



Report to Board of Trustees

May 29, 2017

Subject: Energy Update

Recommendation

This report is for the information of the Board.

Status

2015/16 Energy Use Intensity and Consumption

Energy Use Intensity (EUI) measured in equivalent kilowatt hours per square metre (ekWh/m²) is the base unit for comparison purposes. This metric is developed by first using heating degree days to weather normalize the gas consumption, as its use is nearly exclusive for space heating. Cubic metres of gas or gigajoules, as reported by the utilities, are then converted to equivalent kilowatt hours (ekWh). Total energy consumption is calculated by adding ekWh of gas use to electrical consumption, already reported in kWh.

Determining intensity involves accounting for square footage of all facilities in our inventory including portables and port-a-packs as well as changes to school areas due to additions or school closures. This produces the EUI measured in ekWh/m².

Previous reports used a baseline of 2008 (January through December calendar year) as a benchmark. It is important to note that subsequent data is presented on a school calendar year basis.

EUI is presented in Figures 1a and 1b as follows:

Figure 1a – Energy Use Intensity by Panel (ekWh/m²) versus Year

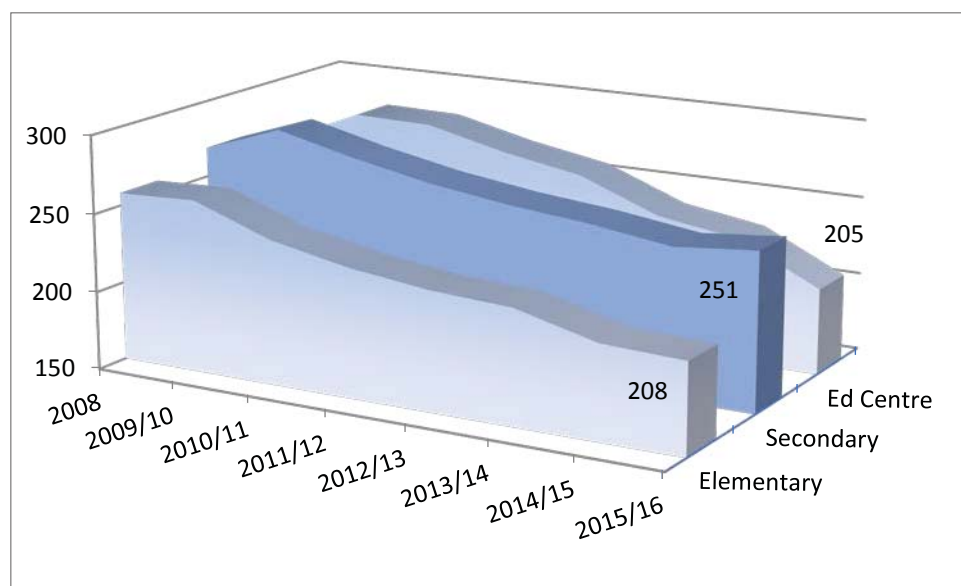
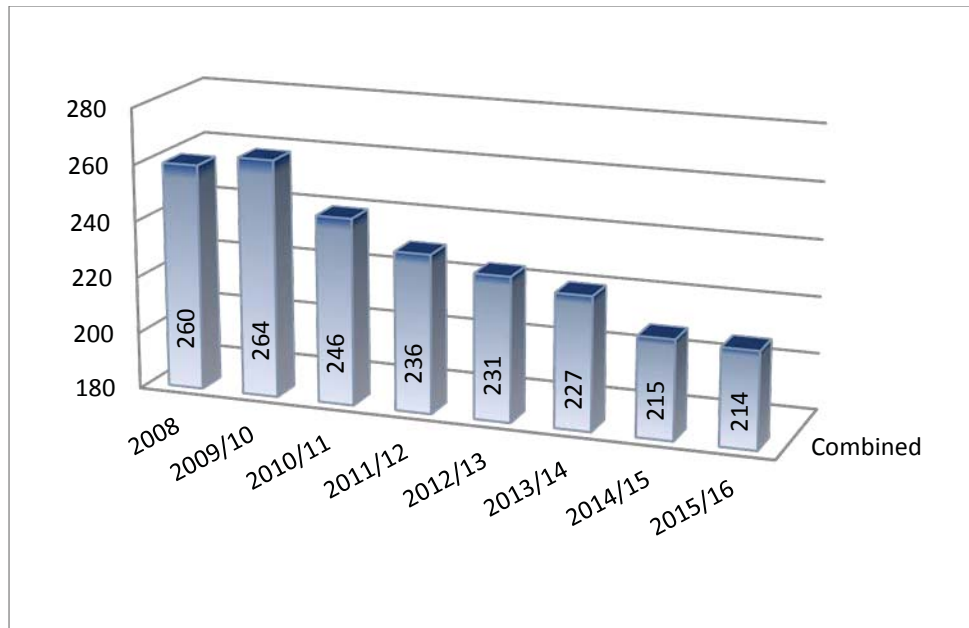


Figure 1b – Energy Use Intensity Combined (ekWh/m²) versus Year

The Board has experienced a 17.7% reduction in EUI when comparing 2015/16 to 2008 average energy intensity for both elementary and secondary schools as well as outdoor and education centres.

Detailed EUI for each school is presented in Appendix A for elementary and Appendix B for secondary schools and the Education Centre.

Consumption by commodity is an important factor that drives expenditures. Natural gas continues to be at a comparatively low cost to electricity. As such, a greater reliance on gas as a resource continues to be beneficial for our operational budget but generates greater greenhouse gas (GHG) emissions.

Energy consumption and expenditures for 2015/16 are presented in Figures 2 and 3 respectively;

Figure 2 – Energy Consumption by Commodity

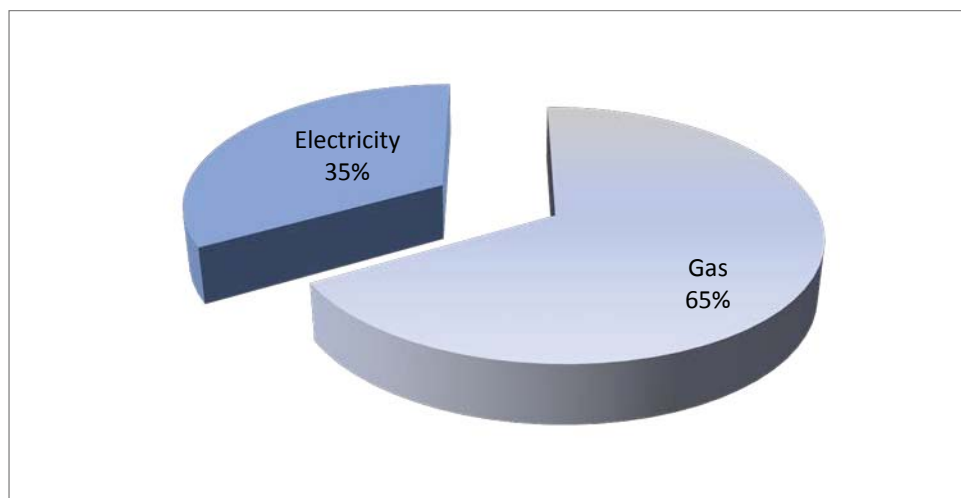
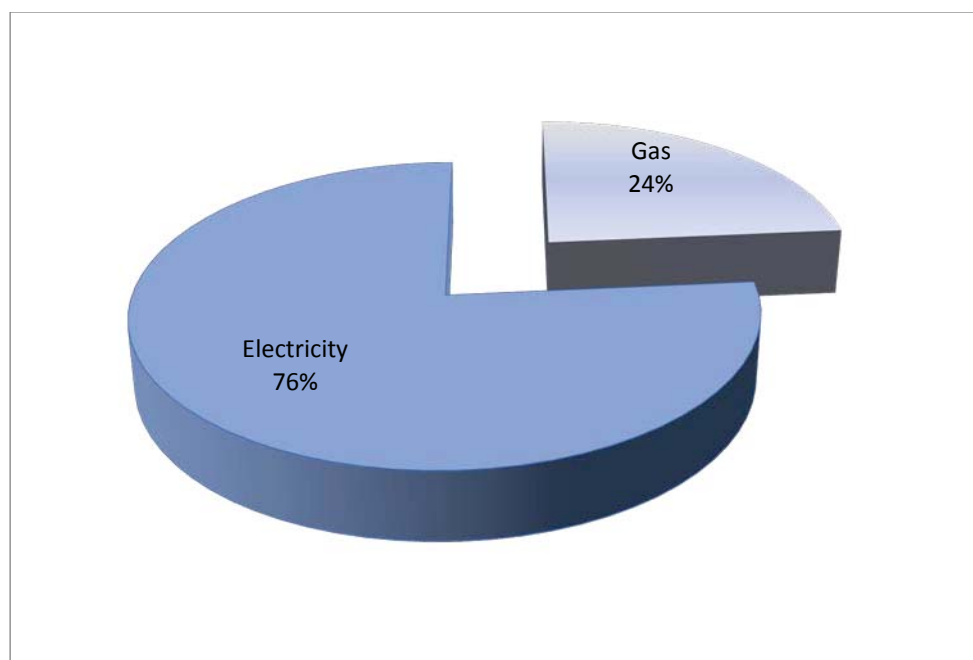


Figure 3 – Energy Expenditures by Commodity



On average for 2015/16, gas cost was approximately 2.8 cents per ekWh and electricity cost was approximately 17.2 cents per ekWh with a combined cost for both commodities at 7.8 cents. This represents a rise in the combined utility cost from 2014/15 of just over 13%.

Energy intensity is driven by consumption. Consumption is an aspect over which the Waterloo Region District School Board (Board) and its stakeholders have partial control. Factors that are controllable may include:

- Student and staff behaviour
- Waste minimization
- Use of efficient technologies
- Automation and control (occupancy sensors or building automation systems)
- Building envelope improvements
- Reduction of equipment power use and heat gain (transition from desktop to chromebooks / tables and similar).
- Designated periods of set-back and/or shut down

Consumption is also driven by factors beyond stakeholder control and can include factors such as:

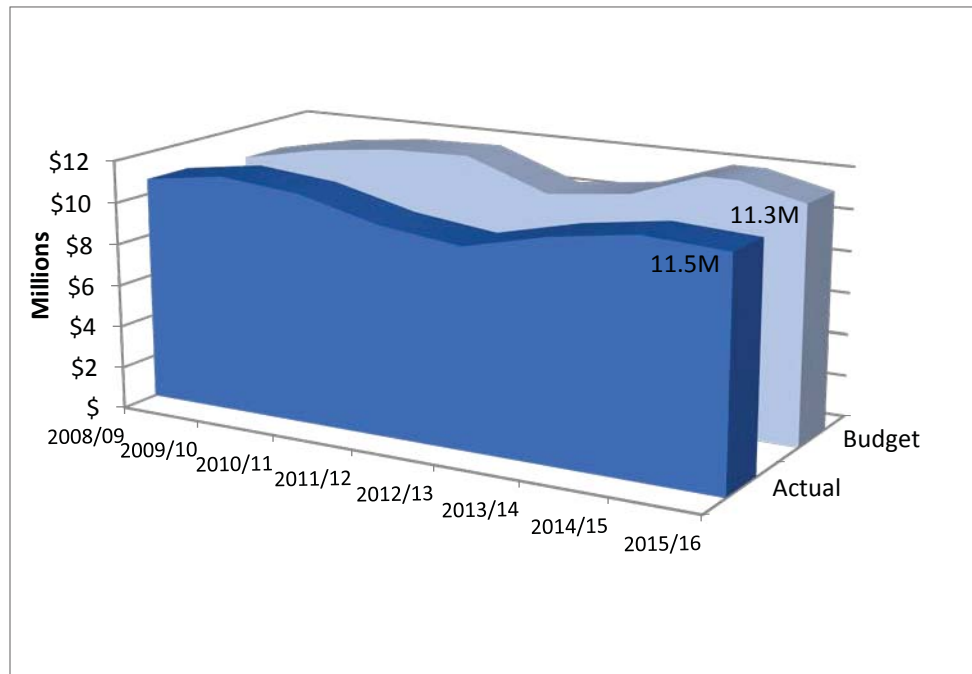
- Weather (warmer summer and shoulder season drives cooling demand)
- Hours of operation (extended use for Ministry initiatives such as Community Use)
- School closures (disposal of redundant school sites, port-a-packs or portables)
- Expansion of facilities and square footage (new schools or school additions)

Energy Budget and Expenditure

An eight year history of Board budgets and expenditures for electricity and gas are presented in Appendix C. The Board gas and electricity budget for 2015/16 was \$11.3M and expenditures were \$11.5M

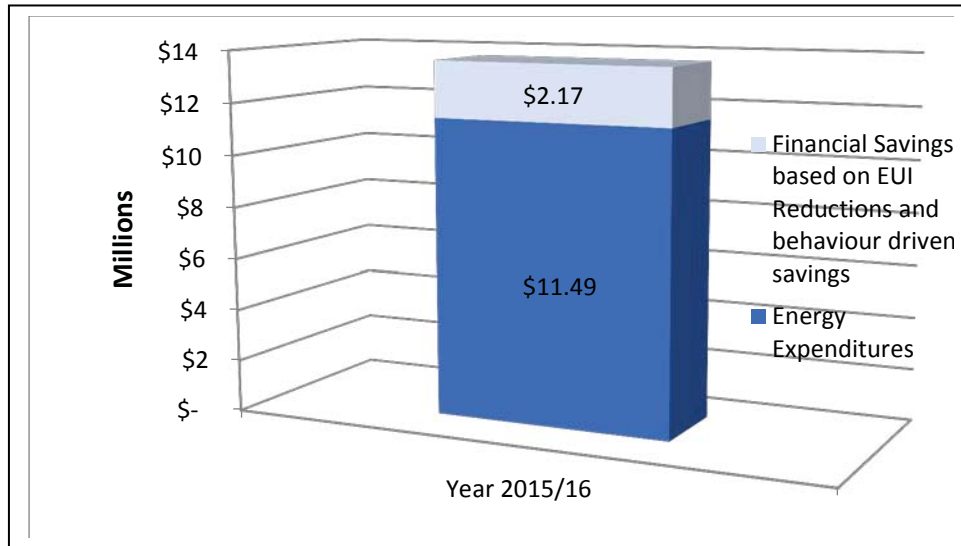
It is important to note when reviewing this information that budget and actual expenses cannot be compared directly year over year as a metric for operational efficiencies. Consumption is user and weather dependent. Costs are market dependent. Market pricing is something the Board has limited control over and market pricing can fluctuate greatly depending on demand and time of use. Business Services staff continues to employ a 5 year cost averaging approach purchasing strategy working through a consortium. This minimizes the Board's exposure to spot market pricing and helped offset substantial increases in transmission, distribution and other service fees that the Board continues to experience. Figure 4 presents the board's budget versus expenditures since 2008.

Figure 4 – Budget and Expenditures (Dollars) versus Year



Costs offset by energy efficiency measures, not only from gains through building upgrades but also from changes in occupant practices, are estimated as noted below. This compares the base line EUI for 2008 at 260 ekWh/m² vs the EUI for 2015/16 at 214 ekWh/m² with both at the current cost of 7.8 cents. Figure 5 represents more than \$2.1M in offset costs for 2015/16 due to EUI reductions and behaviour driven savings.

Figure 5 – Reduction as compared to base line (Dollars) for 2015/16



Regardless of our best efforts to reduce consumption by driving down EUI, energy costs, in particular cost for electricity, are likely to continue to rise in the future. Natural gas costs, although currently stable, may be affected by carbon trade arrangements or other government initiatives. Offsetting these costs by reducing our EUI is critical to minimizing the anticipated increases in future budgets and expenditures.

Operations

Changing human behaviour continues to be our most promising as well as our most challenging area in resource conservation. Presentations by Facility Services staff to schools as part of the Grade 5 curriculum on energy efficiency and sustainability provides a direct link with students and educators. Dialogue with custodial and maintenance personnel, school administrators and others provides awareness and training.

The continuation of the Canada Summer Jobs program, assisting Facility Services with energy efficiency and resource conservation, will again be funded by the Government of Canada.

Transition of computer technologies as driven by Information Technology Services (ITS), from dedicated computer labs with power consuming desktops to decentralized energy efficient chrome books, tablets and laptops, in particular where take-home use occurs, further helps reduce energy throughout the Board.

Technologies

As we construct new facilities or renew older facilities, Facility Services continue to implement suitable energy efficiency technologies, including;

- Energy/heat recovery for building fresh air
- Variable speed drives for fans and pumps
- Occupancy sensors and daylight harvesting for lighting

- T-8 or High Intensity Discharge (HID) to Light Emitting Diode (LED) lighting retrofits
- Carbon Dioxide (CO₂) demand control ventilation
- Astronomical clock control of exterior lighting
- Direct Digital Control (DDC) building automation systems
- Condensing gas air handling units for gyms and similar spaces
- Condensing boilers and water heaters
- Elimination of electric heat for new schools
- Time-of-day control for electric heat at existing schools
- Occupancy control for electric heat and cool in portables
- Regression analysis for boiler plant retrofits

In addition a number of pilot programs were underway to further pursue energy and resource conservation, including;

- Cooling through high efficiency Gas Heat Pump (GHP) systems
- Load shedding cooling controls for summer schools
- Eyedro and AlbertLabs point of use remote power or water monitoring meters
- Retrofit of water meters at all cooling towers and field irrigation systems
- Desiduous shade trees in strategic areas to minimize solar heat gain
- Energy modeling of new schools to assist with energy targets
- Envelope thermography to assist in determining breaches in the building
- Humidity based free cooling in addition to temperature control
- Direct replacement LED lamps and occupancy sensors for non-renovated spaces

As implementations of these technologies help reduce consumption, Business Services staff intends to continue the expansion and use of such technologies where possible, while targeting a reasonable, 3 years to 7.5 years, return on investment (ROI) and available funding. It should be noted that while technology is a great resource to reduce consumption, our greatest opportunity to leverage reductions is to change behaviours and reduce waste.

Further to the use of technology, the continued implementation of Preventative Maintenance (PM) programs and reallocation of staff to further support building maintenance and controls in order to improve performance extends the working life of equipment and its efficient operation.

Renewables

The Board received approximately \$1M for five renewable energy projects from the Ministry in 2010/2011. These projects were completed in late 2011 and have generated more than \$231,000 in revenue over 57 months of operation. Appendix D presents a summary of photovoltaic production and revenues.

It is important to recognize that despite generating significant revenue, the payback on the \$1M capital investment under the MicroFIT program at 80 cents per kWh provides a 20.5 year payback. This time frame would be significantly longer if not subsidized at 80 cents per kWh rate.

Incentives and Reinvestment

In addition to the projects implemented and the saving generated through reduced consumption, the Board has actively sought out incentive programs that generate savings that can be reinvested into schools and further help with resource conservation board wide.

Since 2009, the Board has received more than \$395,000 in incentives from partners that include:

- Cambridge and North Dumfries, Kitchener Wilmot and Waterloo North Hydro
- Reliance Commercial Solutions
- Region of Waterloo
- Union Gas

These incentives continue to be reinvested each year into upgrades directly related to energy conservation or to support schools for their use in promotion of their EcoSchool status. Appendix E presents the EcoSchools recognition awards and recent energy upgrades funded from these incentives.

Background

The Green Energy Act (O.Reg. 397/11), came into effect in 2009 repealed the Energy Conservation Leadership Act and the Energy Efficiency Act. Under this Act the Ministry Education implemented the Utility Consumption Database (UCD). The UCD reports on annual utility consumption and greenhouse gas emissions for more than 5,000 schools and administrative buildings across 72 boards and require the implementation of a 5 year Conservation and Demand Management Plan initiated in 2013/14 and due 2017/18 with a WRDSB targeted reduction in energy of 6.1%.

In school calendar years 2009/10, 2010/11, and 2011/12, Business Services provided energy updates to the Board through the Energy Efficient School Funding (EESF) annual capital report. EESF funding targeted capital investment into schools that were below the average in terms of energy performance and was discontinued by the Ministry at the end of 2011/12.

From 2012/13 to 2015/16 capital funding through School Renewal (SR), School Condition Improvement (SCI) or new capital investment supported energy efficiency measures as Business Services continued to deliver capital projects across the region.

As of April 2017, funding for energy efficiency and greenhouse gas reductions is again available through the Green House Reduction Fund (GGRF) with \$3.0M in projects already tendered and scheduled for summer implementation. It is anticipated this GGRF as well as SR and SCI will continue to provide support for energy efficiency measures for the foreseeable future.

Financial Implications

While the utility budget may represent less than two percent of the overall Board budget, the active management of the utility portfolio is required to mitigate risk exposure as cost over runs or savings can have a significant impact on the operating budget.

The utility budget will continue to be monitored regularly and developed on an annual basis within Business Services in consultation with external agencies as required (consortium, Ministry, OMC Energy Sub-Committee, School Energy Coalition), Coordinating Council, and brought forward through regular budget deliberations.

Communications

The Green Energy Act requires this Energy Update be presented to Board and available publicly on an annual basis. In addition, the Energy Conservation and Demand Management Plan and Energy Consumption and Greenhouse Gas Emission annual reports, as available through the UCD, are available in hard copy at the Education Centre or online for public access as required under the Green Energy Act:

- [*Energy Conservation and Demand Management Plan*](#)
- [*Energy Conservation at the Waterloo Region District School Board*](#)

It is intended that this report will be shared with the, Elementary Accommodation Committee (EAC), Secondary Accommodation Committee (SAC), and Accommodation Steering Committee (ASC) in an effort to enhance awareness and build a knowledge base and momentum for energy conservation in the schools.

Prepared by: Matthew Gerard, Coordinating Superintendent, Business Services
& Treasurer of the Board
Ian Gaudet, Controller, Facility Services
Ron Dallan, Manager of Capital Projects
Lou Lima, Manager of Mechanical, Electrical and Environmental Services
Steve Feeney, Supervisor of Energy Conservation
in consultation with Coordinating Council.

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ANNUAL ENERGY USE INTENSITY - ELEMENTARY SCHOOLS**

Fiscal Year (Sep to Aug) or Calendar Year (Jan to Dec) as available

School	2008	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>
A R Kaufman P.S.	212	267	244	234	239	234	214	209
Abraham Erb P.S.	189	166	173	167	171	166	161	151
Alpine P.S.	287	330	318	334	307	306	293	301
Avenue Road P.S.	242	400	331	197	170	177	177	176
Ayr P.S.	238	292	277	268	257	250	224	217
Baden P.S.	232	176	168	156	161	168	170	157
Blair O.E.C.	Unavailabl	297	267	292	271	273	257	284
Blair Road P.S.	422	249	224	246	212	217	214	224
Breslau P.S.	336	393	268	267	248	338	241	231
Bridgeport P.S.	246	241	245	269	262	194	169	164
Brigadoon P.S.	199	296	213	181	185	193	167	159
Cedar Creek P.S.	211	206	182	174	175	188	172	178
Cedarbrae P.S.	289	245	308	264	255	250	256	241
Centennial (Camb) P.S.	269	286	254	363	266	248	229	228
Centennial (Wloo) P.S.	389	264	244	171	247	258	238	233
Central P.S.	269	294	268	284	277	280	256	278
Chalmers Street P.S.	265	274	288	316	267	257	237	231
Clemens Mill P.S.	223	219	206	209	213	226	226	251
Conestogo P.S.	261	271	252	273	244	239	228	250
Coronation P.S.	440	378	364	326	329	323	332	347
Country Hills P.S.	190	224	229	301	268	230	219	213
Courtland Senior P.S.	246	254	244	219	223	274	226	197
Crestview P.S.	242	322	299	279	246	300	319	293
Dickson P.S.	184	183	185	161	171	171	117	Disposed
Doon P.S.	279	304	281	219	211	201	196	154
Driftwood Park P.S.	232	199	183	185	180	184	197	174
Edna Staebler P.S.	Not Open	171	159	150	159	159	159	145
Elgin Street P.S.	196	226	204	187	196	191	183	199
Elizabeth Ziegler P.S.	272	278	268	251	226	242	240	238
Empire P.S.	238	246	239	227	239	219	208	213
Floradale P.S.	209	191	214	236	232	208	181	222
Forest Glen P.S.	281	260	240	221	202	235	214	200
Forest Hill P.S.	316	269	246	248	208	203	198	228
Franklin P.S.	236	258	233	234	227	218	210	219
Glencairn P.S.	156	177	182	173	187	215	185	177
GrandView (Camb) P.S.	230	251	239	143	168	172	163	153
Grandview (NH) P.S.	197	326	228	233	217	213	189	200
Hespeler P.S.	206	205	184	166	168	180	177	166
Highland P.S.	326	281	275	204	189	205	206	215
Hillcrest P.S.	232	221	209	191	205	182	183	161
Howard Robertson P.S.	407	343	335	280	287	263	269	285

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ANNUAL ENERGY USE INTENSITY - ELEMENTARY SCHOOLS**

Fiscal Year (Sep to Aug) or Calendar Year (Jan to Dec) as available

School	2008	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>
J F Carmichael P.S.	217	198	192	183	161	172	167	176
J.W. Gerth P.S.	Not Open	125	137	120	141	149	150	134
Jean Steckle PS	Not Open	Not Open	Not Open	Not Open	Not Open	146	137	126
John Darling P.S.	179	215	170	171	177	184	196	191
John Mahood P.S.	323	258	228	221	213	198	185	182
Keatsway P.S.	250	197	172	154	132	153	148	148
King Edward P.S.	594	268	261	252	256	247	276	338
Lackner Woods P.S.	192	213	203	210	209	226	220	205
Laurelwood P.S.	223	235	216	220	205	209	205	190
Laurentian P.S.	293	321	303	264	258	310	363	296
Lester B. Pearson P.S.	217	173	171	173	175	166	168	154
Lexington P.S.	307	287	291	261	256	295	228	243
Lincoln Avenue P.S.	289	358	332	330	313	151	98	Disposed
Lincoln Heights P.S.	298	258	232	233	234	213	203	282
Linwood P.S.	356	268	252	273	247	253	239	250
MacGregor Sr P.S.	201	212	204	201	202	201	193	205
MacKenzie King P.S.	294	319	299	313	281	301	217	218
Manchester P.S.	281	316	304	286	258	253	199	183
Margaret Avenue P.S.	229	285	198	236	237	236	248	270
Mary Johnston P.S.	174	176	176	175	165	184	170	168
McQuarrie Centre	539	531	561	411	522	421	299	116
Meadowlane P.S.	225	271	270	255	247	254	234	219
Millen Woods P.S.	Not Open	Not Open	196	153	162	168	153	155
Moffat Creek P.S.	Not Open	Not Open	Not Open	Not Open	138	135	117	138
N A MacEachern P.S.	326	338	317	250	256	255	283	219
New Dawn	412	424	403	430	368	268	209	174
New Dundee P.S.	188	215	205	209	208	192	196	197
Northlake Woods P.S.	311	234	241	234	217	199	193	204
Park Manor P.S.	341	313	284	272	276	279	278	208
Parkway P.S.	289	260	256	280	337	266	240	229
Pioneer Park P.S.	236	274	248	255	260	223	219	218
Preston P.S.	180	188	194	191	191	178	161	162
Prueter P.S.	169	286	277	219	259	241	206	204
Queen Elizabeth P.S.	220	252	251	277	268	251	237	251
Queensmount Sr P.S.	400	309	342	324	258	287	329	257
Riverside P.S.	171	217	175	175	186	208	179	129
Rockway P.S.	265	311	281	311	257	316	268	319
Rosemount P.S.	245	299	287	269	271	272	298	308
Ryerson P.S.	260	264	246	199	207	204	196	180
Saginaw P.S.	250	281	248	232	251	242	235	237
Sandhills P.S.	238	251	226	224	246	237	207	198

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ANNUAL ENERGY USE INTENSITY - ELEMENTARY SCHOOLS**

Fiscal Year (Sep to Aug) or Calendar Year (Jan to Dec) as available

School	2008	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>	<i>EkWh/m2</i>
Sandowne P.S.	285	206	221	293	274	251	262	243
Sheppard P.S.	224	277	268	249	241	247	242	221
Silverheights P.S.	229	209	203	186	183	158	147	146
Sir Adam Beck P.S.	Not Open	Not Open	124	164	130	136	133	134
Smithson P.S.	216	259	249	255	250	224	239	233
Southridge P.S.	284	318	294	288	287	274	305	301
St Andrew's P.S.	247	191	196	173	174	174	174	178
St Jacobs P.S.	236	253	250	235	239	237	222	225
Stanley Park P.S.	299	331	314	299	280	314	262	251
Stewart Avenue P.S.	270	306	191	170	179	168	170	175
Suddaby P.S.	149	197	192	192	146	157	155	154
Sunnyside P.S.	226	243	218	198	205	208	208	192
Tait Street P.S.	227	243	241	229	230	251	176	177
Three Bridges P.S.	193	200	187	193	169	179	94	Disposed
Trillium P.S.	262	342	255	251	253	250	235	251
W.T. Townshend P.S.	158	161	156	139	147	173	145	138
Wellesley P.S.	243	261	252	242	243	242	224	207
Westheights P.S.	309	339	255	232	235	233	238	234
Westmount P.S.	244	256	248	223	241	241	235	137
Westvale P.S.	151	145	141	128	140	136	135	129
William G. Davis P.S.	308	410	331	328	303	292	275	279
Williamsburg P.S.	159	149	145	149	150	158	157	145
Wilson Avenue P.S.	225	185	234	223	226	231	219	294
Winston Churchill P.S.	217	234	216	163	179	183	199	204
Woodland Park P.S.	177	191	179	167	162	155	156	145
Wrigley's Corners O.E.C.	Unavailabl	251	225	282	236	232	246	251
Energy Intensity Average (EkWh/m2)	258	260	242	232	226	223	210	208

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ANNUAL ENERGY USE INTENSITY - SECONDARY SCHOOLS**

Fiscal Year (Sep to Aug) or Calendar Year (Jan to Dec) as available

School	2008	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>	<i>EkWh/m²</i>
Bluevale C.I.	274	291	237	249	255	245	244	236
Cameron Heights C.I.	385	379	368	357	337	328	375	362
Eastwood C.I.	211	237	221	213	224	250	233	234
Elmira District S.S.	278	303	277	258	238	231	243	242
Forest Heights C.I.	325	328	321	341	287	279	269	264
Galt C.I.	254	248	258	296	287	278	267	272
Glenview Park S.S.	275	298	313	284	275	250	232	232
Grand River C.I.	244	283	264	246	260	254	257	263
Huron Heights S.S.	252	280	282	264	272	244	234	253
Jacob Hespeler S.S.	219	281	290	250	265	254	215	254
Kitchener-Waterloo C. & V.S.	291	269	266	251	253	272	238	233
Preston H.S.	260	306	267	259	257	260	249	264
Sir John A. Macdonald S.S.	246	257	242	240	218	210	205	214
Southwood S.S.	275	225	193	177	164	165	160	163
Waterloo C.I.	265	278	272	249	256	251	238	243
Waterloo-Oxford District S.S.	243	322	321	307	281	279	279	287
Energy Intensity Average (EkWh/m²)	269	287	275	265	258	253	246	251
Education Centre (EkWh/m²)	258	280	279	267	258	238	230	205

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ENERGY BUDGET AND EXPENDITURES**

Commodity	2008/09		2009/10	
	Budget	Actual	Budget	Actual
Electricity	\$ 4,616,900	\$ 5,755,988	\$ 5,733,000	\$ 6,797,223
Gas	\$ 5,832,400	\$ 4,966,345	\$ 5,505,900	\$ 4,480,301
Total	\$ 10,449,300	\$ 10,722,333	\$ 11,238,900	\$ 11,277,524

Commodity	2010/11		2011/12	
	Budget	Actual	Budget	Actual
Electricity	\$ 6,759,525	\$ 6,549,661	\$ 6,809,909	\$ 6,572,072
Gas	\$ 4,915,515	\$ 4,352,896	\$ 4,958,342	\$ 3,357,832
Total	\$ 11,675,040	\$ 10,902,557	\$ 11,768,251	\$ 9,929,904

Commodity	2012/13		2013/14	
	Budget	Actual	Budget	Actual
Electricity	\$ 7,204,740	\$ 7,062,058	\$ 7,315,200	\$ 7,432,158
Gas	\$ 3,163,721	\$ 2,377,512	\$ 3,512,270	\$ 2,934,994
Total	\$ 10,368,461	\$ 9,439,570	\$ 10,827,470	\$ 10,367,152

Commodity	2014/15		2015/16	
	Budget	Actual	Budget	Actual
Electricity	\$ 9,213,000	\$ 8,018,535	\$ 8,263,900	\$ 8,803,203
Gas	\$ 3,007,590	\$ 2,934,994	\$ 3,055,500	\$ 2,686,392
Total	\$ 12,220,590	\$ 10,953,529	\$ 11,319,400	\$ 11,489,595

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
PHOTOVOLTAIC GENERATION AND REVENUES (LIFETIME)***

	kWh Production	Revenue
Blair Road P.S.	50,972	\$ 40,828
Forest Glen P.S.	58,899	\$ 47,178
Forest Heights C.I.	51,817	\$ 41,505
Lincoln Heights P.S.	63,401	\$ 50,784
Waterloo C.I.	<u>64,242</u>	<u>\$ 51,457</u>
Total	<u><u>289,331</u></u>	<u><u>\$ 231,752</u></u>

Notes:

* Based on energy produced between November and December 2011 through April 2016.

Links to websites are as follows:

Blair Road P.S.	http://www.cachelan.com/green/solarVuLive.php?ac=blairrdps&dr=dakon
Forest Glen P.S.	http://www.cachelan.com/green/solarVu.php?ac=forestglenps
Forest Heights C.I.	http://www.foresthtsc.solarvu.net/green/solarVu.php?ac=foresthtsc
Lincoln Heights P.S.	http://lincolnhgtsp.solarvu.net/green/solarVuLive.php?ac=lincolnhgtsp&dr=dakon
Waterloo C.I.	http://www.waterlooci.solarvu.net/green/solarVu.php?ac=waterlooci

**WATERLOO REGION DISTRICT SCHOOL BOARD
BUSINESS SERVICES DIVISION
FACILITY SERVICES DEPARTMENT**

**ENERGY UPDATE
ENERGY REBATES REINVESTMENTS**

2015/16 ECO Schools Recognition Awards

Elgin Street	Occupancy Sensors for Lighting
John Darling	Bottle Water Hydration Station
Sandhills	Bottle Water Hydration Station
New Dundee	School Grounds Greening (Trees and Plantings)
GPSS	Energy Efficient Hand Dryers

2015/16 Utility Rebates Reinvestments

SSS	Occupancy Sensors for Lighting in Gyms and Changerooms
Wellesley	Exterior LED Lighting Upgrade
Keatsway	Occupancy Sensors for Corridors and Washrooms
Ed Centre	Remote power meter of data room cooling and server systems
WODSS & 8 others	Astronomical Clock for Exterior Lights
HHSS	Electric Load Shedding Chiller Control
MacKenzie King	DDC Controls Upgrade of Classrooms, Corridors and AHUs

2015/16 Capital Funded Energy Efficiency Upgrades

Elizabeth Ziegler, & GPSS	Steam to Hot Water Conversion c/w Power, AC, Air Handlers and Controls Upgrade
Stewart Ave	Gas Fired Heat Pump System for Heating and Cooling in Lieu of Electric Heat
Linwood, Wellesley and Blair Outdoor	Condensing / Nearcondensing Boiler Plant Upgrade c/w Pneumatic to DDC Controls Upgrade
Lexington, Stewart Ave & 5 Other	ERV, Controls and/or High Efficiency HVAC Upgrade for Office and/or Classrooms Areas
SJAM & GPSS	VFD Upgrades of Heating and/or Air Handling Systems
SSS, Glencairn & 7 Others	Replacement of Various HVAC Units c/w Pneumatic to DDC Controls Upgrade
WODSS	Destratification Fans and Free Cooling Upgrade for Fitness Areas
CHCI, Saginaw & 16 others	Pneumatic or Electric to DDC Controls Upgrade of Various Classrooms, Vestibule Electric Heat, etc.
Glencairn, Howard Robertson & 7 Others	Free Cooling Economizer Control Upgrade with CO2 Demand Control Ventilation
Northlake Woods, GPSS & 4 Others	Domestic Water Storage and/or Consensing Water Heater Upgrade
W.Churchill, Queensmount & 15 Others	LED Lighting / Occupancy Controls Upgrade for Various Classrooms, Corridors, Gyms and/or Admin Areas
Keatsway & 4 Other	LED Exterior Lighting &/or Astro Clock Upgrade
AR Kaufman, Alpine & 11 Others	Building Envelope Upgrades w/ High Efficiency Roofs or Windows
SJAM & WCI	Deciduous Shade Trees at Office / Window Coating Treatment at Classroom to Minimize Summer Solar Heat Gain