



REPORT TO

**CORPORATE SERVICES, STRATEGIC
PLANNING AND PROPERTY
COMMITTEE**

NET ZERO ENERGY STUDY (ALL WARDS)

*"I can do all things through HIM who strengthens me."
Philippians 4:13 (NRSVCE)*

Created, Draft	First Tabling	Review
September 3, 2019	September 12, 2019	

D. Friesen, (Acting) Superintendent, Capital Development and Asset Renewal
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RECOMMENDATION REPORT

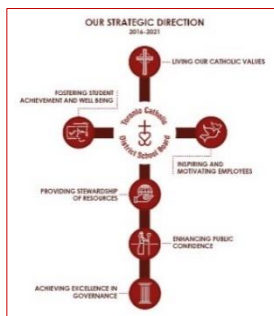
Vision:

At Toronto Catholic we transform the world through witness, faith, innovation and action.

Mission:

The Toronto Catholic District School Board is an inclusive learning community uniting home, parish and school and rooted in the love of Christ.

We educate students to grow in grace and knowledge to lead lives of faith, hope and charity.



Rory McGuckin
Director of Education

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Associate Director
of Academic Affairs

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Associate Director of Facilities,
Business and Community
Development, and
Chief Financial Officer

A. EXECUTIVE SUMMARY

This report presents the *path towards Net Zero* research study findings and recommends next steps. Based on the findings that the Toronto Catholic District School Board is one of the most intense energy consumers among GTA boards and that Net Zero buildings are, so far, very rare and require very low energy use intensity, the research study report has been titled “*Conserve First.*”

Net Zero Emissions, rather than Net Zero Energy, is recommended as a long-term goal, as this is a more achievable target and reduction of greenhouse gas emissions is the critical concern in addressing climate change. While the TCDSB is likely decades away from being able to achieve Net Zero, there are many lessons to be learned from other school boards in Ontario and similar climates in North America. Energy-conserving practices can be developed that can lead to significant reductions in energy use and emissions. Creation of a “conservation culture,” with sustained effort from a host of people, including external partners, over a period of years, even decades, is essential for success. Based on Pope Francis’ “Laudato Si”, this approach could also be construed as aligning with Catholic values.

The staff recommendation is that trustees commit to the creation of a “conservation culture” at the TCDSB. This would require consultation with trustees, staff, students, parents and other school boards, to determine a target for TCDSB’s energy conservation strategy, a roadmap to achieving this target and how to create a conservation culture extending into the core business of teaching students.

The cumulative staff time required to prepare this report was 14 hours

B. PURPOSE

1. *At the Corporate Services, Strategic Planning and Property Committee meeting on March 10, 2016, the Board resolved to become a net zero energy school board.* In December 2017, in order to define a feasible long-term energy target and map out strategies to achieve this target, a consultant was appointed to carry out comprehensive research to:
 - .1 *Benchmark TCDSB existing schools’ energy use, construction standards and Capital costs and compare to other GTA boards;*
 - .2 *Summarize relevant policies and standards;*

- .3 *Track Capital cost implications of energy-saving design strategies that have been employed by others;*
 - .4 *Set specific short and long-term targets and identify risks;*
 - .5 *Make recommendations and identify next steps.*
2. ***This report presents the “Path towards Net Zero” consultant study findings and recommends next steps.*** The study has been titled “Conserve First,” to emphasize the finding that reduction of energy consumption is the critical first step.

C. BACKGROUND

1. ***The Research in Architecture Studio provides research services to public agencies and agencies serving the profession of architecture, focussing on the performance of buildings, the reliability of emerging “green” building technology and risk management.*** In December 2017, following a competitive procurement process, The Research in Architecture Studio was retained to carry out a research study to investigate the challenges and potential for the TCDSB to move toward Net Zero Energy, to provide the Board with a solid basis for decision-making.
2. ***The Board’s Energy Conservation and Demand Management (ECDM) Plan outlines a short-term goal for energy conservation that is still a long way from net zero.*** A new five-year ECDM Plan, prepared by Enerlife Consulting Inc., was approved by the Board on June 6, 2019, targeting a reduction in energy use of 11% over five years. The Board’s commitment of \$2M in School Renewal funding per year for five years is a start on the road to net zero. The “Conserve First” study details just how long that road is and provides options and recommendations for the Board to consider.
3. ***In his 2015 Encyclical, Laudato Si’, Holy Father Francis brings addressing climate change to the forefront as an issue of Catholic Faith.*** The “Conserve First” study outlines three Guiding Principles derived from the Laudato Si’, noting that the Holy Father calls out to all people to integrate their thinking about environmental stewardship with their thinking about disenfranchised people. *“When we speak of the ‘environment,’ what we really mean is a relationship existing between nature and the society which lives in it. . . We are faced not with two separate crises, one environmental and the other social, but rather with one complex crisis which is both social and*

environmental.” (Laudato Si’, article 139). It can be seen as a moral imperative for a Catholic school board to take real steps to address this crisis.

D. EVIDENCE/RESEARCH/ANALYSIS

1. *The Conserve First Net Zero Research Study comprises an Introduction and five parts as follows:*

Introduction: What would “Net Zero” mean for the TCDSB?

Part 1: Starting position and guiding principles;

Part 2: Regulations, standards and conservation culture;

Part 3: Cold-climate Net Zero schools: the new and the few (case studies);

Part 4: “Conserve first” demands a whole array of design strategies;

Part 5: Financing the transition toward Net Zero readiness.

2. *The Executive Summary of the “Conserve First” report is attached as Appendix A.* The full report will be available on the Board’s website under the Environment page at the following link:

<https://www.tcdsb.org/Board/environment/Documents/ConserveFirstNetZeroResearch.pdf>

3. *The findings from each section of the “Conserve First” report can be summarized as follows:*

Intro: • Definitions of Net Zero (NZ) – NZ-Energy at the site, NZ-Emissions (or Carbon) at the site, NZ-Emissions (or Carbon) at the source, NZ-Ready (Energy or Emissions), Near-Zero;

- Key indicator is Energy Use Intensity (EUI), most commonly measured in Ontario in ekWhr/m²/yr;
- Thermal Energy Demand Intensity (TEDI), the energy used for space heating, is the most important component of EUI in our Ontario climate to reduce;
- GTA median for EUI for schools is 176 ekWhr/m²/yr;
- Target maximum for NZ-Emissions schools is 75 ekWhr/m²/yr.

Part 1: • Guiding Principles found in the Laudato Si’ caution against partial solutions in favour of an “integral ecology,” against harmful habits of consumption, and against a “superficial ecology” in favour of a “broader vision” that helps the poor;

- On a per square metre basis, the TCDSB is one of the most intense energy consumers among GTA boards with the highest EUI at 371 kWh/m²/yr and two-thirds of the schools above the GTA median;
- Nearly all TCDSB elementary schools use more than 1.5 times the energy of a NZ-Emissions ready school;
- Some TCDSB schools use 4 times the energy that others do;
- Part 1 analyzes the factors influencing energy use in TCDSB schools and suggests 12 New Directions that are critical to pursuing a greatly reduced level of energy consumption;

- Part 2:
- Applicable laws today – Ontario Building Code, Regulation 507/18 under the Electricity Act, Toronto Green Standard Tier 1;
 - Roadmap for future regulation - Toronto Green Standard Tiers 2-4, Toronto Zero Emissions Buildings Framework;
 - Guidelines available for voluntary adoption – CaGBC Zero Carbon Building Standard, REALPac’s 20 by 15 program, BOMA Canada Net Zero Challenge, Passive House Canada guideline;
 - Toronto Regional Conservation Authority (TRCA) Sustainable Schools ranking of most energy-conserving schools in Ontario;
 - Six principal elements of conservation culture practiced by the ten TRCA-ranked most energy-conserving school boards.

- Part 3:
- Net Zero schools are, so far, very rare;
 - The only three Net Zero or Near Net Zero projects that have been completed in Ontario and Quebec are profiled;
 - Five projects in similar U.S. climates were identified and three of these were studied in depth;
 - All six case studies shared three key approaches – partnering with multiple external agencies, engagement of teachers and students and training of building operators;
 - *“Where ambitious conservation or Net Zero have been realized, success has been the product of the sustained effort of a host of people over a period of years, even decades.”*

- Part 4:
- Technical strategies used in the case study schools in Part 3 are identified and compared to TCDSB’s recently constructed schools;
 - Air tightness testing is essential to achieving exemplary energy performance;

- All five Net Zero schools studied use ground source heat pumps to deliver heating and cooling;
- Insulation levels, window-to-wall ratios, lighting power density, energy-recovery ventilation, HVAC and lighting controls and reduction of “plug loads” are all key strategies;
- Quality control during construction is essential and blower door testing for air-tightness is recommended.

- Part 5:
- The Capital cost of Net Zero buildings studied ranged from 50% to 120% more than the 2018 Ministry of Education benchmark funding for schools;
 - To add only enclosure upgrades to reduce energy consumption would require at least 10-12% above benchmark funding;
 - Creation of an Energy Conservation Capital Fund is suggested with the potential to generate funds for one NZ-Emissions school every 5-7 years.

4. ***In relation to Part 5 of the Conserve First study, TCDSB has also carried out costing of upgrades for a potential pilot Net Zero new school.*** Staff requested a Net Zero upgrade design brief and cost estimate from the architect for the St. Bruno/St. Raymond replacement school. The estimated additional cost was \$3,039,945. On April 4, 2018, staff submitted a request to the Ministry of Education for additional funding to make this TCDSB’s first Net Zero school. This request was not approved.
5. ***The study report outlines a number of options that the TCDSB may choose to set targets and to map a path forward.*** The general conclusion of the study is that the TCDSB is a long way from being able to achieve a target of Net Zero Energy, but that there are many lessons that can be learned from other school boards in Ontario and in similar climates in North America. Energy-conserving practices can be developed that can lead to significant reductions in energy use and greenhouse gas emissions.
6. ***It is essential to develop a “conservation culture” within the Board.*** The other important finding from the study is that school boards and other organizations that have made significant gains in energy conservation and greenhouse gas reduction could not have done so without support from the full range of stakeholders. Trustees, Directors, senior staff, as well as staff at all levels have contributed something substantive and of long duration. A “conservation culture” should extend into the core business of teaching

students. Fostering student achievement includes environmental stewardship literacy and commitment.

E. METRICS AND ACCOUNTABILITY

1. ***Consultation on creation of a conservation culture should be carried out with trustees, staff, students, parents and other school boards.*** The findings of the “Conserve First” Net Zero research study will help determine a target for TCDSB’s energy conservation strategy, a roadmap to achieving this target and, most importantly, how to create a conservation culture at TCDSB. Consultation methods will be assessed on an ongoing basis and modified as required.
2. ***A report on the results of consultation and recommendations for next steps will be presented within one year to the Corporate Services Committee meeting.***

F. IMPLEMENTATION, STRATEGIC COMMUNICATIONS AND STAKEHOLDER ENGAGEMENT PLAN

1. ***The Environment Committee will review the “Conserve First” Net Zero Study report at its next meeting on September 20, 2019.*** The Committee will develop a Consultation Plan, to include:
 - Trustees, including Student Trustees
 - Director of Education
 - Education Council
 - Environmental Support Services management staff
 - Capital Development and Asset Renewal staff
 - Energy Management staff
 - Environmental Support Services front line staff
 - Technical Services staff
 - STEM/Environmental Resource Teachers
 - Principals
 - Students
 - CPIC/OAPCE
 - Parents/Catholic School Parent Councils
 - Other School Boards

2. ***Stakeholder consultation will be carried out between October 2019 and March 2020.*** The intent of the proposed consultation is to arrive at a direction towards combatting climate change devised by, and strongly supported by, all stakeholders, that will be used to develop an implementation plan. This will include:

- identification of an achievable long-term energy performance/ greenhouse gas reduction target;
- identification of means to monitor and demonstrate progress towards this target;
- identification of a reasonable timeline to achieve the target;
- understanding by all stakeholders of the challenges involved in achieving substantial energy use and greenhouse gas emission reductions and the need to create a conservation culture;
- collection of ideas from all stakeholders about opportunities to create a conservation culture within their sector/influence;
- selection of the most promising options for methods to achieve the desired improvements for further research/exploration;
- identification of resources needed to explore options and develop an implementation plan
- identification of policy changes needed to help create and sustain a conservation culture.

3. ***Following the initial consultation, the next steps will be to:***

- recommend required policy changes needed to help create and sustain a conservation culture;
- secure approval and resources to explore the most promising options identified by the consultation;
- carry out research to identify the costs/benefits of the shortlisted options;
- carry out further consultation with stakeholders and select a path;
- collaborate with stakeholders to develop a long-term implementation plan;
- continuously monitor progress of the implementation plan and adapt as needed to ensure continuous, sustainable commitment and improvement.

G. STAFF RECOMMENDATION

1. That trustees commit to the creation of a conservation culture at TCDSB.
2. That consultation on the creation of a conservation culture and identification of targets for energy conservation be carried out, as detailed in the Implementation, Communications and Stakeholder Engagement Plan in this report.