Ontario Energy Board DSM Mid-Term Review Stakeholder Meeting

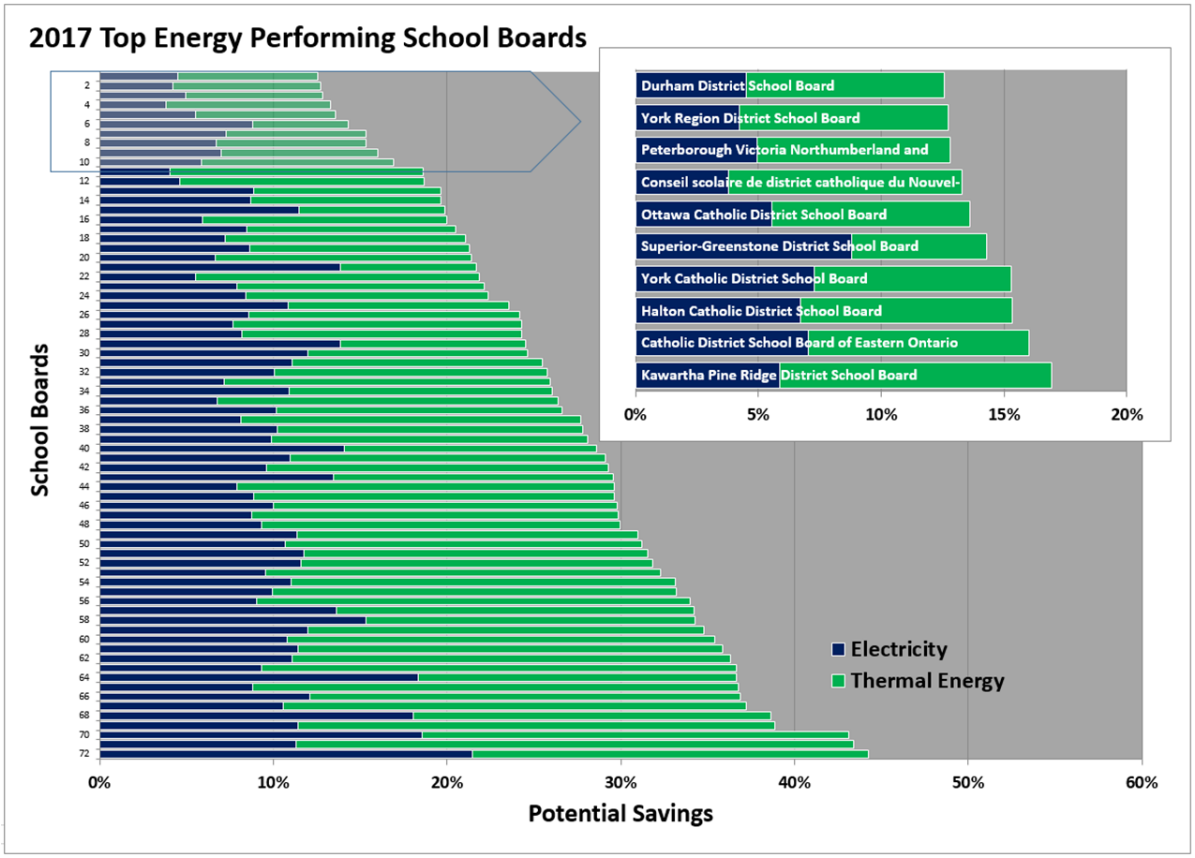
September 6, 2018

Building Towards a Sustainable Future

Agenda

- 2017 Top Performing School Boards Report
- Achieving the Gas Savings Potential
  - Union Gas Charrettes
  - Simcoe County District School Board Project
- Maximizing Achievable Savings
- Conclusions
- Next Generation DSM Programs

2017 Sustainable Schools (SUS) Top Performing School Boards Report



- Since 2007 Sustainable Schools has been reporting on top performing schools across Canada, establishing the magnitude of energy savings potential and directing school boards and utility companies to where the savings are to be found
- Boards are ranked by their total energy savings potential (thermal and electrical energy)

Based on 2014-15 energy use data from Ontario Ministry of Energy's Broader Public Sector database

2017 SUS Top Boards Report

All facilities (71 school boards):

- **5,000** buildings analysed
- Overall total energy savings potential: **29.8%**
  - electricity - **262,000** MWh/year (13%)
  - natural gas - **140.5** million m3/year (38.6%)
- Utility cost savings potential: **$71.7 million** per year
- GHG emissions reduction potential: **294,000 tonnes** of CO2e/year

High savings potential buildings (>$10,000/year in savings):

- **1,987** buildings (40.7% of total)
- Savings potential:
  - electricity - **247,000** MWh/year (94% of total)
  - natural gas – **98.4** million m3/year (70% of total)
- Utility cost savings: **$59.7 million** per year (83% of total)
- GHG emissions reduction: **213,000 tonnes** of CO2e/year

Energy Savings Charrette Pilot Project

- in July 2017, Union Gas partnered with Toronto and Region Conservation (TRCA) to undertake a pilot project with two Ontario school boards with high gas savings potential (Hamilton Wentworth DSB with 31% and Waterloo Region DSB with 33% overall achievable savings potential)

- the project developed energy conservation action plans for 10 high energy conservation potential schools for each board through in-depth energy analysis and Energy Savings Charrettes

- the plans can help the boards and their utility companies prioritize future energy conservation measures and projects, and also feed into upcoming 2019-2024 ECDM Plans

Hamilton Wentworth DSB 2015-16 Energy Savings Potential

		Electricity						Gas						Total $ savings potential
		Consumption		Cost	Target Savings			Consumption		Cost	Target Savings			
School	School Type	Actual (kWh/sq.ft.)	Target (kWh/sq.ft.)	($)	(%)	($)	(kWh)	Actual (ekWh/sq. ft.)	Target (ekWh/sq. ft.)	($)	(%)	($)	(m3)	
Ancaster High	Secondary	5.8	5.2	$ 152,006	10.2%	$ 15,564	103,760	17.6	6.6	$ 68,692	62.7%	$ 43,053	187,187	$ 58,617
Sir Winston Churchill	Secondary	5.6	4.9	$ 147,071	13.3%	$ 19,631	130,874	16.9	8.5	$ 65,343	49.7%	$ 32,457	141,119	$ 52,089
Mary Hopkins	Elementary	4.8	3.4	$ 35,651	30.1%	$ 10,747	71,649	16.5	5.4	$ 18,063	67.1%	$ 12,120	52,696	$ 22,868
Orchard Park	Elementary	6.4	5.5	$ 161,852	14.0%	$ 22,597	150,647	14.5	8.2	$ 53,921	43.7%	$ 23,557	102,422	$ 46,154
Sir Wilfrid Laurier	Elementary	8.9	4.4	$ 108,635	50.0%	$ 54,264	361,761	11.2	5.4	$ 20,281	51.5%	$ 10,442	45,400	$ 64,706
Glendale	Secondary	6.6	5.6	$ 137,564	15.3%	$ 21,100	140,665	12.2	6.6	$ 37,699	46.0%	$ 17,332	75,358	$ 38,432
Queen Mary	Secondary	7.8	4.4	$ 113,052	43.8%	$ 49,536	330,239	10.5	5.4	$ 22,489	48.4%	$ 10,894	47,366	$ 60,430
Westmount	Elementary	5.2	4.9	$ 119,696	6.0%	$ 7,232	48,210	13.0	6.6	$ 44,497	49.5%	$ 22,007	95,682	$ 29,238
Waterdown	Secondary	10.4	6.9	$ 361,845	33.6%	$ 121,734	811,560	6.6	5.6	$ 33,875	14.4%	$ 4,884	21,233	$ 126,618
Sir Allan MacNab	Secondary	2.7	2.7	$ 77,878	0.0%	$ -	0	10.0	6.7	$ 42,332	33.0%	$ 13,951	60,657	$ 13,951
				$1,415,248	22.8%	$ 322,405	2,149,366			$407,193	46.8%	$190,698	829,121	$ 513,103

Alectra schools in yellow; Hydro One schools in green

Waterloo Region DSB 2016-17 Energy Savings Potential

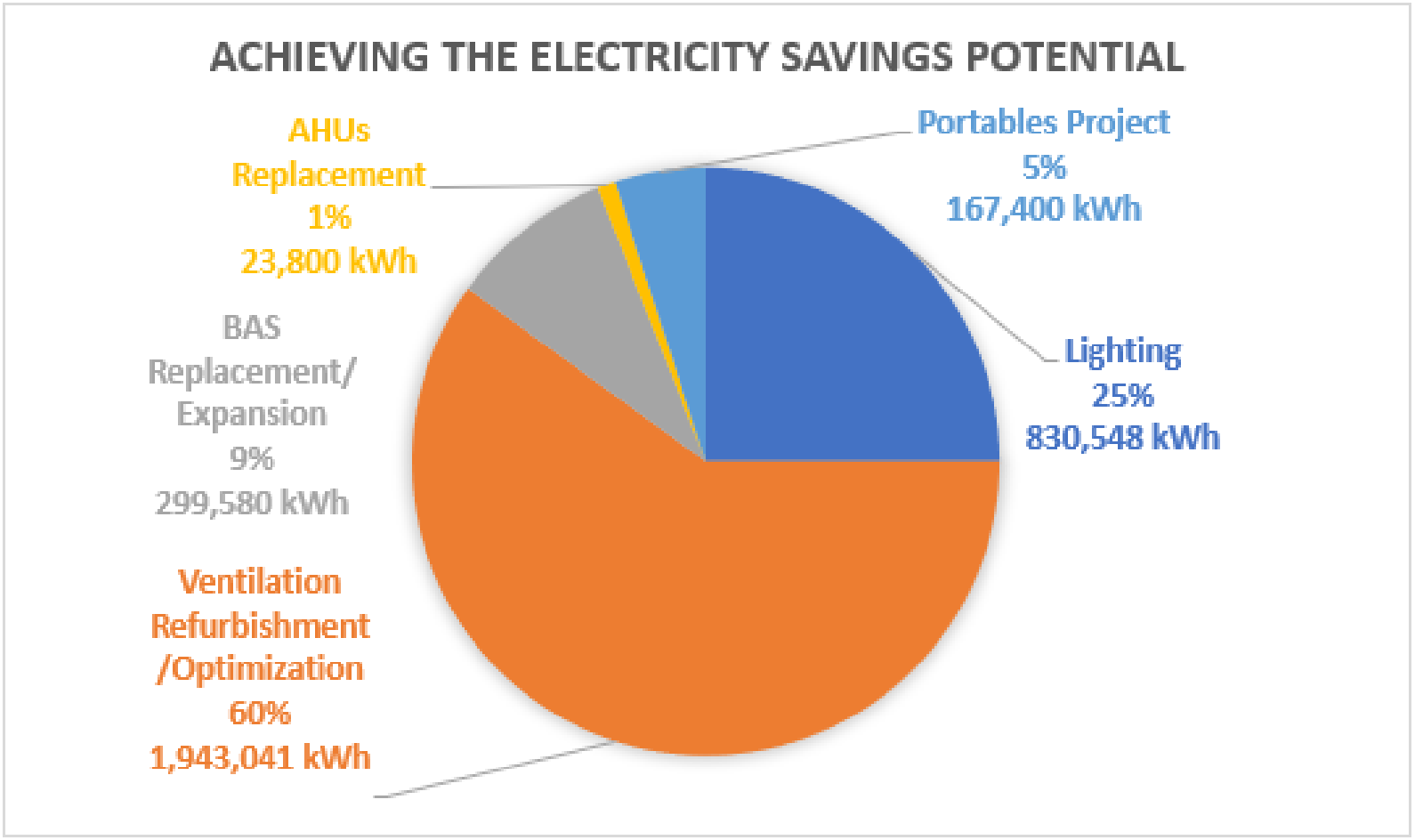
		Electricity						Gas						
		Consumption		Cost	Target Savings			Consumption		Cost	Target Savings			
School	School Type	Actual (kWh/sq.ft.)	Target (kWh/sq.ft.)	($)	(%)	($)	(kWh)	Actual (ekWh/sq. ft.)	Target (ekWh/sq. ft.)	($)	(%)	($)	(m3)	Total $ savings potential
Breslau PS	Elementary	6.6	5.6	$ 57,947	15.3%	$ 8,874	59,158	15.0	5.4	$ 19,439	63.8%	$ 12,410	53,956	$ 21,284
William G Davis PS	Elementary	4.2	4.1	$ 34,307	3.2%	$ 1,094	7,296	18.3	5.4	$ 22,126	70.4%	$ 15,582	67,749	$ 16,677
Waterloo Oxford DSS	Secondary	5.9	5.6	$ 158,805	6.2%	$ 9,900	65,998	16.2	6.5	$ 64,288	59.8%	$ 38,463	167,230	$ 48,363
Galt CI	Secondary	6.7	5.4	$ 177,633	18.8%	$ 33,322	222,148	15.1	6.6	$ 59,372	56.5%	$ 33,533	145,795	$ 66,855
Preston HS	Secondary	5.2	4.8	$ 130,998	8.4%	$ 10,983	73,221	15.8	6.6	$ 58,703	58.4%	$ 34,302	149,139	$ 45,285
Elmira District SS	Secondary	6.1	5.7	$ 139,266	6.9%	$ 9,654	64,361	14.4	6.6	$ 48,632	54.3%	$ 26,385	114,716	$ 36,039
Clemens Mill PS	Elementary	9.2	5.0	$ 77,364	45.8%	$ 35,399	235,990	11.0	5.4	$ 13,691	50.6%	$ 6,931	30,134	$ 42,329
Waterloo Collegiate	Secondary	5.6	5.3	$ 151,542	6.5%	$ 9,789	65,258	14.3	6.6	$ 56,997	54.2%	$ 30,881	134,265	$ 40,670
Saginaw PS	Elementary	7.9	4.4	$ 54,756	44.5%	$ 24,385	162,570	11.4	5.4	$ 11,772	52.5%	$ 6,180	26,867	$ 30,565
Sandowne PS	Elementary	6.6	4.3	$ 44,257	34.2%	$ 15,116	100,772	12.6	5.4	$ 12,574	57.1%	$ 7,177	31,205	$ 22,293
				$1,026,874	**15.4%**	**$ 158,516**	**1,056,772**			**$367,594**	**57.6%**	**$211,843**	**921,056**	**$ 370,359**

Energy + Inc. schools in yellow; Waterloo North Hydro Inc. schools in orange; Kitchener Wilmot Hydro Inc. schools in green

Summary of Projects Identified Through the Charrettes (20 schools)

Measure	Description	Total	Payback	% of Overall Total	# out of 20
Lighting	Budget	$697,286	5.7	4%	8
	Electricity Savings	$116,277		25%	8
Ventilation Refurbishment/Optimization	Budget	$2,596,066	3.8	15%	20
	Electricity Savings	$272,026		60%	16
	Gas Savings	$304,715		72%	20
BAS Replacement/ Expansion	Budget	$2,670,643	32.7	15%	9
	Electricity Savings	$41,941		9%	7
	Gas Savings	$38,009		9%	6
Boilers Replacement/Refurbishment	Budget	$8,932,937	117.7	52%	10
	Gas Savings	$75,379		18%	10
AHUs Replacement	Budget	$2,260,637	337.4	13%	5
	Electricity Savings	$3,332		1%	1
	Gas Savings	$3,353		1%	1
Portables Project	Budget	$140,000	5.3	1%	5
	Electricity Savings	$23,436		5%	5
Total Capital Cost		$17,297,568	-	-	-
Savings	Electricity	$457,012	-	-	-
	Gas	$421,456	-	-	-
	Total	$1,492,564	-	-	-
Overall Simple Payback (years)		11.59	-	-	-

Union Gas Charrettes - Achieving the Electricity Savings Potential



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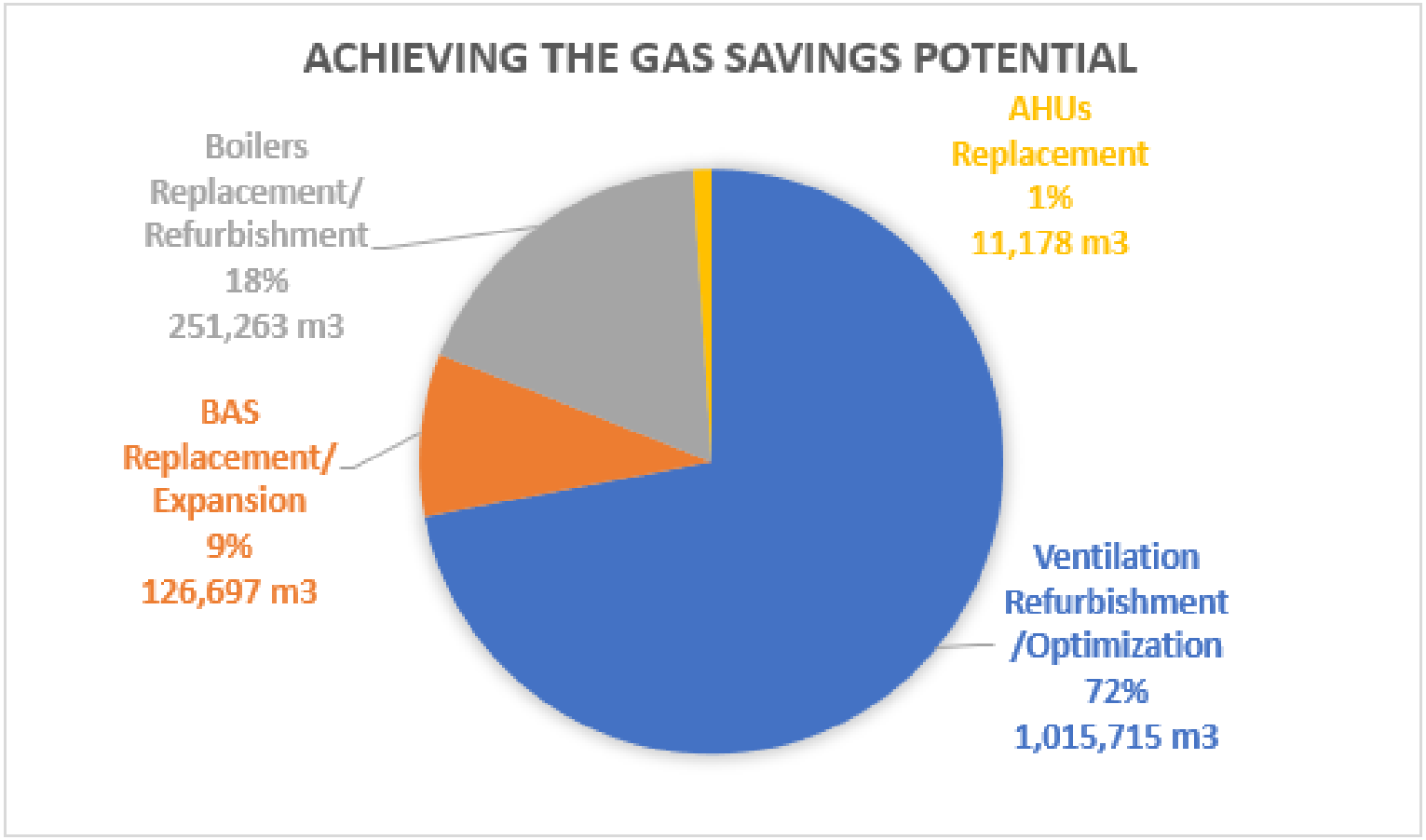


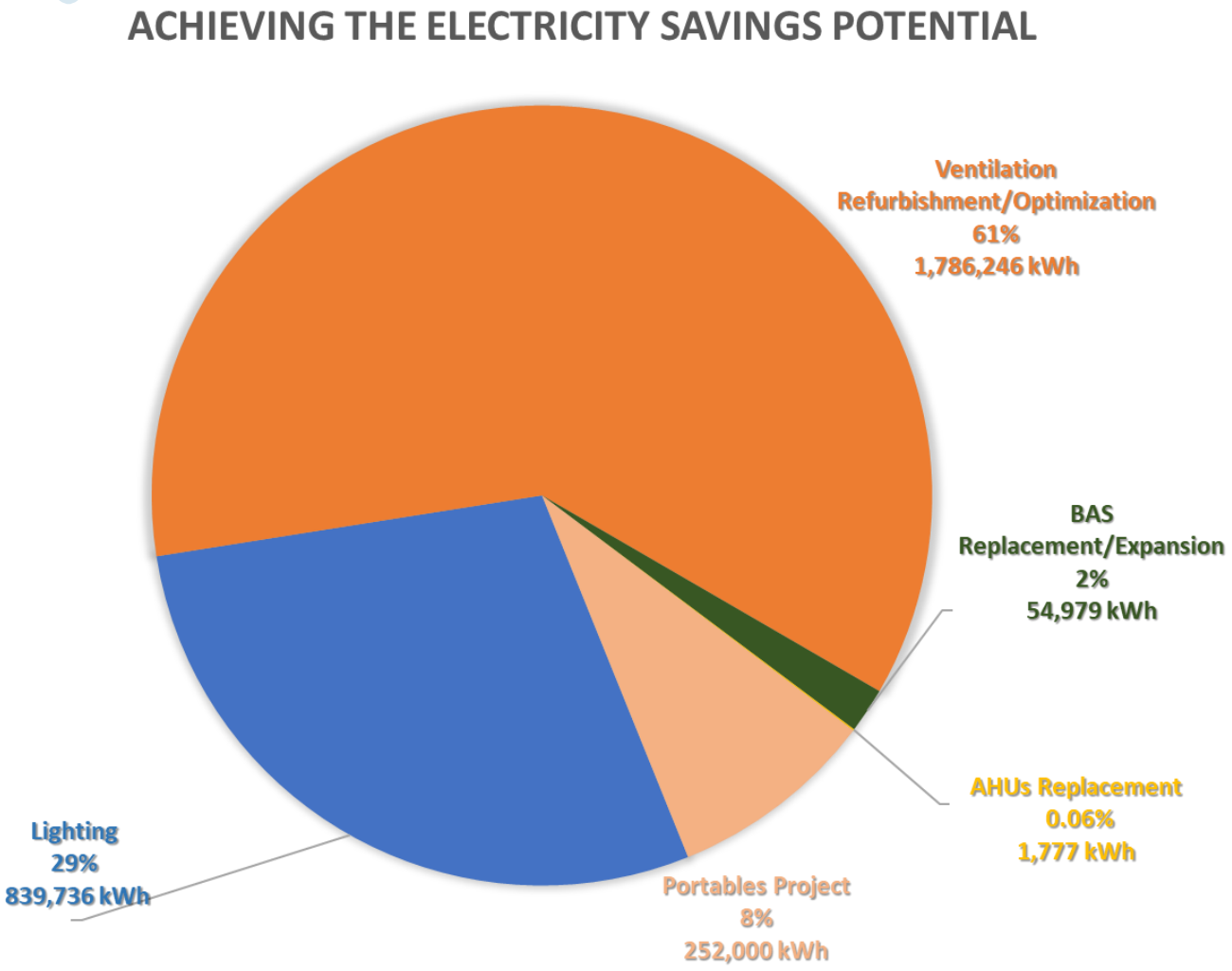
Simcoe County DSB Project

- 29 schools
- Total savings potential of $721,00/year
- 11% electricity savings potential
- 38% gas savings potential
- Measures included: Lighting, Ventilation Refurbishment/Optimization, BAS Replacement/Expansion, Boilers Replacement/Refurbishment, AHUs Replacement and Portables HVAC Controls

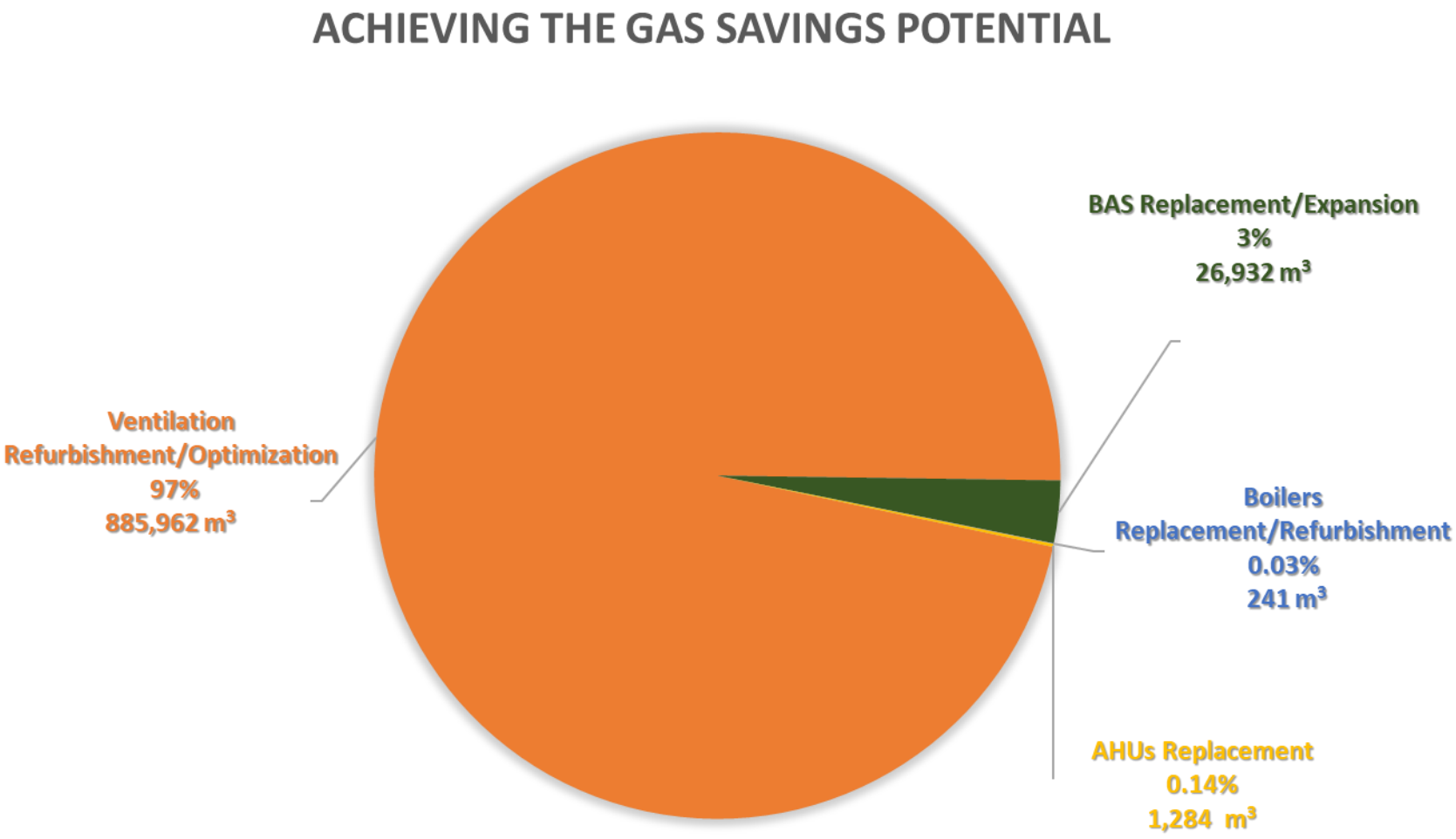
Summary of Simcoe County DSB Projects (29 schools)

Measure	Description	Total	Payback	% of Overall Total	# out of 29
Lighting	Budget	$ 769,408	5.55	18%	15
	Elec. Savings	$ 118,936		29%	15
Ventilation Refurbishment/Optimization	Budget	$ 2,904,995	4.77	68%	29
	Elec. Savings	$ 250,074		61%	25
	Gas Savings	$ 265,789		86%	27
BAS Replacement/Expansion	Budget	$ 240,500	15.12	6%	2
	Elec. Savings	$ 7,953		2%	2
	Gas Savings	$ 7,305		2%	2
Boilers Replacement/Refurbishment	Budget	$ 20,017	331.68	0%	1
	Gas Savings	$ 60		0%	1
AHUs Replacement	Budget	$ 85,787	145.29	2%	1
	Elec. Savings	$ 267		0%	1
	Gas Savings	$ 321		0%	1
Portables Project	Budget	$ 220,500	5.54	5%	5
	Elec. Savings	$ 35,280		9%	5
Total Capital Cost		**$ 4,241,207**			
Savings	Elec. Savings	$ 412,510			
	Gas Savings	$ 308,434			
	Total Savings	$ 720,944			
Simple Payback (yr)		**5.07**			

Simcoe County DSB - Achieving the Electricity Savings Potential



Simcoe County DSB - Achieving the Gas Savings Potential



Maximizing Achievable Savings

- Ventilation Refurbishment and Optimization Projects: More than 70% of the total gas savings potential and approximately 60% of the electricity savings potential is found in Ventilation Refurbishment and Optimization projects. These projects applied to the majority of schools across all 3 boards and provide the best paybacks of all.
- Capital Projects: All 3 boards included schools requiring major capital replacements of obsolete/end-of-life boilers, air handling units and/or building automation systems. Design and performance standards are necessary to deliver the full savings potential of these projects.
- Lighting Projects: Power density as well as light level standards are required for lighting conversions to LED to deliver the full savings potential.
- Portables Projects: Equipment and controls upgrades of HVAC units in portables make up approximately 10% of the total electricity savings potential in the schools and provide a good payback.

Conclusions

- The natural gas savings potential in the schools' sector as a whole is far greater than is currently thought. The Sustainable Schools analysis for the 2014-15 school year determined the achievable potential to approximately 140 million m3/year or 38% of total annual consumption.
- Some boards have greater gas savings potential than others, ranging between 6% to 32% board-wide
- Some individual schools within the boards have far greater potential than others. 8 of the 20 schools taking part in the Union Gas Charrette have potential greater than 100,000 m3/year as opposed to only 2 of the 29 schools in the Simcoe County DSB project
- High-potential boards, and high-potential schools within each board, are readily identified through the Sustainable Schools analysis and should be the focus of DSM efforts aimed at maximizing savings.

Suggested Principles for Next Generation DSM

- Focus on high-potential owners, high potential buildings and high-potential measures
- Multi-year agreements
- Savings measured at the meter
- Graduated incentives based on approaching targets
- Utility company roles of:
  - account manager
  - technical consultant
  - portfolio responsibility

Questions?

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