.1%	9	12	42.5%
AUG	27	0.166	21.6%	21.6%	11	15	42.5%
SEP	50	0.322	21.6%	21.6%	21	29	42.4%
OCT	80	0.415	25.9%	42.2%	34	46	42.5%
NOV	120	0.363	46.0%	60.6%	51	69	42.4%
DEC	148	0.372	53.2%	72.7%	60	88	40.4%
Avg. Mo.	83	0.318	35.9%	44.3%	35	48	42.2%
Annual	1,000	0.446	25.6%		422	578	42.29
Avg Hour	0.11				0.113	0.115	
80'	%	OFFIC	CE - HEATIN	NG-YE			
70	% 62% 63%				6	73%	
60'		51%				53%	
⊢ ⁵⁰		\$5%	43% <u>44%</u> 42%	42% 42%	469		
LN 40° DA 40° A 30°		₩5% 40% 41% ^{2%}		42% 42%	42% 42%2%-	40%	
H 30	%				- 2 6% -		

Exhibit B 12 Commercial Sector LOADLIB Output - Page 4







Appendix C

Background-Section 5: Reference Case Electricity Use

Introduction

Appendix C provides additional detailed information related to the construction of the Commercial sector Reference Case. The appendix discusses the following:

- Natural change assumptions
- Expected growth in building stock
- CEEAM archetype summaries new buildings.

C 1 Natural Change Assumptions

For the purposes of this study, "natural" changes to electricity consumption are defined as those changes to electricity usage patterns that occur without incentive or other intervention. Expected natural changes in electricity consumption patterns over the study period take into account four major factors:

- Naturally-occurring improvements in equipment efficiency
- Expected stock penetration by more efficient equipment
- Changes in equipment density, e.g., computers and plug loads, etc.
- Changes in electric share in end uses for which fuel may vary, such as space heating and water heating.

Note that the first two factors will have the effect of reducing electricity consumption, while the third and fourth factor may result in either increased or decreased electricity demand. While all of these factors influence future electricity use within the Commercial sector, the fourth, specifically increased space heating penetration in new buildings, is the dominant driver of new Commercial sector load growth in the Reference Case.

Based on the assessment of current trends, the most significant natural changes are expected to involve the following end uses:

- Space cooling
- Lighting
- Computer equipment and other plug loads
- Water heating
- Space heating.

Further discussion of these changes follows and, in each case, the discussion identifies the technical change, the major driver(s) and the assumed electricity impact.

Space Cooling

As a result of natural conservation and efficiency gains, it is assumed that new space cooling equipment will provide improved electricity performance compared to existing equipment. Packaged rooftop units are available on the market with energy-efficiency ratios (EER) exceeding 12.0.⁵ Similarly, new centrifugal chillers achieve performance efficiencies in the

⁵ See <u>http://www.energence.com/res/pdf/52W81_energence_58937_0709.pdf</u> for example. Current federal energyefficiency regulations require a minimum EER of 10.3 for rooftop air conditioning units with a capacity of 5.5 - 11 tons.

range of 0.49-0.60 kW per ton. The combined effects of natural conservation and efficiency gains are estimated to result in a decrease of 6% in space cooling EUI over the length of the study.

As illustrated in Exhibit C 1, the net effect of efficiency gains and increased space cooling saturation is expected to reduce energy consumption for space cooling in existing commercial buildings. Increases in overall space cooling energy use through time are expected to be due entirely to the construction of new building stock (Exhibit C 2).

Exhibit C 1 Reference Case Space Cooling Electricity Use in Existing Buildings by Sub Sector and Milestone Year – Hydro Region, Existing Buildings (MWh/yr.)

Sub Sector	2010	2015	2020	2025	2030
Office	569	560	552	543	535
Food Retail	38	37	36	36	35
Non-food Retail	152	150	148	146	143
Hotel / Motel	136	134	132	130	128
Healthcare	43	42	41	41	40
Education	48	47	47	46	45
Restaurant	62	61	60	59	58
Recreation Centres	3	3	3	3	3
Warehouse / Wholesale	6	6	6	6	6
Other General Service	507	499	492	484	477
Grand Total	1,564	1,540	1,517	1,493	1,470

Exhibit C 2 Reference Case Space Cooling Electricity Use in New Buildings by Sub Sector and Milestone Year – Hydro Region, New Buildings (MWh/yr.)

Sub Sector	2010	2015	2020	2025	2030
Office	-	171	361	571	805
Food Retail	-	11	22	35	50
Non-food Retail	-	52	110	174	246
Hotel / Motel	-	34	71	112	158
Healthcare	-	10	22	35	49
Education	-	11	24	37	53
Restaurant	-	18	37	60	85
Recreation Centres	-	0	1	1	1
Warehouse / Wholesale	-	1	3	4	6
Other General Service	-	-	-	-	-
Grand Total	-	308	650	1,030	1,452

Lighting

As a result of natural conservation, it is assumed that the replacement of existing T12 fluorescent lighting and electromagnetic ballasts with new T8 fluorescent lamps and electronic ballasts will continue. Similarly, CFLs will continue to increase their market share over incandescent lamps, particularly in sectors such as Hotel/Motel and Non-food Retail.

The continued growth of CFLs and T8 lighting/electronic ballasts is being driven by:

- Increased consumer recognition of the operating cost savings
- Energy regulations that are gradually removing electromagnetic fluorescent ballasts and incandescent lighting products from the market place.

Overall, the Reference Case assumes that by 2030 the energy intensity of general lighting in the existing building stock will decrease by 8%, while the energy intensity of architectural lighting will decrease by 1%.

Exhibit C 3 shows the impact of these EUI improvements on indoor lighting⁶ energy consumption, while Exhibit C 4 shows indoor lighting energy use by sub sector and milestone year in new construction. Again, all increases in overall indoor lighting energy use through time are expected to be due entirely to the construction of new building stock

Exhibit C 3 Reference Case Lighting Electricity Use by Sub Sector and Milestone Year – Hydro Region, Existing Buildings (MWh/yr.)

Sub Sector	2010	2015	2020	2025	2030
Office	7,995	7,870	7,745	7,620	7,495
Food Retail	2,159	2,146	2,133	2,120	2,107
Non-food Retail	8,053	7,954	7,854	7,755	7,656
Hotel / Motel	2,248	2,228	2,208	2,189	2,169
Healthcare	1,595	1,571	1,546	1,522	1,497
Education	5,534	5,459	5,384	5,309	5,234
Restaurant	1,987	1,975	1,962	1,950	1,937
Recreation Centres	2,529	2,519	2,509	2,499	2,488
Warehouse / Wholesale	7,503	7,484	7,466	7,448	7,429
Other General Service	13,088	12,909	12,731	12,552	12,374
Grand Total	52,691	52,115	51,539	50,963	50,387

Exhibit C 4 Reference Case Lighting Electricity Use by Sub Sector and Milestone Year – Hydro Region, New Buildings (MWh/yr.)

Sub Sector	2010	2015	2020	2025	2030
Office	-	931	1,962	3,103	4,367
Food Retail	-	246	521	830	1,176
Non-food Retail	-	815	1,723	2,735	3,864
Hotel / Motel	-	229	483	767	1,083
Healthcare	-	161	339	534	750
Education	-	614	1,301	2,070	2,932
Restaurant	-	194	416	668	954
Recreation Centres	-	222	468	741	1,043
Warehouse / Wholesale	-	861	1,832	2,928	4,166
Other General Service	-	1,261	2,645	4,165	5,834
Grand Total	-	5,533	11,688	18,540	26,170

⁶ Including general, architectural and high-bay lighting.

Computer Equipment and Other Plug Loads

Computer equipment and other plug loads will continue to grow as a result of increased density of computers and peripherals per occupant, increased use of server load, and growth in other peripherals, such as telephone network equipment. Increased penetration of laptops, more efficient server hardware and higher penetration of ENERGY STAR® rated computer equipment and other plug loads is expected to counterbalance the effect of increasing hardware density to some degree.

Overall, the Reference Case assumes that by 2030 the energy intensity of computer equipment and plug loads in the existing building stock will increase by 15%.⁷ The impact on electricity use in existing buildings is shown in Exhibit C 5, below.

Exhibit C 5 Computer and Plug Load Energy Use in by Sub Sector and Milestone Year – Hydro Region, Existing Buildings (MWh/yr.)

Sub Sector	2010	2015	2020	2025	2030
Office	3,783	3,925	4,067	4,209	4,351
Food Retail	171	178	184	191	197
Non-food Retail	490	509	527	545	564
Hotel / Motel	338	351	363	376	389
Healthcare	232	241	250	258	267
Education	1,070	1,111	1,151	1,191	1,231
Restaurant	95	99	102	106	109
Recreation Centres	25	26	27	28	29
Warehouse / Wholesale	658	683	708	732	757
Other General Service	2,950	3,061	3,171	3,282	3,392
Grand Total	9,814	10,182	10,550	10,918	11,286

Water Heating

Electricity consumption for water heating is expected to stay constant within the existing building stock, but to grow rapidly within the new building stock, as electric water heating fuel shares are expected to be significantly higher in new buildings than in existing ones. This is largely driven by an expected increase in electric space heating in the new building stock (see below), and the fact that buildings rarely maintain oil or propane service for water heating alone.

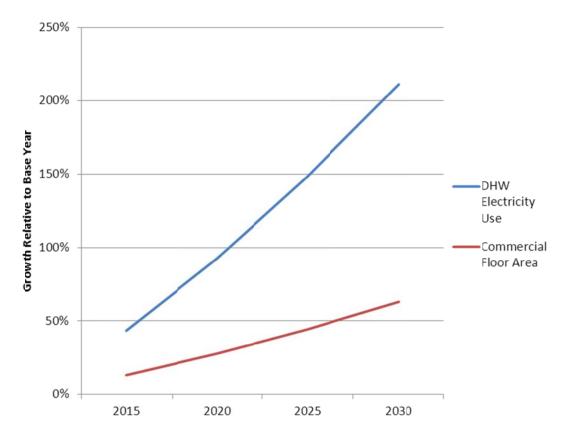
Exhibit C 6 illustrates the increased difference in electric water heating penetration between existing and new buildings. This leads to a growth in electricity use for water heating, which outpaces growth in floor area by a significant margin, as illustrated in Exhibit C 7.

⁷ Estimates based on scenarios presented in Arthur D. Little, *Electricity Consumption by Office and Telecommunication Equipment in Commercial Buildings*. U.S. Department of Energy, 2002.

Exhibit C 6 Electric DHW Share by Sub Sector – Hydro Region, Existing and New Buildings (%)

Existing Buildings	New Buildings
50%	90%
40%	80%
30%	85%
15%	95%
10%	60%
50%	75%
15%	80%
10%	55%
15%	70%
	Buildings 50% 40% 30% 15% 10% 50% 10% 50%

Exhibit C 7 Electric DHW Electricity Consumption Growth Relative to Commercial Floor Area Growth – Hydro Region, Existing and New Buildings (%)



Space Heating

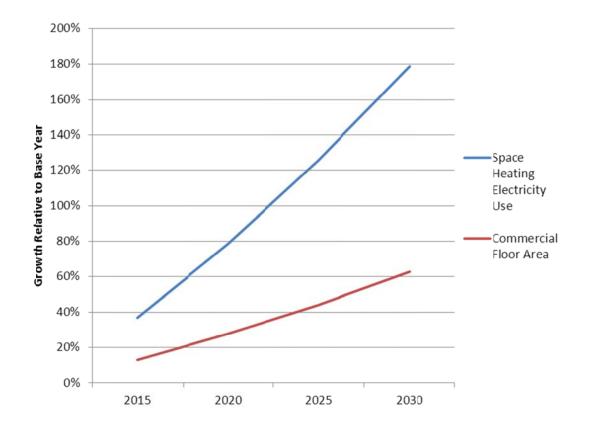
In recent years, electric space heating penetrations in new commercial construction have far exceeded the historical average, a trend that is presently expected to continue. Similar to the discussion of water heating energy above, electricity consumption for space heating is expected to stay constant within the existing building stock, but to grow rapidly within the new building stock. This is expected to be the major contributor to commercial load growth within the study period, accounting for approximately 35% of total commercial load growth.

Exhibit C 8 illustrates the increased difference in electric space heating penetration between existing and new buildings. This leads to a growth in electricity use for space heating, which outpaces growth in floor area by a significant margin, as illustrated in Exhibit C 9.

Exhibit C 8 Electric Space Heating Share by Sub Sector – Hydro Region, Existing and New Buildings (%)

Sub Sector	Existing Buildings	New Buildings
Office	50%	90%
Food Retail	40%	80%
Non-food Retail	30%	85%
Hotel / Motel	15%	95%
Healthcare	10%	60%
Education	50%	75%
Restaurant	15%	80%
Recreation Centres	10%	55%
Warehouse / Wholesale	15%	70%

Exhibit C 9 Electric Space Heating Electricity Consumption Growth Relative to Commercial Floor Area Growth – Hydro Region, Existing and New Buildings (%)



Overall Impact of Natural Changes

As illustrated in Exhibit C 10, the overall impact of the natural changes in energy usage patterns described above are very minimal, a decrease in existing building energy use of approximately 100 MWh, less than 0.1%, by 2030 relative to the Base Year (2010). This is consistent with the 2011 YEC 20-year load forecast, which assumes no per-customer electricity usage growth. Virtually all growth in electricity use through the study period occurs within the new building stock.

Sub Sector	2010	2015	2020	2025	2030
Office	23,792	23,837	23,882	23,927	23,972
Food Retail	10,137	10,136	10,135	10,134	10,132
Non-food Retail	14,252	14,191	14,130	14,069	14,007
Hotel / Motel	7,756	7,759	7,761	7,763	7,766
Healthcare	4,630	4,627	4,624	4,622	4,619
Education	14,514	14,511	14,508	14,505	14,502
Restaurant	7,549	7,544	7,539	7,534	7,528
Recreation Centres	6,739	6,738	6,736	6,735	6,733
Warehouse / Wholesale	14,529	14,558	14,586	14,615	14,644
Other General Service Buildings	29,290	29,260	29,230	29,200	29,170
Grand Total	133,189	133,160	133,131	133,102	133,073

Exhibit C 10 Total Energy Use in by Sub Sector and Milestone Year – Hydro Region, Existing Buildings (MWh/yr.)

C2 Expected Growth in Building Stock

The next step in developing the Reference Case involved the development and application of estimated levels of floor space growth in each building sub sector over the study period. The stock growth rates were derived from the sales forecast data provided by in the YEC 20-year Resource Plan - 2011. The derivation of floor space data in each of the milestone periods applied the following steps:

- As described above for the existing building stock, estimate and apply the expected impact of natural changes within the new building stock over the study period. Efficiency improvements are expected to be more moderate within the new building stock through time. Computer and other plug load growth are expected to be consistent in both existing and new buildings.
- Add floor space at a rate consistent with the YEC forecast of electricity consumption growth for each combination of sub sector and milestone year.

A summary of the total new commercial floor space at each milestone period is provided in Exhibit C 11.

Exhibit C 11 New Commercial Building Floor Space, by Sub Sector and Milestone Year – Hydro Region (ft²)

Sub Sector	2015	2020	2025	2030
Office	177,356	377,774	604,251	860,177
Food Retail	25,449	54,212	86,719	123,458
Non-food Retail	121,260	258,639	414,279	590,606
Hotel / Motel	78,974	168,043	268,497	381,792
Healthcare	25,855	54,914	87,572	124,276
Education	245,057	524,585	843,434	1,207,135
Restaurant	29,049	62,434	100,804	144,902
Recreation Centres	56,705	119,848	190,160	268,456
Warehouse / Wholesale	189,815	404,667	647,859	923,127
Other General Service	210,674	446,254	709,685	1,004,261
Grand Total	1,160,195	2,471,370	3,953,260	5,628,190

C3 CEEAM Archetype Summaries – New Buildings

This section includes summary profiles of the nine new building archetypes constructed for this study. Exhibit C 12 presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Sub Sector	Page #
Office	C – 10
Food Retail	C – 15
Non-food Retail	C – 20
Hotel / Motel	C – 25
Healthcare	C – 30
Education	C – 35
Restaurant	C – 40
Recreation Centres	C – 45
Warehouse / Wholesale	C – 50
Terms Used in Building Profiles	C – 55

Exhibit C 12 Table of Contents - New CEEAM Building Profiles

			COMMERC	IAL SECTOR BUIL	DING PROF	DFILE
NEW BUILDINGS:	SIZE:			VINTAGE:		REGION:
Office Baseline						Yukon
CONSTRUCTION						
	_					
Wall U value (W/m ² .°C) 0.20	W/m².°C	0.04 B	tu/hr.ft² .°F		Typical B	Building Size 1,394 m ² 15,000 ft ²
Roof U value (W/m ² .°C) 0.11	W/m².°C	0.02 B	tu/hr.ft² .°F		Typical Fo	Footprint (m ²) 697 m ² 7,500 ft ²
Glazing U value (W/m ² .°C) 1.60	W/m².°C	0.28 B	tu/hr.ft² .°F		Footprint	nt Aspect Ratio (L:W) 2
						Conditioned Space 100%
Window/Wall Ratio (WIWAR) (%) 0.35	1					Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.35 Shading Coefficient (SC) 0.58					Typical #	as Exterior Zone # Stories 2
						Floor Height (m) 3.7 m 12.0 ft
VENTILATION SYSTEM, BUILDING CONTRO	LS & INDOOR CONDITIC	INS				
Ventilation System Type			CAV	CAVR DDN	Z DDMZVV	VV VAV VAVR IU 100% O.A TOTAL
	System Presen		50%			50% 100%
	Min. Air Flow (9					60%
	(Minimum Thro	tled Air Volu	me as Perce	nt of Full Flow)		
Occupancy or People Density	26	m²/person		274 ft²/persor		%OA 9.08%
Occupancy Schedule Occ. Period	90%					
Occupancy Schedule Unocc. Period						
Fresh Air Requirements or Outside Air	8	L/s.person		16 CFM/per	ion	
Fresh Air Control Type *(enter a	a 1, 2 or 3) 1	If Fresh Air C		= "2" enter % FA. to t	ne riabt:	
(1 = mixed air control, 2 = Fixed fresh air, 3 100%				= "3" enter Make-up A		ion and operation L/s.m ² CFM/ft ²
	·			·····		operation (%)
Sizing Factor	1.1					
Total Air Circulation or Design Air Flow	3.24	L/s.m ²		0.64 CFM/ft ²		Separate Make-up air unit (100% OA)
Infiltration Rate	0.70	L/s.m ²		0.14 CFM/ft ²		Separate Make-up air unit (100% OA) L/s.m ² CFM/ft ² Operation occupied period 50%
(air infiltration is assumed to occur during unoccu		£/3.111		0.14		Operation unoccupied period 50%
hours only if the ventilation system shuts down)						
		=	<u> </u>			
Economizer	Incidence of Use	Enthalpy	y Based	Dry-Bulb Based 100%	Total 100%	
	Switchover Point	K,	J/kg.	18 °C	10070	Peak Design Cooling Load 279,953
			tu/lbm	64.4 °F		Peak Zone Sensible Load 186,991
						Room air enthalpy 28.2 Btu/lbm
Controls Type	System Present (%)		HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
	All Pneumatic		Equipment	Controls		Specific volume of air at 55F & 100% R 13.2 ft³/lbm Design CFM 8,699
	DDC/Pneumatic					Total air circulation or Design air 3.24 /s.m ²
	All DDC					
	Total (should add-up to 10	0%)				
		Propo	rtional	PI / PID Tota	1	
Control mode	Control Mode	1 1000	Tuona	11/110 100	u	
		Fixed Di	scharge	Reset		
	Control Strategy					
Indoor Design Conditions				Room		Supply Air
indoor Design Conditions	Summer Temperature				2 °F	14 °C 57.2 °F
	Summer Humidity (%)		50%			98%
	Enthalpy				2 Btu/lbm	
	Winter Occ. Temperature Winter Occ. Humidity		23	°C 73	4 °F	15 °C 59 °F
	Enthalpy	-		KJ/kg. 22.	Btu/lbm	
	Winter Unocc. Temperatur	е			6 °F	
	Winter Unocc. Humidity		30%			
	Enthalpy		50	KJ/kg. 21.	5 Btu/lbm	1
Damper Maintenance			Incidence	Frequency		
			(%)	(years)		
	Control Arm Adjustment					
	Lubrication					
	Blade Seal Replacement					
Air Filter Cleaning	Changes/Year					
						Daves Overlagh Maintenance
Incidence of Annual HVAC Controls Maintenance				Incidence	ot Annual R	Room Controls Maintenance
A REAL AND	1					
	Annual Maintenance Tasks		Incidence			Annual Maintenance Tasks Incidence
			(%)			(%)
	Calibration of Transmitters					Inspection/Calibration of Room Thermostat
	Calibration of Panel Gauge Inspection of Auxiliary Dev					Inspection of PE Switches Inspection of Auxiliary Devices
	Inspection of Auxiliary Dev Inspection of Control Devi					Inspection of Auxiliary Devices
				ı		(Dampers, VAV Boxes)
						·

	0.77	COMME	RCIAL SECTOR BUILDING PROFILE	550101	
NEW BUILDINGS: Office Baseline	SIZE:		VINTAGE:	REGION: Yukon	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 0.90 12.9 W/m ²	46.5 ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3200 5560 95% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 7 100%	700 1000 ES T8 Mag T8 Elec MH	Total 100% 500 HPS TOTAL
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0 0.65 0.65 0.1	100% 0.6 0.6 0.6	0.6 0.55 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 4.2 MJ/m².yr 162
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 0.10 24.4 W/m ²	32.5 ft-candles			NOTT.yt TO2
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3200 5560 95% 30%	Light Level (Lux) % Distribution Weighted Average	10% 40% 40	100 500 0% 10%	Total 100% 350
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.65 0.65 0.7	0.6 0.6 0.6 0.6	HPS TOTAL 100.0% 0.6 0.55 90
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Load X Hrs		EUI kWh/ft².yr 1.1
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m²	ft-candles		action check: should = 1.00	MJ/m².yr 41
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average			
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0 0.65 0.65 0.1	T12 T8 MH 0.6 0.6 0.6 0.6 75 0.80 0.80 0.55 72 84 88 65	HPS TOTAL 0.6 0.55 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 14.06 V	
OFFICE EQUIPMENT & PLUG LOA	ADS				
Equipment Type	Compu	ters Monitors	Printers Copiers	Servers Plug I	oads
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		9 9 9 9 9 9 9 9 9 9 9 9 9 9	100 200 0.15 0.1 0.6 W/m² 0.8 W/m² 0.05 W/t² 0.07 W/t² 80% 80% 50% 50% 2000 2000 6760 6760	50 0.26 0.5 0.05 0.05 0.05 0.05 0.00 0.000 80% 100% 2000 6760 6260	
Total end-use load (occupied period) Total end-use load (unocc. period)		B W/m ² 0.5 W/ft ² B W/m ² 0.4 W/ft ²		Co	r Equipment EUI kWh/ft².yr 2.77
Usage during occupied period Usage during unoccupied period	100% 66%			Compute	r Equipment EUI kWh/ft².yr 2.77 MJ/m².yr 107.44 Plug Loads EUI kWh/ft².yr 0.72 MJ/m².yr 27.70
FOOD SERVICE EQUIPMENT Provide description below: Kitchen	Gas Fuel	Share: 5.0%	Electricity Fuel Share: 95.0%	Natural Gas EUI EUI kWh/tř².yr 0.1 MJ/m².yr 5.0	All Electric EUI EUI kWh/f².yr 0.10 MJ/m².yr 4.00
REFRIGERATION Provide description below:					[71]] 1305.976
Lunch room/cafeteria/restaurant					EUI kWh/ft².yr 0.10 MJ/m².yr 4.00
					EUI <u>kWh/ft².yr 0.52</u> MJ/m².yr 20.00

NEW BUILDINGS: Office Baseline	SIZE:	c	OMMERCIAL SEC VINTAG		NG PROF	ILE		REGION: Yukon				
SPACE HEATING												
			1									
Heating Plant Type				Natural Gas Boilers	Packaged	A/A HP	Elec W. S. HP		Resistance	Total		
		System Present (%)	Stan. 5'	High % 5%	Unit		10%		60%	100%		
		Eff./COP	75	% 85%	77%	1.70	3.00	4.50	1.00			
		Performance (1 / Eff.) (kW/kW)	1.3	33 1.18	1.30	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	63.3 W/m ² 424 MJ/m ² .y	20.1 Btu/h			1						All Electric EUI	
Electric Fuel Share	80.0%	Fossil Fuel Share	20.0%							_	kWh/ft².yr	9.8
Boiler Maintenance	Annual	Naintenance Tasks	Incidenc	e						L	MJ/m².yr	380
			(%)							F	Natural Gas EUI	14.0
		e Inspection ide Inspection for Scale Buildup	75								kWh/ft².yr MJ/m².yr	14.0 542
		on of Controls & Safeties	100							- -	Market Composite EU	
		s Analysis & Burner Set-up	90							_	kWh/ft².yr	10.6
											MJ/m².yr	412
SPACE COOLING												
A/C Plant Type					1		T	_				
			entrifugal Chillers andard HE	WSHP	Reciproca Open	ting Chillers DX	Absorption W. H.	CW	Total			
		System Present (%) COP	25.0			75.0%			100.0%			
		Performance (1 / COP)	4.7 5 0.21 0.1	.4 3.5 19 0.29				1 1.00				
		(kW/kW) Additional Refrigerant										
		Related Information										
Control Mode		Incidence of Use Fixed										
		Setpo Chilled Water	Jini	_								
		Condenser Water										
					1							
Setpoint		Chilled Water Condenser Water	7 °C 30 °C	44.6	°F °F							
		Supply Air	14.0 °C	57.2								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	59 W/m² 108.0 MJ/m².y	r 2.8 kWh/ft².yr	643 ft²/Ton									
Sizing Factor	1.00	Operation	ation (occ. period)	3000	hrs/year	Note value	e cannot be	less than 2	900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	90.0%											
Electric Fuel Share	100.0%	Gas Fuel Share										
Chiller Maintenance		Naintenance Tasks	Incident	e Frequency	1							
				(years)	-							
		Control, Safeties & Purge Unit Coupling, Shaft Sealing and Bearin	gs		-							
	Megger	Motors	5									
		ser Tube Cleaning n Analysis			+							
		urrent Testing chemical Oil Analysis			1					Г	All Electric EUI	
	Specifo	chemical Oli Analysis]					-	kWh/ft².yr	1.1
Cooling Tower/Air Cooled Condense	r Maintenan Annual M	Aaintenance Tasks	Incident	e Frequency	1						MJ/m².yr	42
			(%)	(years)	-					F	Natural Gas EUI	
		on/Clean Spray Nozzles Service Fan/Fan Motors		-	+						kWh/ft².yr MJ/m².yr	
	Megger				1					r	Market Composite EU	
	[Inspect/		I		l					F	kWh/ft².yr	1.1
											MJ/m².yr	42
DOMESTIC HOT WATER												
Service Hot Water Plant Type			Tank Cond. T	nk Std. Boiler	Cnd. Boil.]			Fossil		Elec. Res.	
		Present (%) 10%	0.70 0.9				Fuel Share Blended Et		10% 0.55		90% 0.94	
Service Hot Water load (MJ/m ² .yr)	22.8	0.55	0.70 0.9	0.75	0.90	Ľ		псіепсу	0.55		0.34	
(Tertiary Load)			[All Electric El	JI	1	Na	tural Gas E	UI	[Market Composite EU	JI
Wetting Use Percentage	90%			kWh/ft².yr	0.6	1		kWh/ft².yr	1.1		kWh/ft².yr	0.7
				MJ/m².yr	24	1	1	MJ/m².yr	41		MJ/m².yr	25.9

		IERCIAL SECTOR BUILDING PROFILE		
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:	
Office Baseline			Yukon	
Dasemie				
HVAC FANS & PUMPS				
			Martilation and External Fan Onesation & Oceana	
SUPPLY FANS			Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan	
System Design Air Flow 3.	.2 L/s.m ² 0.64 CFM/ft ²	Control	Fixed Variable Fixed Variable	
	50 Pa 2.6 wg		Flow Flow	
System Static Pressure VAV 6	50 Pa 2.6 wg	Incidence of Use	50% 50% 100%	
Fan Efficiency 52		Operation	Continuou: Scheduled Continuous Scheduled	
Fan Motor Efficiency 85 Sizing Factor 1.0		Incidence of Use	50% 50% 50% 50%	
	4.8 W/m ² 0.44 W/ft ²	Incidence of Ose	50% 50% 50% 50%	
	.8 W/m ² 0.44 W/ft ²	Comments:		
EXHAUST FANS				
Washroom Exhaust 10	00 L/s.washroom 212 CFM/was	broom		
Washroom Exhaust per gross unit area 0.	.3 L/s.m ² 0.06 CFM/ft ²			
Other Exhaust (Smoking/Conference) 0.	.1 L/s.m ² 0.02 CFM/ft ²			
	.4 L/s.m ² 0.08 CFM/ft ²			
	50 Pa 1.0 wg			
	<u>)%</u>)%			
	.0			
	0.3 W/m ² 0.03 W/ft ²			
AUXILIARY COOLING FOUIPMENT (Conder	nser Pump and Cooling Tower/Condenser Fans)			
	iser i unip and cooling rower/condenser i ans)			
Average Condenser Fan Power Draw	0.018 kW/kW	0.06 kW/Ton		
(Cooling Tower/Evap. Condenser/ Air Cooled	Condenser) 1.05 W/m ²	0.10 W/ft ²		
O and a second Deserve				
Condenser Pump				
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton		
Pump Design Flow per unit floor area	0.003 L/s.m ²	0.005 U.S. gpm/ft ²		
Pump Head Pressure	100 kPa	33.333333 ft		
Pump Efficiency	<u> </u>			
Pump Motor Efficiency Sizing Factor	1.0			
Pump Connected Load	0.63 W/m ²	0.06 W/ft ²		
CIRCULATING PUMP (Heating & Cooling)				
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²	0.0037 U.S. gpm/ft ²	2.4 U.S. gpm/Ton	
Pump Head Pressure	150 kPa	50 ft		
Pump Efficiency	55%			
Pump Motor Efficiency	90%			
Sizing Factor Pump Connected Load	0.5 0.4 W/m²	0.04 W/ft ²		
r unp connected Load	0.4 W/III	0.04		
Supply Fan Occ. Period	3500 hrs./year			
Supply Fan Unocc. Period	5260 hrs./year 19.0 kWh/m².yr			
Supply Fan Energy Consumption	19.0 KWI/IIIyi			
Exhaust Fan Occ. Period	3500 hrs./year			
Exhaust Fan Unocc. Period	5260 hrs./year			
Exhaust Fan Energy Consumption	1.9 kWh/m².yr			
Condenser Pump Energy Consumption	0.8 kWh/m².yr			
Cooling Tower /Condenser Fans Energy Consumption				
g the second sec				
Circulating Pump Yearly Operation	5000 hrs./year			
Circulating Pump Energy Consumption	0.8 kWh/m².yr			
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency		
		(%) (years)		
	Inspect/Service Fans & Motors			
	Inspect/Adjust Belt Tension on Fan Belts		-	111 1140 // -
	Inspect/Service Pump & Motors		E	UI kWh/ft².yr 2.1 M l/m².yr 82.5

NEW BUILDINGS: Office Baseline	ŝ	SIZE:	COMMERCIAL SECT VINTAGE		IG PROFILE		REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		21.5 kWh/ft².yr 832.7 MJ/m².yr		Gas:	2.9 kWh/ft ² .yr	112.7 MJ/n	'm².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Gi	as	
GENERAL LIGHTING	4.2	162.1		kWh/ft².yr	MJ/m².yr	kWh/ft2.yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	1.1	41.3	SPACE HEATING	7.8	304.0	2.8	108.3	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	37.4			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	21.8	0.1	4.1	
HVAC FANS & PUMPS	2.1	82.5	FOOD SERVICE EQUIPMENT	0.1	3.8	0.0	0.3	
REFRIGERATION	0.1	4.0						
MISCELLANEOUS	0.5	20.0						
COMPUTER EQUIPMENT	2.8	107.4						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

				COMMERC		FOR BUILD	NG PROF	ILE						
NEW BUILDINGS: Food Retail	SIZE:				VINTAGE	: New				REGION: Yukon				
Baseline														
CONSTRUCTION														
Wall U value (W/m ² .°C) 0.20	W/m².°C	Γ	0.04	Btu/hr.ft ² .°F	-		Typical B	uilding Size			2,788 m ²	30.00	00 ft ²	
	W/m ² .°C	-		Btu/hr.ft ² .°F				ootprint (m ²)			1,225 m ²		81 ft ²	
	W/m².°C	-		Btu/hr.ft ² .°F				Aspect Ratio	o (L:W)		1	10,10		
		L	0.20					Conditioned S			100%			
	-							Conditioned S			40%			
Window/Wall Ratio (WIWAR) (%) 0.11 Shading Coefficient (SC) 0.69							Typical #	s Exterior Zo Stories	one		1			
								loor Height	(m)		6.0 m	19	9.7 ft	
VENTILATION SYSTEM, BUILDING CONTRO	LS & INC		NS											
Ventilation System Type		Outras David	(0()	CAV	CAVR	DDMZ	DDMZVV	/ VAV	VAVR	IU 10		OTAL		
		System Present Min. Air Flow (%		100%				50%				100%		
		(Minimum Thrott		lume as Per	cent of Fu	ll Flow)				1				
Occupancy or People Density		45	m²/person		404	ft²/person				%OA	25.12%			
Occupancy Schedule Occ. Period		90%	in-person		404	n-/person				760A	10.1270			
Occupancy Schedule Unocc. Period						7								
Fresh Air Requirements or Outside Air		30	L/s.person	1	64	CFM/perso	'n							
Fresh Air Control Type *(enter	a 1, 2 or 3)	1	f Fresh Air	Control Ty	pe = "2" er	nter % FA. to	the right:		T					
(1 = mixed air control, 2 = Fixed fresh air, 3 100						nter Make-up		tion and ope	eration	0.5 L/		0.10 CFM/ft ²		
Sizing Factor		3								50% op	eration (%)		l	
Total Air Circulation or Design Air Flow			L/s.m ²		0.52	2 CFM/ft ²								
						-				unit (100% O		L/s.m ²	C	CFM/ft ²
Infiltration Rate (air infiltration is assumed to occur during unocci	nied	0.70	L/s.m ²		0.14	CFM/ft ²				accupied perio		50% 50%		
hours only if the ventilation system shuts down)	pieu								Operation	noccupied pe	liou	5078		
	r							a						
Economizer	Incidence	of Use	Enthalp	y Based	Dry-Bi 100%	ulb Based	Total 100%		Summary	of Design Para	meters		_	
	Switchov			KJ/kg.		3°C	10070			in Cooling Loa		8,751		
				Btu/lbm	64.4	1°F				Sensible Loa	d 11:	2,333		
Controls Type	System F	resent (%)		HVAC	Room	٦			Room air e Discharge a			28.2 Btu/lbm 23.4 Btu/lbm		
Controls Type	System	resent (70)		Equipment	Controls					ne of air at 55F &	100% R	13.2 ft ³ /lbm		
	All Pneum								Design CFI			5,226		
	DDC/Pne All DDC	umatic				-		l	i otal all cir	culation or De	sign air 2	.65 l/s.m ²		
		ould add-up to 100)%)											
	-		Drana	ortional	PI / PID	Total	1							
Control mode	Control N	lode	Рюро	monal	PI/PID	TOTAL								
		_	Fixed Di	ischarge	Reset		1							
	Control S	trategy					J							
Indoor Design Conditions					Room				Supply Air					
		Temperature	-		°C	71.6	°F	13		55.4 °F				
	Summer Enthalpy	Humidity (%)	-	50%	KJ/kg.	28.2	Btu/lbm	100% 54.5	KJ/kg.	23.4 Bt	u/lbm			
		cc. Temperature			°C	71.6		16		60.8 °F				
		cc. Humidity	-	30%			- 1	45%		10.0				
	Enthalpy Winter Ur	nocc. Temperature	9		KJ/kg. °C	22.8	°F	45.5	KJ/kg.	19.6 Bt	J/IDM			
		nocc. Humidity	-	30%	Ŭ	00.0	1.							
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm							
Damper Maintenance				Incidence		/								
	Control A	rm Adjustment		(%)	(years)	4								
	Lubricatio					-								
		al Replacement												
Air Filter Cleaning	Changes/	Year]		1									
	-		L		-	la dal								
Incidence of Annual HVAC Controls Maintenance	e	Т				incidence o	r Annual R	Room Contro	ois Maintena	ance				
					_									
	Annual M	aintenance Tasks		Incidence				Annual Mai	intenance T	asks		dence		
	Calibratio	n of Transmitters		(%)	1			Inspection/	Calibration	of Room The		%)		
	Calibratio	n of Panel Gauge			1			Inspection	of PE Swite	ches				
	Inspection	n of Auxiliary Devi	ces	-	-			Inspection	of Auxiliary	Devices				
	Inspection	n of Control Devic	es		J				of Control I VAV Boxes	Devices (Valv	€S,			
								Loumpers,		~/	I]		

	0175.		SECTOR BUILDING PROFILE	DECION:			
NEW BUILDINGS: Food Retail Baseline	SIZE:	VIN	IAGE: New	REGION: Yukon			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.45	5 ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5000 3760 100% 20%	Light Level (Lux) % Distribution Weighted Average	400 500 100%			Total 100% 500	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 0.7 0.7 0.65 0.65 15 50	T12 T8 Mag T8 Elec 100% 100% 0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	MH T5 HO 0% 0% 0.7 0.6 0.55 0.55 65 85	TOTAL 100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				E		h/ft².yr 2.8 /m².yr 110
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10	5 ft-candles 4 W/ft²					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5000 3760 100% 20%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	700 1000 T12 T8 Mag T8 Elec	MH T5 HO	Total 100% 500 TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years Group Spot	System Present (%) CU LLF Efficacy (L/W)	50% 50% 0.7 0.7 0.65 0.65 15 50	0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	0% 0.6 0.6 0.55 0.55 65 85	100.0%	
Relamping Strategy & Incidence of Practice			EUI = Load X	Hrs. X SF X GLFF	I		h/ft².yr 2.5 /m².yr 99
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.45	5 ft-candles 9 W/ft²	Flor	or fraction check: should = 1.00	1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 20%	Light Level (Lux) % Distribution Weighted Average	300 500	700 1000	MH T5 HO	Total 500 TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0.65 0.65 15 50	0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	1011 10110 50% 50% 0.6 0.6 0.55 0.55 65 85	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				E		h/ft².yr 4.3 /m².yr 165
TOTAL LIGHTING				Overall LP	10.09 W/m ²	EUI TOTAL kWr MJ/	h/ft².yr 10 /m².yr 374
OFFICE EQUIPMENT & PLUG LOA	DS						!
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	Computers 55 0.65 0.8 W/m ² 0.1 W/tt ² 90% 50% 2000 6760 2.9 W/m ²	Monitors 51 0.65 0.7 0.1 90% 90% 2000 6760	Printers Copiers 100 200 0.01 0.01 0.00 W/m² 0.00 W/m² 0.00 W/m² 0.00 90% 50% 50% 5000 2000 6760 6760 ee notes (cells with red indicator in	217 0.03 m ² 0.1 W/m ² t ² 0.01 W/t ² 100% 2600 6160	Plug Loads 1.5 W/m² 0.14 W/ft² 90% 50% 4100 4660		
Total end-use load (unocc. period)	1.7 W/m ²	0.2 W/ft ²			mputer Equipment		h/ft².yr 0.88
Usage during occupied period Usage during unoccupied period	100% 58%				Plug Loads I	EUI kWł	/m².yr 33.97 h/ft².yr 0.84 /m².yr 32.51
FOOD SERVICE EQUIPMENT Provide description below:	Gas Fuel Share:	60.0% Elec	tricity Fuel Share: 40.0%	Natural Gas EUI EUI kWh/ft².yr MJ/m².yr	2.6 100.0	EUI kWł	ctric EUI h/ft².yr 1.5 /m².yr 60.0
REFRIGERATION Provide description below: Commercial refrigeration display case	s				[h/ft².yr 29.0 /m².yr 1125.0
MISCELLANEOUS					-		h/ft².yr 0.3 /m².yr 10
·					1		

		COMME	RCIAL SECTOR BUILDING PROF		
NEW BUILDINGS: Food Retail Baseline	SIZE:		VINTAGE: New	REGION: Yukon	
SPACE HEATING					
Heating Plant Type		System Present (%) Eff./COP Performance (1 / Eff.) (kW/kW)	Natural Gas Boilers Packaged Stan. High Units 3% 2% 15% 80% 85% 78% 1.25 1.18 1.25	5% 5% 3.20 3.00 4.50	ance Total 5% 100% 00
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	20.9 W/m ² 405 MJ/m ² .yr	6.6 Btu/hr.ft² 10.5 kWh/ft².yr	r		All Electric EUI
Electric Fuel Share	80.0%	Fossil Fuel Share 20.0	% Other Fuel Share		kWh/ft².yr 10.1 MJ/m².yr 392
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence		
	Water Sic Inspection Inspection	Inspection le Inspection for Scale Buildup n of Controls & Safeties n of Burner Analysis & Burner Set-up	(%) 75% 100% 100% 100% 90%		Natural Gas EUI kWh/ft².yr 13.3 MJ/m².yr 513 Market Composite EUI kWh/ft².yr kWh/ft².yr 10.7 MJ/m².yr 416
SPACE COOLING					
A/C Plant Type		Standard System Present (%)	HE Chillers Open	DX W. H. CW 100.0% 100 2 2.7 0.9 1	0%
Control Mode		Incidence of Use Fixed Setpoint Chilled Water Condenser Water	Reset		
Setpoint		Condenser Water 3	7 ℃ 44.6 °F 10 °C 86 °F 10 °C 55.4 °F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	29 W/m ² 49.6 MJ/m ² .yr	9 Btu/hr.ft ² 129 1.3 kWh/ft ² .yr	11_ft²/Ton		
Sizing Factor	1.00	Operation	n (occ. period 4000 hrs/year	Note value cannot be less than 2,900 h	s/year)
A/C Saturation (Incidence of A/C)	75.0%				
Electric Fuel Share	100.0%	Gas Fuel Share			
Chiller Maintenance	Inspect C Inspect C Megger M Condense Vibration Eddy Curi	er Tube Cleaning	Incidence Frequency (%) (years)		All Electric EUI
Cooling Tower/Air Cooled Condense	Inspection Inspect/So Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors	Incidence Frequency (%) (years)		kWh/ft².yr 0.6 MJ/m².yr 21 Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite EUI kWh/ft².yr kWh/ft².yr 0.6 MJ/m².yr 21
DOMESTIC HOT WATER					
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Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors (%) (years)						
(%) (years) Inspect/Service Fans & Motors	Circulating Pump Energy Consumption		kWh/m².yr			
(%) (years) Inspect/Service Fans & Motors	Eans and Pumps Maintenance	Annual 1	Maintenance Tasks	Incidence Frequency		
Inspect/Service Fans & Motors	i and and i ampo maintonanoo	, the deal of				
		Inspect/S	Service Fans & Motors			
Inspect/Adjust Belt Tension on Fan Belts		Inspect/A	Adjust Belt Tension on Fan Belts			
Inspect/Service Pump & Motors EUI kWh/ft².yr 3.0		Inspect/S	Service Pump & Motors			
						M.I/m ² vr 116 7

NEW BUILDINGS: Food Retail Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		NG PROFILE		REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		54.9 kWh/ft².yr 2,127.9 MJ/m².yr		Gas:	4.6 kWh/ft ² .yr	177.0 M	ЛJ/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	icity	Ga	as	
GENERAL LIGHTING	2.8	110.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	
SECONDARY LIGHTING	2.5	98.6	SPACE HEATING	8.1	313.3	2.7	102.7	
TERTIARY LIGHTING	4.3	165.0	SPACE COOLING	0.4	16.1			
OTHER PLUG LOADS	0.8	32.5	DOMESTIC HOT WATER	1.0	40.0	0.4	14.3	
HVAC FANS & PUMPS	3.0	116.7	FOOD SERVICE EQUIPMENT	0.6	24.0	1.5	60.0	
REFRIGERATION	29.0	1,125.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.9	34.0						
ELEVATORS								
OUTDOOR LIGHTING	1.1	42.4						

				COMMER	CIAL SECT		ING PROP	ILE						
NEW BUILDINGS: Non-Food Retail	SIZE:				VINTAGE					REGION	l:			
Non-Food Retail Baseline										Yukon				
CONSTRUCTION														
		F		-								_		
Wall U value (W/m ² .°C) 0.	20 W/m ² .°C		0.04	Btu/hr.ft ² .	°F		Typical B	uilding Size			1,859) m²	20,0	00 ft ²
Roof U value (W/m ² .°C) 0.	11 W/m ² .°C		0.02	Btu/hr.ft ² .	°F		Typical Fo	ootprint (m ²))		1,859) m²	20,0	00 ft ²
Glazing U value (W/m ² .°C) 1.	60 W/m².°C		0.28	Btu/hr.ft ² .	°F		Footprint	Aspect Rati	io (L:W)			5		
								onditioned			100%			
	10							onditioned			45%	6		
	10 78						Typical #	s Exterior Z Stories	one			1		
								loor Height	(m)) m	19	9.7 ft
VENTILATION SYSTEM, BUILDING CONTR	KOLS & INL	OOR CONDITIO	NS											
Ventilation System Type				CAV	CAVR	DDM	DDMZVV	VAV	VAVR	2	U 100% O.	Α ΤΟΤΑ	AL.	
		System Present		100%	0							100		
		Min. Air Flow (%		ļ				50%						
		(Minimum Throt	tied Air Vo	plume as P	ercent of Fu	III Flow)								
Occupancy or People Density		25	m²/perso	n	269	ft²/person				%OA	18.39%	6		
Occupancy Schedule Occ. Period		90%												
Occupancy Schedule Unocc. Period														
Fresh Air Requirements or Outside Air		15	L/s.perso	n	32	CFM/pers	on							
Fresh Air Control Type *(ente	era 1, 2 or 3)	1	If Fresh A	ir Control T	ype = "2" e	nter % FA.	o the right:			349	%			
(1 = mixed air control, 2 = Fixed fresh air, 3 10					ype = "3" e			ation and o	peration		.5 L/s.m ²	0.1	10 CFM/ft ²	
										50	% operatior	n (%)		
Sizing Factor		1.4				0514/0								
Total Air Circulation or Design Air Flow		3.26	L/s.m ²		0.64	CFM/ft ²		Separate	Make-up ai	ir upit (100	M ()		L/s.m ²	CFM/
Infiltration Rate		0.42	L/s.m ²		0.08	CFM/ft ²		Separate	Operation			50		CI W/
(air infiltration is assumed to occur during uno									Operation			50		
hours only if the ventilation system shuts down	i)													
Economizer			Enthaln	y Based	Dry-Bu	lb Based	Total	Т						
Economizer	Incidence	of Use	Linuap	y Daseu	100%	ib Daseu	100%		Summarv	of Desigr	Parameter	s		
	Switchov			KJ/kg.		°C			Peak Des			433,07	5	
				Btu/lbm	64.4	°F			Peak Zon		e Load	197,28		
Controlo Turo	Custom F	accent (0/)		HVAC	Deem	1			Room air				2 Btu/lbm	
Controls Type	System P	resent (%)		Equipmen	Room t Controls				Discharge Specific volu		199 1 55F & 100%		4 Btu/lbm .2 ft ³ /lbm	
	All Pneum	natic		Lquipmen	001111013				Design Cl		331 & 100%	9,17		
	DDC/Pne	umatic							Total air c	rculation	or Design a	ir 3.26	l/s.m²	
	All DDC		20()											
	Total (Shi	ould add-up to 100	J%)											
			Propo	ortional	PI / PID	Tota	1							
Control mode	Control N	lode												
	0		Fixed D	ischarge	Reset									
	Control S	trategy					_							
Indoor Design Conditions					Room				Supply Ai	r				
-		Temperature			°C	69.8	°F		°C		.2 °F			
		Humidity (%)		50%			T	100%						
	Enthalpy Winter Or	cc. Temperature			öKJ/kg. ℃		Btu/lbm ³ °F	54.5	KJ/kg. °C		4 Btu/lbm i9 °F	_		
		c. Humidity		30%			ц.	45%			- ·			
	Enthalpy	-		53	8 KJ/kg.	22.8			KJ/kg.	19.0	6 Btu/lbm			
		nocc. Temperature	е		°C	69.8	°F							
	Winter Ur Enthalpy	nocc. Humidity		30%) KJ/kg.	21.5	Btu/lbm							
	Linualpy			50	110/kg.	21.0	Dianom							
	, 													
Damper Maintenance					Frequency									
	Control A	rm Adjustment		(%)	(years)									
	Lubricatio													
		al Replacement												
Air Filter Cleaning	Changes/	Year			٦									
	onanyes/			L										
		_				Incidence of	f Annual R	oom Contre	ols Mainter	nance				
Incidence of Annual HVAC Controls Maintena	nce											_		
	Approx	aintonance Tech		Incident	1			A pourel M4	aintenance	Tooka		Incide		
	Annual M	aintenance Tasks		Incidence (%)				Annuarivia	an iteriance	IdSKS		Incidend (%)		
	Calibratio	n of Transmitters		(70)	1			Inspection	Calibratio	n of Roon	n Thermosta		1	
	Calibratio	n of Panel Gauge	IS					Inspection	of PE Swi	itches				
		n of Auxiliary Devi			4				of Auxiliar				_	
	Inspection	n of Control Devic	ces	1					of Control		valves,			
								Loampels	, • • • • • • • •			1		

NEW BUILDINGS: Non-Food Retail Baseline	SIZE:		AL SECTOR BUILDI INTAGE:	IG PROFILE	REGION: Yukon				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.80	6.5 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) % Distribution Weighted Average	400 25%	500 600 50% 25% CFL T12 ES	6	MH Т5 HC	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	100% 0.6 0.80	0.7 0.6 0.55 0.55 65 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot							kWh/ft².yr MJ/m².yr	4.3 165
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.10	6.5 ft-candles 3.2 W/ft ²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) % Distribution Weighted Average	300 30%	500 700 40% 30% CFL T12 ES	6	MH T5 HC	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	25% 0.7 0.65 15	012 112 12 75% 0.7 0.6 0.65 0.75 50 72	0.6 0.6 0.80 0.80	0.6 0.6 0.55 0.55 65 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		I	EUI = Load X Hrs. 3	X SF X GLFF			kWh/ft².yr MJ/m².yr	1.6 61
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.10 20.1 W/m ²	6.5 ft-candles 1.9 W/ft ²			ction check: should = 1.00) 1.00	_		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 95% 15%	Light Level (Lux) % Distribution Weighted Average	300 30%	500 700 40% 30% CFL T12 ES	6	MH T5 HC	Total 100% 500 TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	5 0.80 0.80	50% 50% 0.6 0.6 0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot							kWh/ft².yr MJ/m².yr	0.9 35
TOTAL LIGHTING					Overall LP	12.95 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	6.7 260
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.18 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	51 0.18 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	100 0.01 0.00 W/m ² 0.00 W/ft ² 90% 50% 2000 6760	200 0.01 0.1 W/m ² 90% 50% 2000 6760	217 0.02 0.1 W/m ² 0.01 W/ft ² 100% 2000 6760	1.15 W/m ² 0.11 W/ft ² 90% 50% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.0 W/m ² 1.2 W/m ²	0.2 W/ft ² to 0.1 W/ft ²	see notes (cells with r	ed indicator in uppe	r right corner, type "SHIFT				0.54
Usage during occupied period Usage during unoccupied period	100% 59%				C	omputer Equipmen	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.54 20.81 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below: Small restaurants, food courts, kitcher	Gas Fuel Share: nettes	E	lectricity Fuel Share:	100.0%	Natural Gas EU EUI kWh/ft².yr MJ/m².yr	0.4 15.0	EUI	Electric EUI kWh/ft².yr MJ/m².yr	0.3 10.0
REFRIGERATION Provide description below:								kWh/ft².yr MJ/m².yr	0.4 15.0
MISCELLANEOUS								kWh/ft².yr MJ/m².yr	0.3 10

NEW BUILDINGS: Non-Food Retail Baseline	SIZE:		COMMERCIA VIN	L SECTOR NTAGE:	BUILDIN	ig profi	LE		REGION: Yukon				
SPACE HEATING													
Heating Plant Type				Boilers Stan. H	ligh	ackaged Rooftop	A/A HP	W. S. HP	ctric H/R Chiller		Total		
		System Present (%) Eff./COP Performance (1 / Eff.) (kW/kW)		3% 75% 1.33	2% 85% 1.18	15% 77% 1.30	3.20 0.31	10% 3.50 0.29	4.50 0.22	70% 1.00 1.00	100%		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	33.6 W/m ² 358 MJ/m ² .yr		7 Btu/hr.ft ² 3 kWh/ft².yr								Г	All Electric EUI	
Electric Fuel Share	80.0%	Fossil Fuel Share	20.0%								_	kWh/ft².yr	8.5 330
Boiler Maintenance	Annual Ma	intenance Tasks		cidence							L	MJ/m².yr	330
	Water Sid Inspection Inspection	Inspection e Inspection for Scale BL of Controls & Safeties of Burner Analysis & Burner Set-up	ildup	(%) 75% 100% 100% 90%							-	Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite EU kWh/ft².yr MJ/m².yr	12.0 463 JI 9.2 357
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (KW/KW) Additional Refrigerant Related Information	Centrifugal Ct Standard 4.8 0.21	hillers Scre HE Chille 5.4 0.19		Recproctin Open 3.7 0.27		Absorptio W. H. 0.9 1.11	CW 1	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Re Setpoint	eset									
Setpoint		Chilled Water Condenser Water Supply Air	7 °C 30 °C 14.0 °C		44.6 ° 86 ° 57.2 °	F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	68 W/m ² 64.1 MJ/m ² .yr	22 Btu/hr.ft ² 1.7 kWh/ft ² .y		Ton									
Sizing Factor	1.00												
A/C Saturation (Incidence of A/C)	80.0%												
Electric Fuel Share	100.0%	Gas Fuel Share											
Chiller Maintenance	Inspect Co Inspect Co Megger M Condense Vibration Eddy Curr	r Tube Cleaning	Jnit	(%) (y	ears)						F	All Electric EUI kWh/t².yr	0.5
Cooling Tower/Air Cooled Condense	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors		cidence Frec (%) (y	quency ears)							MJ/m².yr Natural Gas EU! kWb/ft².yr MJ/m².yr Market Composite EU kWb/ft².yr MJ/m².yr	21 JI 0.5 21
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Eff./COP	el SHW Std. Tar resent (%) 10.00 0.55		ond. Tnk Std. 0.900	Boiler 0	0.900		Fuel Share Blended E		Fossil 15% 0.60		Elec. Res. 85% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	17.3												
Wetting Use Percentage	90%				ctric EUI /ft².yr n².yr	0.5 19		N	atural Gas E kWh/ft².yr MJ/m².yr	UI 0.7 29		Market Composite EU kWh/ft².yr MJ/m².yr	0.5 20.5

		CIAL SECTOR BUILDING PROFILE	
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Non-Food Retail Baseline			Yukon
Baseline			
HVAC FANS & PUMPS			
SUPPLY FANS			ntilation and Exhaust Fan Operation & Control
System Design Air Flow 3.3	L/s.m ² 0.64 CFM/ft ²		Ventilation Fan Exhaust Fan ed Variable Fixed Variable
System Design Air Flow 3.3 System Static Pressure CAV 400		Control Fix	Flow Flow
System Static Pressure VAV 400		Incidence of Use	100% 100%
Fan Efficiency 60%			ntinuou Scheduled Continuous Scheduled
Fan Motor Efficiency 88%	b		
Sizing Factor 1.00		Incidence of Use	75% 25% 50% 50%
Fan Design Load CAV 2.5			
Fan Design Load VAV 2.5	W/m ² 0.23 W/ft ²	Comments:	
EXHAUST FANS			
Washroom Exhaust 50	L/s.washroom 106 CFM/was	shroom	
Washroom Exhaust per gross unit area 0.1			
Other Exhaust (Smoking/Conference) 0.1			
Total Building Exhaust 0.2			
Exhaust System Static Pressure 250			
Fan Efficiency 25% Fan Motor Efficiency 75%			
Sizing Factor 1.0			
Exhaust Fan Connected Load 0.2			
AUXILIARY COOLING EQUIPMENT (Condense	er Pump and Cooling Tower/Condenser Fans)	
Aurora Oradona Fra Brana Bran	0.000 134//134/	0.07 100/7	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	0.020 kW/kW ondenser) 1.37 W/m ²	0.07 kW/Ton 0.13 W/ft ²	
(Cooling Tower/Evap. Condensel/ All Cooled Co	T.ST W/II-	0.13 W/It-	
Condenser Pump			
Pump Design Flow	L/s.KW	U.S. gpm/Ton	
Pump Design Flow per unit floor area	L/s.m ²	U.S. gpm/ft ²	
Pump Head Pressure	45 kPa	15 ft	
Pump Efficiency	50%		
Pump Motor Efficiency Sizing Factor	80%		
Pump Connected Load	1.0 W/m²	W/ft ²	
		, which is a second sec	
CIRCULATING PUMP (Heating & Cooling)			
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²		S. gpm/Ton
Pump Head Pressure Pump Efficiency	kPa	ft	
Pump Enciency Pump Motor Efficiency	50% 80%		
Sizing Factor	0.8		
Pump Connected Load	W/m ²	W/ft ²	
Supply Fan Occ. Period	5500 hrs./year		
Supply Fan Unocc. Period	3260 hrs./year		
Supply Fan Energy Consumption	19.6 kWh/m².yr		
Exhaust Fan Occ. Period	5500 hrs./year		
Exhaust Fan Unocc. Period	3260 hrs./year		
Exhaust Fan Energy Consumption	1.5 kWh/m².yr		
Condenser Pump Energy Consumption	kWh/m².yr		
Cooling Tower /Condenser Fans Energy Consum	nption 0.3 kWh/m².yr		
Circulating Rump Voorly Operation	7000 hrs 4.000		
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	7000 hrs./year kWh/m².yr		
Circulating Fump Energy Consumption	KVVIVIIP.yI		
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency	
		(%) (years)	
	Inspect/Service Fans & Motors		
	Inspect/Adjust Belt Tension on Fan Belts	<u> </u>	
	Inspect/Service Pump & Motors		EUI kWh/ft².yr 2.0
			MJ/m ² .vr 76.9

NEW BUILDINGS: Non-Food Retail Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		NG PROFILE		REGION: Yukon	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		19.8 kWh/ft².yr 765.6 MJ/m².yr		Gas:	2.5 kWh/ft ² .yr	96.9 MJ/r	m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	Ga	IS	
GENERAL LIGHTING	4.3	164.8		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	1.6	60.6	SPACE HEATING	6.8	264.0	2.4	92.6	
SPECIAL PURPOSE LIGHTING	0.9	34.9	SPACE COOLING	0.4	16.6			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.4	16.2	0.1	4.3	
HVAC FANS & PUMPS	2.0	76.9	FOOD SERVICE EQUIPMENT	0.3	10.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.5	20.8						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	1.3	50.9						
Fuel Specific EUIs for Heating Cod	olina & DHW							

				COMMER	CIAL SECT		DING PROP	FILE						
NEW BUILDINGS: Hotel/Motel	SIZE:				VINTAGE	:				REGION	l:			
Baseline										Yukon				
CONSTRUCTION														
	_			-								_		
Wall U value (W/m ² .°C) 0.2	0 W/m².°C		0.04	Btu/hr.ft ² .	°F		Typical B	uilding Size			1,859	9 m²	20,0	000 ft ²
Roof U value (W/m ² .°C) 0.1	1 W/m ² .°C		0.02	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²)		1,859	9 m²	20,0	000 ft ²
Glazing U value (W/m ² .°C) 1.6	0 W/m².°C		0.28	Btu/hr.ft ² .	°F		Footprint	Aspect Rat	io (L:W)			4		
								onditioned			1009			
								onditioned			459	%		
Window/Wall Ratio (WIWAR) (%) 0.3 Shading Coefficient (SC) 0.6							Typical #	s Exterior Z Stories	one			1		
	0							loor Height	(m)			7 m	12	2.0 ft
VENTILATION SYSTEM, BUILDING CONTR	OLS & INL	OOR CONDITIC	INS											
Ventilation System Type				CAV	CAVR	DDM		VAV	FCoils	s I	U 100% O.	A TOTA	AL.	
		System Present	t (%)	90%				10%				100		
		Min. Air Flow (%						60%						
		(Minimum Throt	ttled Air Vo	olume as P	ercent of Fu	III Flow)								
Occupancy or People Density		50	m²/perso	n	538	ft²/person				%OA	9.779	%		
Occupancy Schedule Occ. Period		50%								/		-		
Occupancy Schedule Unocc. Period		80%												
Fresh Air Requirements or Outside Air		10	L/s.perso	n	21	CFM/pers	on							
Fresh Air Control Type *(enter	r a 1, 2 or 3)	1	lf Fresh ∆	ir Control T	ype = "2" e	nter % FA	to the right.			15	%			1
(1 = mixed air control, 2 = Fixed fresh air, 3 100					ype = 2 e ype = "3" e			ation and o	peration		.5 L/s.m ²	0.1	10 CFM/ft ²	
											% operatio			
Sizing Factor		1.2												
Total Air Circulation or Design Air Flow		2.05	L/s.m ²		0.40	CFM/ft ²		Soporato	Make-up ai	ir unit (100	04 OA)		L/s.m ²	CFM
Infiltration Rate		0.70	L/s.m ²		0.14	CFM/ft ²		Separate	Operatior			50		CFW
(air infiltration is assumed to occur during unoc	cupied	0.10	20		0.11	0.1101			Operation			50		
hours only if the ventilation system shuts down)														
Economizer			Enthols	Deced	Drac Da	lh Deced	Tatal	т						
Economizer	Incidence	of Use	Enmaip	y Based	Dry-Ви 100%	lb Based	Total 100%		Summary	of Desig	Paramete	rs		_
	Switchov			KJ/kg.		°C	1007	-	Peak Des			222,13	3	
				Btu/lbm	64.4	°F			Peak Zon		Load	144,48		
	0			1.0.4.0		1			Room air				2 Btu/lbm	
Controls Type	System P	resent (%)		HVAC	Room t Controls				Discharge		IPY t 55F & 100%		4 Btu/lbm .2 ft ³ /lbm	
	All Pneum	natic		Equipmen	CONTINUIS				Design C		1 55F & 100%	6,72		
	DDC/Pne										or Design a			
	All DDC													
	Total (sho	ould add-up to 10	0%)											
			Prop	ortional	PI / PID	Tota	1							
Control mode	Control N	lode												
			Fixed D	ischarge	Reset									
	Control S	trategy												
Indoor Design Conditions				1	Room				Supply Ai	r		-		
	Summer	Temperature		22	°C	71.0	8°F	13	°C		.4 °F	7		
		Humidity (%)		50%		1	-	100%			_			
	Enthalpy Winter Or	c. Temperature			KJ/kg.		Btu/lbm B°F		KJ/kg.		4 Btu/lbm 59 °F	_		
		c. Humidity		30%	°C	09.0		15 45%			59 F			
	Enthalpy	,			KJ/kg.	22.8	Btu/lbm		KJ/kg.	19.	6 Btu/lbm			
		nocc. Temperatur	e		°C	69.8	8 °F				•	_		
		nocc. Humidity		30%		04.5	Dividian							
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm							
Damper Maintenance					Frequency									
	Control	rm Adjustment		(%)	(years)									
	Lubricatio													
		al Replacement												
Air Filter Cleaning	Channer	Voor			1									
Air Filter Cleaning	Changes/	i edi		L	L									
						Incidence of	of Annual R	oom Contr	ols Mainter	nance		٦		
Incidence of Annual HVAC Controls Maintenan	се											-		
	A	-latera T i		la del	1				1	T 1		The state	-	
	Annual M	aintenance Tasks	5	Incidence (%)	1			Annual Ma	aintenance	I ASKS		Incidend (%)	æ	
	Calibratio	n of Transmitters		(70)	1			Inspection	/Calibratio	n of Roon	n Thermost		+	
	Calibratio	n of Panel Gauge	es		1			Inspection	of PE Sw	itches				
		n of Auxiliary Dev			4				of Auxiliar				_	
	Inspection	n of Control Devi	ces	1					of Contro , VAV Box		(Valves,			
								Luampers	, VAV DUX	c3)				

NEW BUILDINGS: Hotel/Motel Baseline	SIZE:	COMMER	CIAL SECTOR BUILDI VINTAGE:	NG PROFILE	REGION: Yukon				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.25	ft-candles W/ft²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4400 4360 85% 15%	Light Level (Lux) % Distribution Weighted Average	200	300 400 50% CFL T12 ES	50%	MH HPS	Total 100% 450 TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	100% 0.6 0.6 0.80 0.80	0.6 0.6 0.55 0.55 65 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot							kWh/ft².yr MJ/m².yr	1.2 46
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.75	ft-candles W/ft²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) % Distribution Weighted Average	100 25%	125 150 50% 25% CFL T12 ES		MH HPS	Total 100% 125		
Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence	years	System Present (%) CU LLF Efficacy (L/W)	25% 0.7 0.65 15	75% 0.7 0.6 0.65 0.75 50 72	0.6 0.6 0.80 0.80	0% 0.6 0.6 0.55 0.55 65 90	100.0%		
of Practice	Group Spot			EUI = Load X Hrs. >	SF X GLFF			kWh/ft².yr MJ/m².yr	1.7 66
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft²		Floor frac	tion check: should = 1.0	00 1.00	1		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average					Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65	CFL T12 ES 0% 0.7 0.65 0.75 50 72	0.6 0.6 0.80 0.80	MH HPS 100% 0% 0.6 0.6 0.55 0.55 65 90	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot							kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING					Overall LP	9.43 W/m ²	EUI TOTAL	-	2.9 112
OFFICE EQUIPMENT & PLUG LOA		-							
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	-		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.3 0.3 W/m ² 0.0 W/t ² 90% 50% 2000 6760	51 0.3 0.0 W/ft ² 90% 50% 2000 6760	100 0.05 0.1 W/m ² 90% 50% 2000 6760	200 0.033 0.1 W/m ² 0.01 W/ft ² 90% 50% 2000 6760	217 0.02 0.1 W/ft ² 100% 100% 2500 6260	1.5 W/m² 0.14 W/ft² 70% 25% 3000 5760			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.9 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHIF	T F2"			
Usage during occupied period Usage during unoccupied period	100% 48%				(Computer Equipment Plug Loads	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.51 19.79 0.49 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Gas Fuel Share:	75.0%	Electricity Fuel Share:	25.0%	Natural Gas El EUI kWh/ft².yr MJ/m².yr	JI 2.6 100.0	EUI	Electric EUI kWh/ft².yr MJ/m².yr	1.3 50.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	ers/freezers, refrigerated buffet cases	5]					kWh/ft².yr MJ/m².yr	0.8 30.0
MISCELLANEOUS							EUI	WA16/642	0.5
								kWh/ft².yr MJ/m².yr	0.5 20

NEW BUILDINGS: Hotel/Motel Baseline	SIZE:		COMMER	CIAL SECT VINTAGE	OR BUILD	ING PROF	ILE		REGION: Yukon				
SPACE HEATING													
Heating Plant Type					Natural Gas				ctric				
				Bo Stan.	ilers High	Packaged Units	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		75%			3.20	3.00	4.50	95% 1.00	100%		
		Performance (1 / Eff.)		1.33	1.18		0.31	0.33		1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	50.1 W/m ² 338 MJ/m ² .yr		9 Btu/hr.ft ² 7 kWh/ft ² .yr		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>			All Electric EUI	
Electric Fuel Share	95.0%	Fossil Fuel Share	5.0%	þ								kWh/ft².yr	8.7
Boiler Maintenance	Annual Ma	intenance Tasks		Incidence]							MJ/m².yr	338
	Inspection Inspection	Inspection e Inspection for Scale Bu of Controls & Safeties of Burner Analysis & Burner Set-up		(%) 75% 100% 100% 90%								Natural Gas EUI KWh/ft².yr MJ/m².yr Market Composite E KWh/ft².yr MJ/m².yr	10.8 419 UI 8.8 342
SPACE COOLING												· · · ·	
A/C Plant Type													
		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 4.7 0.21	HE 20.0% 5.4	Screw Chillers 4.4 0.23		ting Chillers DX 80.0% 2.9 0.34	W. H. 0.9	CW 1	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air	7 30 13.0	°C	44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	35 W/m² 52.3 MJ/m².yr	11 Btu/hr.ft 1.3 kWh/ft².y		ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	4000	hrs/year	Note value	e cannot be	less than 2,	900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	75.0%												
Electric Fuel Share	100.0%	Gas Fuel Share]									
Chiller Maintenance	Inspect C. Inspect C. Megger M Condense Vibration Eddy Curr	r Tube Cleaning		(0 ()	Frequency (years)							All Electric EUI	
Cooling Tower/Air Cooled Condense	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors	S	Incidence (%)	Frequency (years)	-						kV/h/ft².yr MJ/m².yr Natural Gas EUI kVV/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	0.6 22 UI 0.6 22
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Eff./COP	el SHW Std. Tan resent (%) 550	k HE Tank 5% % 70%	6	Std. Boiler			Fuel Share Blended E		Fossil 5% 0.70	E	Elec. Res. 95% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	236.6												
Wetting Use Percentage	90%			A	Il Electric El kWh/ft ² .yr MJ/m ² .yr	JI 6.7 260		Na	atural Gas E kWh/ft².yr MJ/m².yr	UI 8.7 338		Market Composite E kWh/ft ² .yr MJ/m ² .yr	UI 6.8 263.9

		COMMER	CIAL SECTOR BUILDING PROFILE						
NEW BUILDINGS:	SIZE:		VINTAGE:	REG	GION:				
Hotel/Motel				Yuk	on				
Baseline									
HVAC FANS & PUMPS									
SUPPLY FANS				Ventilation and	Exhaust	t Fan Operation &	Control		
				Ventilation F	Fan	Exhaust Fan			
System Design Air Flow	2.0 L/s.m ²	0.40 CFM/ft ²	Control	Fixed Varia	iable	Fixed Variab	ble		
System Static Pressure CAV	300 Pa	1.2 wg		F	low	Flow	v		
System Static Pressure VAV	300 Pa	1.2 wg	Incidence of Use	100%	-	100%			
Fan Efficiency	45%	<u>.</u>	Operation		Chaluba	ontinuous Schedu	led		
Fan Motor Efficiency	70%		operation	Continuou.Cont	cuulcuo	on and do do do node	lica		
	1.00		Incidence of Line	60%	40%	100%			
Sizing Factor		0.40	Incidence of Use	60%	40%	100%			
Fan Design Load CAV	2.0 W/m ²	0.18 W/ft ²	2						
Fan Design Load VAV	2.0 W/m ²	0.18 W/ft ²	Comments:						
EXHAUST FANS									
Washroom Exhaust	100 L/s.was		shroom						
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.02 CFM/ft ²							
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²							
Total Building Exhaust	0.2 L/s.m ²	0.04 CFM/ft ²							
Exhaust System Static Pressure	250 Pa	1.0 wg							
Fan Efficiency	25%	· · _ · _ · · _ · · · · · ·							
Fan Motor Efficiency	75%								
Sizing Factor	1.0								
Exhaust Fan Connected Load	0.3 W/m ²	0.03 W/ft ²							
Exhaust Fan Connected Load	0.3 W/IIF	0.03 00/112							
			`						
AUXILIARY COOLING EQUIPMENT (C	ondenser Pump	and Cooling Tower/Condenser Fans)						
Average Condenser Fan Power Draw		0.022 kW/kW	0.08 kW/Ton						
(Cooling Tower/Evap. Condenser/ Air Co	ooled Condenser)	0.76 W/m ²	0.07 W/ft ²						
Condenser Pump									
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton						
Pump Design Flow per unit floor area		0.002 L/s.m ²	0.003 U.S. gpm/ft ²						
Pump Head Pressure		kPa	ft						
Pump Efficiency		50%	n						
Pump Motor Efficiency		80%							
Sizing Factor		1.0							
Pump Connected Load		W/m ²	W/ft ²						
CIRCULATING PUMP (Heating & Cool	ing)								
Pump Design Flow @ 5 °C (10 °F) delta	аT	0.002 L/s.m ²	0.0022 U.S. gpm/ft ² 2.4	U.S. gpm/Ton					
Pump Head Pressure		100 kPa	33 ft						
Pump Efficiency		50%							
Pump Motor Efficiency		80%							
Sizing Factor		0.8							
Pump Connected Load		0.3 W/m ²	0.03 W/ft ²						
I drip connected Load		0.5 W/III	0.05 W/IT						
Sumply Fan Oan Drife it		2500 has to a -							
Supply Fan Occ. Period		3500 hrs./year							
Supply Fan Unocc. Period		5260 hrs./year							
Supply Fan Energy Consumption		13.0 kWh/m ² .yr							
Exhaust Fan Occ. Period		3500 hrs./year							
Exhaust Fan Unocc. Period		5260 hrs./year							
Exhaust Fan Energy Consumption		2.4 kWh/m ² .yr							
Condenser Pump Energy Consumption		kWh/m².yr							
Cooling Tower /Condenser Fans Energy	Consumption	0.4 kWh/m².yr							
control routerber rais Ellergy	Sonoumption	0.4 КМИЛИ.У							
Circulating Pump Yearly Operation		7000 hrs./year							
Circulating Pump Energy Consumption		0.1 kWh/m².yr							
	F								
Fans and Pumps Maintenance	Annual M	Maintenance Tasks	Incidence Frequency						
			(%) (years)						
		Service Fans & Motors							
	Inspect/A	Adjust Belt Tension on Fan Belts					_		
	Inspect/S	Service Pump & Motors					EUI	kWh/ft².yr	1.5
			· · · · · · · · · · · · · · · · · · ·					MJ/m².yr	57.1

NEW BUILDINGS: Hote/Motel Baseline		SIZE:	COMMERCIAL SECT VINTAGE:		ng profili		REGION: Yukon			
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		22.6 kWh/ft².yr 876.0 MJ/m².yr		Gas:	2.9 kWh/ft ² .yr	112.8 MJ/m ² .	².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Ga	as			
GENERAL LIGHTING	1.2	46.0	-	kWh/ft².yr	MJ/m².yr	kWh/ft2.yr	MJ/m².yr			
SECONDARY LIGHTING	1.7	66.1	SPACE HEATING	8.3	321.0	0.5	20.9			
TERTIARY LIGHTING			SPACE COOLING	0.4	16.5					
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.4	247.0	0.4	16.9			
HVAC FANS & PUMPS	1.5	57.1	FOOD SERVICE EQUIPMENT	0.3	12.5	1.9	75.0			
REFRIGERATION	0.8	30.0								
MISCELLANEOUS	0.5	20.0								
COMPUTER EQUIPMENT	0.5	19.8								
ELEVATORS	0.1	3.9								
OUTDOOR LIGHTING	0.4	17.0								

			COMME		CTOR BUILD	ING PROF	ILE				
NEW BUILDINGS: Health Care	SIZE:			VINTAGE	:			REGION: Yukon			
Baseline											
CONSTRUCTION											
										05.000	<i>(</i> 10)
	W/m².°C		0.04 Btu/hr.ft ²				ilding Size		8,829 m ²	95,000	
	W/m².°C		0.02 Btu/hr.ft ²				otprint (m ²)		1,400 m ²	15,064	ft ²
Glazing U value (W/m ² .°C) 1.60	W/m ² .°C	().28 Btu/hr.ft ²	.°F			Aspect Ratio (I		2		
							onditioned Spa onditioned Spa		100% 45%		
Window/Wall Ratio (WIWAR) (%) 0.20	٦						s Exterior Zone		4376		
Shading Coefficient (SC) 0.65						Typical # \$			3		
						Floor to Fl	oor Height (m	1)	4.3 m	14.0	ft
VENTILATION SYSTEM, BUILDING CONTRO											
VENTILATION STOTEM, BUILDING CONTIN											
Ventilation System Type			CAV		DDMZ	DDMZVV		FCoils		TAL	
		System Present (%)	50%	6			50%		1	00%	
		Min. Air Flow (%) (Minimum Throttled A	ir Volume as P	Percent of F	ull Flow)		60%				
		(Willing and The died /		CIOCIL OF T							
Occupancy or People Density		30 m²/pe	erson	323	ft²/person			%OA	26.86%		
Occupancy Schedule Occ. Period		90%									
Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		75% 55 L/s.p		447	CFM/persor						
Fiesti Ali Requirements of Outside Ali		55 L/S.p	erson	117	CFIM/persor	1					
Fresh Air Control Type *(enter a	a 1, 2 or 3)	1 If Fre	sh Air Control	Гуре = "2" е	enter % FA. to	the right:		15	%	1	
(1 = mixed air control, 2 = Fixed fresh air, 3 100%			sh Air Control				ion and operat			0.10 CFM/ft ²	
Sining Easter								50	% operation (%)]	
Sizing Factor Total Air Circulation or Design Air Flow		6.82 L/s.m	2	1.3/	CFM/ft ²						
Total All Onediation of Design All Flow		0.02 2/3.11		1.0-	Orman		Separate Mal	ke-up air unit (100%	OA)	L/s.m ²	CFM/ft ²
Infiltration Rate		0.70 L/s.m	12	0.14	CFM/ft ²		Op	peration occupied p	eriod	50%	
(air infiltration is assumed to occur during unoccu	pied						Op	peration unoccupied	period	50%	
hours only if the ventilation system shuts down)											
Economizer		En	thalpy Based	Drv-B	ulb Based	Total	j				
	Incidence			100%		100%	Su	mmary of Design F	Parameters		
	Switchove	r Point	KJ/kg.		°C			eak Design Cooling			
			Btu/lbm	64.4	۴			eak Zone Sensible L			
Controls Type	System Pr	resent (%)	HVAC	Room	1			oom air enthalpy scharge air enthalp		28.2 Btu/lbm 23.4 Btu/lbm	
	oysterii i		Equipmer					ecific volume of air at 5		13.2 ft ³ /lbm	
	All Pneum						De	esign CFM	21,	278	
	DDC/Pneu	imatic			_		To	tal air circulation or	Design air fk 6.8	32 l/s.m ²	
	All DDC Total (sho	uld add-up to 100%)									
	r o tai (ono										
			roportional	PI / PID	Total						
Control mode	Control Me		Disation	Deret							
	Control St		ed Discharge	Reset	_						
	Control of	alogy	1			1					
Indoor Design Conditions				Room	-	-		ipply Air			
		emperature		4 °C	75.2	°F	14 °C	57	.2 °F		
	Enthalpy	lumidity (%)	50%	s 5 KJ/kg.	28.2	Btu/lbm	100% 54.5 K	1/kg 23	4 Btu/lbm		
		c. Temperature	24		75.2		16.5 °C		.7 °F		
	Winter Oc	c. Humidity	30%			_	45%				
	Enthalpy			3 KJ/kg.		Btu/lbm	45.5 K.	J/kg. 19.	6 Btu/lbm		
		occ. Temperature	24		75.2	۳F					
	Enthalpy	JCC. Humaily		o KJ/kg.	21.5	Btu/lbm					
				J							
					-						
Damper Maintenance				Frequency	/						
	Control Ar	m Adjustment	(%)	(years)	_						
	Lubrication										
	Blade Sea	I Replacement									
Air Filter Cleaning	Changes/	′ear		٦							
		1			Incidence of	Annual Ro	om Controls N	laintenance			
Incidence of Annual HVAC Controls Maintenance	9	l									
	Annual Ma	intenance Tasks	Incidence	e			Annual Mainte	enance Tasks	Incide	ence	
			(%)						(%		
		of Transmitters		4				libration of Room	Thermostat		
		of Panel Gauges		-			Inspection of				
		of Auxiliary Devices of Control Devices		-				Auxiliary Devices Control Devices (V	alves		
	mopection	5. SOUROLDEVIDES					(Dampers, VA				
							· · · · ·	,			

NEW BUILDINGS: Health Care Baseline	SIZE:		COMME	RCIAL SECTOR BUIL VINTAGE:	DING PROFI	LE		EGION: ukon				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	450 Lux 0.90 11.6 W/m ²		ft-candles W/ft²									
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 90% 30%		Light Level (Lux) % Distribution Weighted Average	20 IN		400 50%	500 50%	T8 Elec	МН Н	Total 100% 450 PS TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years		System Present (%) CU LLF Efficacy (L/W)	0.	7 0.7 5 0.65	0.6 0.75 72	0.6 0.80 84	100% 0.6 0.80 88	0.6 0 0.55 0.5	0% 100.0% .6		
Relamping Strategy & Incidence of Practice	Group Spot	_		L				I		EUI	kWh/ft².yr MJ/m².yr	5.2 201
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 0.10 15.4 W/m ²		ft-candles W/ft²								wo/myr	201
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 85%		Light Level (Lux) % Distribution Weighted Average	20	50%	400 50%	500 T8 Mag	T8 Elec	мн н	Total 100% 350 PS TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	_	System Present (%) CU LLF Efficacy (L/W)	0. 0.6	100% 7 0.7 5 0.65	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0 0.55 0.9	100.0% 100.0% 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot				EUI = Load	d X Hrs. X S	SF X GLFF			EUI	kWh/ft².yr MJ/m².yr	1.1 41
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	250.00 Lux 8.2 W/m ²		ft-candles W/ft²		[Floor fractio	on check: sh	nould = 1.00	1.0	00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100%		Light Level (Lux) % Distribution Weighted Average	20	% 50%	500	700	TOFIC	MILLI	Total 100% 250 PS TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	_	System Present (%) CU LLF Efficacy (L/W)	IN 5 0. 0.6	% 5% 7 0.7 5 0.65	T12 ES 0.6 0.75 72	T8 Mag 0.6 0.80 84	T8 Elec 90% 0.6 0.80 88	0.6 0 0.55 0.9	PS TOTAL 0% 100.0% 1.6 55 90		
Relamping Strategy & Incidence of Practice	Group Spot									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							0	verall LPD	12.00 W/m ²	EUI TOTAL	. kWh/ft².yr MJ/m².yr	6.2 242
OFFICE EQUIPMENT & PLUG LOA	DS											
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period		55 18 .9 W/m² .1 W/ft²	Monitors	Printers 100 0.02 0.1 W/m ² 0.01 W/ft ² 90%	200 0.02 0.1 0.01 90%	W/m²	217 0.04 0.3 W 0.02 W 100%	//m²	Plug Loads 3.85 W/m ² 0.36 W/ft ² 90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50 200 676	% 00	50% 2000 6760	50% 2000 6760	50% 2000 6760	-	100% 2600 6160	_	25% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)		.4 W/m² .2 W/m²	0.5 W/ft ² 0.2 W/ft ²	to see notes (cells with	red indicator	in upper rig	ht corner, ty					
Usage during occupied period Usage during unoccupied period	100 40							C	omputer Equipm Plug Loa		kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	1.11 43.10 1.74 67.29
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Gas Fue	l Share:	75.0%	Electricity Fuel Share:	25.0%	E	EUI KV	ural Gas EUI Vh/ft².yr J/m².yr	<u>3.1</u> 120.0	A EUI	I Electric EUI kWh/ft².yr MJ/m².yr	2.1 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrige	rated buffet cases	S]						EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
MISCELLANEOUS										EUI	kWh/ft².yr MJ/m².yr	0.3 10

			COMME		TOR BUILD	ING PROF	ILE						
NEW BUILDINGS: Health Care Baseline	SIZE:			VINTAGE	:				REGION: Yukon				
SPACE HEATING													
Heating Plant Type				Bo Stan.	Natural Gas bilers High	Packaged Unit	A/A HP	Ek W. S. HP	ectric H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP Performance (1 / Eff.)		5% 75% 1.33	20% 85% 1.18	15% 78% 1.28	1.70	5% 3.00 0.33	4.50 0.22	55% 1.00 1.00	100%		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	33.7 W/m ² 920 MJ/m ² .yr 1.00		7 Btu/hr.ft² 7 kWh/ft².yr				<u> </u>			<u> </u>	I	All Electric EUI	
Electric Fuel Share	60.0%	Fossil Fuel Share	40.0%	þ							-	kWh/ft².yr MJ/m².yr	22.9 887
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence							L		
	Water Sic Inspection Inspection	Inspection le Inspection for Scale Bu n of Controls & Safeties n of Burner Analysis & Burner Set-up	ildup	(%) 75% 100% 100% 100% 90%							-	Natural Gas EUI KWh/ft².yr MJ/m².yr Market Composite E KWh/ft².yr MJ/m².yr	29.3 1136
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 4.7 0.21	HE 75.0% 7 6.1	Screw Chillers 4.4 0.23	Reciprocat Open 3.6 0.28	DX 25.0% 2.7		n Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air		°C °C °C	44.6 86 57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	66 W/m ² 56.2 MJ/m ² .yr	21 Btu/hr.ft² 1.5 kWh/ft².y		ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note valu	e cannot be	less than 2,9	00 hrs/year	.)		
A/C Saturation (Incidence of A/C)	75.0%												
Electric Fuel Share	100.0%	Gas Fuel Share											
Chiller Maintenance	Inspect C Inspect C Megger M Condense Vibration Eddy Cur	er Tube Cleaning	Init Bearings	Incidence (%)	Frequency (years)						F	All Electric EUI kWh/tf:yr	0.5
Cooling Tower/Air Cooled Condense	Inspection Inspect/S Megger N	n/Clean Spray Nozzles ervice Fan/Fan Motors	8	Incidence (%)	Frequency (years)							MJ/m².yr Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	21
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	Present (%)	5.00%	ò	Std. Boiler 25.00% 85%			Fuel Share Blended E		Fossil 40% 0.85		Elec. Res. 60% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	118.3						-						
Wetting Use Percentage	90%				All Electric EU kWh/ft².yr MJ/m².yr	I 3.4 130			atural Gas E kWh/ft².yr MJ/m².yr	UI 3.6 139		Market Composite E kWh/ft².yr MJ/m².yr	EUI 3.5 133.7

		COMME	RCIAL SECTOR BUILDING PROFILE				
NEW BUILDINGS:	SIZE:		VINTAGE:	REGION:			
Health Care				Yukon			
Baseline							
HVAC FANS & PUMPS							
SUPPLY FANS				Ventilation and Exhaust F		trol	
				Ventilation Fan	Exhaust Fan	-	
System Design Air Flow	6.8 L/s.m ²	1.34 CFM/ft ²	Control	Fixed Variable	Fixed Variable		
System Static Pressure CAV	750 Pa	3.0 wg		Flow	Flow	-	
System Static Pressure VAV	750 Pa	3.0 wg	Incidence of Use	80% 20%	100%	-	
Fan Efficiency	55%		Operation	ContinuousScheduled C	ontinuousScheduled	1	
Fan Motor Efficiency	89%					-	
Sizing Factor	1.00		Incidence of Use	75% 25%	75% 25%		
Fan Design Load CAV	10.5 W/m ²	0.97 W/ft ²	a				
Fan Design Load VAV	10.5 W/m ²	0.97 W/ft ²	Comments:				
EXHAUST FANS							
EXHAUST FANS							
Weekreen Exheurt	100 1/2 1/2	212 CEM/wa	altro o m				
Washroom Exhaust Washroom Exhaust per gross unit area	100 L/s.was 0.1 L/s.m ²	hroom 212 CFM/was 0.03 CFM/ft ²	shioom				
Other Exhaust (Smoking/Conference) Total Building Exhaust	0.5 L/s.m ² 0.6 L/s.m ²	0.10 CFM/ft ² 0.13 CFM/ft ²					
Exhaust System Static Pressure	250 Pa	1.0 wg					
Fan Efficiency	25%	1.0 Wg					
Fan Motor Efficiency	25% 75%						
Sizing Factor	1.0						
Exhaust Fan Connected Load	0.9 W/m ²	0.08 W/ft ²					
Exhaust Fair Connected Load	0.9 W/III-	0.08 00/11-					
AUXILIARY COOLING EQUIPMENT (Cor	ndenser Pumn	and Cooling Tower/Condenser Fans)				
	achiser r ump)				
Average Condenser Fan Power Draw		0.017 kW/kW	0.06 kW/Ton				
(Cooling Tower/Evap. Condenser/ Air Coo	led Condenser)		0.10 W/ft ²				
(Cooking Totton 21ap: Contaction 7 in Coo		1.00	0.10				
Condenser Pump							
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton				
Pump Design Flow per unit floor area		0.004 L/s.m ²	0.005 U.S. gpm/ft ²				
Pump Head Pressure		100 kPa	33 ft				
Pump Efficiency		60%	00 11				
Pump Motor Efficiency		88%					
Sizing Factor		1.0					
Pump Connected Load		0.67 W/m ²	0.06 W/ft ²				
r unp connected Load		0.07	0.00				
CIRCULATING PUMP (Heating & Cooling	a)						
	5/						
Pump Design Flow @ 5 °C (10 °F) delta 1	r	0.003 L/s.m ²	0.0042 U.S. gpm/ft ² 2.4	U.S. gpm/Ton			
Pump Head Pressure		100 kPa	33 ft				
Pump Efficiency		60%					
Pump Motor Efficiency		88%					
Sizing Factor		0.8					
Pump Connected Load		0.4 W/m ²	0.04 W/ft ²				
Supply Fan Occ. Period		4000 hrs./year					
Supply Fan Unocc. Period		4760 hrs./year					
Supply Fan Energy Consumption		68.0 kWh/m ² .yr					
Exhaust Fan Occ. Period		4000 hrs./year					
Exhaust Fan Unocc. Period		4760 hrs./year					
Exhaust Fan Energy Consumption		6.5 kWh/m ² .yr					
Condenser Pump Energy Consumption		0.7 kWh/m².yr					
Cooling Tower /Condenser Fans Energy C	onsumption	0.3 kWh/m².yr					
Circulating Pump Yearly Operation		7000 hrs./year					
Circulating Pump Energy Consumption		1.4 kWh/m².yr					
Fans and Pumps Maintenance	Annual I	Maintenance Tasks	Incidence Frequency				
			(%) (years)				
		Service Fans & Motors					
		Adjust Belt Tension on Fan Belts					
	Inspect/s	Service Pump & Motors				EUI kWh/ft².y	r 7.1
						MJ/m ² .yr	276.6

NEW BUILDINGS: Health Care Baseline	\$	SIZE:	COMMERCIAL SEC VINTAGE:	for Buildi	NG PROFIL	F	REGION: ′ukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		34.6 kWh/ft².yr 1,339.4 MJ/m².yr		Gas:	15.5 kWh/ft ² .yr	600.3 MJ/n	m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electric	ity	Ga	as	
GENERAL LIGHTING	5.2	200.7	_	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
SECONDARY LIGHTING	1.1	41.2	SPACE HEATING	13.7	532.0	11.7	454.6	
TERTIARY LIGHTING			SPACE COOLING	0.4	15.6			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	2.0	78.0	1.4	55.7	
HVAC FANS & PUMPS	7.1	276.6	FOOD SERVICE EQUIPMENT	0.5	20.0	2.3	90.0	
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	1.1	43.1						
ELEVATORS	0.2	7.7						
OUTDOOR LIGHTING	0.8	32.2						

			COMMERC	CIAL SECTOR BUILD	ING PROF	ILE				
NEW BUILDINGS: Education	SIZE:			VINTAGE:			REG Yuko			
Baseline										
CONSTRUCTION										
Wall U value (W/m ² .°C) 0.20	W/m².°C	0.04	Btu/hr.ft².°F		Typical Bu	ilding Sizo		4,000	m ² 42.04	0 ft ²
	W/m².°C		Btu/hr.ft ² .°F			-		2,000		
						otprint (m ²)		2,000	21,52	5 11-
Glazing U value (W/m ² .°C) 1.60	W/m².°C	0.28	Btu/hr.ft ² .°F			Aspect Ratio		100%		
						onditioned S		50%		
Window/Wall Ratio (WIWAR) (%) 0.28						Exterior Zo				
Shading Coefficient (SC) 0.68	1				Typical # S			2	· · · ·	<u> </u>
					Floor to Fl	oor Height ((m)	3.5	m 11.	5 ft
VENTILATION SYSTEM, BUILDING CONTRO	LS & INDOOR CON	IDITIONS								
Ventilation System Type	Suptom E	resent (%)	CAV 100%	CAVR DDMZ	DDMZVV	VAV	VAVR	IU 100% O.A	TOTAL 100%	
	Min. Air F		10078						100 /8	
		Throttled Air Vol	ume as Perce	nt of Full Flow)			1	I		
			r	151 601				00.000/		
Occupancy or People Density Occupancy Schedule Occ. Period		14 m²/person 90%	L	151 ft²/person			%OA	20.36%		
Occupancy Schedule Unocc. Period		3078								
Fresh Air Requirements or Outside Air		6 L/s.person	Ĩ	13 CFM/perso	n					
	a 1, 2 or 3)			= "2" enter % FA. to the			tion	10%	0.40 CEM/#2	
(1 = mixed air control, 2 = Fixed fresh air, 3 1009	% fresh air)	IT Fresh Air	Control Type	= "3" enter Make-up A	ir ventilatio	n and opera		0.5 L/s.m ² 50% operation (0.10 CFM/ft ²	
Sizing Factor		1.1					¥	oo moperation (<i>////</i>	
Total Air Circulation or Design Air Flow		2.10 L/s.m ²	[0.41 CFM/ft ²				-		
			F	0.00			/lake-up air unit (L/s.m ²	CFM/ft ²
Infiltration Rate (air infiltration is assumed to occur during unoccu	nied	0.30 L/s.m ²	L	0.06 CFM/ft ²			Operation occup Operation unocc		50% 50%	
hours only if the ventilation system shuts down)	pied						Operation unocc	upled period	30 /8	
····· , ··· , ··· ,										
Economizer			by Based	Dry-Bulb Based	Total					_
	Incidence of Use	20%		80%	100%		Summary of De		750 400	
	Switchover Point		KJ/kg. Btu/lbm	20 °C 68 °F			Peak Design Co Peak Zone Sens		750,400 348,610	
			Dtu/IDITI	00 1			Room air enthal		28.2 Btu/lbm	
Controls Type	System Present (%)	HVAC	Room			Discharge air en		23.4 Btu/lbm	
			Equipment	Controls				air at 55F & 100% R	13.2 ft ³ /lbm	
	All Pneumatic DDC/Pneumatic		35% 55%	90%			Design CFM Total air circulat	on or Design air	16,217 2.10 l/s.m ²	
	All DDC		10%	10%		L	Total all circulat	on of Designan	2.10 \$3.11	
	Total (should add-up	to 100%)	100%	100%						
	r				-					
Control mode	Control Mode	Prop	ortional	PI / PID Total						
Control mode	Control Mode	Fixed D	Discharge	Reset	-					
	Control Strategy		, , , , , , , , , , , , , , , , , , ,							
	r			_						
Indoor Design Conditions	Summer Temperatu	-	24	Room °C 75.2	l∘⊏	14	Supply Air	57.2 °F		
	Summer Temperatur Summer Humidity (%		50%	0 75.2	. F	100%		<u>57.2</u> F		
	Enthalpy	-,		KJ/kg. 28.2	Btu/lbm		KJ/kg.	23.4 Btu/lbm		
	Winter Occ. Temper		22	°C 71.6	°F	17	°C	62.6 °F		
	Winter Occ. Humidit	Ý	30%	K 1/1/m 22.0	D4 //han	45%	1/ 1/1/10			
	Enthalpy Winter Unocc. Temp	erature	22		Btu/lbm	45.5	KJ/kg.	19.6 Btu/lbm		
	Winter Unocc. Humi		30%	•						
	Enthalpy			KJ/kg. 21.5	Btu/lbm					
Damper Maintenance			Incidence	Frequency						
Damper Maintenance			(%)	(years)						
	Control Arm Adjustm	ient		<u> </u>						
	Lubrication									
	Blade Seal Replacer	nent								
Air Filter Cleaning	Changes/Year	[4							
						_				
Incidence of Annual HVAC Controls Maintenana	100%			Incidence o	f Annual Ro	oom Contro	ls Maintenance	100.0%		
Incidence of Annual HVAC Controls Maintenance	e 100%									
	Annual Maintenance	Tasks	Incidence			Annual Mai	intenance Tasks		Incidence	
			(%)				-		(%)	
	Calibration of Trans						Calibration of Ro	oom Thermostat	100%	
	Calibration of Panel Inspection of Auxilia		100%				of PE Switches of Auxiliary Devi	<u></u>		
	Inspection of Auxilia Inspection of Contro						of Control Devic			
							VAV Boxes)			

NEW BUILDINGS: Education Baseline	SIZE:		COMMER	RCIAL SECTO VINTAGE:	r Buildin	g profil	E		REGION: Yukon					
LIGHTING GENERAL (CLASSROOM) LIGHTIN	6													
Light Level	420 Lux	39.0	ft-candles											
Floor Fraction (GLFF) Connected Load	0.80 9.9 W/m ²	0.9	W/ft ²											
Occ. Period(Hrs./yr.)	2000		Light Level (Lux)		300	500	700	1000				Total	[
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6760 90%		% Distribution Weighted Average		40%	60%						100% 420		
Usage During Unoccupied Period	10%				INC	CFL	T12 ES	T8 Mag	T8 Elec	МН	T5 HC			
Fixture Cleaning:			System Present (%)		0.7	0.7	0.0		100%			100.0%		
Incidence of Practice Interval	years		CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 82	0.6 0.80 88	0.6 0.55 65	0.6	5		
Relamping Strategy & Incidence of Practice	Group Spot	t	Lineacy (L/W)		15	50	12	02	00	03	30	EUI	kWh/ft².yr	1.8
ARCHITECTURAL LIGHTING													MJ/m².yr	71
Light Level	370 Lux	34.4	ft-candles											
Floor Fraction (ALFF) Connected Load	0.10 16.3 W/m ²	1.5	W/ft ²											
Occ. Period(Hrs./yr.)	2000		Light Level (Lux)		300	500	700	1000				Total	ſ	
Unocc. Period(Hrs./yr.)	6760		% Distribution		65%	35%						100%		
Usage During Occupied Period Usage During Unoccupied Period	90% 10%		Weighted Average		ING	051	T40 50	TOMOS			TELK	370		
Fixture Cleaning:			System Present (%)		INC	CFL 100%	T12 ES	T8 Mag	T8 Elec	MH	T5 HC	D TOTAL 100.0%		
Incidence of Practice Interval	years		CU LLF		0.7 0.65	0.7 0.65	0.6 0.75	0.6 0.80	0.6 0.80	0.6 0.55	0.6			
Relamping Strategy & Incidence	Group Spot	t	Efficacy (L/W)		15	50	72	82	88	65	90			
of Practice					E	UI = Load	I X Hrs. X	SF X GLF	F				kWh/ft².yr MJ/m².yr	0.4 14
HIGH BAY (GYMNASIUM) LIGHTING Light Level	300.00 Lux	27.0	ft-candles				loor froati	on chock:	should = 1.	00	1.00			
Floor Fraction (HBLFF) Connected Load	0.10 13.0 W/m ²		W/ft ²			Ľ	1001 Hacti	UTI CHECK.	Should = 1.	00	1.00			
Occ. Period(Hrs./yr.)	2000		Light Level (Lux)		300	500	700	1000				Total	ſ	
Unocc. Period(Hrs./yr.)	6760		% Distribution		100%							100%		
Usage During Occupied Period Usage During Unoccupied Period	90% 10%		Weighted Average									300		
	·		Sustem Dresent (0()		INC	CFL	T12 ES	T8 Mag	T8 Elec	MH 75%	T5 H0 25%			
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval	years		LLF Efficient (LAM)		0.65 15	0.65 50	0.75 72	0.80 84	0.80 88	0.55 65	0.55			
Relamping Strategy & Incidence of Practice	Group Spot	t	Efficacy (L/W)		15	50	12	04	00	60	90		kWh/ft².yr	0.3
													MJ/m².yr	12
TOTAL LIGHTING									Overall LP	9.58	W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	3 97
OFFICE EQUIPMENT & PLUG LOA	DS													
Equipment Type	Com	puters	Monitors	Printe	ers	Copie	ers	Ser	vers	Pluç) Loads			
Measured Power (W/device)		55	51	100	_	200	-	217	1					
Density (device/occupant)	0	.16	0.16	0.02		0.02		0.01			1			
Connected Load		0.6 W/m ² 0.1 W/ft ²	0.6 W/m ² 0.1 W/ft ²	0.1 W		0.3 V 0.03 V			W/m² W/ft²		W/m² W/ft²			
Diversity Occupied Period	9	0%	90%	90%		90%		100%		100%				
Diversity Unoccupied Period Operation Occ. Period (hrs./year)		<u>5%</u> 000	25% 2000	25% 2000		25% 2000		100% 2000		50% 2000				
Operation Unocc. Period (hrs./year)	67	760	6760	6760		6760	-	6760		6760				
Total end-use load (occupied period) Total end-use load (unocc. period)		2.6 W/m² 1.0 W/m²	0.2 W/ft ² 0.1 W/ft ²								_	1		
Usage during occupied period Usage during unoccupied period		0% 0%								Compu	ter Equipmer Plug Load	sEUI	kWh/ft².yr MJ/m².yr kWh/ft².yr	0.61 23.80 0.50
												1	MJ/m².yr	19.37
FOOD SERVICE EQUIPMENT	o -		50.0%	FILM N. F.	-1.01	F0 00/	г				I			
Provide description below: Cooking	Gas Fu	el Share:	50.0%	Electricity Fu	ei Share:	50.0%	ł	Na EUI	atural Gas E kWh/ft².yr	UI 0.8		EUI	Electric EUI kWh/ft ² .yr	0.5
									MJ/m².yr	30.0	1		MJ/m².yr	20.0
REFRIGERATION														
Provide description below:				7								(cur	144/6/642	<u>.</u>
Coolers, freezers, pop machines													kWh/ft².yr MJ/m².yr	0.1 5.0
MISCELLANEOUS														
												EUI	kWh/ft².yr	0.1
													MJ/m².yr	5

NEW BUILDINGS: Education Baseline	SIZE:		COMMER	CIAL SECT VINTAGE:		ING PROF	ILE		REGION: Yukon				
SPACE HEATING													
Heating Plant Type					Fossil Fuel				ctric				
				Boi Stan.	lers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller F	Resistance	Total		
		System Present (%)			35%			25%		40%	100%	100%	
		Eff./COP Performance (1 / Eff.)		75% 1.33	<u>85%</u> 1.18	75%	1.70			1.00 1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	38.7 W/m ² 386 MJ/m ² .yr		Btu/hr.ft² kWh/ft².yr								Γ		
Electric Fuel Share	65.0%	Gas Fuel Share	35.0%	I								All Electric EUI kWh/ft².yr	10.0
Boiler Maintenance	Annual M	aintenance Tasks		Incidence								MJ/m².yr	386
				(%)							Γ	Natural Gas EUI	-
	Fire Side Water Side	75% 100%								kWh/ft².yr MJ/m².yr	8.5 329		
	Inspection	n of Controls & Safeties	100%										
		of Burner Analysis & Burner Set-up		100% 90%								Market Composite EL kWh/ft ² .yr	UI 9.1
				1								MJ/m².yr	352
SPACE COOLING													
A/C Diant Tune													
A/C Plant Type			Centrifugal C	hillers	Screw	Recprocti	ing Chillers	Gas (Cooling	Total			
			Standard		Chillers	Open	DX	Absorptio					
		System Present (%) COP	10.0%	5.4	4.4	15.0% 3.6	75.0%		1.8	100.0%			
		Performance (1 / COP)	0.21		0.23	0.28							
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint 100%										
		Condenser Water	100%										
Setpoint		Chilled Water		°C	42.8								
		Condenser Water Supply Air	35	°C	95 57.2								
					07.2								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	55 W/m² 77.5 MJ/m².yr	17 Btu/hr.ft ² 2.0 kWh/ft ² .yr		ft²/Ton									
Sizing Factor	1.00		Operation (o	cc period)	3000	hrs/vear	Note value	e cannot be	less than 2,9	00 hrs/vez	ar)		
5										,			
A/C Saturation (Incidence of A/C)	5.0%												
				т									
Electric Fuel Share	100.0%	Gas Fuel Share		1									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge U	nit	(%) 100%	(years) 2								
	Inspect C	oupling, Shaft Sealing and											
	Megger N Condense	er Tube Cleaning											
	Vibration												
		rent Testing nemical Oil Analysis									Г	All Electric EUI	
	<u> </u>					1						kWh/ft².yr	0.9
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency]						MJ/m².yr	35
_				(%)	(years)						F	Natural Gas EUI	
		VClean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr MJ/m².yr	
	Megger N											Madat Osma site El	
	Inspect/v	erify Operation of Controls										Market Composite EL kWh/ft ² .yr	0.9
												MJ/m².yr	35
DOMESTIC HOT WATER													
		Standard		Tank	Cnd.	Water		1		Fe ''		Flee Dee	
Service Hot Water Plant Type	Fossil Fu System P	el SHW Boiler resent (%) 5%	Tank Heater	Heater 20%	Boiler	Heater	4	Fuel Share	e	Fossil 25%		Elec. Res. 75% 100%	
	Eff./COP	75%		70%	90%	90%		Blended E		0.71		0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	40.0												
					I Electric El]	All	Natural Gas E		F	Market Composite EL	
Wetting Use Percentage	80%				kWh/ft².yr MJ/m².yr	1.1 44		1	kWh/ft².yr MJ/m².yr	1.5 56		kWh/ft².yr MJ/m².yr	1.2 47.1
				1	wio/iii*.yi	44	1	1	1710/11/T.YI	00		iviJ/111=.y1	-+/.I

		RCIAL SECTOR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:	VINTAGE:		GION:					
Education			Yuk	kon					
Baseline									
HVAC FANS & PUMPS									
SUPPLY FANS			Ventilation and	d Exhaust I	Fan Oper	ration & Contr	ol		
			Ventilation F			ust Fan			
	L/s.m ² 0.41 CFM/ft ²	Control			Fixed	Variable			
System Static Pressure CAV 500				Flow		Flow			
System Static Pressure VAV 500		Incidence of Use	100%		100%	0 - 1			
Fan Efficiency 55% Fan Motor Efficiency 85%		Operation	Continous Sch	neauleaco	ntinuous	Scheduled			
Sizing Factor 1.00		Incidence of Use	20%	80%	20%	80%			
Fan Design Load CAV 2.3			2070	0070	2070	0070	1		
	W/m ² 0.21 W/ft ²	Comments:							
EXHAUST FANS									
Washes an Estavel									
	L/s.washroom 212 CFM/wash L/s.m² 0.02 CFM/ft²	room							
Washroom Exhaust per gross unit area 0.1 Other Exhaust (Smoking/Conference) 0.1									
	L/s.m ² 0.04 CFM/ft ²								
Exhaust System Static Pressure 250									
Fan Efficiency 25%									
Fan Motor Efficiency 75%									
Sizing Factor 1.0									
	3 W/m ² 0.02 W/ft ²								
	<u> </u>								
AUXILIARY COOLING EQUIPMENT (Condense	ser Pump and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw	0.003 kW/kW	0.01 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser) 0.16 W/m ²	0.02 W/ft ²							
Condenser Pump									
Condenser Pump									
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area	0.003 L/s.m ²	0.004 U.S. gpm/ft ²							
Pump Head Pressure	kPa	ft							
Pump Efficiency	60%								
Pump Motor Efficiency	85%								
Sizing Factor	1.0								
Pump Connected Load	W/m ²	W/ft ²							
CIRCULATING PUMP (Heating & Cooling)									
During Database Flavor @ 5 00 (40 05) dates T	0.000 1 /22	0.0005 11.0 mm ///2	П. О						
Pump Design Flow @ 5 °C (10 °F) delta T	0.002 L/s.m ²	0.0035 U.S. gpm/ft ² 2.4	U.S. gpm/Ton						
Pump Head Pressure Pump Efficiency	30 kPa 60%	10 ft							
Pump Efficiency Pump Motor Efficiency	85%								
Sizing Factor	1.0								
Pump Connected Load	0.1 W/m ²	0.01 W/ft ²							
	0.1								
Supply Fan Occ. Period	2200 hrs./year								
Supply Fan Unocc. Period	6560 hrs./year								
Supply Fan Energy Consumption	7.9 kWh/m².yr								
Exhaust Fan Occ. Period	2200 hrs./year								
Exhaust Fan Unocc. Period	6560 hrs./year								
Exhaust Fan Energy Consumption	0.9 kWh/m².yr								
Condenser Pump Energy Consumption	kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consumption									
Cooling Tower/Condenser Fans Energy Consult									
Circulating Pump Yearly Operation	7000 hrs./year								
Circulating Pump Energy Consumption	0.6 kWh/m².yr								
5	,								
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency							
		(%) (years)							
	Inspect/Service Fans & Motors								
	Inspect/Adjust Belt Tension on Fan Belts								
	Inspect/Service Pump & Motors						EUI	kWh/ft².yr	0.9
							1	M.I/m ² vr	34.2

NEW BUILDINGS: Education Baseline	\$	SIZE:	COMMERCIAL SECT VINTAGE:		NG PROFI	REGION: Yukon			
EUISUMMARY									
TOTAL ALL END-USES:	Electricity:		12.7 kWh/ft².yr 493.6 MJ/m².yr		Gas:	3.7 kWh/ft².yr	144.1 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	G	IS		
GENERAL (CLASSROOM) LIGHTIN	1.8	70.9		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr		
ARCHITECTURAL LIGHTING	0.4	14.5	SPACE HEATING	6.5	251.1	3.0	115.0		
HIGH BAY (GYMNASIUM) LIGHTING	0.3	11.6	SPACE COOLING	0.05	1.8				
OTHER PLUG LOADS	0.5	19.4	DOMESTIC HOT WATER	0.9	33.0	0.4	14.1		
HVAC FANS & PUMPS	0.9	34.2	FOOD SERVICE EQUIPMENT	0.3	10.0	0.4	15.0		
REFRIGERATION	0.1	5.0	MISCELLANEOUS	0.1	5.0				
MISCELLANEOUS	0.1	5.0	I.						
COMPUTER EQUIPMENT	0.6	23.8							
ELEVATORS									
OUTDOOR LIGHTING	0.2	8.5							

			COMMERC	IAL SECTOR BUILD	ING PROFILE		
NEW BUILDINGS:	SIZE:			VINTAGE:		REGION:	
Restaurant Baseline	All					Yukon	
CONSTRUCTION							
Wall U value (W/m ² .°C) 0.20	W/m².°C		0.04 Btu/hr.ft ² .°F		Typical Building Size	500 m ²	5,380 ft ²
	W/m².°C		0.02 Btu/hr.ft ² .°F		Typical Footprint (m ²)	500 m²	5,380 ft ²
	W/m².°C		0.28 Btu/hr.ft ² .°F		Footprint Aspect Ratio (L:W)	1	
		L	0.20 Diamini 1		Percent Conditioned Space	100%	
					Percent Conditioned Space	40%	
Window/Wall Ratio (WIWAR) (%) 0.15	T				Defined as Exterior Zone		
Shading Coefficient (SC) 0.85	1				Typical # Stories	1	
					Floor to Floor Height (m)	4.5 m	14.8 ft
VENTILATION SYSTEM, BUILDING CONTRO	LS & IND	OOR CONDITIONS					
Ventilation System Type			CAV	CAVR DDM2	DDMZVV VAV VAVF		
		System Present (%)	60%		100/	40% 60%	
		Min. Air Flow (%) (Minimum Throttled A	Air Volume as Perce	nt of Full Flow)	10%		
		(within the died)					
Occupancy or People Density		50 m²/p	person	538 ft²/person		%OA 13.90%	
Occupancy Schedule Occ. Period		90%	-				
Occupancy Schedule Unocc. Period			г	10 0 0000			
Fresh Air Requirements or Outside Air		19 L/s.p	person	40 CFM/perso	n		
Fresh Air Control Type *(enter a	a 1, 2 or 3)	2 If Erc	esh Air Control Type	= "2" enter % FA. to th	ne right:	40%	
(1 = mixed air control, 2 = Fixed fresh air, 3 100%					ir Ventilation and operation		CFM/ft ²
						50% operation (%)	
Sizing Factor		1					
Total Air Circulation or Design Air Flow		2.73 L/s.r	m²	0.54 CFM/ft ²			
		0.00	· [0.00	Separate Make-up a		L/s.m ² CFM/ft ²
Infiltration Rate (air infiltration is assumed to occur during unoccu	nied	0.30 L/s.r	m²	0.06 CFM/ft ²		n occupied period 50% n unoccupied period 50%	
hours only if the ventilation system shuts down)	pieu				Operation	In unoccupied period 50%	
Economizer			Enthalpy Based	Dry-Bulb Based	Total		
	Incidence		50%	50%		y of Design Parameters	
	Switchove	er Point	KJ/kg.	18 °C		sign Cooling Load 263,743	
			Btu/lbm	64.4 °F		ne Sensible Load 62,254 r enthalpy 28.2	Btu/lbm
Controls Type	System P	resent (%)	HVAC	Room			Btu/lbm
	e yoto		Equipment	Controls			ft³/lbm
	All Pneum	natic	60%	90%	Design C		
	DDC/Pne	umatic	30%		Total air o	circulation or Design air 2.73	l/s.m ²
	AII DDC		10%	10%			
	I otal (sho	ould add-up to 100%)	100%	100%			
			Proportional	PI / PID Total	1		
Control mode	Control N	lode					
			-ixed Discharge	Reset	-		
	Control S	trategy					
la de en Decimo Os aditis de				D	Querra ha A	1-	
Indoor Design Conditions	Summer	Temperature		Room °C 75.2	°F 15 °C	59 °F	
		Humidity (%)	50%	0 13.2	100%	33 1	
	Enthalpy	, , , , , , , , , , , , , , , , , , , ,		KJ/kg. 28.2	Btu/lbm 54.5 KJ/kg.	23.4 Btu/lbm	
	Winter Oc	cc. Temperature	22		°F 15 °C	59 °F	
		c. Humidity	30%	K 1/1	45%	40.0 01.01	
	Enthalpy Winter Lin	occ. Temperature		KJ/kg. 22.8 °C 71.6	Btu/lbm 45.5 KJ/kg.	19.6 Btu/lbm	
		locc. Temperature	30%	71.6	o re		
	Enthalpy	loce. Humany		KJ/kg. 21.5	Btu/lbm		
						J	
Damper Maintenance				Frequency			
	Control A	rm Adjustment	(%)	(years)			
	Lubricatio						
		al Replacement					
				·			
Air Filter Cleaning	Changes/	Year	4				
				Insidence	f Annual Room Controls Mainte	enance 100.0%	
Incidence of Annual HVAC Controls Maintenance	e 100%	5		incidence o	n Annuar Nuom Controis Mainte	100.0%	
		<u> </u>					
	Annual M	aintenance Tasks	Incidence		Annual Maintenance		
	-		(%)			(%)	
		n of Transmitters	1000			on of Room Thermostat 100%	
		n of Panel Gauges	100%		Inspection of PE Sw Inspection of Auxilia		
		n of Control Devices			Inspection of Auxilia		
			I		(Dampers, VAV Box		

NEW BUILDINGS: Restaurant Baseline		SIZE: Ali		COMMER	RCIAL SECT VINTAGE:	or Buildin	g profil	E		REGION: Yukon					
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 0.50 9.5	Lux		ft-candles W/ft²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%			Light Level (Lux) % Distribution Weighted Average		400 100%	500 CFL	700 T12 ES	1000 T8 Mag	T8 Elec	МН	HP	Total 1009 40	00	
Fixture Cleaning: Incidence of Practice Interval		years		System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 82	100% 100% 0.6 0.80 88	0.6 0.55 65	0.6	100.09 5		
Relamping Strategy & Incidence of Practice	Group	Spot											EUI	kWh/ft².yr MJ/m².yr	2.1 81
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.50	Lux W/m²		ft-candles W/ft²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%			Light Level (Lux) % Distribution Weighted Average		300 100%	500 CFL	700 T12 ES	1000 T8 Mag	T8 Elec	MH	HP	Total 1009 30 S TOTAL	00	
Fixture Cleaning: Incidence of Practice Interval		years		System Present (%) CU LLF Efficacy (L/W)		1NC 25% 0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 82	0.6 0.80 88	0.6 0.55 65	0.6 0.55	100.0%		
Relamping Strategy & Incidence of Practice	Group	Spot				E	UI = Load	IX Hrs. X	SF X GLF	=			EUI	kWh/ft².yr MJ/m².yr	4.6 178
OTHER (HIGH BAY) LIGHTING Light Level Floor Fraction (HBLFF) Connected Load		Lux W/m²		ft-candles W/ft ²			_			should = 1.0	0	1.00)		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%			Light Level (Lux) % Distribution Weighted Average		300	500	700	1000				Total		
Fixture Cleaning: Incidence of Practice Interval		years		System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	T12 ES 0.6 0.75 72	T8 Mag 0.6 0.80 84	T8 Elec 0.6 0.80 88	0.6 0.55 65	HP: 09 0.6 0.55 90	% 0.0%		
Relamping Strategy & Incidence of Practice	Group	Spot											EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING										Overall LP	15.17 \	N/m²	EUI TOTA	L kWh/ft².yr MJ/m².yr	6.7 259
OFFICE EQUIPMENT & PLUG LOA	ADS														
Equipment Type		Computers	5	Monitors	Prir	nters	Copie	ers	Ser	/ers	Plug	Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period		55 0.36 0.4 W 0.0 W 90%		51 0.36 0.4 W/m ² 0.0 W/ft ² 90%	100 0.01 0.00 0.00 90%	W/m² W/ft²		V/m² V/ft²		W/m² W/ft²	1.15 0.11 90%				
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		50% 2000 6760		50% 2000 6760	50% 2000 6760		50% 2000 6760	-	100% 2000 6760		50% 4100 4660				
Total end-use load (occupied period) Total end-use load (unocc. period)		1.9 W 1.1 W	//m² //m²	0.2 W/ft ² 0.1 W/ft ²							Compute	er Equipmer	nt EUI	kWh/ft².yr	0.49
Usage during occupied period Usage during unoccupied period		100% 59%										Plug Load	sEUI	MJ/m².yr kWh/ft².yr MJ/m².yr	18.95 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below: Cooking		Gas Fuel Sh	are:	75.0%	Electricity F	Fuel Share:	25.0%		EUI	tural Gas EL kWh/ft².yr MJ/m².yr	JI 23.2 900.0		EUI	All Electric EUI kWh/ft².yr MJ/m².yr	16.8 650.0
REFRIGERATION Provide description below: Walk-ins, reach ins, fridges etc													EUI	kWh/ft².yr MJ/m².yr	9.0 350.0
MISCELLANEOUS													EUI	kWh/ft².yr MJ/m².yr	0.3 10

			COMMER	CIAL SECT	OR BUILD	ING PROF	ILE						
NEW BUILDINGS: Restaurant Baseline	SIZE: All			VINTAGE	:				REGION: (ukon				
SPACE HEATING													
Heating Plant Type					Fossil Fuel		1		Electric				
rieating riant rype					ilers	Packaged	A/A HP	W. S. HP		Resistance	Total		
		System Present (%)		Stan. 3%	High 2%	Unit 15%		10%		70%	100%	100%	
		Eff./COP		80%	85%	77%	250%	350%	80%	1.00			
		Performance (1 / Eff.) (kW/kW)		1.25	1.18	1.30	0.40	0.29	1.25	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	35.3 W/m ² 393 MJ/m ² .y	11.2	Btu/hr.ft² kWh/ft².yr										
Electric Fuel Share	80.0%	Fossil Fuel Share	20.0%								-	All Electric E kWh/ft ² .yt	
Dailar Maintenanaa		Naintenance Tasks	<u>1</u>	_	r							MJ/m².yr	
Boiler Maintenance	Annuar	namenance rasks		Incidence (%)							Г	Natural Gas	EUI
		e Inspection ide Inspection for Scale Buil	dun	75% 100%								kWh/ft².y MJ/m².yr	
	Inspecti	on of Controls & Safeties	dup	100%							L		
		on of Burner s Analysis & Burner Set-up		100% 90%								Market Compos kWh/ft².y	
	The Oa	s Analysis & Durner Set-up		3078								MJ/m².yr	
SPACE COOLING													
A/C Plant Type			Centrifugal C	hillers	Screw	Recprocti	ng Chillers	Gas Co	oling	Total			
			Standard	HE	Chillers	Open	DX	Absorptior	Engine	100.00/			
		System Present (%) COP	4.7	5.4	4.4	3.6	100.0%	0.9	1.8	100.0%			
		Performance (1 / COP)	0.21		0.23	0.28	0.33		0.56				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint 100%										
		Condenser Water	100%										
Setpoint		Chilled Water		°C	42.8								
		Condenser Water Supply Air		°C 0°C	95 59								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	155 W/m² 71.7 MJ/m².y	49 Btu/hr.ft ²	245	ft²/Ton		1							
Sizing Factor	1.00		Operation (o	cc period)	3000	hrs/vear	Note value	e cannot be l	ass than 2	900 brs/ves	ar)		
			Operation (0	cc. penou)	3000	ni 3/year	NOTE VAIUE	s cannot be i	555 than 2,	500 m 3/yea	ai <i>j</i>		
A/C Saturation (Incidence of A/C)	80.0%												
Electric Fuel Share	100.0%	Gas Fuel Share		Ι									
Chiller Maintenance	Annual N	Aaintenance Tasks		Incidence	Frequency								
	Inspect	Control, Safeties & Purge U	nit	(%)	(years) 2								
	Inspect	Coupling, Shaft Sealing and											
	Megger Conden	ser Tube Cleaning											
		n Analysis											
	Spectro	urrent Testing chemical Oil Analysis									Г	All Electric E	UI
	<u></u>	÷				•						kWh/ft².y	· 0.8
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	Aaintenance Tasks		Incidence	Frequency						L	MJ/m².yr	
		on/Clean Spray Nozzles		(%)	(years)						F	Natural Gas kWh/ft².y	
	Inspect/	Service Fan/Fan Motors										MJ/m².yr	
	Megger Inspect/	Motors Verify Operation of Controls									Г	Market Compos	ito El II
	inspect	venty operation of controls		1							F	kWh/ft².y	· 0.8
												MJ/m².yr	29
DOMESTIC HOT WATER				. .	<u> </u>	147 -	1						
Service Hot Water Plant Type	Fossil F	uel SHW Boiler	Tank Heate	Tank r Heater	Cnd. Boiler	Water Heater				Fossil		Elec. Res.	
	System	Present (%)		20%			1	Fuel Share	leler	20%		80% 100%	6
Service Hot Water load (MJ/m ² .yr)	Eff./CO 400.0	5 75%	60%	70%	90%	90%		Blended Eff	iciency	0.70		0.91	
(Tertiary Load)	·			-			1				г	Madaria	. .
Wetting Use Percentage	10%				Il Electric EL kWh/ft ² .yr	ار 11.3	+		atural Gas Wh/ft².yr	EUI 14.8	F	Market Compos kWh/ft².y	
<u> </u>					MJ/m².yr	440			/J/m².yr	571		MJ/m².yr	

			CIAL SECTOR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:		VINTAGE:		EGION:					
Restaurant	All			Y	'ukon					
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS						st Fan Ope	ration & Contr	rol		
				Ventilatio			iust Fan			
	' L/s.m²	0.54 CFM/ft ²	Control	Fixed V	/ariable	Fixed	Variable			
System Static Pressure CAV 500		2.0 wg	lasidanan silas	4000/	Flow	100%	Flow			
System Static Pressure VAV 625 Fan Efficiency 52%		2.5 wg	Incidence of Use Operation	100% Continous S	cheduled	100% Continuous	Scheduled	-		
Fan Motor Efficiency 80%			Operation	Conunous 3	scrieduleu	Sontinuous	Scheduled			
Sizing Factor 1.00			Incidence of Use	90%	10%	100%				
	3 W/m ²	0.31 W/ft ²								
	W/m ²	0.38 W/ft ²	Comments:							
EXHAUST FANS										
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	am.							
	L/s.washroom	0.08 CFM/ft ²	om							
	L/s.m ²	0.02 CFM/ft ²								
	L/s.m ²	0.10 CFM/ft ²								
	0 Pa	1.0 wg								
Fan Efficiency 25%										
Fan Motor Efficiency 72%										
Sizing Factor 1.0		0.00 14//0								
Exhaust Fan Connected Load 0.7	7 W/m²	0.06 W/ft ²								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Co	ooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.022 kW/kW	0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	3.42 W/m ²	0.32 W/ft ²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.008 L/s.m ²	0.012 U.S. gpm/ft ²							
Pump Head Pressure		kPa	ft							
Pump Efficiency		60%								
Pump Motor Efficiency		85%								
Sizing Factor		1.0								
Pump Connected Load		W/m ²	W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T		0.007 L/s.m ²	0.0098 U.S. gpm/ft ² 2.4	U.S. gpm/To	20					
Pump Head Pressure		kPa	0.0098 0.3. gpm/n= 2.4	JU.S. gpm/10	511					
Pump Efficiency		60%								
Pump Motor Efficiency		85%								
Sizing Factor		1.0								
Pump Connected Load		W/m ²	W/ft ²							
Sumply Fon Oce, Daried		2000 hrs ///aar								
Supply Fan Occ. Period Supply Fan Unocc. Period		3900 hrs./year 4860 hrs./year								
Supply Fan Energy Consumption		27.2 kWh/m².yr								
Copply Fair Energy Consumption		21.2 (000000.9)								
Exhaust Fan Occ. Period		3900 hrs./year								
Exhaust Fan Unocc. Period		4860 hrs./year								
Exhaust Fan Energy Consumption		6.1 kWh/m².yr								
Condenser Pump Energy Consumption		kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consum	nption	0.4 kWh/m².yr								
Circulating Pump Yearly Operation		7000 hrs./year								
Circulating Pump Energy Consumption		kWh/m².yr								
Chowarding Fump Energy Consumption	L									
Fans and Pumps Maintenance	Annual Mainten	nance Tasks	Incidence Frequency							
·			(%) (years)							
		e Fans & Motors								
		Belt Tension on Fan Belts							1140 / -	
	inspect/Service	Pump & Motors						EUI	kWh/ft².yr M I/m² yr	3.1 121.4

NEW BUILDINGS: Restaurant Baseline		SIZE: All	COMMERCIAL SECT VINTAGE:		ng profil		REGION: Yukon	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		44.7 kWh/ft².yr 1,731.6 MJ/m².yr		Gas:	22.4 kWh/ft ² .yr	866.8 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	G	IS	
GENERAL LIGHTING	2.1	80.9		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	4.6	178.4	SPACE HEATING	8.1	314.8	2.0	77.5	
OTHER (HIGH BAY) LIGHTING			SPACE COOLING	0.6	23.4			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	9.1	351.6	3.0	114.3	
HVAC FANS & PUMPS	3.1	121.4	FOOD SERVICE EQUIPMENT	4.2	162.5	17.4	675.0	
REFRIGERATION	9.0	350.0	MISC.	0.3	10.0			
MISCELLANEOUS	0.3	10.0				20.4		
COMPUTER EQUIPMENT	0.5	18.9						
ELEVATORS								
OUTDOOR LIGHTING	2.2	84.8						

			C	COMMER		OR BUILD	ING PROF	FILE						
NEW BUILDINGS: Rec Centre	SIZE:				VINTAGE	:New				REGION: Yukon				
Baseline										rukon				
CONSTRUCTION														
				D . A (10)	-						1.050	٦.]
Wall U value (W/m².°C)	0.20 W/m ² .°C	-		Btu/hr.ft ² .				uilding Size			1,859		20,000	-
Roof U value (W/m ² .°C)	0.11 W/m².°C	-		Btu/hr.ft ² .°				ootprint (m ²)			1,859	m²	20,000	π²
Glazing U value (W/m ² .°C)	1.60 W/m ² .°C		0.28	Btu/hr.ft ² .	F			Aspect Rati onditioned			100%			
								onditioned			50%			
Window/Wall Ratio (WIWAR) (%)	0.05							s Exterior Z	lone			-		
Shading Coefficient (SC)	0.80						Typical # :	Stories loor Height	(m)		6.1	m	19.9	T ft
							1.001.001	loor rioigin	()		0.1	_···	10.0]
VENTILATION SYSTEM, BUILDING CO	NTROLS & IND	OOR CONDITION	IS											
Ventilation System Type				CAV	CAVR	DDMZ	DDMZVV	VAV	VAVR	IL	J 100% O.A	TOTAL	I	
		System Present (100%								100%		
		Min. Air Flow (%) (Minimum Throttle			react of Fu	dl Flaud		50%				1		
		(Minimum Thiotae		ume as Pe	ercent of Fu	lii Flow)								
Occupancy or People Density			n²/person		538	ft²/person				%OA	21.47%	•		
Occupancy Schedule Occ. Period		90%												
Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		10 1	./s.person		21	CFM/perso	n							
			20.0010011			or inspered								
	enter a 1, 2 or 3)					nter % FA. t							T	
(1 = mixed air control, 2 = Fixed fresh air, 3	3 100% fresh air)	lf	Fresh Air	Control T	ype = "3" ei	nter Make-u	p Air Ventila	ation and op	peration		5 L/s.m ² operation		CFM/ft ²	
Sizing Factor		1								507	oloberation	(70)		
Total Air Circulation or Design Air Flow		0.93 L	./s.m²		0.18	CFM/ft ²							-	
la filha di a a Data		0.40	12		0.00	0514/62		Separate I	Make-up ai			500/	L/s.m ²	CFM/ft ²
Infiltration Rate (air infiltration is assumed to occur during the second second second second second second second second second	unoccupied	0.40 L	_/s.m²		80.0	CFM/ft ²			Operation Operation			50% 50%		
hours only if the ventilation system shuts d									oporation	anocoupie	aponoa	0070	1	
_ ·				<u>.</u>				т						
Economizer	Incidence	of Lise	Enthalpy	Based	Dry-Bu 100%	lb Based	Total 100%		Summan	of Design	Parameters			٦
	Switchove		ł	KJ/kg.		°C	10070		Peak Desi			, 160,296		
				Btu/lbm	64.4				Peak Zone	Sensible		78,854		
	Custom D	(0/)			Deem	1			Room air				Btu/lbm	
Controls Type	System P	resent (%)	F	HVAC Equipment	Room Controls				Discharge Specific volu		9y 55F & 100% F		Btu/lbm ? ft³/lbm	
	All Pneum	atic		Equipment	CONTROLO				Design CF		001 a 100701	3,668		
	DDC/Pnet	umatic							Total air c	irculation of	r Design ai	r 0.93	l/s.m ²	
	All DDC Total (sho	uld add-up to 100%	%)											
	Total (bild		,0)			1								
			Propor	rtional	PI / PID	Total								
Control mode	Control M	ode	Fixed Dis	scharge	Reset		-							
	Control St	rategy	T IAGG DIG	sonarge	110301									
	L						-						-	
Indoor Design Conditions	Cummer 7	a man a rati ura	-	22	Room	74.0		10	Supply Air		1 or	1		
		emperature lumidity (%)	-	50%	°C	71.0	°F	100%	°C	55.	٩°			
	Enthalpy			65.5	KJ/kg.		Btu/lbm	54.5	KJ/kg.		Btu/lbm			
		c. Temperature	_	16 30%	°C	60.8	°F	16 45%		60.	°F			
	Enthalpy	c. Humidity	-		KJ/kg.	22.8	Btu/lbm		KJ/kg.	19.6	Btu/lbm			
		occ. Temperature			°C		B °F	10.0	rtorig.	10.0	Branbin			
		occ. Humidity		30%										
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm	1					T	
Damper Maintenance					Frequency									
	Control Ar	m Adjustment		(%)	(years)									
	Lubricatio													
		I Replacement]								
Air Filter Cleaning	Changes/	(ear	Γ											
· · · · · · · · · · · · · · · · · · ·	g		L		1							_		
		1				Incidence of	f Annual R	oom Contro	ols Mainten	ance				
Incidence of Annual HVAC Controls Maint	enance	J												
	Annual Ma	intenance Tasks		Incidence]			Annual Ma	aintenance 7	Tasks		Incidence	Т	
				(%)								(%)	1	
		of Transmitters									Thermosta	t	1	
		of Panel Gauges of Auxiliary Devic							of PE Swith of Auxilian			+	+	
		of Control Device			1			Inspection	of Control	Devices (Valves,		1	
									, VAV Boxe			L	1	
1														

NEW BUILDINGS: Rec Centre Baseline	SIZE:	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:New	REGION: Yukon
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.20	7.2 ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) 300 500 700 100 % Distribution 50% 50% 100 Weighted Average INC CFL T12 ES T8 Ma	100% 400
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) ITZ E3 ITZ E3 <thitz e3<="" th=""></thitz>	100% 100.0% 6 0.6 0.7 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 0.8 MJ/m².yr 29
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.05	.9 ft-candles .2 W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%	Light Level (Lux) 300 500 700 100 % Distribution 100% 100	100% 300
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 100% CU 0.7 0.7 0.6 0.1 LLF 0.65 0.65 0.75 0.8 Efficacy (LW) 15 50 72 8	100.0% 6 0.6 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GL	EUI kWb/ft².yr 0.2 FF MJ/m².yr 9
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.75	1.9 ft-candles Floor fraction check .0 W/ft ²	: should = 1.00 1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 90% 15%	Light Level (Lux) 200 300 400 100 % Distribution 25% 50% 25% 0 Weighted Average	100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL T12 ES T8 Ma System Present (%)	25% 75% 100.0% 6 0.6 0.6 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 2.9 MJ/m².yr 113
TOTAL LIGHTING			Overall LP 2.55 W/m ² EUI TOTAL kWh/ft ² .yr 3.9 M.J/m ² .yr 152
OFFICE EQUIPMENT & PLUG LOA	DS		
Equipment Type Measured Power (W/device)	Computers	Monitors Printers Copiers St 51 100 200 21	Plug Loads
Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	0.05 0.1 W/m ² 0.0 W/ft ² 90% 50% 2000	0.05 W/m² W/m² 0.1 W/m² W/m² W/m² 0.0 W/t² W/t² W/t² 90% 90% 50% 100' 50% 50% 50% 100' 2000 2000 2000 2000	% 25%
Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	6760	6760 6760 6760	5260
Total end-use load (unocc. period)	0.3 W/m ²	0.0 Wft ²	Computer Equipment EUI kWh/ft².yr 0.05
Usage during occupied period Usage during unoccupied period	100% 30%		MJ/m².yr 1.96 Plug Loads EUI kWh/ft².yr 0.41 MJ/m².yr 16.07
FOOD SERVICE EQUIPMENT Provide description below:	Gas Fuel Share:	10.0% Electricity Fuel Share: 90.0% EUI	Natural Gas EUI All Electric EUI kWh/ft².yr 0.6 MJ/m².yr 25.0
REFRIGERATION Provide description below: Refrigeration Plant and Auxiliaries		Artificial Ice Saturation 100.0%	EUI KWh/ft².yr 7.0 MJ/m².yr 271.2
MISCELLANEOUS			EUI kWh/ft².yr 0.3 MJ/m².yr 10

NEW BUILDINGS: Rec Centre Baseline	SIZE:		COMMER	CIAL SECT VINTAGE	OR BUILD	ING PROFI	LE		EGION: lukon				
SPACE HEATING													
Heating Plant Type					Fossil Fuel					Electric			
				Bo Stan.	ilers High	Packaged Units	A/A HP	W. S. HPH	/R Chiller	ResistanceT	otal		
		System Present (%) Eff./COP		10% 80%	10% 85%	30% 78%	1.70	3.00	4.50	50% 1.00	100%		
		Performance (1 / Eff.)		1.25			0.59	0.33	4.50	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	29.7 W/m ² 336 MJ/m ² .yr		Btu/hr.ft² kWh/ft².yr								F	All Electric EUI	
Electric Fuel Share	50.0%	Gas Fuel Share	50.0%									kWh/ft².yr	8.7
Space Heat Saturation	70.0% Annual Ma	aintenance Tasks		Incidence								MJ/m².yr	336
(Incidence of SPC HT)	Water Sid Inspection Inspection	Inspection e Inspection for Scale Buil of Controls & Safeties of Burner Analysis & Burner Set-up	dup	(%) 75% 100% 100% 90%								Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	10.9 421 UI 9.8 378
SPACE COOLING													
A/C Plant Type													
		System Present (%) COP Performance (1 / COP) (KW/KW) Additional Refrigerant Related Information	Centrifuga Standard 4.7 0.21	HE 5.4		Reciprocati Open 3.6 0.28		Absorption (N. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air		า วา วา	44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	25 W/m² 14.3 MJ/m².yr	8 Btu/hr.ft ² 0.4 kWh/ft ² .yr		ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note value	cannot be le	ess than 2,	900 hrs/yea	r)		
A/C Saturation (Incidence of A/C)	5.0%												
Electric Fuel Share	100.0%	Gas Fuel Share]									
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence	Frequency	1							
	Inspect Co Megger M Condense Vibration Eddy Curr	r Tube Cleaning		(%)	(years)						-	All Electric EUI kWh/ft².yr	0.1
Cooling Tower/Air Cooled Condense	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors		Incidence (%)	Frequency (years)							MJ/m².yr Natural Gas EUI kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	4 EUI 0.1 4
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Eff./COP	el SHW Std. Tank resent (%) 0.55	30%	5%				Fuel Share Blended Effi	iciency	Fossil 45% 0.74	E	lec. Res. 55% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	80.0 Incidend Heat r	e of Heat recr'y 40%		A	Il Electric El		Г	Nati	ural Gas E	UI		Market Composite E	UI
Wetting Use Percentage	50%				kWh/ft².yr MJ/m².yr	2.3 88	_	k	Wh/ft².yr IJ/m².yr	2.8 107		kWh/ft².yr MJ/m².yr	2.5 96.7

		COMMER	CIAL SECTOR BUILDING PROFILE			
NEW BUILDINGS:	SIZE:		VINTAGE:New	REGI		
Rec Centre Baseline				Yuko	n	
Baseline						
HVAC FANS & PUMPS						
SUPPLY FANS				Ventilation and E	Exhaust Fan Operation & Co	ontrol
				Ventilation Fa		
System Design Air Flow	0.9 L/s.m ²	0.18 CFM/ft ²	Control	Fixed Varial		
System Static Pressure CAV	300 Pa	1.2 wg		Flo		
System Static Pressure VAV	300 Pa	1.2 wg	Incidence of Use	100%	100%	-
	60%		Operation	ContinuousScheo	duledContinuous Scheduled	1
	80%		lasidence of the	500/	500/ 500/ 500/	-
Sizing Factor Fan Design Load CAV	1.00 0.6 W/m ²	0.05 W/ft ²	Incidence of Use	50%	50% 50% 50%	-
Fan Design Load VAV	0.6 W/m ²	0.05 W/ft ²	Comments:			
		0.00	Common to.			
EXHAUST FANS				1		
Washroom Exhaust	100 L/s.washroom		hroom			
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.02 CFM/ft ²				
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²				
Total Building Exhaust	0.2 L/s.m ²	0.04 CFM/ft ²				
Exhaust System Static Pressure	250 Pa	1.0 wg				
Fan Efficiency Fan Motor Efficiency	25% 75%					
Sizing Factor	1.0					
Exhaust Fan Connected Load	0.3 W/m ²	0.03 W/ft ²				
	0.0 10/11	0.00 11/1				
AUXILIARY COOLING EQUIPMENT (Cond	denser Pump and C	Cooling Tower/Condenser Fans)				
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton			
(Cooling Tower/Evap. Condenser/ Air Coole	ed Condenser)	0.51 W/m ²	0.05 W/ft ²			
Condenses Dump						
Condenser Pump						
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton			
Pump Design Flow per unit floor area		0.001 L/s.m ²	0.002 U.S. gpm/ft ²			
Pump Head Pressure		kPa	ft			
Pump Efficiency		50%				
Pump Motor Efficiency		80%				
Sizing Factor		1.0				
Pump Connected Load		W/m ²	W/ft ²			
CIRCULATING PUMP (Heating & Cooling)	1					
CINCOLATING FORM (Treating & Cooling)	,					
Pump Design Flow @ 5 °C (10 °F) delta T		0.001 L/s.m ²	0.0016 U.S. gpm/ft ² 2.4	U.S. gpm/Ton		
Pump Head Pressure		kPa	ft	J - 51		
Pump Efficiency		50%				
Pump Motor Efficiency		80%				
Sizing Factor		0.8				
Pump Connected Load		W/m ²	W/ft ²			
Supply Fan Occ. Period		3500 hrs./year				
Supply Fan Unocc. Period		5260 hrs./year				
Supply Fan Energy Consumption		3.6 kWh/m².yr				
Exhaust Fan Occ. Period		3500 hrs./year				
Exhaust Fan Unocc. Period		5260 hrs./year				
Exhaust Fan Energy Consumption		1.7 kWh/m².yr				
Condenser Pump Energy Consumption		kWh/m².yr				
Cooling Tower /Condenser Fans Energy Co	nsumption	0.1 kWh/m².yr				
Circulating Pump Yearly Operation		7000 hrs./year				
Circulating Pump Energy Consumption		kWh/m².yr				
Fans and Pumps Maintenance	Annual Mainte	enance Tasks	Incidence Frequency			
	-		(%) (years)			
		e Fans & Motors				
		Belt Tension on Fan Belts	<u>↓ </u>			EUI kWh/ft².yr 0.5
	inspect/Servic	e Pump & Motors				EUI kWh/ft².yr 0.5 M.J/m².yr 19.2

NEW BUILDINGS: Rec Centre Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		ng profile		REGION: Yukon	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		18.1 kWh/ft².yr 701.0 MJ/m².yr		Gas:	5.1 kWh/ft².yr	198.2 M	IJ/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	Ga	as	
GENERAL LIGHTING	0.8	29.2		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	0.2	9.2	SPACE HEATING	3.0	117.4	3.8	147.3	
TERTIARY LIGHTING	2.9	113.3	SPACE COOLING	0.0	0.2			
OTHER PLUG LOADS	0.4	16.1	DOMESTIC HOT WATER	1.2	48.4	1.2	48.4	
HVAC FANS & PUMPS	0.5	19.2	FOOD SERVICE EQUIPMENT	0.6	22.5	0.1	2.5	
REFRIGERATION	7.0	271.2						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.1	2.0						
ELEVATORS								
OUTDOOR LIGHTING	1.1	42.4						

				COMMER	CIAL SECT		ING PROF	FILE						
NEW BUILDINGS: Warehouse/Wholesale	SIZE:				VINTAGE	:	REGION: Yukon							
Baseline										rukon				
CONSTRUCTION														
				-								_		
Wall U value (W/m ² .°C)	0.20 W/m ² .°C		0.04	Btu/hr.ft ² .	°F		Typical Bu	uilding Size			3,253	; m²	35,0	00 ft ²
Roof U value (W/m ² .°C)	0.11 W/m ² .°C		0.02	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²))		3,253	s m²	35,0	00 ft ²
Glazing U value (W/m ² .°C)	1.60 W/m ² .°C		0.28	Btu/hr.ft ² .	°F			Aspect Rati				1		
								onditioned			100%			
Window/Wall Ratio (WIWAR) (%)	0.05							onditioned s Exterior Z			40%	ò		
	0.80						Typical #		one			1		
								loor Height	(m)		6.1	m	19	9.9 ft
VENTILATION SYSTEM, BUILDING CONT			NS											
Ventilation System Type				CAV		DDM	DDMZVV	VAV	VAVR	R I	J 100% O.			
		System Present		100%				500/				100	%	
		Min. Air Flow (% (Minimum Throt		nlume as Pi	ercent of Fu	III Flow)		50%				_		
		(010011 01 1 0									
Occupancy or People Density			m²/persor	n	1076	ft²/person				%OA	30.70%	6		
Occupancy Schedule Occ. Period		90%												
Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		25	L/s.perso	n	53	CFM/pers	n							
	nter a 1, 2 or 3)				ype = "2" e									
(1 = mixed air control, 2 = Fixed fresh air, 3	100% fresh air)		If Fresh A	ir Control T	ype = "3" ei	nter Make-u	p Air Ventila	ation and op	peration		5 L/s.m ²		10 CFM/ft ²	
Sizing Factor		1								505	6 operation	. (%)		J
Total Air Circulation or Design Air Flow		0.81	L/s.m ²		0.16	CFM/ft ²								
_								Separate I					L/s.m ²	CFM
Infiltration Rate	e eeu mie d	0.40	L/s.m ²		0.08	CFM/ft ²			Operation			50		
(air infiltration is assumed to occur during un hours only if the ventilation system shuts dow									Operation	unoccupi	ea perioa	50	%	
	,													
Economizer			Enthalp	y Based		lb Based	Total							
	Incidence				100%		100%				Parameter		•	
	Switchove	er Point		KJ/kg. Btu/lbm	18 64.4		-		Peak Des Peak Zon			287,60 120,64		
		ļ		Dianom	04.4		1	4	Room air		Loud		2 Btu/lbm	
Controls Type	System P	resent (%)		HVAC	Room				Discharge				4 Btu/lbm	
		- 41 -		Equipmen	t Controls				Specific vol Design Cl		55F & 100%		.2 ft³/lbm	
	All Pneum DDC/Pne										or Design a	5,61 ir 0.81	∠ I/s.m²	
	All DDC													
	Total (sho	uld add-up to 100	0%)											
			Brond	ortional	PI / PID	Tota	1							
Control mode	Control M	ode	Пор	Jitional	11/110	TOta								
			Fixed D	ischarge	Reset		-							
	Control S	trategy												
Indoor Design Conditions				1	Room				Supply Ai	r				
Indeer Design Conditions	Summer	Femperature		22	2°C	71.0	°F	13	°C		4 °F	٦		
		lumidity (%)		50%	b		-	100%						
	Enthalpy	.			5 KJ/kg.		Btu/lbm		KJ/kg.		Btu/lbm	_		
		c. Temperature		30%	°C	69.8	°F	16 45%		60.	°F			
	Enthalpy	o. Humany			3 KJ/kg.	22.8	Btu/lbm		KJ/kg.	19.6	Btu/lbm			
	Winter Un	occ. Temperatur	е		°C		°F		Ŭ			_		
		occ. Humidity		30%			T							
	Enthalpy			50) KJ/kg.	21.5	Btu/lbm					-		
Damper Maintenance					Frequency]								
	Control A	rm Adjustment		(%)	(years)									
	Lubricatio													
		al Replacement												
Air Eilter Cleaning	Changes/	Voor			Т									
Air Filter Cleaning	Changes/	- Cai		L	_									
		_				Incidence of	f Annual R	oom Contro	ols Mainter	nance]		
Incidence of Annual HVAC Controls Mainten	nance]												
		aintenance Tasks		Incidence				Annual Ma	intenana	Taska		Incidenc	0	
	AnnuarMa	annendrice Tasks		(%)				ATTINUAT IVIA	an iter ial iCe	1 0312		(%)	,c	
	Calibratio	n of Transmitters		()= /	1			Inspection	/Calibratio	n of Room	Thermosta			
		n of Panel Gauge			4				of PE Swi			+		
		of Auxiliary Dev			-				of Auxiliar		Valves	+	-	
	inspection		500	1	_				, VAV Box		vaives,			
									, 200	- 4				

NEW BUILDINGS: Warehouse/Wholesale Baseline	SIZE:	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:	REGION: Yukon
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.15	2 ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 90% 15%	Light Level (Lux) 300 500 700 100 % Distribution 50% 50% 100 Weighted Average INC CFL T12 ES T8 Ma	100% 400
Fixture Cleaning: Incidence of Practice Interval	years	Nystem Present (%) INC ITZ ES ITZ ES <t< td=""><td>100% 100.0% 0 0.6 0.7 0.6 0 0.80 0.55 0.55</td></t<>	100% 100.0% 0 0.6 0.7 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 0.5 MJ/m².yr 19
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.05	9] ft-candles 9] W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 90% 15%	Light Level (Lux) 300 500 700 100 % Distribution 100% 100	100% 300
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 25% 75% CU 0.7 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 Efficacy (L/W) 15 50 72 84	100.0% 0.6 0.6 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GL	EUI KWh/ft².yr 0.3 FF MJ/m².yr 13
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	0.80	a) ft-candles Floor fraction check T)W/ft ² Floor fraction check	: should = 1.00 1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 100% 15%	Light Level (Lux) 200 300 400 100 % Distribution 25% 50% 25% 0 Weighted Average	100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL T12 ES T8 Ma System Present (%)	50% 50% 100.0% 0 0.6 0.6 0.6 0 0.80 0.55 0.55
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 3.7 MJ/m².yr 143
TOTAL LIGHTING			Overall LP 12.10 W/m ² EUI TOTAL kWh/ft ² .yr 4.5 MJ/m ² .yr 176
OFFICE EQUIPMENT & PLUG LOA	1		
Equipment Type	Computers		ervers Plug Loads
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	54.55 0.59 0.3 W/m ² 0.0 W/ft ² 90% 50% 2000	0.0 W/tr2 0.00 W/tr2 0.01 W/tr2 0.02 90% 90% 90% 100	6 1W/m ² 1W/m ² 1W/m ² 1W/m ² 0 0 0 0 0 0 0 0 0 0 0 0 0
Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	6760	6760 6760 6760 6760 0.2]W/ft² to see notes (cells with red indicator in upper right corr	
Total end-use load (unocc. period) Usage during occupied period	0.7 W/m ²	0.1 W/ft ²	Computer Equipment EUI kWh/ft².yr 0.46 MJ/m².yr 17.72
Usage during unoccupied period	44%		Plug Loads EUI kWh/ft².yr 0.41 MJ/m².yr 16.07
FOOD SERVICE EQUIPMENT Provide description below:	Gas Fuel Share:	Electricity Fuel Share: 100.0%	All Electric EUI KWh/ft?.yr 0.1 MJ/m².yr 5.0
REFRIGERATION Provide description below: Large refrigeration storage			EUI KWh/ft².yr 1.8 MJ/m².yr 70.0
MISCELLANEOUS			EUI kWh/ft².yr 0.3 MJ/m².yr 10

NEW BUILDINGS: Warehouse/Wholesale Baseline	SIZE:		COMMER	CIAL SECT VINTAGE	OR BUILD	ING PROFI	ILE		REGION: Yukon				
SPACE HEATING													
Heating Plant Type				1		Hot Water	System			Electric			
rieating riant rype						Packaged		W. S. HPI		Resistance	Total		
		System Present (%)		Boiler 15%	Unit Heater	Units 35%				50%	100%		
		Eff./COP Performance (1 / Eff.) (kW/kW)		75% 1.33	75% 1.33	77% 1.30	1.70 0.59	3.00 0.33	4.50 0.22	1.00 1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	29.2 W/m ² 393 MJ/m ² .yr		Btu/hr.ft² kWh/ft².yr										
Electric Fuel Share	50.0%	Fossil Fuel Share	50.0%								-	All Electric EUI kWh/ft².yr	10.1
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence	1							MJ/m².yr	393
				(%)							E	Natural Gas EUI	
		Inspection e Inspection for Scale Buil	dup	75% 100%								kWh/ft².yr MJ/m².yr	13.3 514
	Inspection	of Controls & Safeties of Burner		100% 100%								Market Composite E	51.11
		Analysis & Burner Set-up		90%							-	kWh/ft².yr	11.7
												MJ/m².yr	454
SPACE COOLING													
A/C Plant Type			-										
			Centrifuga Standard	l Chillers HE	Screw Chillers	Reciprocat Open	ing Chillers DX	Absorption W. H.	Chillers CW	Total			
		System Present (%)					100.0%			100.0%			
		COP Performance (1 / COP)	4.7	5.4 0.19	4.4	3.6 0.28	2.9 0.34	0.9	1 1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water Condenser Water	Setpoint										
Setpoint		Chilled Water	7	ŀc	44.6	°F							
		Condenser Water Supply Air	30 13.0	°C °C	86 55.4								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	26 W/m ² 13.8 MJ/m ² .yr	8 Btu/hr.ft² 0.4 kWh/ft².yr	1460	ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	4000	hrs/year	Note value	cannot be	less than 2,	,900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	5.0%												
Electric Fuel Share	100.0%	Gas Fuel Share]									
Chiller Maintenance		intenance Tasks		Incidence (%)	Frequency (years)								
		ontrol, Safeties & Purge Ur oupling, Shaft Sealing and											
	Megger N	otors											
	Vibration												
	Eddy Curr	ent Testing emical Oil Analysis									F	All Electric EUI kWh/ft².yr	0.1
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks			Frequency							MJ/m².yr	5
	Inspection	/Clean Spray Nozzles		(%)	(years)						⊢	Natural Gas EUI kWh/ft².yr	
	Inspect/Se	ervice Fan/Fan Motors									L	MJ/m².yr	
	Megger M Inspect/Ve	otors erify Operation of Controls	i									Market Composite E kWh/ft².yr MJ/m².yr	EUI 0.1 5
DOMESTIC HOT WATER												ivi3/11F.yi	<u></u>
Service Hot Water Plant Type	Fossil Fue	I SHW Std. Tank	HE Tank	Cond. Tnk	Std. Boiler	Cnd. Boil.	[Fossil	E	Elec. Res.	
		resent (%) 25%	ъ́ 5%				Ì	Fuel Share		30%	-	70%	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	Eff./COP 18.2	55%	6 70%		75%	90%		Blended Ef		0.58		0.91	
Wetting Use Percentage	90%			4	Il Electric EL kWh/ft².yr MJ/m².yr	JI 0.5 20			tural Gas E kWh/ft².yr MJ/m².yr	UI 0.8 32		Market Composite E kWh/ft².yr MJ/m².yr	EUI 0.6 23.5

		COMMER	CIAL SECTOR BUILDING PROFILE	
NEW BUILDINGS:	SIZE:		VINTAGE:	REGION:
Warehouse/Wholesale				Yukon
Baseline				
HVAC FANS & PUMPS				
SUPPLY FANS				Martilation and Estrate Fan Onesetian & Onestal
SUPPLY FANS				Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan
System Design Air Flow	0.8 L/s.m ²	0.16 CFM/ft ²	Control	Fixed Variable Fixed Variable
			Control	
System Static Pressure CAV	300 Pa	1.2 wg	Incidence of the	Flow Flow
System Static Pressure VAV	300 Pa	1.2 wg	Incidence of Use	100% 100%
Fan Efficiency	60%		Operation	Continuous Scheduled Continuous Scheduled
Fan Motor Efficiency	80%			
Sizing Factor	1.00		Incidence of Use	50% 50% 50%
Fan Design Load CAV	0.5 W/m ²	0.05 W/ft ²		
Fan Design Load VAV	0.5 W/m ²	0.05 W/ft ²	Comments:	
EXHAUST FANS				
EXHAUST PANS				
Weekreem Eukeust	100 1/2 week	242 CEM/wa		
Washroom Exhaust	100 L/s.wash		shiooni	
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.01 CFM/ft ²		
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²		
Total Building Exhaust	0.2 L/s.m ²	0.03 CFM/ft ²		
Exhaust System Static Pressure	250 Pa	1.0 wg		
Fan Efficiency	25%			
Fan Motor Efficiency	75%			
Sizing Factor	1.0	0.00 14///12		
Exhaust Fan Connected Load	0.2 W/m ²	0.02 W/ft ²		
AUXILIARY COOLING EQUIPMENT (C	ondoncor Dump a	and Cooling Towor/Condensor Fans)	
AUXILIART COULING EQUIPMENT (C	ondenser Pump a	ind Cooling Tower/Condenser Fans)	
Average Condenses For Device Draw		0.020 kW/kW	0.07 kW/Ton	
Average Condenser Fan Power Draw				
(Cooling Tower/Evap. Condenser/ Air Co	ooled Condenser)	0.52 W/m ²	0.05 W/ft ²	
Condensor Dump				
Condenser Pump				
Ruma Design Flow		0.052 1 /2 1/21	20 U.S. mm/Ten	
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton	
Pump Design Flow per unit floor area		0.001 L/s.m ²	0.002 U.S. gpm/ft ²	
Pump Head Pressure		kPa	ft	
Pump Efficiency		50%		
Pump Motor Efficiency		80%		
Sizing Factor		1.0	10///12	
Pump Connected Load		W/m²	W/ft ²	
CIRCULATING PUMP (Heating & Cool	ling)			
	_			
Pump Design Flow @ 5 °C (10 °F) delta	al	0.001 L/s.m ²		U.S. gpm/Ton
Pump Head Pressure		kPa	ft	
Pump Efficiency		50%		
Pump Motor Efficiency		80%		
Sizing Factor		0.8	14///10	
Pump Connected Load		W/m²	W/ft ²	
Supply For One Desired		2500 hrs to an		
Supply Fan Occ. Period		3500 hrs./year		
Supply Fan Unocc. Period		5260 hrs./year		
Supply Fan Energy Consumption		3.1 kWh/m ² .yr		
External Exp Over Exist		0500 h /		
Exhaust Fan Occ. Period		3500 hrs./year		
Exhaust Fan Unocc. Period		5260 hrs./year		
Exhaust Fan Energy Consumption		1.3 kWh/m ² .yr		
Condenser Pump Energy Consumption		kWh/m².yr		
Cooling Tower /Condenser Fans Energy	Consumption	0.1 kWh/m ² .yr		
		7000		
Circulating Pump Yearly Operation		7000 hrs./year		
Circulating Pump Energy Consumption		kWh/m².yr		
	-			
Fans and Pumps Maintenance	Annual M	laintenance Tasks	Incidence Frequency	
			(%) (years)	
1		ervice Fans & Motors		
1		djust Belt Tension on Fan Belts		
	Inspect/S	ervice Pump & Motors		EUI kWh/ft².yr 0.4
1				MJ/m ² .vr 16.2

NEW BUILDINGS: Warehouse/Wholesale Baseline	:	SIZE:	COMMERCIAL SECT VINTAGE:		ng profili	REGION: Yukon		
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		13.9 kWh/ft².yr 537.3 MJ/m².yr		Gas:	6.9 kWh/ft².yr	266.6 M.	iJ/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	city	Ga	as	
GENERAL LIGHTING	0.5	19.4		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
SECONDARY LIGHTING	0.3	13.4	SPACE HEATING	5.1	196.4	6.6	257.1	
TERTIARY LIGHTING	3.7	142.9	SPACE COOLING	0.0	0.3			
OTHER PLUG LOADS	0.4	16.1	DOMESTIC HOT WATER	0.4	14.0	0.2	9.5	
HVAC FANS & PUMPS	0.4	16.2	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	1.8	70.0						
MISCELLANEOUS	0.3	10.0						
COMPUTER EQUIPMENT	0.5	17.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's
	exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per
	degree Fahrenheit (BTU/hr. f ^{2.o} F) through walls, roofs
	and windows. The U-value is the reciprocal of the R-
	value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear
Window-to-wall ratio	glass Defines the ratio of window to insulated exterior wall area
General lighting	Defines the lighting types that are used within the main
General lighting	areas of a building, e.g., for a School, the area is
	classrooms and the lighting type is fluorescent; for a
	Food Retail store, the main area is the retail floor.
LPD	Lighting power density expressed in terms of W/ft ²
Lux	The amount of visible light per square meter incident on
	a surface (lumen/m ²)
Inc	Incandescent lamps
CFL	Compact fluorescent lamps
T12	T12 fluorescent lamps with magnetic ballasts
T8	T8 fluorescent lamps with electronic ballasts
MH	Metal halide lamps
HPS	High-pressure sodium lamps
HID	High-intensity discharge lighting includes both MH and
	HPS
Secondary lighting	Defines the lighting types that are used within the
, , , ,	secondary areas of a building, e.g., for a School, the
	secondary areas are corridors, lobbies, foyers, etc.,
Tertiary lighting	Defines the lighting types that are used within special
	purpose areas of a building, e.g., for a School, the
	tertiary area is a gymnasium.
Outdoor lighting	Defines the outdoor lighting including parking lot and
	façade
Overall LPD	The total floor weighted LPD that includes general,
	secondary, tertiary, and outdoor.
Fans	Defines mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
space heating	Defines the mix of heating equipment types found within
45110	the stock of buildings
ASHP	Air-source heat pump
WSHP	Water-source heat pump
Resistance	Electric resistance heating equipment including boilers
Netwol.coc	and baseboard heaters
Natural gas	Natural gas heating equipment including packaged
Capace cooling	rooftop units and boilers
Space cooling	Defines the mix of cooling equipment types found within the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance
Centinugai	of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a
CERTITIE	performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
	Direct expansion cooling equipment that use small
DX	

Appendix D

Background-Section 6: Reference Case Peak Load

No additional data. As noted in the main text, the same method and hours-use factors that were used for the Base Year calculation were applied to the Reference Case electricity values.

Appendix E

Background-Section 7: Technology Assessment - Energy-efficiency Measures

Introduction

Exhibit E 1 provides an example of part of the worksheet that calculates the CCE for T8 fluorescent lamps, one of the analyzed measures. For more detail on this and all the other measures, refer to the measure TRC model Excel workbooks submitted with this report.

18 Fluorescent Lamb	s (T12 Baseline)										
·····	• (• == = = = = = = = ;				References/Notes						
Description:	While code changes have eliminated T3 still remain installed in the building st neaarly 30% savings with no decrease unavailable on the market at large, this	ock and standard T8 lig n light levels. Due to T	shting presents 12 lighting being								
Baseline:	Standard 2-lamp F34T12 fixture consur	ning 81 W and produci	ng 4,779 lumens.	OPA 2010 Quasi-Prescriptive Measures and Assumptions, Page 98							
Upgrade:	Upgrade is a 2-lamp F32T8 fixture cons				Prescriptive Measures and Assumptions, Page 98						
				01/12010 Qubit							
Inter.Eff.Mode:	Electricity										
Primary End-Use	General Lighting										
Measure Type:	Baseload										
Discount Rate:	5.25%										
GHG Adder Incl.?	No				1						
Resource Costs:				= User Input	= User Input						
	Avoided Cost (NPV)	Customer Cost		= Calculation	= Calculation						
Elec. (\$/kWh)	\$3.922	\$0.132									
Elec. (\$/kW)	\$0.000	\$7.394									
Nat. Gas (\$/m ³)	\$3.165	\$0.232									
Oil (\$/L)	\$0.000	\$1.250									
Water (\$/1000L)	\$0.000	\$1.500									
Sub-sector		Low Use	Medium Use	High Use	References/Notes						
Baseline Consumption	Elec. (kWh/yr.)	200.6	345.1	431.6	The hours of use is based on the building archetypes for General Lighting as noted in the description.						
	Oil (L/yr.)										
Upgrade Consumption	Elec. (kWh/yr.)	143.6	247.1	309.0							
	Oil (L/yr.)										
Winter Peak Hours-Use Factor											
	Elec. (kWh/yr.)	56.9	98.0	122.5							
Annual Resource Savings	Elec. (kW peak)	-	-	-							
	Oil (L/yr.)	-	-	-	OPA Quasi-Prescriptive Measures and Assumptions, Pag						
	Upgrade, Material (\$)	\$31.28	\$31.28	\$31.28	100						
	Upgrade, Installation (\$)	\$17.25	\$17.25	\$17.25	Estimated Installation Cost						
Cost Parameters	Baseline, Material (\$)				Evaluated at full cost						
	Baseline, Installation (\$)										
	Total Measure Cost (\$)	\$48.53	\$48.53	\$48.53							
	Basis (Full/Incr.)	Full	Full	Full							
Incremental O&M (\$/yr.)		\$0	\$0	\$0							
Lifetimes	Upgrade (yrs.)	16.00	16.00	16.00	16 years - BC Hydro QA Standard						
• • • • • • • • • • • • • • • • • • •	Baseline (yrs.)	16.00	16.00	16.00	16 years - BC Hydro QA Standard						
Cost Savings (\$/yr.) Simple Payback (yrs.)		\$ 7.54	\$ 12.97	\$ 16.22							
Simple Payback (yrs.) NPV of O&M Costs (\$)		6.4 \$0	3.7	3.0 \$0							
	Electric Energy	223.36	384.32	480.65							
	Electric Demand	0.00	0.00	480.85							
Total Benefits (\$)	Natural Gas	0.00	0.00	0.00							
iotal Schence (9)	Oil	0.00	0.00	0.00							
	Water	0.00	0.00	0.00							
Measure TRC (\$)	water	0.00	335.79	432.12							
Benefit/Cost Ratio		4.60	7.92	432.12							
Cost of Conserved Electricity (CCE) (¢	:/kWh)	4.60	4.65	3.72							
	,,	0.00	4.03	3.72	4						
	Raw	28.4%	28.4%	28.4%							
Savings over Baseline	w/ Elec.Htg. Penalty	28.4%	28.4%	28.4%							

Appendix F Background-Section 8: Economic Potential - Electric Energy Forecast

Introduction

Exhibit F 1 provides the detailed Economic Potential results for the hydro grid.

Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Office																		
2015	3,420	1,306	-	423	3,367	187	895	316	1,428	55	-	16	-	-	-	-	-	11,415
2020	3,633	1,431	-	476	4,491	299	1,151	384	1,671	65	-	36	-	-	-	-	-	13,637
2025	3,880	1,572	-	536	5,730	424	1,440	460	1,957	76	-	41	-	-	-	-	-	16,116
2030	4,272	1,731	-	603	7,101	563	1,767	546	2,294	89	-	46	-	-	-	-	-	19,012
Food Retail																		
2015	335	386	397	179	332	12	164	73	78	-	6	2,468	-	-	-	-	-	4,429
2020	355	429	470	198	491	19	216	91	92	-	13	3,586	-	-	-	-	-	5,959
2025	379	477	553	219	667	27	275	111	108	-	14	4,763	-	-	-	-	-	7,593
2030	418	532	647	243	863	35	341	133	126	-	16	5,527	-	-	-	-	-	8,882
Non-food Retail																		
2015	2,611	1,599	376	600	1,298	54	462	118	203	-	-	40	-	-	-	-	-	7,362
2020	2,738	1,724	450	708	1,942	88	626	152	239	-	-	91	-	-	-	-	-	8,758
2025	2,889	1,865	534	831	2,656	126	811	191	280	-	-	103	-	-	-	-	-	10,287
2030	3,149	2,025	630	970	3,450	169	1,021	235	329	-	-	116	-	-	-	-	-	12,095
Hotel / Motel																		
2015	455	946	-	191	1,215	40	298	676	126	9	-	54	-	-	-	-	-	4,010
2020	479	1,035	-	215	1,728	62	376	1,017	146	10	-	122	-	-	-	-	-	5,191
2025	508	1,135	-	241	2,294	87	465	1,401	170	12	-	137	-	-	-	-	-	6,451
2030	556	1,248	-	271	2,922	114	565	1,835	198	14	-	155	-	-	-	-	-	7,876
Healthcare																		
2015	636	274	-	128	481	13	415	75	99	10	5	9	-	-	-	-	-	2,145
2020	677	292	-	143	735	19	540	110	115	12	11	20	-	-	-	-	-	2,674
2025	725	312	-	159	1,018	27	680	150	134	14	12	23	-	-	-	-	-	3,254
2030	797	335	-	177	1,334	35	837	194	156	16	14	26	-	-	-	-	-	3,921

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Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Education																		
2015	1,974	902	224	273	2,264	14	513	754	408	25	21	48	-	-	-	-	-	7,419
2020	2,130	963	276	310	3,426	21	661	897	482	29	47	103	-	-	-	-	-	9,345
2025	2,315	1,032	334	351	4,739	29	830	1,059	570	35	54	112	-	-	-	-	-	11,459
2030	2,582	1,110	399	399	6,224	39	1,022	1,245	675	41	62	121	-	-	-	-	-	13,918
Recreation Centres																		
2015	263	162	703	382	151	0	84	118	12	-	-	1,567	-	-	-	-	-	3,443
2020	269	170	813	424	273	1	103	165	14	-	-	1,729	-	-	-	-	-	3,962
2025	276	180	937	470	408	1	124	218	17	-	-	1,907	-	-	-	-	-	4,537
2030	292	190	1,074	521	558	1	147	277	19	-	-	2,105	-	-	-	-	-	5,185
Restaurant																		
2015	224	1,013	-	388	620	17	182	334	43	-	38	669	-	-	-	-	-	3,529
2020	254	1,103	-	431	831	28	245	516	51	-	87	1,043	-	-	-	-	-	4,590
2025	289	1,206	-	482	1,063	42	317	725	61	-	100	1,407	-	-	-	-	-	5,692
2030	332	1,324	-	540	1,321	57	400	965	73	-	115	1,690	-	-	-	-	-	6,818
Warehouse / Wholesale																		
2015	468	448	2,421	447	1,050	1	224	112	272	17	-	3	-	-	-	-	-	5,464
2020	492	491	2,897	504	1,744	2	278	159	319	20	-	6	-	-	-	-	-	6,912
2025	521	540	3,435	568	2,521	3	339	211	374	23	-	7	-	-	-	-	-	8,543
2030	569	596	4,044	640	3,394	4	409	271	439	27	-	8	-	-	-	-	-	10,402
Other General Service																		
2015	3,650	1,686	273	664	2,110	37	658	230	852	-	11	36	-	-	-	-	-	10,207
2020	3,779	1,821	324	757	3,005	37	876	281	986	-	24	81	-	-	-	-	-	11,971
2025	3,939	1,972	377	861	3,990	36	1,120	339	1,143	-	27	90	-	-	-	-	-	13,894
2030	4,242	2,140	437	977	5,075	36	1,393	404	1,325	-	30	101	-	-	-	-	-	16,160

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Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Non-Buildings																		
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Street lighting																		
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,016	-	2,016
2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,113	-	2,113
2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,304	-	2,304
2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,620	-	2,620
Parking Lot Plug																		
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	88
2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92	92
2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	101	101
2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114	114
Grand Total																		
2015	14,036	8,722	4,394	3,676	12,889	375	3,896	2,806	3,522	116	80	4,910	-	-	-	2,016	88	61,526
2020	14,808	9,459	5,230	4,165	18,665	577	5,073	3,772	4,114	136	182	6,817	-	-	-	2,113	92	75,204
2025	15,721	10,291	6,170	4,718	25,087	802	6,401	4,866	4,813	159	208	8,589		-	-	2,304	101	90,229
2030	17,209	11,233	7,231	5,342	32,242	1,053	7,903	6,106	5,633	187	237	9,894	-	-	-	2,620	114	107,004

Appendix G

Background-Section 9: Technology Assessment - Peak Load Measures

Introduction

Appendix G provides additional detailed information related to peak load reduction measures. The appendix discusses the following:

- Overview
- Description of electric peak reduction measures
- Measure lifecycle costing worksheets.

G1 Overview

Electric peak load measures are typically implemented by utilities to avoid or defer the costs of capacity expansion. Capacity costs refer to all levels of capital-based investments, including generating stations (new and upgraded), transmission and distribution lines, along with substations, transformers and other infrastructure required to deliver power, primarily related to peak capacity driven requirements.

Exhibit G 1 illustrates the base case Non-food Retail general lighting load profile on a cold December day (base case 4,647 MWH from Exhibit 10 in the body of the report). As shown, the daytime aggregate annual peak for these customers is estimated at about 0.93 MW, with about 0.95 MW for Peak Period 1 (6 pm) for this sub sector, and 0.90 MW for Peak Period 2 (4-8 pm).

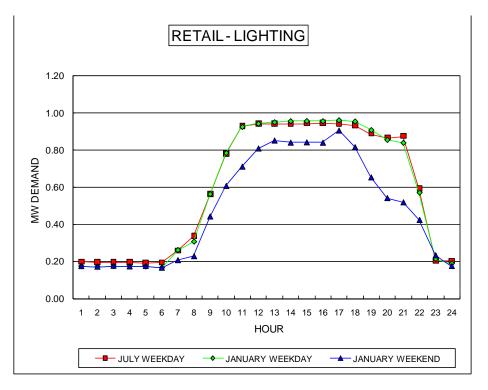


Exhibit G 1 Baseline Commercial Non-Food Retail Lighting

Supply capacity can be purchased, but infrastructure must still be available to deliver the supply to customers. DSM measures that reduce peak requirements avoid and/or defer these capital-intensive investments.

From the customer's side, adoption of electric peak reduction strategies is typically dependent on the overall benefits to them, including direct incentive payments or rate benefits. Under most current rates for all but the smallest commercial customers, customers are billed both for peak demand (kW) and also for electric energy (kWh). Consequently, electric peak load measures that do not also reduce overall energy consumption do provide some financial benefits to customers if they coincide with their billing peaks. The industry trend is towards more specific pricing, including time-of-use and even hourly pricing, or peak incentives that pass along some of the utility benefits to customers on a performance basis. These new pricing structures provide incentive for commercial customers to implement measures or to participate in utility peak load reduction programs, as long as the differential between peak and off-peak prices are sufficient to provide a noticeable bill saving potential. These options are only limited by the availability and cost of suitable metering technology, remote facility data communications and by energy measurement storage options that would enable remote and/or automated measurement and control of devices.

G2 Description of Electric Peak Reduction Measures

The following sub sections provide a description of each of the measures listed in Section 9 of the main report. The discussion is organized by major end use and is presented in the following sub sections:

- Water heating
- Block heater timers and storage
- Lighting
- Whole facility misc. equipment
- Thermal energy storage for room and supplemental heating.

The discussion of each measure is organized as follows.

- Description
- Assumptions on applicability (dwelling type, unit types, vintage)
- Typical costs one-time incremental, operating costs
- Typical electric peak reductions
- Other benefits
- Useful life
- Barriers and constraints for Economic and Achievable implementation
- Program issues.

Water Heating

Assumptions used for Analysis			
Applicable facility type(s)	 Small-Medium Commercial Buildings – all with individual unit control laiouite 		
	individual unit control/circuits		
Applicable equipment type	 Water heater with at least a 40-gallon tank. 		
Vintage	 Existing and new 		
Costs	 \$200 incremental cost in existing and new homes; \$125 incremental cost as a add on to existing control system Approximately \$10/site/year maintenance/evaluation 		
Electric peak reduction	 80% reduction in water heating end use evening peaks About 80% of non-standby water heating energy reduction during curtailment is recovered 		
Useful life	 10 years 		

Switch-based Water Heating Unit Load Control Assumptions used for Analysis

Description

Switch-based water heating load control is accomplished by the installation of a remote control switch on either the water heater itself or on the circuits controlling the water heater. In older systems, this type of control has been accomplished via radio frequency (RF) control, which allows remote shut off of the water heater under specific capacity-constrained conditions during a limited number of pre-specified hours during winter peak months. In the systems that are currently offered, pager-based communications is used. An even more economic solution is to "piggyback" on an existing communications system. For example, if space heat control already exists, water heat control can be added via a hard-wired or wireless connection. This can significantly reduce the total cost of the water heat control.

Depending upon the length of the control, when the control is operated, and the size of the water heater tank, units can be shut off for the entire control period or cycled to limit their on time to a predetermined number of minutes per control cycle. Water heat control is commercially available and implemented in hundreds of thousands of sites in the U.S., thus demonstrating the viability of the technology, success of the programs, customer acceptance and utility satisfaction.

Applicability

Applicable dwelling types are any commercial buildings with an electric water heater that has at least a 40-gallon tank. The size of the tank is important because it provides hot water during times when the control is in effect. The larger the water heater tank, the longer the control can be in place without disrupting the customer's requirements.

Costs

Switches cost about \$100 per unit, plus \$100 for installation, plus maintenance. Costs are reduced to \$125 (i.e., \$25 incremental installation) if the control switch can be added to an existing control system at the same time, including any remote system, which may include thermostat control, engine block heater control, lighting or other. There are no savings in installation costs for a new facility.

Electric Peak Reduction

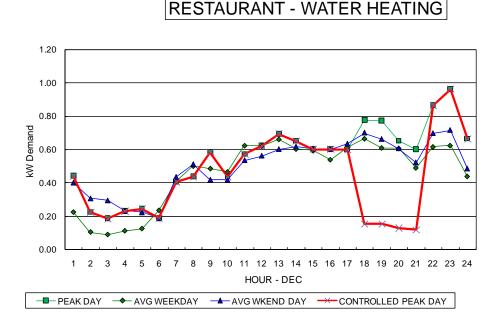
Assuming systems comparable to residential and primarily used for kitchen, washing and laundry usage, and annual energy consumption per participant (with 100% electric fuel use) of 4,000 kWh, the table below provides estimated impacts, assuming 80% reduction in load (i.e., 20% overrides, communications and switch failures):

Sub sector	Load Shape Code	Winter Peak Hour 18 (Peak period 1) impact	Winter Peak eve 4- 8 pm (Peak Period 2) Impact	Winter Weekday morning 7-9 am (Peak Period 3) impact
Restaurant	2033	0.62	0.58	0.39
Hotel/Motel and Healthcare	2034	0.57	0.53	0.40
Retail	2035	0.24	0.39	0.15
Commercial All Other	2037	0.57	0.53	0.40

Exhibit G 2 Commercial Sub Sector Load Shape Impact (kW)

For the selected sub sectors and building size indicated, the range of Peak Period 2 impacts for this measure is 0.50 kW to 0.57 kW, assuming +/- 5% reduction percentage (from 20% average). Education is excluded because there is no significant water heater load expected during Peak Periods 1 or 2. Exhibit G 3 below illustrates an 80% reduction for Restaurant peak day water heating, compared to peak, weekday and weekend day load profiles.

Exhibit G 3 Commercial Water Heater Baseline vs. Controlled Load



Other Benefits

The water heater control switch would not provide customers with any ancillary benefits and thus the only incentive for participation would be monetary in nature, likely on a per annum or per control event basis.

Useful Life

This technology has a long history, going back at least 30 years on various types of equipment, including central air conditioners, water heaters and pool pumps. For the costing analysis, a 10-year life has been assumed, although there are programs which have had switches in place for longer.

Cost-Effectiveness Summary

Based on a one-time cost of approximately \$200, ongoing maintenance of 5% (about \$10/yr.) and estimated annual impacts of 0.50 kW – 0.57 kW, a preliminary estimate of the CEPR is \$48 - \$55 per kW. As an incremental option to other load control options within facilities, the installation costs would be reduced by \$75 and the resulting CEPR would be \$35 - \$40 per kW.

Barriers and Constraints

Contractors are often the cause for lack of participation or dropouts, since they may incorrectly blame the switches for system performance problems, dissuading participation or resulting in removals. New tenants or their contractors may not know what the switches are and have them removed. With one-way communications, there is no way to verify whether the switch is even in place and an accurate count of actual switches in place cannot be reliably made without a systematic site verification plan.

Program Issues

Because there are no customer benefits inherent in the technology, a cash incentive would typically be expected for each season that the measure was needed, payable either by season or by event (or both). Additional work would be required to maintain, verify and evaluate the system performance to the same degree of accuracy as two-way systems due to the lack of confirmation and higher incidence of removals and failures.

Engine Block Heater Load Control Assumptions used for Analysis				
Applicable facility type(s)	 For commercial fleets and maintenance vehicles often plugged in at the end of the work day 			
Applicable equipment type	 Block heaters and warmers 			
Vintage	 Existing and new 			
Costs	 \$25 cost per vehicle for fleets of 10 or more \$10 installation cost per vehicle Approximately \$5/site/year maintenance/evaluation 			
Electric peak reduction	 95% reduction in evening peaks 100% of energy reduction during curtailment is recovered 			
Useful life	 10 years 			

Block Heater Timers and Storage

Description

Engine block heater timers and/or control are accomplished by the installation of a timer that could be monitored and/or controlled by the utility to ensure that it is not overridden. The critical component in this application is to defer any operation until after the 5-8 pm peak period, especially in December, but including weekends as well. While timers can be used to reduce unnecessary energy consumption, reducing the heat cycle from 8-12 hours per day to the two to three hours per day that is required to ensure that engines are at warm enough temperatures to start, the timing of the operation is particularly key to the capacity control aspect. Ideally, operation should be both deferred until after 8 pm and staggered to prevent a local distribution peak (if the fleet operation was sizable enough), as well as billing demands for the fleet facility account, likely a separate parking garage or lot, to relieve the overall system peak associated with the 5-8 pm period.

Applicability

Applicable facility types are any business operation with a fleet of vehicles, such as post offices, taxis and utilities (electric, gas, cable, delivery services, taxi, hotel shuttle, etc.) where plug-in heaters are required for the vehicle fleet.

Costs

Given that a fleet operation is involved, economies of scale can be applied to reduce the costs of switch installation. Assuming at least 10 vehicles are involved, switches are assumed to cost about \$25 per unit, plus \$10 for installation, plus maintenance. There is no assumed incremental option.

Electric Peak Reduction

As with residential applications, assuming annual energy consumption per participant of 258 kWh, which would likely have been included in the outdoor lighting end-use category, baseline electric peak period loads are estimated as 0.173 kW for Peak Period 1 (system peak hour 6 pm), and 0.216 kW for Peak Period 2 (winter peak weekday 4-8 pm). Assuming 100% load control for evening peak hours, Exhibit G 4 below illustrates the baseline vs. control load profiles on the system peak day. This results in an estimated average of 0.173 kW per unit peak reduction for Peak Period 1 (at 6 pm) and an average of 0.216 kW per unit peak reduction for Peak Period 2 (4-8 pm), assuming no overrides or switch failures. These estimates may erode over time due to a number of factors, disabling of switches (by customers and contractors) and malfunctioning timers, so some maintenance and ongoing monitoring should be expected.

In Exhibit G 4 below, the red line represents the timer control option (controlled peak day) while the green line (peak day) represents the baseline. None of these load profiles assume use of timers used solely to reduce energy, which would not necessarily reduce evening peak demand unless specifically programmed to do so. The degree to which timers are set to defer usage and also lock out operation during 4-8 pm would be considered duplicated savings.

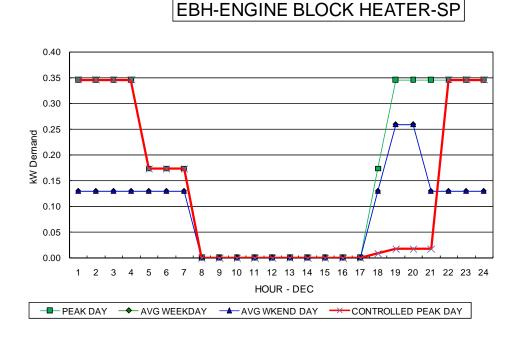


Exhibit G 4 Commercial Fleet Block Heater Baseline vs. Controlled Load

Other Benefits

The timers would also provide energy savings and, depending on the applicable rate in effect, could be operated to maximize bill savings as well.

Useful Life

Timers are an established technology. For the costing analysis, a 10-year life has been assumed, although timers can be expected to last longer than that if maintained in clean working condition, which would presumably be more feasible in a fleet facility environment.

Cost-Effectiveness Summary

Based on a one-time cost of approximately \$25, ongoing maintenance of 10% (about 5/yr.) and estimated annual impacts of 0.173 kW – 0.216 kW per switch, a preliminary estimate of the CEPR is \$33 - \$42 per kW when applied to fleet facilities.

Barriers and Constraints

In a fleet operation, it is unlikely that contractors or operators would disconnect timers. Some switches may not maintain the correct time without some type of battery backup.

Program Issues

Without time-of-use rates, customers have no particular incentive to maintain the lock-out feature or timer operation to exclude the 4-8 pm period, so some monitoring may be necessary to ensure that block heater operation avoids system peaks. Additional monitoring and sampling would be required to maintain, verify and evaluate the system performance, which would be facilitated if the applicable facility were separately metered.

Lighting Load Control

Assumptions used for Analysis			
Applicable facility type(s)	• /	All building types	
Applicable equipment type	1 =	Non-essential lighting	
Vintage	= E	Existing and new	
Costs	f	550 incremental cost in existing and new acilities; approximately \$5/site/yr. naintenance/evaluation	
Electric peak reduction		100% of non-essential lighting, assumed as 10% of baseline lighting usage, or 0.234 kW. No recovery energy is assumed	
Useful life	• 8	3 years	

Switch-based Lighting Load Control

Description

General and architectural lighting represent approximately 27% of Base Year (2010) energy consumption in Commercial sector buildings. In virtually every building and facility, there are expected to be a number of non-essential lighting loads that could be controlled for limited periods, such as during system peak critical hours.

Switch-based lighting load control is accomplished by the installation of a remote control switch on non-essential lighting circuits, wall switches and plug-in lamps or decorative lighting. Existing automation systems currently utilize plug-in modules with communication via power line carrier or short-run radio signals. These systems can also interface with PCs and through telephone interfaces so that remote control can be accomplished as well. In terms of technical capability, the improvements to these existing systems that will facilitate their use in utility electric peak load control would require some reduced cost and more standardized and reliable remote interfaces.

Typical commercial EMS systems have some capability for remote programming for on-demand control use, but this capability may need to be enhanced. Most likely, this would be achieved as part of an add-on wireless communications control switch linked to the outside through a remote load control system already in place to maximize or even enable cost effectiveness. What is required is a gateway via broadband (e.g., broadband over power lines) or through the meter that would accept outside signals (such as from the utility) and convert them to short-run wireless (or wired) signals that would trigger switches placed on selected lights and appliances. This section describes the lighting applications only, in order to determine effect on lighting load profiles. The next section addresses aspects of non-lighting loads, although lighting and non-lighting plug loads are not expected to require separate systems, but rather a single gateway that controls switches for any plug load or, for lighting, wall switch. This technology would be applicable for any commercial facility, which could make effective use of total building communications through building wiring or a building wi-fi system, as is common for electrical sub metering applications today.

Applicability

This measure is applicable to all building and business types, but would be most applicable to Offices, Non-food Retail, Hotel/Motel, Education and Warehouses, and especially where occupancy varies and occupancy sensors are not viable.

Costs

Gateway systems are estimated at \$100 - \$300 per site installed, although they would be expected to serve multiple purposes. For example, a programmable communicating thermostat or electric meter already installed in a commercial building for other applications could include a relay board that would relay signals from a remote host over broadband, building wiring or via wi-fi to individual devices in commercial spaces from one or more distinct customers within a single building. Switches are assumed to cost about \$10 per unit (assume 10 for this example), which could control multiple lights and plug loads, and \$100 installation. There is no savings assumed for installation costs for a new building.

Electric Peak Reduction

Based on annual general and architectural lighting loads per facility, using an Office suite of 5,000 square feet as an example, estimated base lighting consumption would be approximately 33,000 kWh (assuming 6.6 kWh/ft²). Based on this, and using the general lighting load shape and assuming 30% of the average lighting load is controllable during the 4-8 pm Peak Period 2, impacts would be approximately 1.60 – 1.77 kW/site. In the figure below, the red line represents the timer control option (controlled peak day) while the green line (peak day) represents the baseline, assuming 30% lighting reduction from 4-8 pm.

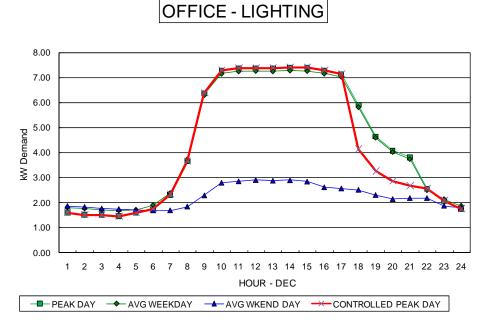


Exhibit G 5 Commercial Office Lighting Baseline vs. 30% Controlled Load

Other Benefits

The gateway systems and switches would provide customers with many ancillary benefits, such as remote shut off of lights and appliances for security, convenience and energy saving, although no energy savings has been assumed for this analysis.

Useful Life

This technology has a fairly long history, going back at least 20 years for various protocols of home automation devices, including X-10 protocol units, which have been available through

electronics stores under various brand names. For the costing analysis, an eight-year life has been assumed, although the units typically last 10-15 years.

Cost-Effectiveness Summary

Based on the inclusion of a modest (\$100) gateway system installation and 10 switches (at \$10 each), installation cost of approximately \$100, ongoing maintenance/support of 10% (about \$10/yr,) and estimated annual impacts of 1.60 - 1.77 kW, the estimated CEPR is \$26 - \$28 per kW/yr. when applied to an Office. Business types with more coincident lighting during 4-8 pm, such as Retail, Healthcare and Hotel/Motel would be better options. For practical and economic purposes, this type of system may be incremental to an existing EMS or other facility control system, which would reduce the installation cost further.

Barriers and Constraints

The technology for this application, while existing, is not quite ready for general use and would be greatly enhanced by the introduction of gateways that are only now being pilot tested. In addition, without some type of time-based rate, there would be little incentive for customers to purchase these devices, even as timers, without cash incentives.

Program Issues

In the short term, the utility could work with building owners, building managers, electronics distributors and ESCOs to pilot test and demonstrate the benefits of these types of systems for remote shutdown of lights during the defined peak periods on system-critical days. This would be facilitated by adoption of time-of-use rates that would be consistent with the peak periods, with critical peak pricing periods on a handful of system peak days providing the additional incentive for customers to utilize their systems during system peak critical periods. Typical switches can be overridden easily so programming them as a default to shut certain lights for the peak winter months with the option to turn them back on if needed would be feasible.

Multiple (Miscellaneous Plug Loads)

See the discussion on lighting for description, applicability and costs, which are the same.

Electric Peak Reduction

Assuming a typical medium commercial Office suite of 5,000 ft², assume average computer and plug loads would be about 20,000 kWh/yr. at 3.96 kWh/ ft²/yr. for miscellaneous plug loads. This would translate to about 3.23 kW of system-coincident computer and plug loads (under the Peak Period 2 definition). There are numerous devices to which this measure could be applied, including phantom loads; principal among these would be copiers, printers, monitors and electronic device chargers (many of which could be ganged on one power strip with a single switch). For the purposes of this analysis, it is assumed that 717 - 920 watts of devices could be controlled by five switches controlling "smart" power strips. Some equipment may have built-in features that place them in standby or sleep mode but this has not been assumed. This would consist of either standby (or sleep mode) power on units not being used, or full active standby power on units considered temporarily non-essential, as designated through cooperative agreement among utility, building management and occupants. The table below lists the best

candidates, based on a 1999 standby study by LBNL,⁸ as well as other sources and project team experience.

Appliance	Range of Power Consumption (Watts)
Small office copier	20 (standby) - 250 W
Ink jet printer	4 – 6 W
Laser printer	20 – 40 W
Hot/cold water cooler	70 W
LCD monitor	10 – 28 W
CRT monitor	50 -150 W
Instant/one-cup coffee-makers	30 – 50 W
Set-top boxes	5 – 25 W
Large screen TVs/monitors	5 – 22 W

Exhibit G 6 Commercial Office Appliance Power Consumption Ranges (W)

For example, in offices with two or more copiers, at least one could be designated as interruptible, and either turned off or placed in sleep mode (standby) during utility system-critical days, reducing electric load by the active standby power level or active standby less standby. Initially, this function could be done through O&M measures, but ultimately are assumed to be implemented by remote utility control, either directly or through building management, as well as integrated into energy management systems (EMS). Copiers, laser printers, one-cup coffee makers and hot/cold water coolers would be ideal for these applications since they have heating elements that consume significant power and can be shut down for several hours without significant effect on business operations.

Cost-Effectiveness Summary

Based on the 100% incremental scenario, five switches (\$50) and \$20 for incremental installation costs, \$10/yr. for maintenance, and estimated annual impacts of 200 watts on demand, encompassing a mix of the above devices being controlled, the estimated CEPR is \$17 - \$23 per kW/yr. vs. stand alone (\$100 gateway) of \$30 - \$41 per kW/yr. For practical purposes, this type of system would not be used in stand-alone cases, only as an increment to an existing gateway system with lighting switches already in place.

Multiple Facility – Remote Circuit Control

Switch-based Interruptible Circuit Load Control						
		Assumptions used for Analysis				
Applicable facility type(s)		Office, Hotel/Motel building elevators				
		Retail, Food, Hotel, Restaurant and Education refrigeration				
Applicable equipment type		Elevators, selected refrigeration/lighting units, HVAC systems				
		and pumps				
Vintage		Existing and new				
Costs		\$200 incremental cost in existing and new buildings; \$100				
		incremental cost as a add on to an existing control system				
 Approximately \$20/site/yr. maintenance/evaluation 						
Electric peak reduction						
·		selected elevator and refrigeration/lighting equipment, 50% for				
		HVAC systems and pumps; minimal recovery energy				
Useful life		10 years				

⁸ Standby Power. http:/standby.lbl.gov – Lawrence Berkeley National Labs.

Description

Switch-based load controls on interruptible equipment is accomplished by the installation of remote control switches on selected equipment that is redundant (e.g., multiple elevator banks) or considered temporarily non-essential (e.g., refrigeration and lighting on beverage cases where spoilage is not an issue, HVAC systems and pumps in large facilities). In older systems, this type of control has been accomplished via radio frequency (RF) or power line carrier ("PLC" - through building wiring) control, which allows remote shut off of circuits under specific capacity-constrained conditions during a limited number of pre-specified hours during winter peak months. In newer systems and those projected for the future, other communications systems are expected, including wireless and wi-fi. An even more economic solution is to "piggyback" on an existing communications system or EMS. Most controlled loads anticipated under this measure would be capable of 100% shutdown for the several hours of critical peak periods. Units could also be cycled to limit their on time to a predetermined number of minutes per control cycle, but this may not be feasible for control of large circuits. In elevators, linking into local lock-out circuitry may be feasible, which would eliminate the need (and cost) of installing switches on circuits. For HVAC systems and pumps, existing EMS or demand-control systems could be accessed.

Applicability

Applicable facility types are any commercial buildings with types of loads that can be shut down for several hours without adverse effects on business operations or customer service. For example, elevators in multiple elevator buildings, refrigeration in empty cases or lighting in selected refrigeration cases, and HVAC fans and pumps could all be controlled. This would have some limits since Peak Period 2 (4-8 pm) generally corresponds to times when they may be in active use for some facility types (e.g., elevators in offices, refrigerator cases for grocery stores or restaurants). Another example is beverage cases for soft drinks or alcohol in grocery stores or supermarkets that would be minimally affected by being shut off for several hours.

Costs

Control system costs are assumed to be \$200 for new installations. Switch costs are assumed at about \$50 per unit, plus \$100 for installation, plus \$50/yr. maintenance. Costs are reduced to \$150 (i.e., \$150 incremental installation) if the control switch can be added to an existing control system at the same time. There is no savings in installation costs for a new facility.

Electric Peak Reduction

Elevator loads are approximately 2% of medium-large Office buildings, where this option is most applicable. For a typical large Office building it is assumed that Peak Period 2 demand would be approximately 15 kW. Assuming 25% of elevator consumption would be deferrable (shut down one of four elevators), that would result in 3.75 kW load reduction potential.

HVAC system fans and pumps comprise approximately 10% of commercial energy consumption. This option would be considered applicable only in larger facilities where there is central control and would exclude the Restaurant sub sector. We have assumed an average of about 3 kW per circuit. Assuming that 50% of HVAC system fans and pumps would be deferrable through use of alternate shutdowns and cycling, the result would be an estimated 1.5 kW per unit of peak reduction.

For refrigeration units (with lighting), this would apply primarily to Food Retail applications, including cafeterias in the Education, Hotel/Motel and Restaurant sub sectors. Refrigeration for a 5,000-ft² food store would contribute about 17.5 kW in the baseline scenario (3.5 kW per 1,000 ft²). Control of 10% of that load would be 1.75 kW, which should be controllable with five switches (350 watts/switch).

Other Benefits

None.

Useful Life

Control switch technology has a long history. For the costing analysis, an eight-year life has been assumed.

Cost-Effectiveness Summary

For elevator controls and HVAC system fans and pumps, we have assumed a capital cost of \$300, installation of \$250, plus \$100 for switches. Based on a stand-alone scenario and estimated electric peak load reduction totaling 5.25 kW for applicable building types (large Office buildings for elevators, most building types for fans and pumps), the estimated CEPR is \$38 per kW/yr. for stand-alone systems. For elevators, most likely, this system would be used in stand-alone cases because of the difficulty in integrating it with other building systems. For HVAC system fans and pumps, while it is assumed that this would be a stand-alone system, it could also be integrated with other building systems. Removing the capital cost of a gateway, but leaving installation, switch and maintenance would reduce the CEPR to \$31/kW/yr.

For refrigeration control, we have assumed stand-alone control system costs of \$200 for devices, \$100 for installation and \$125 for five switches in a 5,000-ft² facility, with \$50 annual maintenance, all over eight-year equipment life. This would result in an estimated CEPR of \$53 per kW/yr. For an incremental installation (no capital equipment), this would reduce the CEPR to \$39 per kW/yr.

Barriers and Constraints

The technology for this application is already utilized in limited applications, but would be greatly enhanced by the introduction of gateways, which are only now being pilot tested, that would link outside utility control to internal building control systems. Financial incentives would provide a significant incentive for customers to invest in these systems themselves, in the absence of utility incentives for the initial investment or pay-for-performance incentives for peak demand response.

Program Issues

In the short term, the utility could work with building owners, building managers and customers with applicable interruptible refrigeration systems, including ESCOs, to pilot test and demonstrate the benefits of these types of systems for remote shutdown of elevator, HVAC fans, pumps and refrigeration units during the defined peak periods on system-critical days. This would be facilitated by adoption of time-of-use rates that would be consistent with the peak periods, with critical peak pricing periods on a handful of system peak days providing the additional incentive for customers to utilize their systems during system peak critical periods. Typical switches can be overridden.

In addition, the effect of current and potential incoming federal regulations for reduced standby power levels should be taken into account when estimating potential program impact.

Electric Thermal Storage (ETS) Room Units

Electric Thermal Storage (ETS) Room Units

	Assumptions used for Analysis
Applicable facility type(s)	 Hotel/Motel, Restaurant and Office, where individual room unit control is feasible and can take advantage of variable occupancy – requires off-peak rate structure
Applicable equipment type	 Baseboard systems compatible with replacement by stand- alone room unit ETS systems
Vintage	 Existing and new
Costs	 Assuming 15-hour operation (nine hour overnight charge time): \$1,200 - \$1,600 for room ETS units, vs. \$400 for standard room baseboard system Assume \$200 incremental installation costs; approximately \$100/site/yr. incremental maintenance
Electric peak reduction	 Assume 95% of current full electric loads (assuming 5% override), operating 100% off peak otherwise, with only residual fan (same as baseline) during 15 daytime hours. Estimated 0.73 kW peak reduction for 2,500 annual kWh Approximately 5% increase in space heating energy for losses
Useful life	 15 years (comparable to heat pump)

Description

ETS is a technology that has been widely used in Europe and selectively used in North America for more than 40 years. The basic premise of the systems is to convert electricity into heat and store it in specially designed high-density ceramic bricks, capable of holding heat up to 1,650°C. Combined with a utility off-peak rate, operation in charging mode during low-cost off-peak hours can provide heat all day, if properly sized, by thermostat-controlled release of heat from the bricks through either forced air or hydronic systems. Units come in various sizes, from whole-house units to individual room units. Control systems to ensure proper heat distribution are typically included and systems can be retrofitted or installed in new construction applications. The principal manufacturer in North America is Steffes Corp.⁹, and marketing is principally accomplished through electric co-ops, as well as many northern U.S. and Canadian utilities, including Nova Scotia Power and Hydro-Quebec, where a sufficient differential between peak and off-peak prices during winter months makes it economical for residents. Many winter-peaking generation, transmission and distribution co-ops market the units in order to minimize their capacity requirements during peak winter.

Applicability

With the various size units available, ETS can be installed in any room, as a replacement or as a supplement to electric baseboard systems. For the Hotel/Motel and Healthcare sub sectors, and some Offices where occupancy varies, ETS can be used to replace comparable electric baseboard units. Often, a separate meter is used to measure only the central heating systems

⁹ http://www.steffes.com.

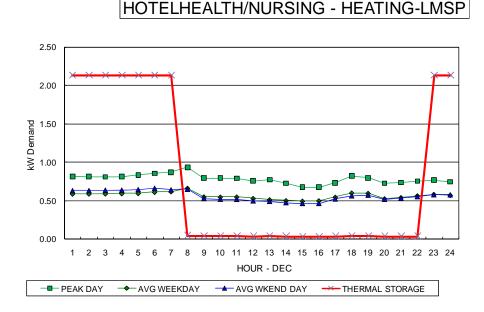
to best take advantage of the off-peak rate but a separate meter would not be viable for room units. Systems would be configured to take advantage of rates, ideally a time-of-use rate, with charging periods designed to virtually eliminate any operation during peak periods. For Yukon, a 15-hour peak rate period (7 am - 10 pm) and nine-hour off-peak rate (10 pm - 7 am) would be used by the utility.

Costs

Initial costs for ETS systems are significantly higher than standard heating systems. For the economics to work for the customer, the rate differential must be significant, at least two or three to one for peak to off-peak. Initial costs are roughly proportional to the unit sizing, with an ETS system requiring two to three times the size of a standard system, and somewhat higher installation and maintenance costs. In addition, additional control equipment and sometimes wiring upgrades are necessary, as well as placement in the home (requires sufficient support for additional weight), making the specification of a system critical in terms of applicability. In general, larger facilities work best. For the purpose of this study, preliminary costs have been developed based on literature search and an interview with a representative of Steffes Corp.

Electric Peak Reduction

Electric peak load reduction would be theoretically 100% of the peak heating requirements of a standard electric space heater for the applicable room. Off-peak loads would be more than twice the levels so it would be critical to size the systems properly for the expected charging period. For example, for a large room with 3,000 annual kWh requirements for space heating, Peak Period 1 loads would be about 0.87 kW, and Peak Period 2 loads would average 0.77 kW. For the costing analysis, it is assumed that 5% of the usage would still be on peak to account for minimal overrides or where units do not provide all heating requirements through off-peak charging (even though theoretically designed to do so). For a room ETS unit, the comparable overnight (charging) on a peak day would be as illustrated below. Peak load reduction would therefore be about 0.82 kW at the hour ending 6 pm system Peak Period 1 and average 0.74 kW during the 4-8 pm peak period.





Other Benefits

None.

Useful Life

This technology has a long history in Europe and the bricks are virtually indestructible, so the useful life is considered the same as comparable room heating systems, 15 years. Electronic control systems are required, which involve some maintenance.

Cost-Effectiveness Summary

For central systems, analysis is based on a one-time incremental cost of approximately \$1,000 for the unit plus \$150 installation, plus \$50 annual maintenance. Estimated annual impacts of 0.73 - 0.76 kW were used, based on 95% of Peak Period 1 and 2 loads. Under those assumptions, a preliminary estimate of the CEPR is \$132 - \$147 per kW/yr.

Barriers and Constraints

The existence of an off-peak rate with significant differential is a major consideration, although additional metering and infrastructure (priced at \$150 per site) would not be justified solely for this purpose. Numerous logistical and wiring issues would also need to be addressed. Space requirements and sufficient weight-bearing floors for installation of the units, which are much heavier than standard heating equipment, would be potential constraining factors to feasible installations.

Program Issues

While many co-ops and several major Canadian utilities have programs for this application, which could be consulted to assist in designing the program and identifying barriers experienced in real implementation (not just pilot programs), the programming infrastructure required would involve a significant commitment.

Electric Heat Switch Controls for Hotel/Motel

		vitch Controls for Hotels ns used for Analysis
Applicable facility type(s)	1	Hotel/Motel, where 10% of space heating is electric, where individual room control is feasible and can take advantage of variable occupancy
Applicable equipment type		Electric room heating systems compatible with switch control
Vintage		Existing and new
Costs	÷	\$1,250 system cost with installation plus \$50/switch for 10 room installation, plus \$200 annual maintenance Assume \$200 incremental installation costs, with all other costs the same
Electric peak reduction		Assume 50% reduction in base loads, including overrides, estimated 6.2 – 6.4 kW reduction for 10 rooms for 5-9 pm period, approximately 5% increase in space heating energy for losses
Useful life	•	10 years (comparable to heat pump)

Description

Electric heating in the Hotel/Motel sub sector is subject to occupancy variables. Existing switch technology is available to enable remote central control of individual room units via thermostat or switch control. For rooms that are temporarily unoccupied (not reserved at all or the occupants are out of their rooms) during the 4-8 pm period, heating could be reduced significantly. It is estimated that 50% reduction could be achieved via temporary curtailment.

Applicability

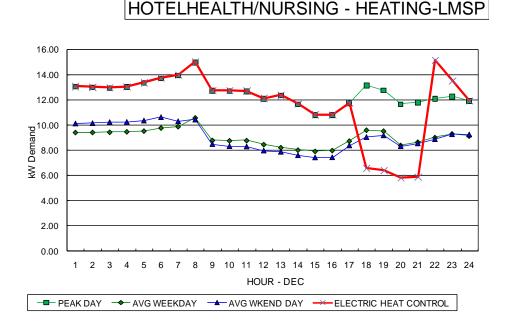
Hotels or motels with at least 10 rooms would be expected to be large enough to accommodate the central control systems required.

Costs

Initial costs for a central control system are estimated at \$1,000 for a 10-room system, with \$200 annual maintenance and \$250 installation. Switches are estimated at \$50 each, so a 10-switch system would cost \$500.

Electric Peak Reduction

Electric peak load reduction would be theoretically 50% of the peak heating requirements of a standard electric space heater for the applicable room. Based on a 400-ft² room, 10 rooms and 10 kWh/ ft² annual heating requirement, total base annual consumption for 10 rooms would be 40,000 kWh. This translates to a 4-8 pm peak of about 10.31 kW and 11.55 kW at 6 pm for the 10 rooms. A 50% peak load reduction would therefore be about 5.2 – 5.8 kW, as illustrated below.





Other Benefits

Hotels and motels could use this at other times to remotely reduce heating when rooms are unoccupied in order to save energy and also reduce their own billing peak.

Useful Life

Switches have a typical lifetime of 10 years, with maintenance.

Cost-Effectiveness Summary

Assuming systems costs as outlined above, a 10-room system would have a CEPR of \$56 - \$63 per kW/yr. An incremental system installation, assuming that there is already a system in place that would be capable of the type of control and could be retrofitted to the required curtailment scheduling, would have a CEPR of \$42 - \$47 per kW/yr.

Barriers and Constraints

Concerns about guest comfort would need to be addressed and some heating systems would not be compatible with the type of equipment and systems required. Some type of override (remotely by hotel manager or by guest) may need to be tuned to enable easy access.

Program Issues

None.

G3 Measure Lifecycle Costing Worksheets

The following worksheets detail the calculation of CEPR for each of the electric peak measures listed.

LIFE-C	YCLE COSTI	NG WORKSHEET	
One-Way Switch - Water H	eating		
1 One-time Costs - Retrofit		2 Recurring Costs (\$/yr)	
Capital/Device	\$100.00	Maintenance	\$10.00
Installation	\$100.00	Support	\$0.00
Other	\$0.00	Other	\$0.00
Total	\$200.00	Total	\$10.00
3 <u>Net present Value Cost (1)</u>	<u>\$273.79</u>		
	Low	<u>High</u>	
4 Peak Reduction (kw/yr)	0.41	0.56	
5 Life-Cycle Peak reduction	4.10	5.60	
6 Cost of Electric Peak Reduct	tion (CEPR)		
(Rounded to \$)	\$67.00	\$49.00	
(1) Discount Rate/yr	7.5%		
Device Lifetime (yrs)	10		

LIFE-CY	CLE COSTING	G WORKSHEET	
One-Way Switch - Water Hea	ating (increment	tal)	
1 One-time Costs - Retrofit	2	Recurring Costs (\$/yr)	
Capital/Device	\$100.00	Maintenance	\$10.00
Installation	\$25.00	Support	\$0.00
Other	\$0.00	Other	\$0.00
Total	\$125.00	Total	\$10.00
3 <u>Net present Value Cost (1)</u>	<u>\$198.79</u>		
	Low	<u>High</u>	
4 <u>Peak Reduction (kw/yr)</u>	0.41	0.56	
5 Life-Cycle Peak reduction	4.10	5.60	
6 Cost of Electric Peak Reduction	on (CEPR)		
(Rounded to \$)	\$48.00	\$35.00	
(1) Discount Rate/yr	7.5%		
Device Lifetime (yrs)	10		

LIFE-CYCLE COSTING WORKSHEET					
One-Way Switch - Engine B	lock Heater				
1 One-time Costs - Retrofit		2 Recurring Cost	<u>s (\$/yr)</u>		
Capital/Device	\$25.00	Ma	aintenance	\$5.00	
Installation	\$10.00	Suj	pport	\$0.00	
Other	\$0.00	Oth	her	\$0.00	
Total	\$35.00		Total	\$5.00	
3 <u>Net present Value Cost (1)</u>	<u>\$71.89</u>				
	Low	<u>High</u>			
4 Peak Reduction (kw/yr)	0.259	0.329			
5 Life-Cycle Peak reduction	2.59	3.29			
6 Cost of Electric Peak Reduct	ion (CEPR)				
(Rounded to \$)	\$28.00	\$22.00			
(1) Discount Rate/yr	7.5%				
Device Lifetime (yrs)	10				

LIFE-CYCLE COSTING WORKSHEET					
One-Way Switch - Engine Block Heater (incremental)					
1 One-time Costs - Retrofit		2 Recurring (Costs (\$/yr)		
Capital/Device	\$25.00		Maintenance	\$5.00	
Installation	\$10.00		Support	\$0.00	
Other	\$0.00		Other	\$0.00	
Total	\$35.00		Total	\$5.00	
3 <u>Net present Value Cost (1)</u>	<u>\$71.89</u>				
	Low	<u>High</u>			
4 Peak Reduction (kw/yr)	0.259	0.329			
5 Life-Cycle Peak reduction	2.59	3.29			
6 Cost of Electric Peak Reduct	ion (CEPR)				
(Rounded to \$)	\$28.00	\$22.00)		
(1) Discount Rate/yr	7.5%				
Device Lifetime (yrs)	10				

LIFE-C	YCLE COSTI	NG WORKS	HEET	
One-Way Switch - Lighting	(stand-alone)			
1 One-time Costs - Retrofit		2 Recurring	Costs (\$/yr)	
Capital/Device	\$100.00		Maintenance	\$5.00
Installation	\$100.00		Support	\$5.00
Switches (10)	\$100.00		Other	\$0.00
Total	\$300.00		Total	\$10.00
3 <u>Net present Value Cost (1)</u>	<u>\$362.97</u>			
	Low	<u>High</u>		
4 <u>Peak Reduction (kw/yr)</u>	0.92	1.38		
5 Life-Cycle Peak reduction	7.36	11.04		
6 Cost of Electric Peak Reduct	tion (CEPR)			
(Rounded to \$)	\$49.00	\$33.00		
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	8			

LIFE-C	YCLE COSTI	NG WORKSI	HEET	
One-Way Switch - Commer	cial Plug Loads	<u>.</u>		
1 One-time Costs - Retrofit		2 Recurring C	losts (\$/yr)	
Capital/Device	\$100.00		Maintenance	\$10.00
Installation	\$20.00		Support	\$0.00
Switches (5)	\$50.00		Other	\$0.00
Total	\$170.00		Total	\$10.00
3 <u>Net present Value Cost (1)</u>	<u>\$232.97</u>			
	Low	<u>High</u>		
4 <u>Peak Reduction (kw/yr)</u>	0.300	0.300		
5 Life-Cycle Peak reduction	2.40	2.40		
6 Cost of Electric Peak Reduct	tion (CEPR)			
(Rounded to \$)	\$97.00	\$97.00		
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	8			

LIFE-C	YCLE COSTI	NG WORKSHI	EET	
One-Way Switch - Commerce	cial Plug Loads	s (incremental)		
1 One-time Costs - Retrofit		2 Recurring Cos	<u>sts (\$/yr)</u>	
Capital/Device	\$0.00	Μ	laintenance	\$10.00
Installation	\$20.00	S	upport	\$0.00
Switches (10)	\$50.00	0	ther	\$0.00
Total	\$70.00		Total	\$10.00
3 <u>Net present Value Cost (1)</u>	<u>\$132.97</u>			
	Low	<u>High</u>		
4 Peak Reduction (kw/yr)	0.300	0.300		
5 Life-Cycle Peak reduction	2.40	2.40		
6 Cost of Electric Peak Reduct	tion (CEPR)			
(Rounded to \$)	\$55.00	\$55.00		
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	8			

LIFE-CYCLE COSTING WORKSHEET				
One-Way Switch - Commerci	al Elevators, H	VAC Fans and Pumps (Sta	and-alone)	
1 One-time Costs - Retrofit	2	Recurring Costs (\$/yr)		
Capital/Device	\$300.00	Maintenance	\$100.00	
Installation	\$250.00	Support	\$50.00	
Switches	\$100.00	Other	\$0.00	
Total	\$650.00	Total	\$150.00	
3 <u>Net present Value Cost (1)</u>	<u>\$1,594.49</u>			
	Low	<u>High</u>		
4 Peak Reduction (kw/yr)	5.250	5.250		
5 Life-Cycle Peak reduction	42.00	42.00		
6 Cost of Electric Peak Reduction	on (CEPR)			
(Rounded to \$)	\$38.00	\$38.00		
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	8			

LIFE-CYCLE COSTING WORKSHEET							
One-Way Switch - Commercial Elevators, HVAC Fans and Pumps (incremental)							
1 One-time Costs - Retrofit 2 Recurring Costs (\$/yr)							
Capital/Device	\$0.00		Maintenance	\$100.00			
Installation	\$250.00		Support	\$50.00			
Switches	\$100.00		Other	\$0.00			
Total	\$350.00		Total	\$150.00			
3 <u>Net present Value Cost (1)</u>	<u>\$1,294.49</u>						
	Low	<u>High</u>					
4 Peak Reduction (kw/yr)	5.250	5.250					
5 Life-Cycle Peak reduction	42.00	42.00					
6 Cost of Electric Peak Reduct	tion (CEPR)						
(Rounded to \$)	\$31.00	\$31.00					
(1) Discount Rate/yr	7.5%						
Device Lifetime (yrs)	8						

LIFE-CYCLE COSTING WORKSHEET								
One-Way Switch - Commercial Interruptible Loads - Refrigeration								
1 <u>One-time Costs - Retrofit</u> 2 <u>Recurring Costs (\$/yr)</u>								
Capital/Device	\$200.00		Maintenance	\$50.00				
Installation	\$100.00		Support	\$0.00				
Switches (5)	\$125.00		Other	\$0.00				
Total	\$425.00		Total	\$50.00				
3 <u>Net present Value Cost (1)</u>	<u>\$739.83</u>							
	Low	<u>High</u>						
4 Peak Reduction (kw/yr)	1.750	1.750	(10% of peak fo	or 5000 sf)				
5 Life-Cycle Peak reduction	14.00	14.00						
6 Cost of Electric Peak Reduct	tion (CEPR)							
(Rounded to \$)	\$53.00	\$53.0	0					
(1) Discount Rate/yr	7.5%							
Device Lifetime (yrs)	8							

LIFE-CYCLE COSTING WORKSHEET								
One-Way Switch - Commercial Interruptible Loads - Refrigeration (incremental)								
1 One-time Costs - Retrofit2 Recurring Costs (\$/yr)								
Capital/Device	\$0.00		Maintenance	\$50.00				
Installation	\$100.00		Support	\$0.00				
Switches (5)	\$125.00		Other	\$0.00				
Total	\$225.00		Total	\$50.00				
3 <u>Net present Value Cost (1)</u>	<u>\$539.83</u>							
	Low	<u>High</u>						
4 Peak Reduction (kw/yr)	1.750	1.750	(10% of peak fo	or 5000 sf)				
5 Life-Cycle Peak reduction	14.00	14.00						
6 Cost of Electric Peak Reduct	ion (CEPR)							
(Rounded to \$)	\$39.00	\$39.0	00					
(1) Discount Rate/yr	7.5%							
Device Lifetime (yrs)	8							

LIFE-C	YCLE COSTI	NG WORKS	SHEET	
Electric Thermal Storage - H	Room Unit Hea	ting System	- Commercial	
1 One-time Costs		2 Recurring	Costs (\$/yr)	
Capital/Device	\$1,000.00		Maintenance	\$50.00
Installation	\$150.00		Support	\$0.00
Other (Meter)	\$0.00		Other	\$0.00
Total	\$1,150.00		Total	\$50.00
3 <u>Net present Value Cost (1)</u>	\$1,624			
	Low	<u>High</u>		
4 <u>Peak Reduction (kw/yr)</u>	0.73	0.76	(95% of Peak period 2)	
5 Life-Cycle Peak reduction	10.95	11.40		
6 Cost of Electric Peak Reduct	ion (CEPR)			
(Rounded to \$)	\$148	\$142		
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	15			

LIFE-C	YCLE COSTI	NG WORKS	SHEET	
One-Way Switch - Hotel Ele	ctric Heating			
1 One-time Costs - Retrofit		2 Recurring	Costs (\$/yr)	
Capital/Device	\$1,000.00		Maintenance	\$200.00
Installation	\$250.00		Support	\$0.00
Switches (10)	\$500.00		Other	\$0.00
Total	\$1,750.00		Total	\$200.00
3 <u>Net present Value Cost (1)</u>	<u>\$3,225.78</u>			
	Low	<u>High</u>		
4 Peak Reduction (kw/yr)	6.20	6.40	10 rooms @509	% Cycling
5 Life-Cycle Peak reduction	62.00	64.00		
6 Cost of Electric Peak Reduct	tion (CEPR)			
(Rounded to \$)	\$52.00	\$50.0	0	
(1) Discount Rate/yr	7.5%			
Device Lifetime (yrs)	10			

LIFE-CYCLE COSTING WORKSHEET							
One-Way Switch - Hotel Electric Heating (incremental)							
1 One-time Costs - Retrofit		2 Recurring	Costs (\$/yr)				
Capital/Device	\$200.00		Maintenance	\$200.00			
Installation	\$250.00		Support	\$0.00			
Switches (10)	\$500.00		Other	\$0.00			
Total	\$950.00		Total	\$200.00			
3 <u>Net present Value Cost (1)</u>	<u>\$2,425.78</u>						
	Low	<u>High</u>					
4 <u>Peak Reduction (kw/yr)</u>	6.20	6.40	10 rooms @50%	% Cycling			
5 Life-Cycle Peak reduction	62.00	64.00					
6 Cost of Electric Peak Reduct	ion (CEPR)						
(Rounded to \$)	\$39.00	\$38.0	0				
(1) Discount Rate/yr	7.5%						
Device Lifetime (yrs)	10						

The following worksheets calculate the counts by end use for per-unit cost calculations and supply curve development.

Wate	r Heat Load Control	
Segm	ents:	kW Totals
	restaurant	383
	Small/Med Hotel	495
	Health	42
	Long-term Care	337
	Other Hotel/Motel	495
	Total	1,752
		80% reduction
		1,402 kW
		0.41 kW/reduction (from life cycle analysis)
		3,418 units reduced

Lighting Control

Segments:		kW Totals
	General Lighting	81,621
	Arch Lighting	26,122
	Total	107,743
		10% reduction
		10,774 kW
		0.234 kW/reduction (from life cycle analysis)
		46,044 units reduced

Plug Load Control

Segments:			kW Totals	
	All Plugs		19,142	
		Total	19,142	
			25%	reduction
			4,785	kW
			0.3	kW/reduction (from life cycle analysis)
			15,951	units reduced

Refrigeration

Segments:	Retail Food		kW Totals 13,086	
		Total	1,309 1.75	reduction kW kW/reduction (from life cycle analysis) units reduced

HVAC Fans & Elevators Segments: kW Totals Large Office Elevators 736 Large Office HVAC 12,016 Total 12,752 25% reduction 3,188 kW 5.25 kW/reduction (from life cycle analysis) 607 units reduced

Hotel Switch Control	
Segments:	kW Totals
Large Hotel Space Heat	835
Other Hotel Sp Heat	1,073
Total	1,908
	50% reduction
	954 kW
	6.3 kW/reduction (from life cycle analysis)
	151 units reduced

Hotel & 10% Restaurant/Ofice Thermal Storage

Segments:		kV	V Totals	
	Large Hotel Space Heat		835	
	Other Hotel Sp Heat		1,073	
	Restaurant	10%	131	
	Other Office	10%	492	
	Total		2,531	
			95%	reduction
			2,404	kW
			0.745	kW/reduction (from life cycle analysis)
			3,227	units reduced

Appendix H

Background-Section 10: Achievable Potential - Electric Energy Forecast

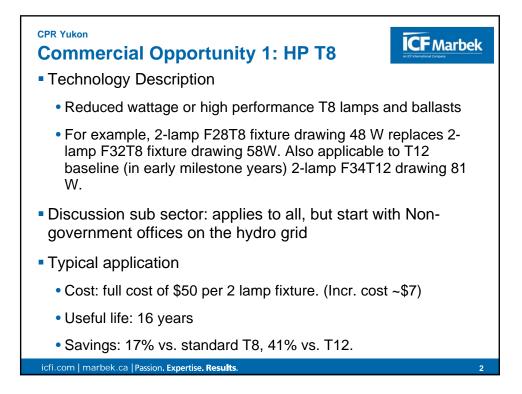
Introduction

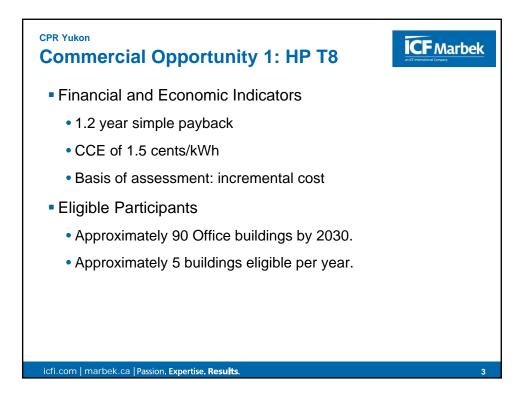
Appendix H provides additional detailed information related to the generation of the Commercial sector Achievable Potential forecasts, including background material provided to achievable workshop participants. The appendix includes the following:

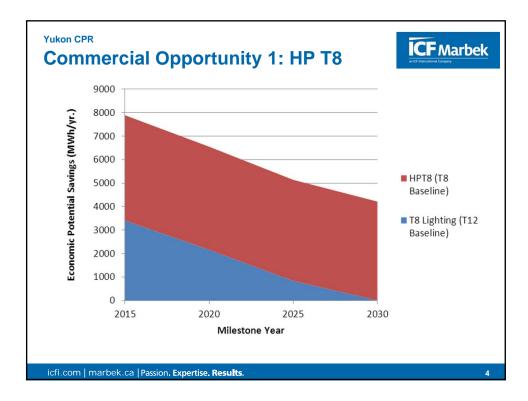
- Commercial achievable workshop action profile slides
- Commercial achievable workshop measure worksheets
- Detailed upper and lower achievable potential results.

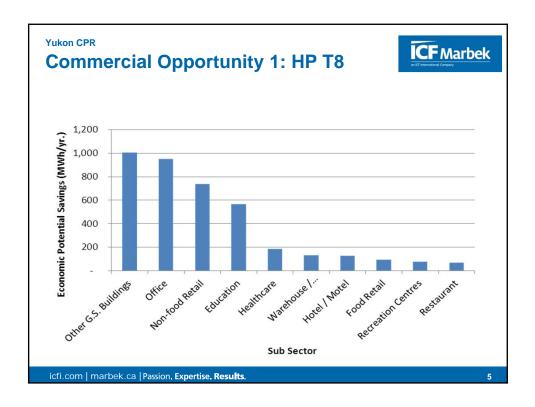
H1 Achievable Workshop Action Profile Slides

CPR Yukon Commercial Opportunity 1: HP T8 Fixtures - Related Technologies				
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)	
Occupancy Controls	629	0.6%	6.4	
HPT8 (T8 Retrofit)	4,212	3.9%	13.8	
HP to redesign increment	135	0.1%	-1.6	
Dimming Controls (Daylighting)	1,163	1.1%	24.1	
Total	6,139	5.7%		
icfi.com marbek.ca Passion, Expertise, Results	5.		1	

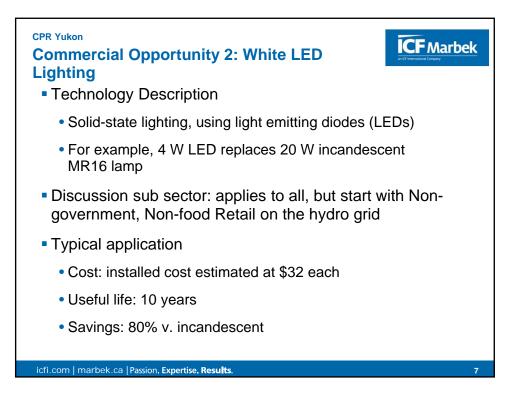


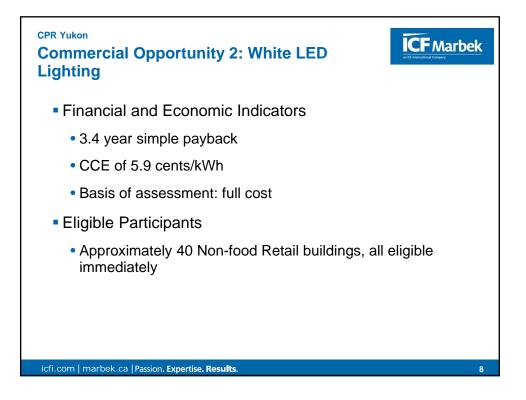


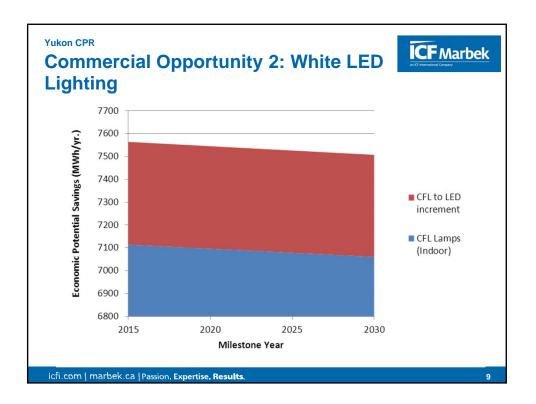


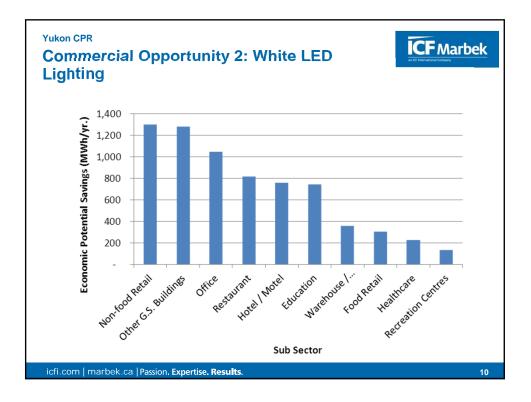


CPR Yukon Commercial Opportunity 2: White LED Lighting – Related Technologies				
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)	
CFL Lamps (Indoor)	7,061	6.6%	4.0	
CFL to LED increment	447	0.4%	2.4	
CFL Lamps (Outdoor)	579	0.5%	3.9	
Total	8,086	7.5%		
icfi.com marbek.ca Passion . Expertise. Results			6	

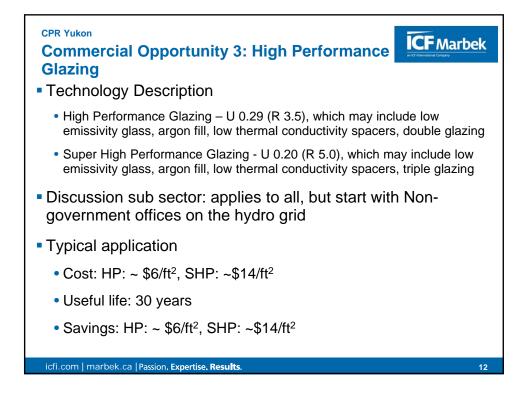


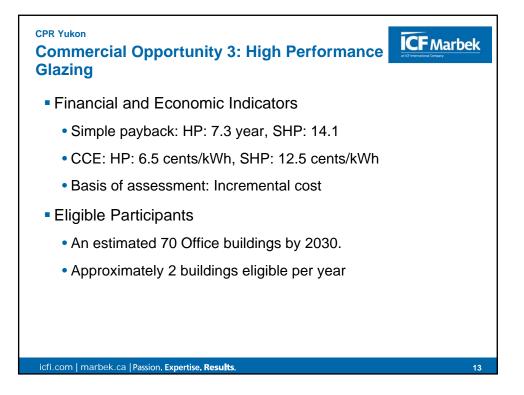


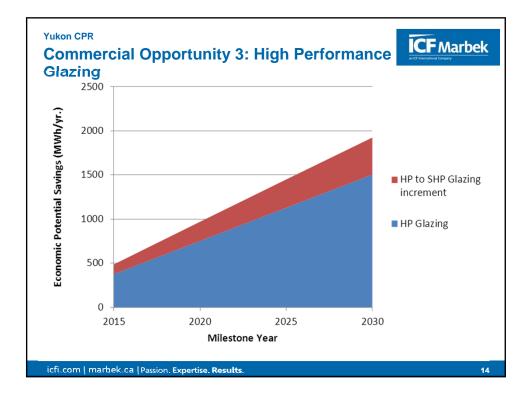


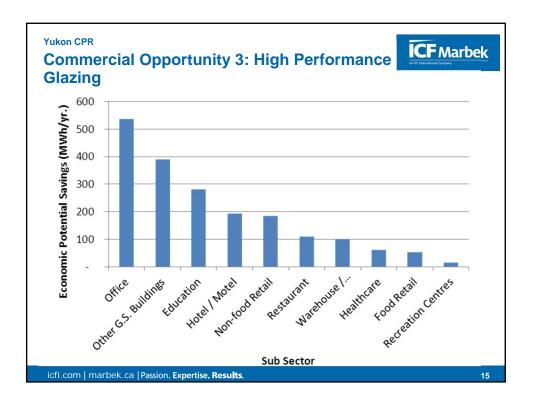


CPR Yukon Commercial Opportunity 3: High Performance Glazing - Related Technologies				
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)	
Roof Insulation	859	0.8%	6.0	
Wall Insulation	1,306	1.2%	7.2	
HP Glazing	1,505	1.4%	6.5	
HP to SHP Glazing increment	420	0.4%	6.0	
Total	4,090	3.8%		
icfi.com marbek.ca Passion, Expertise, Results			11	

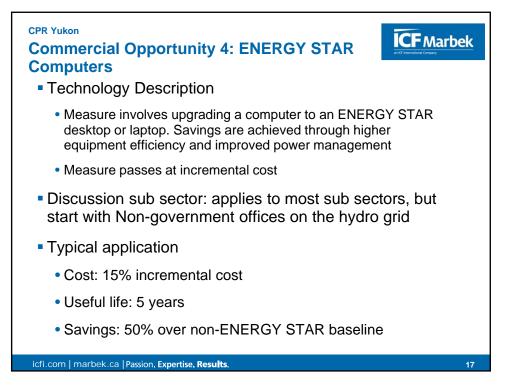


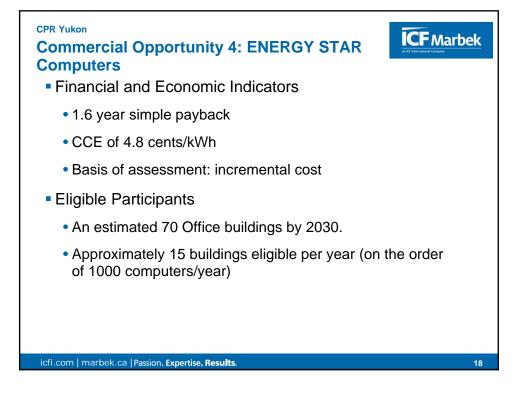


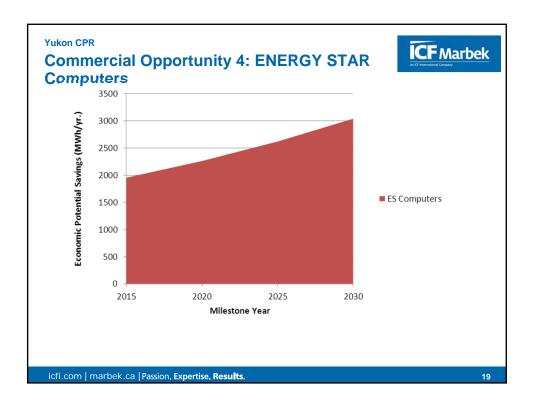


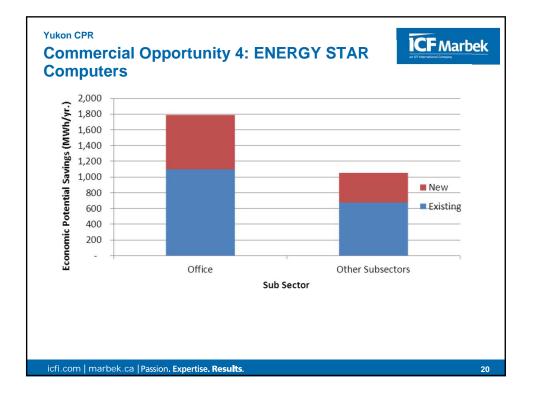


CPR Yukon Commercial Opportunity 4: ENERGY STAR Computers - Related Technologies				
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)	
ES Computers	3,042	2.8%	4.8	
ES Office Equipment	376	0.4%	8.2	
ES Servers	454	0.4%	6.7	
ES Fridges, Freezers	759	0.7%	7.5	
Total	4,631	4.3%		
icfi.com marbek.ca Passion, Expertise, Results,			16	

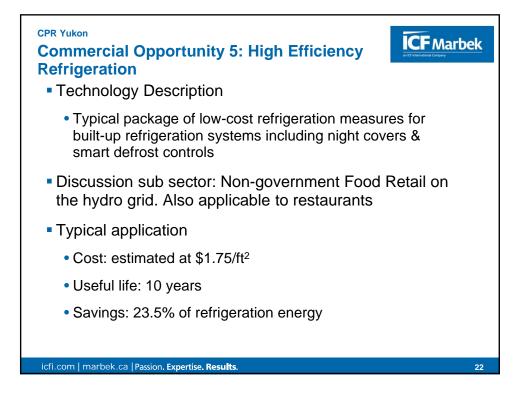


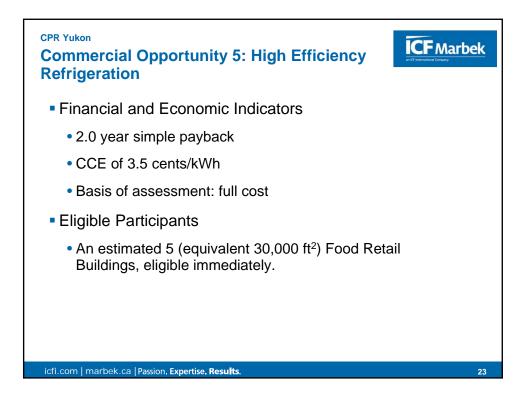


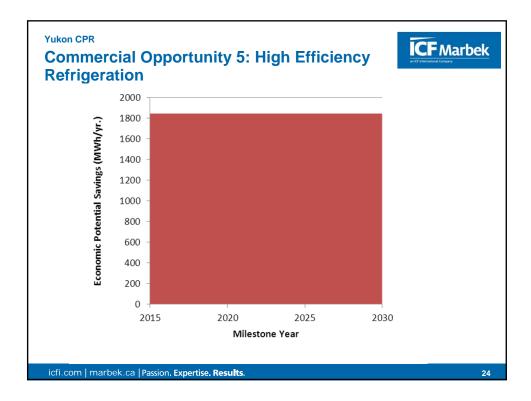


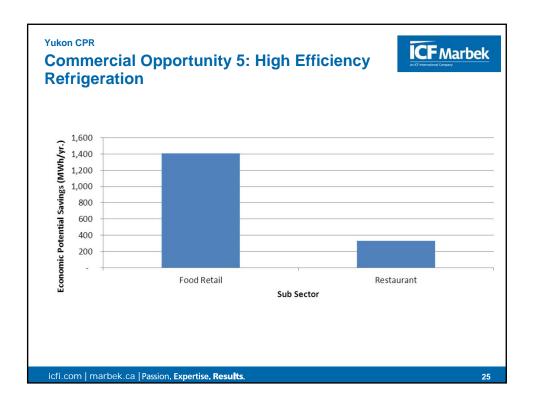


CPR Yukon Commercial Opportunity 5: High Efficiency Refrigeration				
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)	
HE Refrigeration - Full Cost	1,846	1.7%	5.0	
HE Refrigeration - Incr. Cost	2,553	2.4%	6.2	
Ref. Plant Ctrls	58	0.1%	9.4	
Total	4,457	4.2%		
icfi.com marbek.ca Passion . Expertise. Results .			21	

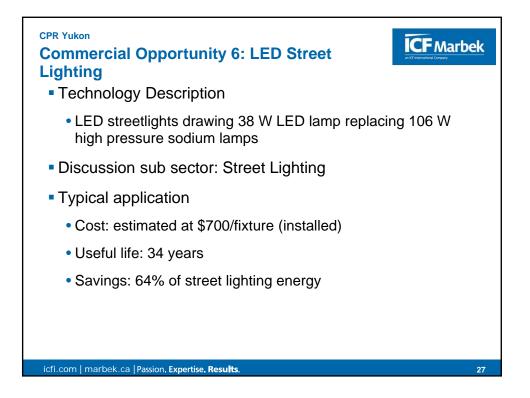




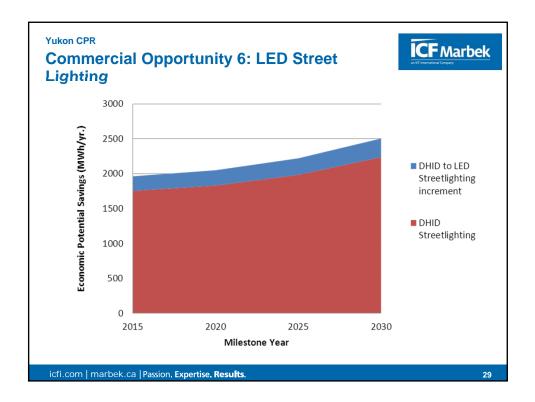




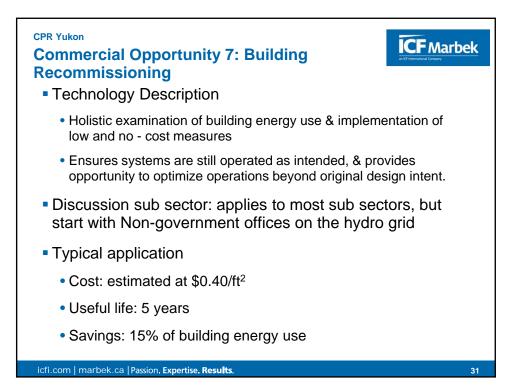
CPR Yukon Commercial Opportunity 6: LED Street Lighting					
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)		
DHID Streetlighting	2,238	2.1%	10.1		
Pulse-start MH (Outdoor)	788	0.7%	3.9		
Induction (Outdoor)	60	0.1%	25.2		
DHID to LED Streetlighting	267	0.2%	5.5		
Total	3,353	3.1%			
icfi.com marbek.ca Passion. Expertise. Results				26	

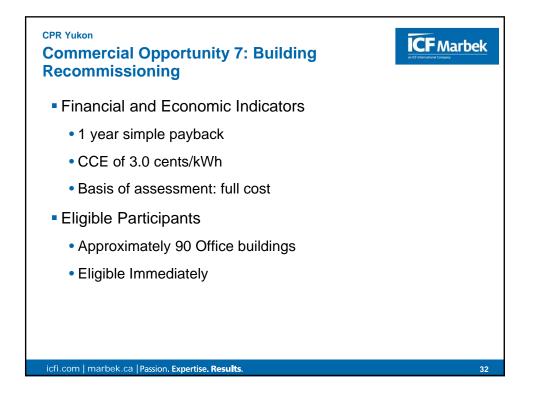


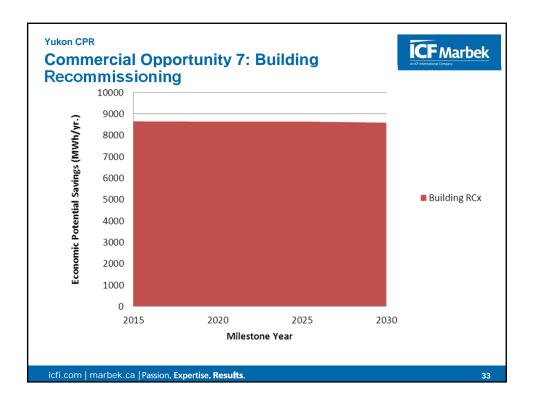


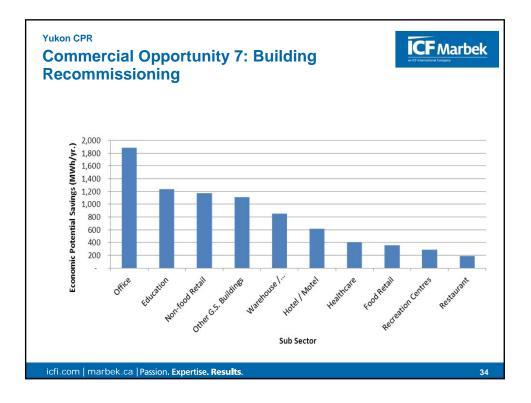


CPR Yukon Commercial Opportunity 7 Recommissioning	Commercial Opportunity 7: Building												
Measures	Economic Potential Savings (MWh/yr.)	% of Total Economic Potential	Weighted Average CCE (c/kWh)										
Air Sealing	815	0.8%	3.5										
Programmable Tstat	927	0.9%	9.5										
Tank Insulation	101	0.1%	3.8										
Building RCx	8,588	8.0%	5.1										
DC Ventilation	464	0.4%	5.1										
Low Flow Showerheads	245	0.2%	7.3										
Low Flow Pre Rinse Spray Valve	118	0.1%	2.5										
Low Flow Faucets	1,126	1.1%	0.4	_									
Total	12,385	11.6%		-									
				-									
icfi.com marbek.ca Passion, Expertise, Results.				30									





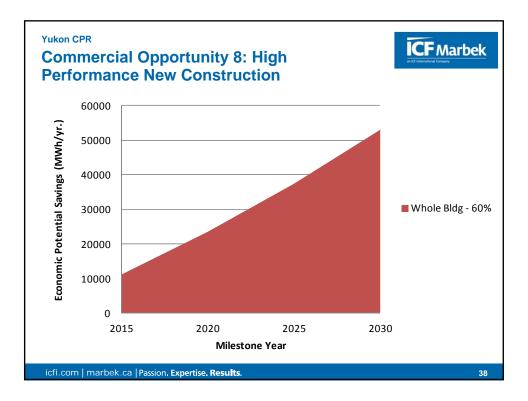


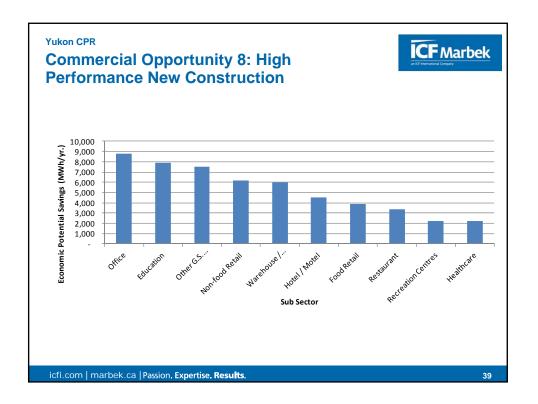


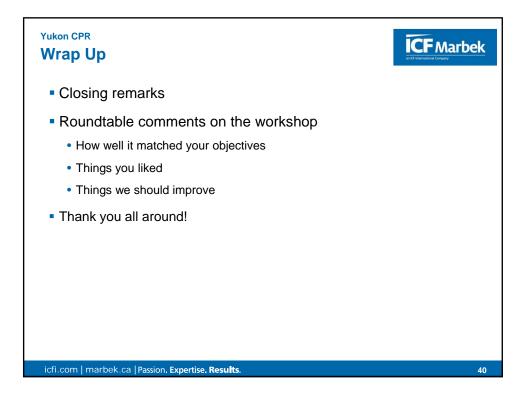
Measures	Economic Potential Savings	% of Total Economic Potential	Weighted Average CCE
Whole Bldg - 60%	(MWh/yr.) 53,008	49.5%	(c/kWh) 17.9
Total	53,008	49.5%	11.0











H2 Achievable Workshop Measure Worksheets

Commercial Sector C1 -- High Performance T8s

Sub	Sector for Discussion: RW T8	> Large Office > Existi	ing > Hydro			
Measure information	CCE (¢/kWh)	1.5	Increi	nental Cost		
	Approx. Payback (years)	1				
Approximate Economic Savin Potential (MWh/yr) in 2015	gs	7,900	Includes	T12 -> RW T8		
Approximate Economic Saving Potential (MWh/yr) in 2030	gs	4,200				
	Total ft ² (approx.)	1,360,000	(Incl. Gov	Gov't & Non-Gov't)		
Market Size	Total # of sites	90	Ea. 15.00	00 ft ² buildings		
	% eligible	95%		can't" + current		
	# eligible sites/yr.	5				
	# eligible sites by 2030	90				
Participation Rates, by Year	(% of Eligible Sites)	2015	2030	Curve		
НР Т8	Low		50%	Curve A/B		
HF IO	High		95%	Curve A/B		
	Achievable Poten	tial (# Buildings)				
НР Т8	Low	0	3			
-	High	0	5			
Participation Rates fo	r Other Regions / Subsectors	(H=higher; L=lower; S	S=same; N/A=n			
Office		Government		a bit higher or same		
Food Retail	higher					
Non-Food Retail	same	Diesel Grids		lower		
Hotel / Motel	same					
Education	higher	Standard T8 (T12 ba	iseline)			
Restaurant	lower					
Recreation Centres	same					
Warehouse / Wholesale	same					

Commercial Sector C2 -- White LEDs

Sub Secto	or for Discussion: White LEDs >				
Measure information	CCE (¢/kWh)	5.9	Fu	ull Cost	
	Approx. Payback (years)	3			
Approximate Economic Savings Potential (MWh/yr) in 2015		7,600	Includes Incandescent & baseline		
Approximate Economic Savings Potential (MWh/yr) in 2030		7,500			
	Total ft ² (approx.)	912,000			
Market Size	Total # of sites	50	Ea. 20.00	0 ft ² buildings	
	% eligible	95%		can't" + current	
	# eligible sites/yr.	40			
	# eligible sites by 2030	40			
Participation Rates, by Year (%	of Eligible Sites)	2015	2030	Curve	
White LEDs	Low		50%	Curve B	
	High		80%	Curve A/B	
	Achievable Potenti	ial (# Buildings)			
White LEDs	Low	0	20		
	High	0	32		
Participation Rate	es for Other Subsectors (H=hig	her; L=lower; S=sam	e; N/A=not appli	cable)	
Office	tors a bit lower than the bi	ig Government			
Food Retail					
Non-Food Retail		Diesel Grids		a bit lower	
Hotel / Motel					
Education		CFL Lamps (Incand	escent B aselinae) y	everyone who d	
Restaurant					
Recreation Centres					

Commercial Sector C3 -- HP Glazing

	CCE (¢/kWh)	6.0, 12.5	HP/SHP, Incremental Cost				
Measure information	Approx. Payback (years)	7.3, 14.1	HP/SHP				
Approximate Economic Savings Potential (MWh/yr) in 2015		500					
Approximate Economic Savings Potential (MWh/yr) in 2030		2,000					
	Total ft ² (approx.)	151,111	(Incl. Gov	't & Non-Gov't)			
Market Size	Total # of sites	10	Eq. 15,000 ft ² building				
	% eligible	80%	Exclude "d	can't" + current			
	# eligible sites/yr.	1					
	# eligible sites by 2030	8					
Participation Rates, by Year (% o	f Eligible Sites)	2015	2030	Curve			
SHP Glazing	Low		20%	Curve irrelevan			
Shir Glazing	High		70%	Curve A			
	Achievable Pote	ntial (# Sites)					
SHP Glazing	Low		1				
	High		2				
Remaining	Low		2				
	High		1				
HP Glazing	Low		0				
	High		0				
Total	Low	0	1				
	High	0	2				
	for Other Subsectors (H=hig		ne; N/A=not appli	cable)			
Office		Government		same			
Food Retail							
Non-Food Retail		Diesel Grids		n/a			
Hotel / Motel							
Education		Roof insulation					
Restaurant		Wall insulation					
Recreation Centres							
Warehouse / Wholesale							

Commercial Sector C4 -- ENERGY STAR Computers

	CCE (¢/kWh)	4.8	Incremental Co	st		
Measure information	Approx. Payback (years)	1.6				
Approximate Economic Savings Potential (MWh/yr) in 2015		2,000				
Approximate Economic Savings Potential (MWh/yr) in 2030		3,000				
	Total ft ² (approx.)	1,364,000	(Incl. Gov't & Non-Gov't)			
Market Size	Total # of sites	90	Eq. 15,000 ft ² buildings			
	% eligible	75%	Exclude "	can't" + current		
	# eligible sites/yr.	14	Approx 100	0 machines/year		
	# eligible sites by 2030	70				
Participation Rates, by Year (%	of Eligible Sites)	2015	2030	Curve		
ENERGY STAR Computers	Low		25%	Curve B		
ENERGY STAR Computers	High		50%	Curve A		
	Achievable Potent	ial (# Buildings)				
ENERGY STAR Computers	Low	0	4			
	High	0	7			
Participation Rate	s for Other Subsectors (H=hig	her; L=lower; S=sa	me; N/A=not appli	icable)		
Office		Government		D 100% 2010		
Food Retail						
Non-Food Retail		Diesel Grids				
Hotel / Motel						
Education		ENERGY STAR Off	ice Equip.			
Restaurant		ENERGY STAR Ser	vers			
Recreation Centres		ENERGY STAR Frid	dges/Freezers			
Warehouse / Wholesale						

Commercial Sector C5 -- HE Refrigeration - Full Cost Measures

Eq. 105,0	Full Cost 2000 ft ² buildings 'can't" + current
Exclude "	'can't" + current
2030	
2030	
2030	
	Curve
100%	Curve D by 2020
100%	Curve D by 2015
5	
5	
; N/A=not appl	licable)
	higher
cremental Cost	t
-	cremental Cost

Commercial Sector C6 -- LED Streetlighting

3	Sub Sector for Discussion: LEI			
Measure information	CCE (¢/kWh)	15.6	Ful	l Cost
	Approx. Payback (years)	18.0		
Approximate Economic Savings				
Potential (MWh/yr) in 2015		2,500		
Approximate Economic Savings		2 500		
Potential (MWh/yr) in 2030		2,500		
	Total ft ² (approx.)	n/a		
Market Size	Total # of sites	5,700		
	% eligible	100%		
	# eligible sites	5,700		
	# eligible sites by 2030	5,700		
Participation Rates, by Year (% c	of Eligible Sites)	2015	2030	Curve
ED Street Lighting	Low		100%	Curve B
	High		100%	Curve B
	Achievable Poten	itial (# Lamps)		
LED Street Lighting	Low	0	5,700	
	High	0	5,700	
Participation Rates	for Other Subsectors (H=hig	her; L=lower; S=sam	e; N/A=not applic	able)
Office		Government		
Food Retail				
Non-Food Retail		Diesel Grids		same
Hotel / Motel				
Education		DHID		
Restaurant		Pulse Start MH (Ou	itdoor)	
Recreation Centres				
Warehouse / Wholesale				

Commercial Sector C7 -- Recommissioning

5	ub Sector for Discussion: RCx		-	
Measure information	CCE (¢/kWh)	3.0	Fu	ll Cost
	Approx. Payback (years)	1.0		
Approximate Economic Savings		0.000		
Potential (MWh/yr) in 2015		8,600		
Approximate Economic Savings		0.000		
Potential (MWh/yr) in 2030		8,600		
	Total ft ² (approx.)	1,364,000		
Market Size	Total # of sites	90	Eq. 15,000	Oft ² buildings
	% eligible	33%	Exclude "ca	an't" + current
	# eligible sites	30		
	# eligible sites by 2030	30		
Participation Rates, by Year (%		2015	2030	Curve
RCx	Low		40%	Curve B
ncx	High		80%	Curve B
	Achievable Potent	ial (# Buildings)		
RCx	Low	0	12	
ncx	High	0	24	
Total	Static	0	12	
	Aggressive	0	24	
Participation Rate	es for Other Measures (H=hig	her; L=lower; S=same;	N/A=not applic	able)
Office		Government		slower
Food Retail	same			
Non-Food Retail	same	Diesel Grids		
Hotel / Motel	same			
Education	same	Programmable T'Stat	ts	
Restaurant	same	Air Sealing		
Recreation Centres	higher	Low Flow Fixtures		
Warehouse / Wholesale	same			

Commercial Sector C8 -- Advanced New Construction Measures

505 50	ector for Discussion: New Con			
Measure information	CCE (¢/kWh)	4.0/7.6/16.8	25%/4	0%/60%
	Approx. Payback (years)	4.9/9.2/20.5		
Approximate Economic				
Savings Potential (MWh/yr)		10,000		
in 2015				
Approximate Economic				
Savings Potential (MWh/yr)		53,000		
in 2030			- / -	
Market Size	Total # of sites (estimated)	380	Eq. 15,000 ft ² bu	ildings
	% eligible	100%		
	# eligible sites per year	19		
	# eligible sites by 2030	380		
Participation Rates, by Year	(% of Eligible Sites)	2015	2030	Curve
60% Better	Low		45%	Curve B
	High		95%	Curve B
Remaining	Low	19	10	
	High	19	1	
40% Better	Low		54%	
	High		100%	
Remaining	Low	19	5	
including	High	19	0	
25% Better	Low		100%	
	High			
	Achievable Potent	ial (# Buildings)		
60% Better	Static	0	9	
	Aggressive	0	18	
40% Better	Static	0	6	
	Aggressive	0	1	
25% Better	Static	0	5	
	Aggressive	0	0	
Total	Static	0	19	
Total	Aggressive	0	19	
Participation Rates for	r Other Subsectors/Regions (H	H=higher; L=lowe	r; S=same; N/A=no	t applicable)
Office		Government		
Food Retail				
Non-Food Retail		Diesel Grids		
Hotel / Motel				
Education				
Restaurant				
Recreation Centres				
Warehouse / Wholesale				

H3 Detailed Achievable Potential Results

Exhibit H 1 and Exhibit H 2 provide detailed results for the hydro grid for the upper and lower Achievable Potential scenarios respectively.

							-	-	-						•		-	
Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Office											·	-						
2015	304	433	-	68	212	6	39	42	706	6	-	1	-	-	-	-	-	1,819
2020	717	779	-	147	770	34	178	99	946	17	-	7	-	-	-	-	-	3,695
2025	1,235	1,052	-	243	1,770	100	448	179	1,250	35	-	11	-	-	-	-	-	6,323
2030	1,987	1,279	-	366	3,325	224	890	295	1,631	62	-	17	-	-	-	-	-	10,076
Food Retail																		
2015	33	133	35	32	18	0	7	10	10	-	0	1,572	-	-	-	-	-	1,850
2020	76	239	103	68	74	2	33	24	23	-	2	2,102	-	-	-	-	-	2,748
2025	129	324	213	111	187	6	85	43	40	-	4	2,900	-	-	-	-	-	4,042
2030	204	396	374	164	375	14	171	72	63	-	6	3,577	-	-	-	-	-	5,416
Non-food Retail																		
2015	239	567	31	95	69	2	20	15	35	-	-	4	-	-	-	-	-	1,077
2020	560	1,013	92	208	294	10	94	37	69	-	-	17	-	-	-	-	-	2,393
2025	952	1,351	193	354	741	30	242	69	114	-	-	29	-	-	-	-	-	4,076
2030	1,511	1,611	344	552	1,493	67	493	119	173	-	-	44	-	-	-	-	-	6,407
Hotel / Motel																		
2015	42	315	-	31	67	1	14	68	16	1	-	5	-	-	-	-	-	560
2020	98	566	-	67	276	8	61	184	37	3	-	23	-	-	-	-	-	1,322
2025	167	764	-	111	675	22	152	398	64	5	-	39	-	-	-	-	-	2,397
2030	266	929	-	167	1,325	47	298	770	99	10	-	58	-	-	-	-	-	3,969
Healthcare																		
2015	53	93	-	21	22	0	17	7	91	1	0	1	-	-	-	-	-	308
2020	128	166	-	44	100	2	79	20	107	3	2	4	-	-	-	-	-	655
2025	226	221	-	72	263	6	202	43	126	6	3	6	-	-	-	-	-	1,175
2030	367	262	-	108	550	14	405	82	149	11	5	10	-	-	-	-	-	1,962

Exhibit H 1 Total Upper Achievable Potential Electricity Savings by End Use, Sub Sector and Milestone Year (MWh/yr.) – Hydro Grid

Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Education																		
2015	177	307	18	45	119	0	22	98	383	3	2	5	-	-	-	-	-	1,179
2020	423	547	55	99	481	2	98	226	457	8	9	19	-	-	-	-	-	2,424
2025	740	728	117	164	1,230	7	249	406	545	17	15	31	-	-	-	-	-	4,249
2030	1,206	864	211	248	2,547	16	498	665	651	31	23	45	-	-	-	-	-	7,004
Recreation Centres																		
2015	25	56	60	63	8	0	10	14	2	-	-	144	-	-	-	-	-	382
2020	58	100	179	135	35	0	26	36	4	-	-	311	-	-	-	-	-	883
2025	97	132	366	222	95	0	50	71	6	-	-	523	-	-	-	-	-	1,564
2030	150	156	637	328	209	1	86	127	10	-	-	808	-	-	-	-	-	2,512
Restaurant																		
2015	16	339	-	60	53	1	17	35	6	-	3	337	-	-	-	-	-	867
2020	44	609	-	129	167	4	49	95	13	-	15	472	-	-	-	-	-	1,598
2025	85	820	-	212	361	10	104	208	24	-	26	683	-	-	-	-	-	2,534
2030	149	994	-	317	654	22	195	409	37	-	40	909	-	-	-	-	-	3,726
Warehouse / Wholesale																		
2015	42	148	197	72	71	0	23	13	81	2	-	0	-	-	-	-	-	650
2020	99	267	589	156	241	0	62	32	127	5	-	1	-	-	-	-	-	1,581
2025	170	361	1,234	259	603	1	124	66	187	11	-	2	-	-	-	-	-	3,016
2030	270	440	2,201	390	1,272	2	218	123	263	19	-	3	-	-	-	-	-	5,201
Other General Service																		
2015	288	530	20	94	160	7	60	30	441	-	1	3	-	-	-	-	-	1,634
2020	689	963	61	207	519	14	170	71	578	-	4	15	-	-	-	-	-	3,291
2025	1,199	1,313	129	350	1,178	21	361	129	749	-	7	25	-	-	-	-	-	5,461
2030	1,934	1,611	231	540	2,261	27	670	215	960	-	11	38	-	-	-	-	-	8,498

Street Lighting Architectural Lighting Architectural Lighting Architectural Lighting Outdoor Lighting Space Heating Space Heating Space Heating Space Heating Outdoor Lighting Outdoor Loghting Outdoor Loghting Outdoor Loghting Pumps Water Heating Computer Equipment Cooking Equipment Cooking Equipment Refrigeration Refrigeration Miscellaneous Non Buildings Non Buildings	Block Heater	Grand Total
Non-Buildings		
2015		-
2020		-
2025		-
2030		-
Street lighting		
2015 1	45 -	145
2020 5	92 -	592
2025	87 -	1,387
2030 2,	520 -	2,620
Parking Lot Plug		
2015	- 10	10
2020	- 25	25
2025	- 47	47
2030	- 82	82
Grand Total		
2015 1,219 2,922 362 581 800 20 229 332 1,770 13 7 2,072 1	45 10	10,481
2020 2,892 5,251 1,080 1,261 2,957 78 848 823 2,361 36 32 2,971 5	92 25	21,207
2025 5,000 7,067 2,253 2,099 7,102 204 2,016 1,612 3,105 74 56 4,251 1,	87 47	36,271
2030 8,044 8,542 3,999 3,179 14,012 433 3,926 2,876 4,035 132 84 5,508 2,4	20 82	57,472

					•••••					,					(<i>,</i>	<i>y</i> a. e. e.	
Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Office			-			-			-			-	•		-		-	
2015	162	422	-	49	91	4	21	22	615	3	-	0	-	-	-	-	-	1,390
2020	399	747	-	102	383	22	101	53	765	9	-	2	-	-	-	-	-	2,583
2025	727	988	-	165	975	68	267	101	985	18	-	4	-	-	-	-	-	4,299
2030	1,234	1,165	-	246	1,993	157	556	176	1,299	33	-	9	-	-	-	-	-	6,868
Food Retail																		-
2015	18	129	19	23	8	0	4	5	1	-	0	1,017	-	-	-	-	-	1,224
2020	42	229	57	47	40	1	19	13	6	-	1	2,386	-	-	-	-	-	2,842
2025	76	304	123	75	111	4	51	25	15	-	1	3,157	-	-	-	-	-	3,943
2030	126	361	226	109	240	10	108	44	32	-	2	3,681	-	-	-	-	-	4,938
Non-food Retail																		-
2015	128	552	16	68	33	1	11	8	14	-	-	0	-	-	-	-	-	831
2020	310	973	51	145	160	7	54	20	27	-	-	4	-	-	-	-	-	1,751
2025	555	1,274	113	243	443	20	149	40	52	-	-	11	-	-	-	-	-	2,900
2030	928	1,479	210	378	959	47	317	74	95	-	-	22	-	-	-	-	-	4,510
Hotel / Motel																		-
2015	22	306	-	22	32	1	7	34	2	1	-	1	-	-	-	-	-	428
2020	54	542	-	47	147	5	34	105	9	1	-	6	-	-	-	-	-	950
2025	98	717	-	75	393	14	90	252	24	3	-	14	-	-	-	-	-	1,680
2030	164	845	-	112	830	32	184	522	49	5	-	29	-	-	-	-	-	2,773
Healthcare																		-
2015	28	91	-	15	11	0	9	4	90	1	0	0	-	-	-	-	-	249
2020	71	160	-	31	58	1	45	11	105	2	1	1	-	-	-	-	-	486
2025	132	209	-	49	166	4	122	27	123	3	1	2	-	-	-	-	-	839
2030	227	241	-	72	369	10	256	55	145	6	1	5	-	-	-	-	-	1,386

Exhibit H-2 Total Lower Achievable Potential Electricity Savings by End Use, Sub Sector and Milestone Year (MWh/yr.) – Hydro Grid

Sub Sector / Milestone Year	General Lighting	Architectural Lighting	High-bay Lighting	Outdoor Lighting	Space Heating	Space Cooling	HVAC Fans and Pumps	Water Heating	Computer Equipment	Other Plug Loads	Cooking Equipment	Refrigeration	Elevators	Miscellaneous	Non Buildings	Street Lighting	Block Heater	Grand Total
Education																		-
2015	95	299	10	32	55	0	12	50	380	2	1	1	-	-	-	-	-	935
2020	236	526	31	68	267	2	56	120	450	4	2	5	-	-	-	-	-	1,767
2025	437	687	69	110	760	5	149	227	536	9	4	12	-	-	-	-	-	3,005
2030	751	794	131	166	1,689	11	313	391	639	16	6	23	-	-	-	-	-	4,931
Recreation Centres																		-
2015	13	54	32	45	5	0	5	7	0	-	-	47	-	-	-	-	-	209
2020	32	96	98	93	22	0	14	20	1	-	-	113	-	-	-	-	-	488
2025	55	124	209	150	65	0	28	43	3	-	-	215	-	-	-	-	-	892
2030	90	143	379	219	149	0	51	83	5	-	-	375	-	-	-	-	-	1,495
Restaurant																		-
2015	9	330	-	44	25	1	9	18	1	-	1	216	-	-	-	-	-	654
2020	25	584	-	90	85	3	28	56	4	-	4	517	-	-	-	-	-	1,396
2025	51	770	-	145	199	7	63	135	9	-	8	711	-	-	-	-	-	2,096
2030	94	906	-	214	387	16	124	281	19	-	12	885	-	-	-	-	-	2,938
Warehouse / Wholesale																		-
2015	23	144	105	52	33	0	12	7	57	1	-	0	-	-	-	-	-	433
2020	55	256	328	108	136	0	33	18	79	3	-	0	-	-	-	-	-	1,017
2025	99	339	720	175	386	1	71	41	116	6	-	1	-	-	-	-	-	1,954
2030	167	400	1,344	262	875	1	133	80	175	10	-	2	-	-	-	-	-	3,449
Other General Service																		-
2015	153	513	11	68	79	4	31	15	389	-	0	0	-	-	-	-	-	1,265
2020	380	913	34	144	281	7	95	38	476	-	1	4	-	-	-	-	-	2,373
2025	694	1,214	75	238	690	10	217	73	601	-	2	10	-	-	-	-	-	3,824
2030	1,176	1,437	139	364	1,414	14	426	128	777	-	3	19	-	-	-	-	-	5,897

Non-Buildings 2015 -	Grand Total
2020	-
	-
2025	-
	-
2030	-
Street lighting	-
2015 145 -	145
2020 592 -	592
2025 1,387 -	1,387
2030 2,620 -	2,620
Parking Lot Plug	-
2015 5	5
2020 13	13
2025 25	25
2030 43	43
Grand Total	-
2015 651 2,841 193 417 372 11 121 170 1,551 7 2 1,282 145 5	7,768
2020 1,604 5,025 600 874 1,579 48 480 454 1,923 19 9 3,038 592 13	16,258
2025 2,924 6,626 1,308 1,426 4,188 135 1,207 962 2,464 39 16 4,137 1,387 25	26,843
2030 4,957 7,772 2,430 2,143 8,905 298 2,467 1,835 3,236 70 24 5,048 2,620 43	41,849