



ENERGY CONSERVATION



Toronto  
District  
School  
Board

# | REPORT

JANUARY 2006

Smart Meter Pilot • Online Energy Reports • Lighting Retrofits  
More Certified EcoSchools • BAS Mechanical Retrofits  
New Green School • Toronto Turbine Virtual Tour for Kids

More inside ➞

## Acknowledgements

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For the complete photo of the TDSB's 2005 EcoSchools team representatives, see page 13.

*Toronto District School Board Energy Conservation Report, January 2006*

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*"Lighting accounts for 30-40% of the electricity used in a typical high school. In a small elementary school, lighting can account for 50-60% of the electricity consumed."*

– Energy Management Group, TDSB Facility Services

*"It's just a myth that it takes more energy to turn a light off than to leave it on."*

– Toronto Hydro

*"When adequate light is available from the sun, or when rooms are not being used, all lights are to be turned OFF."*

– TDSB EcoSchools Energy Conservation Standard #1

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## EXECUTIVE SUMMARY

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Following the practice established in the TDSB's *Environment Report: Making Real Change Happen* (May 2005), this report continues the Board's effort to report to all staff, parents and the public on the results of its initiatives to reduce its consumption of energy.

There are sound financial, health and environmental reasons for conserving energy.

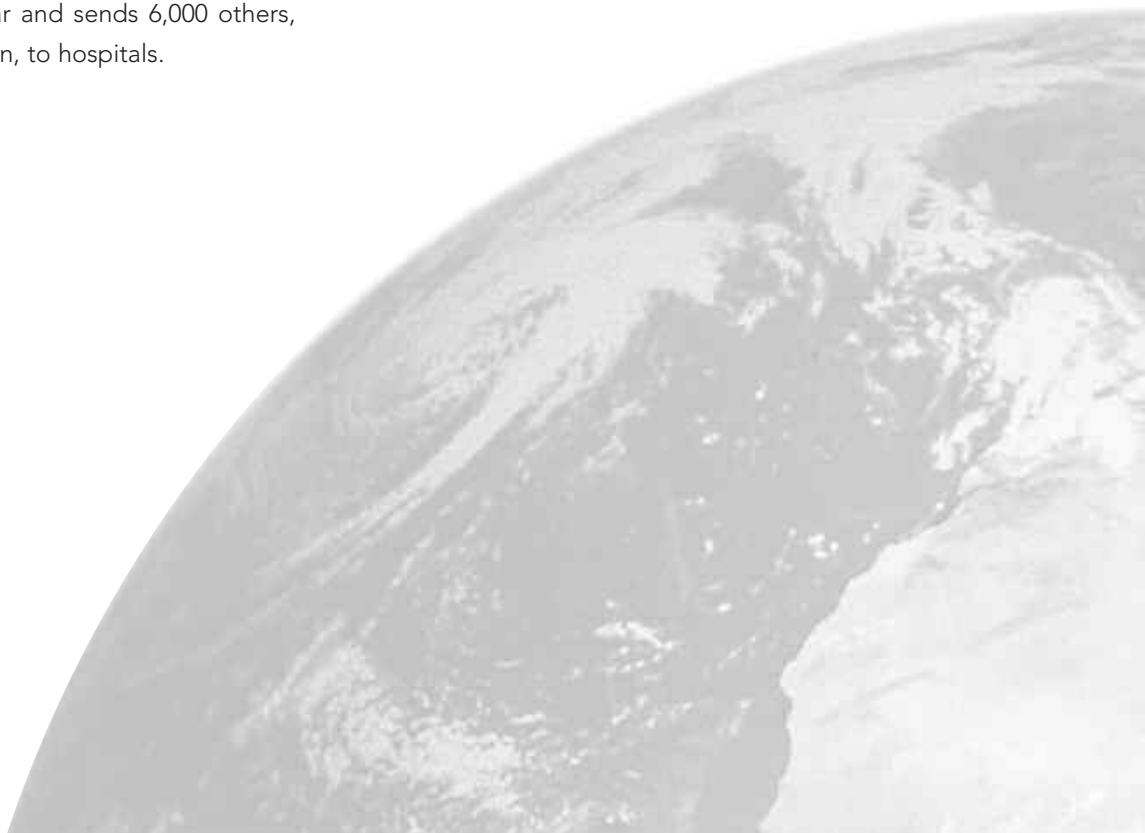
Under the provincial funding formula, energy costs come out of the same budget line as caretaking and maintenance. As a result, sharply rising energy costs continue to erode the TDSB's caretaking and maintenance budget, making it increasingly difficult for the TDSB to clean and maintain its schools adequately.

In addition to the monetary costs and the related decline in service to schools, the TDSB's consumption of energy has impacts on the health of people and the planet. Our energy use contributes to air pollution. In Toronto, smog contributes to the deaths of 1,700 people each year and sends 6,000 others, many of whom are children, to hospitals.

The TDSB's energy consumption also causes the annual release of approximately 250,000 tonnes of the greenhouse gas carbon dioxide. Greenhouse gases trap heat in the Earth's atmosphere, resulting in a warmer planet, more extreme weather events, air pollution, and the extinction of some plants and animals.

The report shares the highlights of work completed by TDSB staff and others during the 2004/05 school year. In addition to presenting the Board's strengths, it lists the main areas for improvement and the steps being taken in response to these challenges. The publication of the energy data allows readers to assess the TDSB's performance for themselves.

The watchword of transparency guides this report throughout. The TDSB believes it to be an essential ingredient for driving real improvements across a very large public institution.



*In this report, readers will learn that:*

- ⊙ In the 2004/05 school year, the TDSB increased its consumption of natural gas by 0.8% and electricity by 0.1% compared to 2003/04. However, compared to our 2002/03 baseline year, the TDSB's consumption of natural gas has decreased by 6.7%<sup>1</sup> and electricity by 8.3%.
- ⊙ A decrease in the per unit cost of natural gas in 2004/05 was offset by the increase in the electricity per unit cost. As a result, the TDSB paid the same amount for energy in 2004/05 compared to the year before.
- ⊙ The number of certified EcoSchools rose from 13 in 2003/04 to 53 in 2004/05, indicating that an increasing number of school staff, students and parents are making a serious effort to help the Board reduce its energy consumption.
- ⊙ The design of Thomas L. Wells PS — the TDSB's first new school in years — incorporates many advanced energy saving features.

- ⊙ "Smart" meters at 31 pilot schools are capturing and reporting on the hourly consumption of natural gas and electricity in "near real time."
- ⊙ Monthly energy reports are now available on-line for all schools.
- ⊙ The TDSB has teamed up with Toronto Hydro to produce new classroom resources on renewable energy.

As this report demonstrates, the Toronto District School Board is making a concerted effort to significantly cut its energy consumption.

For more information on the Board's Energy Conservation program, contact Frank Coppinger, General Manager, Facility Services at 416-394-3912 or [frank.coppinger@tdsb.on.ca](mailto:frank.coppinger@tdsb.on.ca) or Richard Christie, Program Coordinator, Ecological Literacy and Sustainable Development, School Services, 416-394-7495 or [richard.christie@tdsb.on.ca](mailto:richard.christie@tdsb.on.ca).

<sup>1</sup> As shown in the "Performance Summary" section on page 9, the 6.7% decrease in natural gas consumption (2004/05 compared to 2002/03) can be attributed in part to the fact that the winter of 2002/03 was colder than in both 2003/04 and 2004/05.

## HIGHLIGHTS FROM 2004/05

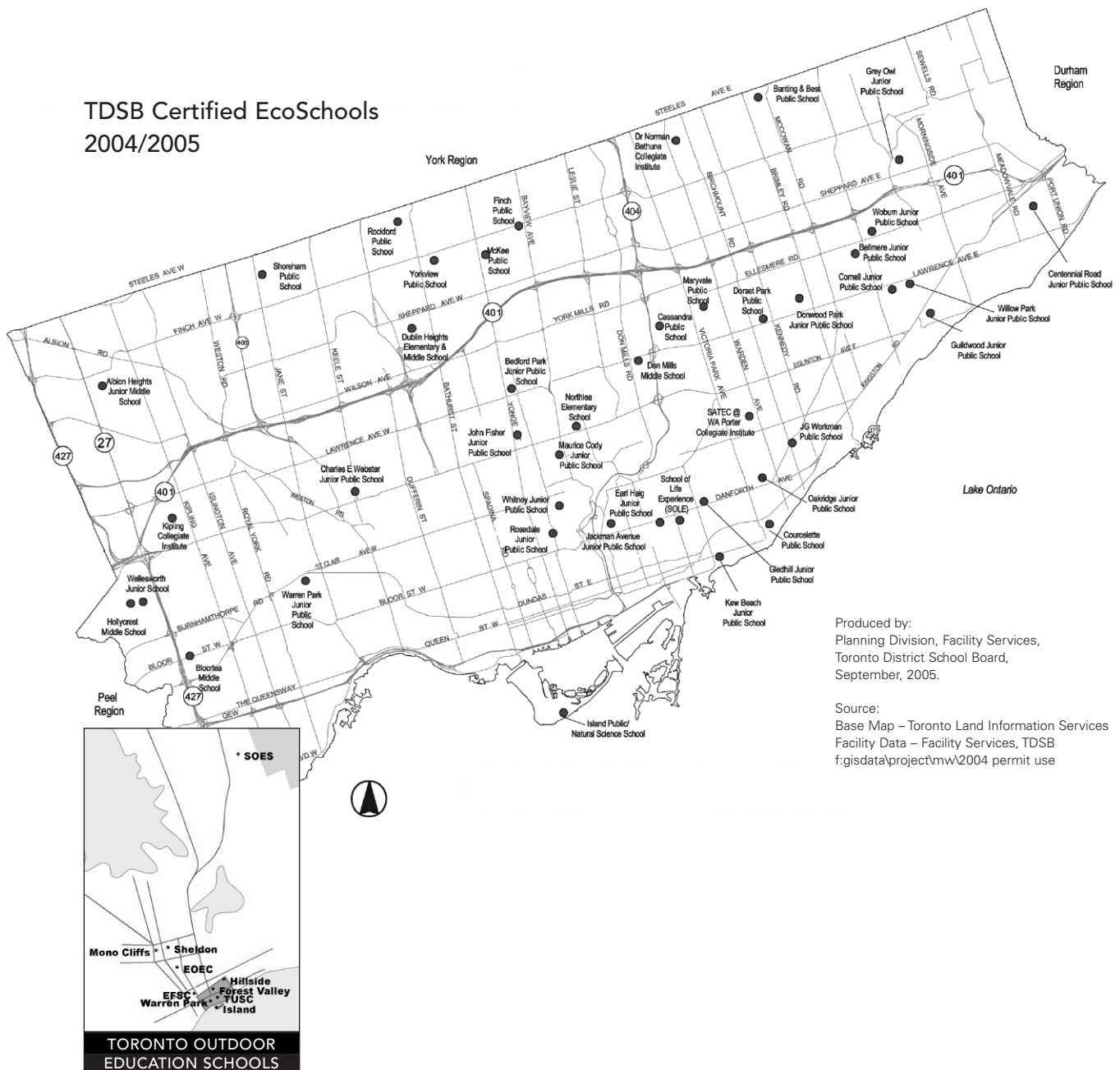
### Big jump in the number of certified EcoSchools

In 2004/05, the TDSB experienced a sharp increase in the number of schools that were certified as bronze, silver or gold EcoSchools. Fifty-three schools were certified — up from 13 in 2003/04. To become certified, these schools have made significant efforts to reduce their energy consumption and minimize the waste that they send to landfill. Many EcoSchools

go even further to green their school grounds, incorporate lessons about nature and the environment in their lessons, take part in community clean-ups, and hold environmental festivals.

For more information on becoming a certified EcoSchools, visit <http://ecoschools.tdsb.on.ca>

TDSB Certified EcoSchools  
2004/2005



Produced by:  
Planning Division, Facility Services,  
Toronto District School Board,  
September, 2005.

Source:  
Base Map – Toronto Land Information Services  
Facility Data – Facility Services, TDSB  
f:gisdata\project\mw\2004 permit use

## New Thomas L. Wells school incorporates advanced energy saving features

Opened in September 2005, Thomas L. Wells PS was designed with large windows to provide natural lighting and help heat and cool the building, motion sensor light switches to automatically turn off lights in unused rooms, and passive air ventilation allowing wind to keep the air flowing throughout the school. These innovative details not only save power, but also teach valuable lessons in energy conservation and respect for the environment.



Photo: Tom Urban

**Thomas L. Wells PS classroom**

Designed by Baird Sampson Neuert Architects, the school features classrooms laid out to maximize daylight and control the effects of the sun. Light shelves shade intense summer sun and reflect reduced winter sun deep into the building. The school is set up with sensors to turn off unneeded classroom lights. In addition, a combination of high and low window vents provides effective natural ventilation as an alternative to mechanical cooling. Materials used throughout the school are durable and will help promote long term sustainability as well as healthy indoor air quality. Thomas L. Wells is expected to attain a Silver Level under the US Green Building Council's LEED program.<sup>2</sup>

<sup>2</sup> The Leadership in Energy and Environmental Design (LEED) green building rating system is a national U.S. standard for developing high performance sustainable buildings. Based on scientific standards, LEED emphasizes state of the art strategies for sustainable development, water savings, energy efficiency, materials selection and indoor air quality.

## "Smart" meters at 31 pilot schools capture and report on the hourly consumption of natural gas and electricity in "near real time"

In 2004/05, the TDSB installed interval or "smart" meters in 31 pilot schools across the city. Smart meters are electronic digital devices connected to existing analogue natural gas and electricity meters. Once every 15 minutes, 24 hours a day, the smart meters send electronic pulses across the Board's wide area network to a centrally located computer that captures the information.

Displaying school energy consumption for each school in "near real time" allows technical staff and head caretakers to spot unusual spikes in energy consumption quickly so that problems can be addressed before they cost the TDSB a lot of money in wasted energy consumption. This information is also a valuable teaching tool for teachers working with their students to analyze their school's energy consumption as a first step in developing a plan to reduce their school's energy use.

## Energy reports for all schools are now available on-line

Even though only 31 pilot schools have smart meters, all schools can now find out how much electricity and natural gas their school consumes each month and how this year's consumption compares to previous years. On-line energy reports allow staff to monitor their school's energy use and keep track of whether their efforts to reduce their consumption are effective. The information is displayed in a very user-friendly format.



On-line energy reports are available only from a computer connected to the TDSB's wide area network. Go to **TDSBWeb>Facility Services>Energy**.

### New Building Automation Systems (BAS) and mechanical retrofits

The BAS and mechanical retrofits allow TDSB to monitor the outside weather conditions and use computers to control the operation of the mechanical equipment, so as to maintain the required building temperatures. The operation of mechanical equipment can be reduced as appropriate at night, on weekends, and during holidays, allowing the room temperatures to drop automatically when the schools are unoccupied.

Since 1999 TDSB staff have designed and supervised the installation of new BAS/mechanical projects at 83 schools. On average, the natural gas consumption has declined by 22% and electricity by 9% at these sites.

### More lighting retrofit projects

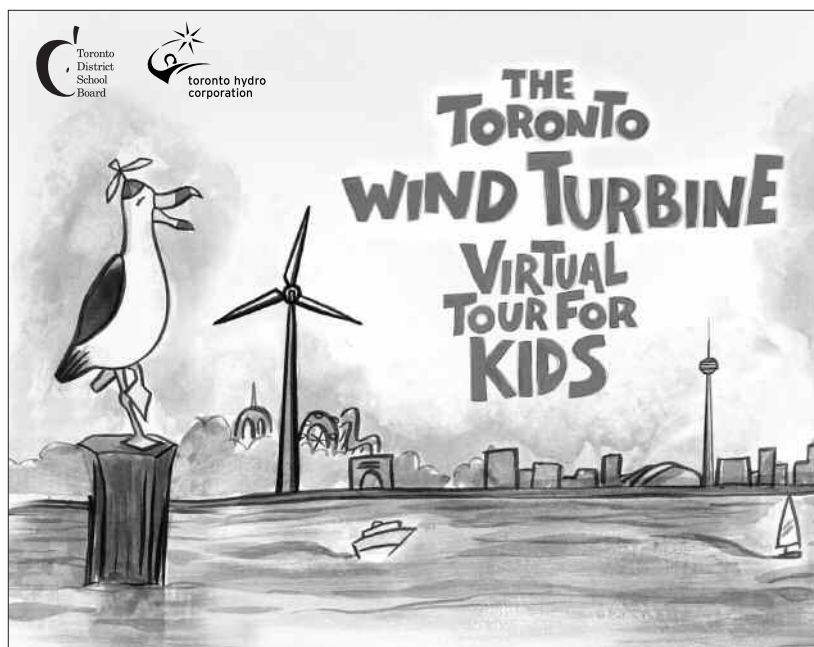
New lighting systems are brighter and more energy efficient than older systems. The major component of the lighting retrofit project includes upgrading existing interior lighting systems in each facility to more energy efficient T8 fluorescent and exit lighting systems. In most cases, lighting retrofits can reduce school energy consumption by 15 to 20%. In 2004/05, the TDSB upgraded the lighting systems at

23 more of its schools. Since 1999 lighting retrofits have been completed in 169 schools.

### TDSB teams up with Toronto Hydro to develop new classroom resources on renewable energy

Burning fossil fuels to meet our energy needs is warming the earth. How to produce enough energy without further polluting the planet is one of the great challenges of our times. To give teachers and students a fresh opportunity to become well-versed in energy studies, TDSB staff in partnership with Toronto Hydro are developing a series of energy education resources.

The Toronto wind turbine is an important local example that can open students' minds to the idea of seeking alternative solutions to meet our energy needs. Resources include a virtual tour of the wind turbine, an elementary guide for an actual field trip, and classroom inquiry activities, as well as a background resource reminding readers of the larger context — the connection between climate change (the Kyoto Protocol) and energy-efficient schools. (See illustrations on page 10.) Resources will be available in late winter 2006; please visit <http://ecoschools.tdsb.on.ca> for more details.



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## WALKING THE TALK: *How did we do in meeting last year's commitments?*

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The TDSB's first Environment Report (May 2005) outlined a summary of its 2004/05 energy conservation action plan under the heading "next steps." The following section restates the initiatives and provides a summary of whether or not they were successfully implemented.

### ***Students and School Staff***

- |  |                     |
|--|---------------------|
| • Increase the number of schools certified as bronze, silver, and gold EcoSchools from 13 to at least 56 (or 10% of TDSB schools). | Acceptable progress |
| • Improve the promotion of the EcoSchools Energy Conservation Guide and increase outreach to schools.                              | Achieved            |
| • Implement "kudos" program to recognize caretakers who are doing an exemplary job in conserving energy at their schools.          | Acceptable progress |

### ***Staff Development***

- |  |                     |
|--|---------------------|
| • Provide ongoing training for operations engineers and head caretakers on the operation of school building automated systems (BAS). | Acceptable progress |
| • Develop and implement a training program on the TDSB's energy standards for maintenance staff and family team leaders.             | Acceptable progress |

### ***Accountability***

- |   |          |
|---|----------|
| • Develop and implement an auditing program for all TDSB energy projects. | Achieved |
|---|----------|

### ***Data Management***

- |   |          |
|---|----------|
| • Improve the tracking, analysis, and reporting of energy consumption at the site level.  | Achieved |
| • Improve the accuracy of budgeting for energy costs at the site level.   | Achieved |
| • Pilot the use of interval or "smart" meters in 31 schools to capture and report on the hourly consumption of natural gas and electricity in "near real time." | Achieved |

### ***Energy Projects***

- |  |          |
|--|----------|
| • Complete lighting retrofits at 12 schools and BAS/mechanical retrofits at 18 schools.          | Achieved |
| • Start the planning and implementation of BAS/mechanical retrofits at an additional 25 schools. | Achieved |

### Energy Projects CONTINUED

- |  |              |
|--|--------------|
| • Improve the identification, investigation, and repair of buildings that have malfunctioning mechanical equipment.  | Achieved     |
| • Pilot 3 new designs for portable classroom heating controls.   | Achieved     |
| • Connect the BAS in 100 schools to their building surveillance systems so that temperatures are lowered and mechanical equipment operated less frequently whenever the surveillance systems are switched on (indicating that the building is unoccupied). | Not achieved |

### Energy Operations

- |  |                     |
|--|---------------------|
| • Reduce the use of morality and parking lot lighting between 11:30 p.m. and 7:00 a.m. at 200 schools. | Acceptable progress |
|--|---------------------|

### Preventive and Corrective Maintenance

- |   |                     |
|---|---------------------|
| • Continue the TDSB's annual preventive and corrective maintenance program for the following equipment: |                     |
| • Exterior doors on 246 buildings   | Acceptable progress |
| • Forced flow cabinet heaters<br>(locations in the entranceways of buildings) at 450 buildings          | Acceptable progress |
| • Portable unit ventilators in 400 portable classrooms  | Acceptable progress |
| • 250 classroom unit ventilators  | Acceptable progress |
| • 109 Aerco boilers   | Achieved            |
| • 350 atmospheric and package boilers   | Acceptable progress |
| • 600 Rooftop HVAC units  | Acceptable progress |
| • 800 heat pumps  | Acceptable progress |
| • 650 pneumatic control systems   | Acceptable progress |
| • Building Automation Systems in 400 buildings  | Acceptable progress |

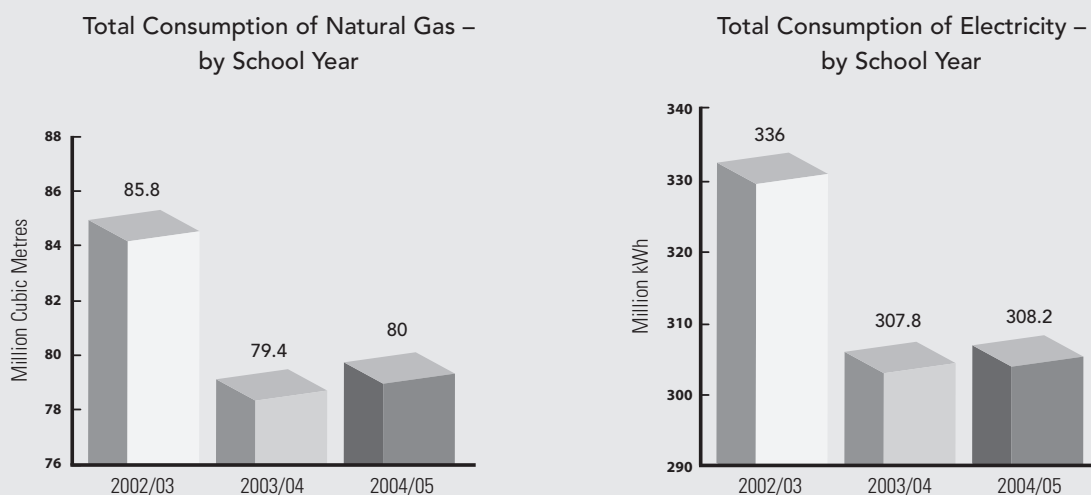
*"Portable electric heaters may be used only as a short-term emergency measure when heating problems arise and when mechanical equipment is being repaired."*

– TDSB EcoSchools Energy Conservation Standard #5

## PERFORMANCE SUMMARY: 2004/05

1. In September 2003, the TDSB's Energy Coordinating Committee set aggressive targets for reducing the TDSB's consumption of natural gas by 15% and electricity by 6% by August 2006.
2. In the 2004/05 school year, the TDSB increased its consumption of natural gas by 0.8% and electricity by 0.1% compared to 2003/04. However, compared to our 2002/03 baseline year, the TDSB's consumption of natural gas has decreased by 6.7%\* and electricity by 8.3%.
3. Since the overall winter weather pattern in 2004/05 was very similar to 2003/04, the 0.8% increase in natural gas consumption this past year can be attributed to the conversion of five schools from oil heating to natural gas and one school conversion from electricity to natural gas.
4. The TDSB used 0.1% more electricity in 2004/05 compared to 2003/04 because of the significant increase in the number of its schools used in July and August this year and the fact that the summer months were much warmer, leading to greater use of air conditioning.
5. A decrease in the per unit cost of natural gas in 2004/05 was offset by the increase in the electricity per unit cost. As a result, the TDSB paid the same amount for energy in 2004/05 as the year before.

### Consumption



### Cost

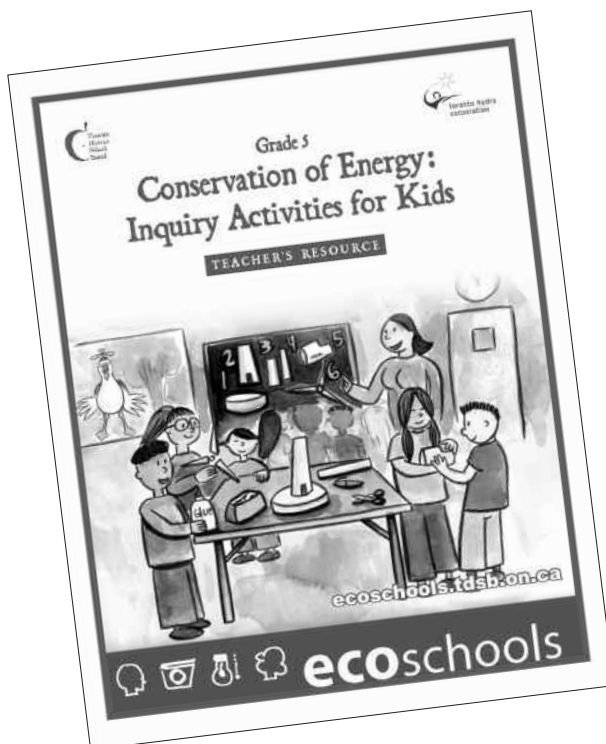
Indicator	Total (03/04)	Total (04/05)	% change from 03/04	Per unit 04/05	% change compared to 03/04
Cost – natural gas	\$30,596,180	\$29,284,000	4% decrease	36.6 cents/m <sup>3</sup>	5% decrease
Cost – electricity	\$28,688,819	\$30,435,000	6% increase	9.88 cents/kWh	5% increase

\* Note: the 6.7% decrease in natural gas consumption (2004/05 compared to 2002/03) can be attributed in part to the fact that the winter of 2002/03 was colder than those of 2003/04 and 2004/05.

## STRENGTHS

- ⊙ Despite a small increase in electricity consumption last year, the TDSB has still exceeded its 3-year 6% electricity conservation target.
- ⊙ A sharp increase in the number of certified EcoSchools indicates that school staff, students and parents are becoming increasingly engaged in conserving energy in schools.
- ⊙ The 83 schools that have received a BAS/mechanical retrofit in the last 6 years have achieved significant reductions in natural gas consumption.
- ⊙ The collection, verification, analysis and reporting of energy consumption data, along with identifying billing errors and forecasting, have improved significantly.
- ⊙ The TDSB has strengthened the internal auditing of its energy projects.

Energy Conservation classroom resources developed by TDSB EcoSchools in partnership with Toronto Hydro.  
(See page 6 for more information.)



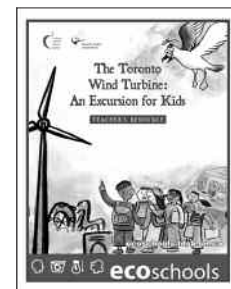
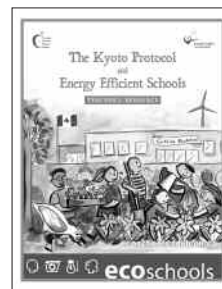
## AREAS FOR IMPROVEMENT

### Reduce natural gas consumption

- ⊙ Despite significant reductions in the natural gas consumption at the 83 schools that have received BAS/mechanical retrofits in the last 6 years, the TDSB has yet to make significant progress in cutting its overall consumption of natural gas across its 650 buildings (making achievement of its 3-year target appear unlikely).

### Address the building maintenance backlog

- ⊙ The overall condition of TDSB facilities continues to deteriorate. The cost of the TDSB's maintenance backlog was \$595 million in 2001. This grew to \$774 million in September 2004 and to \$960 million in September 2005, and is projected to grow to \$1.2 billion by September 2008. This state of serious disrepair is the result of years of inadequate funding for building renewal. Conserving energy in schools where the building conditions continue to worsen is very difficult.



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## NEXT STEPS

### Students and school staff

- ⊙ Increase the number of schools certified as bronze, silver and gold EcoSchools from 53 to at least 70.
- ⊙ Develop and implement a “second generation” EcoSchools Energy Conservation Guide for students and teachers.

### Staff development

- ⊙ Continue to make energy conservation presentations to principals at Family of Schools meetings.
- ⊙ Provide ongoing training for operations engineers and head caretakers on the operation of school building automation systems (BAS).
- ⊙ Develop and implement a new coordinated energy conservation training program for staff in the TDSB’s Facility Services department.
- ⊙ Continue to make energy conservation training a priority.

### Accountability

- ⊙ Conduct internal audits of all TDSB energy projects.

### Data management

- ⊙ Upgrade the on-line energy reports to make them even more useful tools for teachers and students.
- ⊙ Monitor the effectiveness of the interval or “smart” meter pilot project in 31 schools.

### Projects

- ⊙ Complete lighting retrofits at 24 schools and BAS/mechanical retrofits at 31 schools.
- ⊙ Design, implement and evaluate three renewable energy pilot projects.
- ⊙ Upgrade the boilers in 12 schools, windows in 95 schools and the insulation in the roofs at 107 schools.

### Standards

- ⊙ Communicate the new Energy Conservation Standards approved by the Board to all staff.

### Design

- ⊙ Seek Board approval to undertake “deep retrofits” at schools in order to implement measures that would lead to significant reductions in energy use.

### Operations

- ⊙ Upgrade the controls in the Building Automated Systems at 20 schools that have older systems.

### Preventive and corrective maintenance

Continue and further develop the TDSB’s annual preventive and corrective maintenance program for the following equipment:

- ⊙ Exterior doors on 260 buildings
- ⊙ Forced flow cabinet heaters (located in the entranceways of buildings) at 450 buildings
- ⊙ Portable unit ventilators in 400 portable classrooms
- ⊙ 250 classroom unit ventilators
- ⊙ 109 Aerco boilers
- ⊙ 350 atmospheric and package boilers
- ⊙ 720 Rooftop HVAC units
- ⊙ 490 heat pumps
- ⊙ 650 pneumatic control systems
- ⊙ Building Automation Systems in 400 buildings

## THE PEOPLE MAKING IT HAPPEN

At the forefront of the TDSB's efforts to conserve energy are the staff, students and parents in our schools. The following list of the EcoTeam members of the TDSB's 53 certified bronze, silver and gold EcoSchools (see page 4 for more information).

### SCHOOL ECOTEAMS

<b>Albion Heights Jr. MS</b> Marilyn Aishford, Teacher Diane Bright, Teacher Anita Hayhoe, Teacher	John Long, Head Caretaker Anna Viegandt, Vice Principal Paul, Student Anmol, Student	Jacky, Student Rohit, Student Reuban, Student Secilia, Student	Chirayu, Student Shenelle, Student Sumeet, Student Vanessa, Student
<b>Banting and Best Public School</b> Gail Follert, Teacher	Anne Ng, Teacher Jurgen Remisch, Teacher	Hripsik Sarkissian, Vice Principal Tim Shepherd, Head Caretaker	Amy Wheler, Teacher
<b>Bedford Park Jr. Public School</b> Karen Kelly-Archer, Teacher	Lisa Green, Parent Sheila Harbin, Office Administrator	Ian McMillan, Head Caretaker Elaine Ramsay, Parent	Nick Stefanoff, Principal Hannah, Student Mark, Student
<b>Bellmere Jr. Public School</b> Theresa Dillinger, Vice Principal	Azza Hamid, Principal Trent Humphrey, Head Caretaker	Mary Shier, Teacher Neelan, Student Jahnavi, Student	Ragavey, Student YuBo, Student Maharshi, Student
<b>Bloorlea M.S.</b> Mario Buttigieg, Head Caretaker	Anne Coppinger, Teacher Lu Lazos, Office Administrator	Helene Pfeiffer, Principal Michelle, Student	Natashia, Student Samantha, Student Jessica, Student
<b>Cassandra Public School</b> Ryan Adams, Teacher	Lynda Barker, Teacher Cynthia Hoy, Parent	Theresa Kay, Parent Rhoda Potter, Principal	Phil Vassel, Head Caretaker Alistair, Student Madison, Student
<b>Centennial Rd. Jr. Public School</b> Shauan Mary Van Hoof, Principal	Nancy Hodgkinson, Office Administrator	Chad Reid, Head Caretaker Meg Thompson, Teacher	Hugo, Student Jodi-Anne, Student
<b>C.E. Webster Public School</b>	Anne Beetlestone, Principal Tony DiFabio, Head Caretaker	Brenda Mennie, Teacher Nancy Rakowski, Teacher	Catherine Watts, Teacher
<b>Cornell Jr. Public School</b>	Catherine Schoenfeld, Teacher Cheryl Vousden, Head Caretaker	Allison Williams, Teacher Afshan, Student	Grade 4, 5, and 6 of the Earth Savers Club
<b>Courcelette Public School</b>	John Evans, Head Caretaker Kim Macdonald, Principal	Holly Pennington, Teacher	Nick, Student
<b>Don Mills Middle School</b> Kevin Freckelton, Vice Principal Sebastian Hergott, Teacher Paula Nicora, Teacher Marion Oliver, Teacher	Laura Rimas, Office Administrator Marcia Shantz, Teacher Kristin, Student Jennifer, Student Dani, Student	Bulut, Student Lulu, Student Sonja, Student Shanice, Student Nada, Student	Celine, Student Joy, Student Olivia, Student Taylor, Student
<b>Donwood Park Jr. Public School</b> Matt Brundle, Teacher Peggy Crowthers, Daycare Supervisor David Ellis, Teacher	Darlene Hirons, Principal Lee Ann Knapp, Teacher Micheline Lim, Teacher Margaret Pace, Parent Mario Renaud, Parent	Peggy, Daycare Supervisor Eva Rendek, Teacher Onsia, Student Mursal, Student Shelby, Student	Styna, Student Shamal, Student Ravii, Student Kathy, Student Shireen, Student Timothy, Student
<b>Dorset Park Public School</b> Ginny Brooking, Principal	Julie Kekewish, Teacher Tina Leino-Whyte, Teacher	Jeff Thomas, Head Caretaker Haley, Student	Jeremy, Student Steevan, Student
<b>Dr. Norman Bethune C.I</b> Cheryl Carr, Teacher Stella Dasko, Principal	Judy Tutchener, Teacher Peter Vande Wiel, Head Caretaker Patricia, Student	Kristina, Student Emily, Student Jenny, Student	Kevin, Student Alexandra, Student
<b>Dublin Heights Elementary &amp; Middle School</b> Dunja Aijic, Parent Jane Cooper-Eade, Principle	Miriam Henriques, Teacher Michael Jobe, Head Caretaker Matty Oliveira, Teacher Candidate Theresa Ryckewaert, Teacher	Avery Sampson, Teacher Jonna Watson, Parent Elysia, Student Elyzabeth, Student	Alexander, Student Adam, Student Jackie, Student Caterina, Student Heather, Student

EcoTeam representatives from  
53 TDSB certified EcoSchools,  
*Certification Awards Ceremony,*  
*City Hall, September 2005.*



<b>Earl Haig Jr Public School</b> Michael Byrne, Principal Sally Carneiro, Daycare staff Winne Chan, Breakfast/Lunchroom supervisor Scott Collins, Head Caretaker Susan Crofts, Community Randy Donohue, Parent	Evelyn Dow, Educational Assistant Mary Hamiwaki, Teacher Tiiu Kajak, Teacher Lucy Patterson, Community Member Audrey-Ann Winsor, Vice Principal Emily, Student Gabriel, Student	Kaitlin, Student Olivia, Student Joanna, Student Vivian, Student Alexus, Student Matthew, Student Sara, Student Sara N, Student Karina, Student	Tommy, Student Megan, Student Jeremy, Student Yiping, Student Lucy, Student Mariam, Student Kostas, Student Ronan, Student Bryson, Student
<b>Finch Public School</b> Erika Allen, Teacher	Jan Davies, Principal Christina Huang, Teacher	Niki Karadi, Teacher Kathy McBey, Parent	Todd Morrison, Head Caretaker The Green Ambassadors Student Environment Club
<b>George S. Henry Academy</b> Russel Allen, Head Caretaker Rita Filicetti, Teacher	Robert Hall, Teacher Debbie Perrin, Principal Yash, Student	Charlene, Student Selena, Student Amulya, Student	Sasidar, Student Aditi, Student Viver, Student
<b>Gledhill Jr. Public School</b>	Marita Adams, Principal Vincent Bolduc, Teacher	Marielle LeBlanc, Teacher Mary-Margaret McMahon, Parent	Aysha, Student
<b>Grey Owl Jr. Public School</b>	Lesley Dyce, Teacher Liz Holder, Teacher	Avi Lavee, Teacher Bill Parish, Vice Principal	Dave Ragobeer, Head Caretaker Environment Club (20 students)
<b>Guildwood Jr. Public School</b> Corey Cameron, Lunchroom Supervisor	Gord Griffiths, Head Caretaker Dan Marcoux, Parent	Rose Mitchell Spohn, Parent Pauline Tetley, Principal	Jeffrey, Student
<b>Hollycrest MS</b> Renata Collins, EcoTeam Chair & Teacher	Jose Rolden, Head Caretaker Elif, Student	Jessica, Student Salman, Student	Glenn, Student Brent, Student Leah, Student

<b>Jackman Ave Jr. Public School</b> Leasa Adams, Teacher Grace Chao, Teacher	Mandy Csamer, Teacher Rose Falvo, Teacher Tom Recke, Teacher	Kathy Scholfield, Teacher Karen Urban, Vice Principal Terry Walsh, Principal	Recycling Club Students Composting Club Students Garden Club Students Parents from the Garden Club
<b>J.G.Workman Public School</b> Ellen D'Heureux, Teacher	Patti Parton, Teacher Lee-Ann Poole, Principal	Rachel, Student Deba, Student	Kristen, Student
<b>John Fisher Jr. Public School</b> Naag Jetha, Teacher Melinda Keckes, Parent Clare Mian, Principal	Philip Roy, Teacher Jennifer Spiess, Parent Amanda, Student Brian, Student	Katie, Student Frank, Student Lara, Student Thea, Student	Samuel, Student Samanth, Student Justin, Student Yonah, Student
<b>Kew Beach Jr Public School</b> Marilyn Bowness, Office Admin	Astrid DeCairos, Teacher Michael McCarthy, Head Caretaker	Sybille Parry, Teacher Beverly O'Brien, Teacher Karen Procepec, Parent	Marjorie Rose, Principal Katie, Student Elizabeth, Student
<b>Kipling Collegiate Institute</b> Jana Audenard, Teacher	Raj Pannu, Teacher Ralph Tetzlaff, Head Caretaker	Anum, Student Hamsika, Student	Hassan, Student Pankhuri, Student Sweta, Student
<b>Maryvale Public School</b> Bruce Bartlett, Caretaker Tom Driscoll, Head Caretaker Lisa Shulman, Teacher Environment Club of Maryvale Public School: Aakifa, Student Abeera, Student Abisha, Student Araventhana, Student	Derrick, Student Emily Anne, Student Erin, Student Hajesha, Student Hannan, Student Jananey, Student Jennifer, Student Jermain, Student Jessica, Student Julia, Student	Justine, Student Kathleen, Student Kaylas, Student Liam, Student Manisha, Student Mariam, Student Michael, Student Michelle, Student Nevetha, Student Nicholas, Student	Sara, Student Sahamir, Student Shannon, Student Shriya, Student Sunaina, Student Thulasi, Student Vithusa, Student Yalda, Student Thilzad, Student Saira, Student
<b>Maurice Cody Jr. Public School</b> Beverly Bruce, Teacher Clare Carter, Teacher Carol Anne Coulter, Parent Cindy English, Eco Co-Chair, Parent Judy Green, Principal Joyce Graham, Teacher Pat McCarthy, Head Caretaker Rachel Netley, Teacher Cheryle Russell, Eco Co-Chair, Parent Judy Sheine, Parent Kelly Smith, Parent	Kirsten Sixt, Parent Wendy Tamminen, Parent Mitchell, Student Jessica, Student Niki, Student Antonia, Student Erik, Student Sabrina, Student Katherine, Student Rachel, Student Haleigh, Student Simon, Student Owen, Student Hannah, Student	Madeline, Student Julia, Student Hope, Student Lizzie, Student Aisha, Student Teagan, Student Dean, Student Zoe, Student Emma, Student Willow, Student Elizabeth, Student Audrey, Student Quinn, Student Erin, Student	Samantha, Student Dana, Student Katherine, Student Erin, Student Sydney, Student Bryn, Student Sarah, Student Julia, Student Jennifer, Student Cailen, Student Shannon, Student Emily, Student Sarah, Student Gillian, Student
<b>McKee Public School</b>	Shirley Cuthbertson, Principal	Ralph Cooper, Head Caretaker Vince Spadero, Teacher	All the students from the Grade 5 class
<b>Northlea Elementary &amp; Middle School</b>	Bruce Burley, Teacher Francine Chalifour, Teacher	Grace Chung, Teacher Donatien Gahungu, Teacher Karen Harrington, Teacher	Julie Roberts, Teacher Andrea Rowen, Principal Jayson Stewart, Teacher
<b>Oakridge Jr. Public School</b> Sue Banks, Teacher	Herman Brech, Head Caretaker Elissa Green, Teacher Deb Gilchrist, Teacher	Peter McKinley, Teacher Nadira Persaud, Principal Khajia, Student	Nujat, Student Ramsha, Student Sara, Student
<b>Rockford Public School</b>	Kirsten Adler, Office Admin Angela Bedard, Teacher	Gladys Beaton, Principal Cheryl Blanchard, Education Assistant	Brenda Gluck, Teacher Janet Peden, Teacher Dubrovka Vasic, Teacher
<b>Rosedale Jr. Public School</b> Lori Barnes, Parent	Julia Chmilnitzky, Teacher Sherran Coyle, Principal	Rani Glick, Parent Normand Jones, Head Caretaker	Alex, Student
<b>SATEC @W.A. PORTER Collegiate Institute</b> Michelle Baraclough, Teacher	Mark Booth, Principal Mika Green, Teacher Ross Hart, Caretaker	Steve Lloyd, Teacher Doug McMillan, Teacher Linda Ryan, Teacher	Jagdamba, Student Suganthan, Student Nabil, Student Cindy, Student

<b>School of Life Experience (S.O.L.E.)</b> Dave Jones, Head Caretaker	Rob Little, Office Administrator Dr. Marilyn Mendelssohn, Principal Sam Sarath-Chandra, Teacher	Lisa Turner, Teacher Bernadette Zubrisky, Teacher Alia, Student	Maya, Student Sonja, Student Victoria, Student
<b>Shoreham Public School</b> Janet Bandurak, Teacher John Crunkleton, Teacher Ladeanne Debassige, Teacher	Steven Joudrey, TRCA representative Gord Kingsmill, Principal Larry McGuire, Head Caretaker	Maureen Olton, Educational Assistant Gary Pieters, Vice Principal Jo Volk, Teacher	Cardine Zikovitz, ESL Teacher Steven, Student Eleana, Student Tizanna, Student
<b>Wellesworth Jr. Public School</b> Stephen Elkerton, Teacher Dennis Forze, Head Caretaker	Marilyn Hagerman, Educational Assistant Liz McFarlane, Principal	Janine McCann, Teacher Glen Tapley, Parent Clint Wilson, Parent	Hasan , Student Mohammed, Student
<b>Whitney Public School</b> Rick Hay, Teacher	Rob Maxwell, Head Caretaker Jennie Petko, Principal	Nicole, Student Megan, Student	William, Student Sarah, Student
<b>Willow Park Jr. Public School</b> Marwa Hamid, Vice Principal	Heather Groves, Principal Diana Kordic, Teacher Herpreet Minhas, Teacher	Paula Masterson, Case Youth Worker Betty Rabito, Teacher	Al Roberts, Head Caretaker Laura Sereda, Teacher David Townsend, Teacher
<b>Woburn Jr. Public School</b> John Bonauro, Head Caretaker Doreen Laird, Teacher	Usha Nair, Teacher Sheila Punchard, Office Administrator	Saro Uthayaicumar, Parent Bev Wallis, Teacher Jill Watson, Principal	Rebecca, Student Pooja, Student
<b>Yorkview Public School</b> Jo-Anne Berlinguette, Teacher David Feldman, Teacher	Chantal Jobe, Head Caretaker Niraj Joshi, Parent Anne Kneelman, Principal	Maureen McCullough, Parent David Moule, Parent Frank Vandermeij, Parent	Many students, parents and teacher volunteers of the Green Club
<b>Etobicoke Field Studies Centre</b>	Rob Crew, Specialist	Jane Madarasz, Specialist	Pam Miller, Site Supervisor
<b>Etobicoke Outdoor Education Centre</b>	Eric Fitzgerald, Caretaker Barb Irmie, Specialist	Dave Knowler, Specialist Chris Mermer, Teacher	Deb Merriam, Specialist Lynda Russell, Specialist Lori Yez, Teacher
<b>Forest Valley Outdoor Education Centre</b>	Barb Barrowman, Office Administrator Rodway Daniels, Specialist	Dean Henley, Specialist Andy Kennedy, Teacher Bill Gallogley, Caretaker	Dusan Takac, Caretaker Sandee Sharpe, Site Supervisor Emily Smit, Intern
<b>Hillside Outdoor Education Centre</b>	Neil Bennett, Caretaker Juli Harris-Rensink, Teacher	Carmela Marshall, Teacher Ryan Sim, Teacher	Sadi Siva, Friends of the Rouge Jane Wadden, Site Supervisor Brett Wilcox, Specialist
<b>Island Public/ Natural Science School</b> Margaret Catanzaro, Staff	John Goodyear, Teacher Karen Maxwell, Teacher Christer Nilsson, Principal	Sonia Palacios, Teacher John Pellow, Head Caretaker Cheryl Shannon, Site Supervisor	Linda Wilson, Parent Neve, Student Sophia, Student
<b>Mono Cliffs Outdoor Education Centre</b> Christina Bajmak, Intern Richard Blackburn, Chef Leigh Bloomfield, Intern Marie Brown, Kitchen staff Lisa Cameron-Clarke, Housekeeping Staff	Brenda Carling, Teacher Alexander Casey, Intern Bob Clarence, Caretaking Staff Marianne DeWit, Kitchen Staff Sharon Ellis, Housekeeping Staff Jessica Harrower, Specialist Mary Lou Hogan, Specialist Alison Irvine, Site Supervisor	Alison Leppard, Intern Kathy Lindsay, Specialist Shirley Mather, Specialist Frank May, Head Woodsman Brian McLean, Head Caretaker Allison McDonald, Office Administrator Marianne McLeish, Intern	Christine Post, Specialist Sharon Rees, Kitchen Staff Melissa Shaw Intern Paul Thorton, Specialist Lori White, Housekeeping Staff
<b>Scarborough Outdoor Education School</b>	Dave Boyce, Site Supervisor	Pete Hitchcock, Specialist	Susan MacDougall, Teacher
<b>Sheldon Outdoor Education Centre</b>	Tricia Barrett, Teacher Pam Bondett, Site Supervisor	Tracy Gallagher, Cook Andy Kennedy, Site Supervisor	Steve McElroy, Specialist Brian Moody, Woodsperson Jon Tamlin, Specialist
<b>Toronto Urban Studies Centre</b>	Lorraine Clarkson, Site Supervisor Martha Ann Edgar, Teacher	Maria Laino, Office Admin Monique Linteau, Specialist	Kathleen McFayden, Specialist Chris Metropolis, Specialist Tal Schacham, Specialist
<b>Warren Park Jr. Public School/Warren Park Outdoor Education Centre</b>	Judy Kramer, Site Supervisor	Ryan Henderson, Specialist	

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## CENTRAL SUPPORT STAFF

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In addition to the staff, students and parents working within local schools, the following central technical and program staff have made significant contributions to conserving energy as part of the TDSB's Energy Coordinating Committee.

Hasu Amin	Energy Project Engineer
Karim Asani	Electrical Coordinator, Energy Management Group
Maurice Buonastella	Project Coordinator, Energy Management Group
Brian Cameron	Family Team Leader, Regional Operations
Richard Christie	Program Coordinator, School Services - Program
Charlie Conquergood	FTL / CMMS Specialist, Operations Central Services
Frank Coppinger	General Manager
Rick Daigle	Regional Manager, Regional Operations
Paul Giannoulis	Facility Services Business Team Lead, Standards, Compliance & Environment
David Hainey	Family Team Leader, Regional Operations
Laurence Jay	Coordinator, Central Services
Tonis Kilp	Quality Team Leader, Quality Team
Ralf Klopf	Family Team Leader, Regional Operations
Ben Kuye	Utility Administrator, Energy Management Group
Malcolm Lander	Project Coordinator, Energy Management Group
Ken Laursen	Family Team Leader, Regional Operations
Fred McGrath	Business Specialist
Rob Patterson	Family Team Leader, Regional Operations
David Percival	Manager, Standards, Compliance & Environment
Bev Ryan	Coordinator, Employee Development
Ron Schell	Family Team Leader, Regional Operations
Eric Steen	Maintenance Team Leader, Central Services
Melanie Stoughton	Coordinator, Administrative Services
Vladin Strashun	Mechanical Coordinator, Design & Construction
John Wong	Electrical Coordinator, Design & Construction



## TORONTO DISTRICT SCHOOL BOARD TRUSTEES

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**WARD 1**  
Stan Nemiroff



**WARD 2**  
John Campbell



**WARD 3**  
Bruce Davis



**WARD 4**  
Stephnie Payne



**WARD 5**  
Sheine Mankovsky



**WARD 6**  
Elizabeth Hill



**WARD 7**  
Irene Atkinson



**WARD 8**  
Howard Goodman



**WARD 9**  
Maria Rodrigues



**WARD 10**  
Chris Bolton



**WARD 11**  
Josh Matlow



**WARD 12**  
Mari Rutka



**WARD 13**  
Gerri Gershon



**WARD 14**  
Sheila Ward  
Chair



**WARD 15**  
Rick Telfer



**WARD 16**  
Sheila Cary-Meagher



**WARD 17**  
Michael Coteau



**WARD 18**  
Gary Crawford  
Vice-Chair



**WARD 19**  
Scott Harrison



**WARD 20**  
David Shory



**WARD 21**  
Noah Ng



**WARD 22**  
Patrick Rutledge

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