

# Cochrane High Sustainable Development Committee

Residents Concerns Research Report  
April 12, 2016



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The Cochrane High School's Sustainable Development Committee is a student organization that works to bridge the gap between knowledge and action on issues related to sustainability in the school community. We work to make CHS as sustainable as possible through policy initiatives and infrastructure upgrades. The Sustainable Development Project is a multi-phase effort that spans 15 years of volunteer student action. The committee's proposal for a small residential wind turbine is consistent with the goals and vision of the SDC.

During three roundtable discussions the concerns of residents closest to the school property were voiced. Respectfully the SDC has responded to these concerns. We categorized the concerns into ten topics. The following report addresses six of these topics. The remaining three topics, shadow flicker, noise, and animals, are turbine specific. These topics will be professionally researched and addressed in conjunction with the REF relative to turbine selection. The fourth topic not covered in this report is the approving authority which is currently being debated in Council April 2016.

Should you have any concerns or questions that arise from this report please feel free to contact Ms Stephanie Bennett at [sbennett@rvschools.ab.ca](mailto:sbennett@rvschools.ab.ca) or 403-932-2542

- **Historically, property values have increased at Cochrane Heights and are expected to continue to do so, even after the installation of a small wind turbine outlined in the REF.**
- **Property Appraisers, Assessors, Realtors, and Brokers; provided evidence that property values will not be negatively impacted if REF requirements are followed.**
- **By modelling sustainable development we are appealing to future home buyers. (Fig. 1)**
- **Visual impact is minimal; a 12m turbine cannot be detected without extended viewing and can at times go unnoticed by a casual observer. (Fig. 2)**

The Town of Cochrane, in conjunction with community stakeholders, utilized a collaborative process in creating the REF. Stipulations contained in the REF that restrict noise levels and require minimal setbacks are designed to insure that quality of life and subsequently property value, are not negatively impacted. Residents of Olympic Heights, living in close proximity to their school turbine are not negatively impacted. As a result of a survey (refer to Tables A-D on pages 11 and 12) it was determined that long term residents did not relocate and that property values remained consistent as houses sold and new families joined the community. Local realtor Denise Staples and City of Calgary appraiser, Jim Wallace provided supporting data that confirm the survey results. Some residents even referred to the turbine as a community landmark. As a new generation of homebuyer enters the market green energy technologies could actually be an attraction (refer to Figures 3 and 4 on page 4). Currently, a wind turbine is a somewhat unfamiliar sight in residential areas, however in the years to come we hope residents of Cochrane Heights will come to see the turbine as less intrusive than power lines, arenas, and schools. While not to dismiss personal preferences, personal preferences should not prevail over the common good.

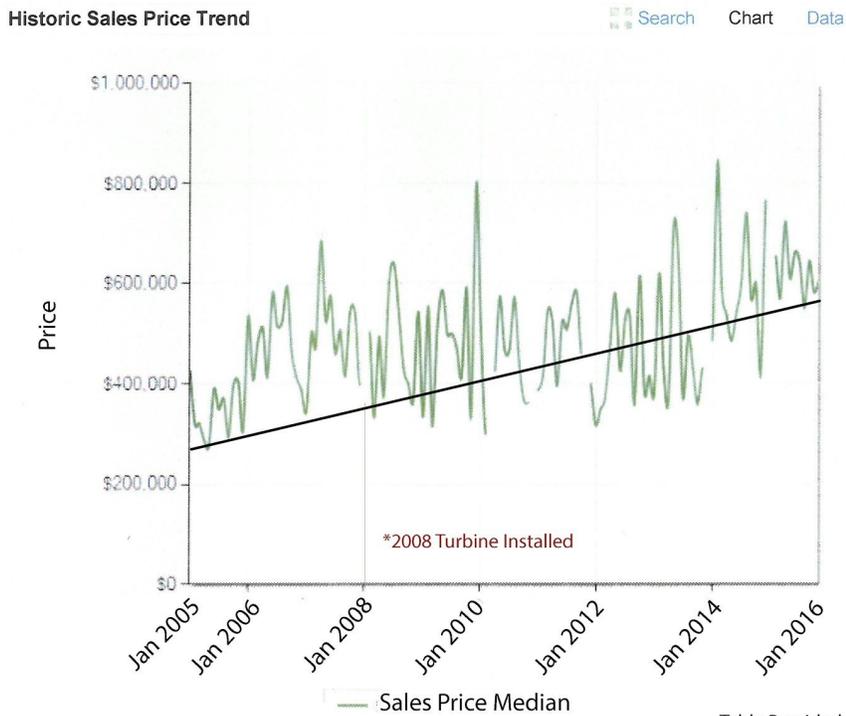


Figure 1. Photo taken in Riversong, Cochrane, AB



Figure 2. Photo taken at Olympic Heights Elementary 101m

**Figure 3. Historical Sales Price Trend Olympic Heights**



Property Value trends at Olympic Heights 2007 pre-turbine and Olympic Heights 2008 post-turbine<sup>1</sup>

**Figure 4. Property Trends in Calgary overtime.**



“The price appears to be more impacted by market influence than anything else.” D. Staples CIR Realty & J. Wallace Professional Appraiser, Wallace Appraisal Services LTD.

<sup>1</sup> Relators use historical sales to determine the current market value. Property assessments are for determining taxes and mill rates, they are not always reflective of current market trends.

- **Any turbines that we research to meet the REF requirements are similar in structure to that of a streetlight.**
- **At 12 m in height, this small turbine will be lower than the spruce and poplar trees in Cochrane Heights and slightly above the height of the fieldhouse currently situated on the east side of the football field at Cochrane High school.**
- **Wind turbines that fit within residential boundaries are slender and grey which are features that successfully integrate them into their surroundings.**
- **The garden at the north end of the high school doubles as a future visual mitigation measure.**

Some residents of the Heights question the rationality of the SDC's turbine project amidst their opposition. It seems when we mention "wind turbine" people default to the utility scale turbines seen on rural wind farms. Our commitment to the project is rooted in our concern for our future and a desire to do better. We want to reduce our carbon footprint within our facilities operations. To accomplish this we are "scaling up" one of the assets that we have; namely wind. We are moving toward this goal mindful of our community. Due to its neutral grey colour and slender design, residential wind turbines blend into the surrounding natural and built environments. Residential wind turbines; are significantly smaller than the industrial turbines, have a more slim-line design that tapers at the top much like a street light, which is a familiar and acceptable structure throughout the neighbourhood.

With the rotor diameter being less than 4 m across means a residential wind turbine in our neighbourhood will not dominate or be more visually intrusive than other factors of the area, such as mature trees, the football field house and communications tower. Finally, our new outdoor classroom, completed in July 2015 (phase VIII) valued at \$35,000.00, improves the view of a small parcel of land at the north end of the school. As this area matures, the greenery will provide an additional buffer zone between the residents on 4th Avenue and the small wind turbine.

## How does the school plan on maintaining the integrity of the turbine?

- Residential wind turbines generally have a lifespan of 20-25 years.
- SDC will rely on grants, private donations and other fundraising techniques to fund the entire lifecycle of the wind turbine; installation, maintenance and decommission.
- Cochrane High School ensures that SDC already obtains the funds to fulfill its obligations to the maintenance and decommissioning of the project.
- The REF ensures that all safety requirements for a residential wind turbine are met.

Recommendations for maintenance will depend on the type of turbine chosen. Cochrane High School's SDC will fundraise all monies required to complete the project including maintenance and decommissioning costs. This project will be cradle-to-grave/ full cost accounting. The project will not proceed until all funding for the project has been raised. No financing from the Town of Cochrane, Rocky View School Division, or Cochrane High School will be required.

SDC is researching the possibility of developing a working relationship with a post-secondary institution. Our project site and equipment would provide these institutions the opportunity for work experience/training and apprenticeship programs during maintenance periods.

Safety is RVS's number one priority and, as such, Cochrane High School's SDC will be responsible for proving to both the school division and the Town of Cochrane, that all REF requirements are met to the highest standards. This includes conducting a study on shadow flicker and having the turbine of choice CSA approved.

## Are small wind turbines a waste of money and inefficient?

- **This project reflects full-cost accounting from purchase to decommissioning.**
- **SDC has raised enough money to install the turbine and maintain it for up to 10 years, and will continue to raise funds in the coming years.**
- **Our proposal will scale up our renewable energy sources by 50% and create a more efficient hybrid system than photovoltaics alone.**
- **In our circumstance, payback is immediate.**

The SDC has a maintenance fund so that we can look after all our projects independently. It is our responsibility to maintain and decommission this renewable technology for its entire lifecycle. There will be zero costs to the town, school or school division. This proposed project is a cradle-to-grave economic model. The turbine will be a donation to Cochrane High School by the SDC, and therefore, the school is receiving payback the moment the turbine is connected.

With the addition of this stand alone small wind turbine, Cochrane High's total renewable energy production capacity will be increased by 50%. The turbine will create an efficient use of assets that are available year round. During the summer, the wind is generally at its lowest, during this time the solar panel component of Cochrane High's renewable energy system will be the primary producer. During the rest of the year, when the weather is windier, the turbine will be the principal producer. This hybrid relationship between solar and wind power best addresses energy demands efficiently. The efficiency of the system lies in the optimal use of renewable energy sources available in our area and the minimal ecological footprint incurred.

Wind power is identified by the government of Canada as the second most important source of renewable energy, trumped only by hydro power.<sup>2</sup> The federal government has committed to creating green energy jobs as Canada moves toward sustainable energy production. Nationally, wind energy creates billions of dollars in economic value by creating jobs and drastically reducing pollution that harms public health and the environment.<sup>3</sup> In addition to these economic benefits consumers are protected against the volatility of prices in the fossil fuel market. Wind turbine technology is improving including increased performance, and advanced operations, causing the cost of wind electricity to decline significantly.

Global investing is changing, future markets will incorporate low carbon technologies.<sup>4</sup> Our project will be an investment that is consistent with up-to-date national and international planning policy and government advice. Cochrane High will be at the forefront of understanding an energy strategy that seeks to diversify and integrate all of our energy resources in an innovative way.

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<sup>2</sup> "About Renewable Energy." *About Renewable Energy*. N.p., n.d. Web. 12 Apr. 2016.

<sup>3</sup> "Canadian Cleantech Conundrum | Corporate Knights." *Corporate Knights*. N.p., 10 Sept. 2015. Web. 12 Apr. 2016.

<sup>4</sup> Pittis, Don. "Warning for Investors, Not Just Environmentalists, in Fossil Fuel Spending: Don Pittis." CBCnews. CBC/Radio Canada, 08 Apr. 2016. Web. 11 Apr. 2016

## Why can't students learn about wind energy using the turbine already in place?

- **Seeing is believing, technology has changed.**
- **Our up scaled project fits in the high school curricula for the natural sciences and social sciences.**
- **We will continue to use the existing turbine, but wish to do a better job utilizing wind resources on a more substantial scale.**

A small wind turbine on our site provides students, parents, residents and visitors with concrete evidence of the viability of this renewable technology. It leads to a sophistry that "seen evidence" can be easily and correctly interpreted. Our visible location allows all of us to better understand the issues and solutions to finite resources.

The current turbine is inaccessible to students and visitors to our school. It is too small and we know that we can do better to move our school towards greater sustainability. We wish to consciously shape our future through responsible actions.

We are taught that climate change is part of a cycle and that there are both natural and anthropogenic causes to altering this cycle. Human actions can change systems on a global scale. These actions require energy and because we are using energy at an unprecedented rate, we are witnessing consequences. The Insurance Industry is responding to this reality. There is indisputable evidence that our actions are having a negative impact on the natural cycling of our water, land and air which are causing the climate to become more hostile.<sup>5</sup> The SDC is challenging the status quo and wish to pursue a larger wind turbine.

### **Curricular Links:**

**Science 9** Unit C Environmental Chemistry; Unit D Electrical Principles

**Science 10** Unit 2 Energy Flow in Technological Systems; Unit 3 Cycling of Matter in Living systems; Unit 4 Energy Flow in Global Systems

**Science 30** Unit C Electromagnetic Energy; Unit D Energy and the Environment

**Biology 20** Unit 3 Photosynthesis and Cellular Respiration

**Chemistry 20** Unit 2 Gases

**Chemistry 30** Chemical Energy Sources

**Physics 20** Unit A Kinematics; Unit C Motion, Work and Energy

**Social 10** Related Issue 3 Globalization and Sustainability

**Social 9** Consumerism, Quality of Life and Decision Making

**Social 10, 20, 30** Identity, Citizenship and Political and Economic Systems

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<sup>5</sup> "The Insurance Industry Responds to Climate Change Risk." *Risk Management*. N.p., n.d. Web. 22 Mar. 2016.

## Where Will the Turbine be Located?

- **The location will depend on whether the turbine is upwind or downwind oriented, then selected for optimum efficiency.**
- **The SWT will be appropriately located congruent with the REF.**
- **The turbine will be located on the windward side of the Cochrane Hill.**
- **Given the elevation Cochrane High is a highly suitable location for a SWT.**

Choosing an appropriate site for a residential turbine will be dependent on the REF as well as ensuring the efficient operation of the turbine. Our school site is ideal because it's in an open space free of obstacles. Cochrane Heights is located on the windward side of a hill. Wind comes from the North, West and Northwest directions. The REF requires any turbine to be at least 36 meters (118 ft) away from the nearest resident. All of these metrics make Cochrane High an ideal location to position a small wind turbine.

Locating the turbine in the most equidistant position available on our site, ensures the noise requirement of the REF is met, and addresses the issue of visual impact felt by all neighbours adjacent to Cochrane High School.

**Government of Canada / Gouvernement du Canada**

## WIND TURBINE NOISE AND HEALTH STUDY: SUMMARY OF KEY FINDINGS

**WHAT IS THE WIND TURBINE NOISE AND HEALTH STUDY?**

Health Canada, in partnership with Statistics Canada, has conducted a study involving communities in Southern Ontario and Prince Edward Island to better understand the impacts of wind turbine noise on health and well-being. A total of 1238 households participated, out of a possible 1570.

The study had three parts:

- An in-person questionnaire, which was given to randomly selected participants living at various distances from the wind turbines;
- A collection of physical health measures that assessed stress levels using hair cortisol, blood pressure and resting heart rate, as well as measures of sleep quality; and
- More than 4000 hours of wind turbine noise measurements conducted by Health Canada to support calculations of wind turbine noise levels at all homes in the study.

**The *Wind Turbine Noise and Health Study* is a landmark study and the most comprehensive of its kind. Both the methodology used and the results are significant contributions to the global knowledge base and examples of innovative, leading-edge research.**

### KEY FINDINGS

**IT IS IMPORTANT** to note that the results from this study do not provide definitive answers on their own and should be considered along with the other research available on the impacts of wind turbine noise on health. Results may also not be applied to other communities as the wind turbine locations in this study were not randomly selected from all possible sites operating in Canada.

***Illness and chronic disease\****  
No evidence was found to support a link between exposure to wind turbine noise and any of the self-reported illnesses (such as dizziness, tinnitus, migraines) and chronic conditions (such as heart disease, high blood pressure, diabetes).

***Stress\****  
No association was found between the multiple measures of stress (such as hair cortisol, blood pressure, heart rate, self-reported stress) and exposure to wind turbine noise.

***Sleep\****  
The results of this study do not support an association between wind turbine noise and self-reported or measured sleep quality.

\* While some people reported some of the health conditions above, their existence was not found to change in relation to exposure to wind turbine noise.

***Annoyance and quality of life***  
An association was found between increasing levels of wind turbine noise and individuals reporting to be very or extremely annoyed.

No association was found with any significant changes in reported quality of life, or with overall quality of life and satisfaction with health. This was assessed using the abbreviated version of the World Health Organization's Quality of Life Scale.

***Noise***  
Calculated noise levels were found to be below levels that would be expected to directly affect health (World Health Organization – *Community Noise Guidelines [1999]*). This finding is consistent with self-reported and measured results of the study.

### HOW WILL THE INFORMATION BE USED?

Health Canada will consider the results of this study, along with other scientific research available, when providing advice on the health impacts of wind turbine noise.

These findings will also support decision-makers, such as provincial and territorial governments, in the development of decisions, advice and policies related to wind power development proposals, installations and operations.

These results are considered preliminary until published in the peer-reviewed scientific literature.

**For more information**  
A more detailed Summary of Findings from the Wind Turbine Noise and Health Study has been published on the Health Canada website at [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca). For more information, please contact: [crrpb-prcpcc@hc-sc.gc.ca](mailto:crrpb-prcpcc@hc-sc.gc.ca).

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**Canada**

\*To view this document in original form, please refer to website.

<http://www.sustainabledevelopment.ca/wp-content/uploads/2015/07/Phase-VII-Health-Canada-Wind-Turbine-Study-Results-2014.pdf>

## Appendix B: Rocky View Schools Liability

As with all facilities and properties owned by RVS, any damage and/or injury caused as a result of the wind turbine would be covered under Rocky View Schools liability insurance.

First read was March 28

Second read will be April 25

When passed we will include

## Tables A-D: Olympic Heights Online Survey Results

Table A

How long have you been a resident of Olympic Heights? (8 responses)

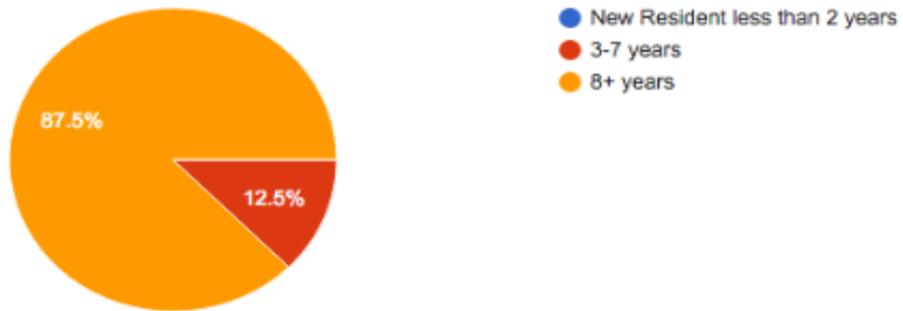


Table B

What was the primary reason for moving to Olympic Heights? (8 responses)

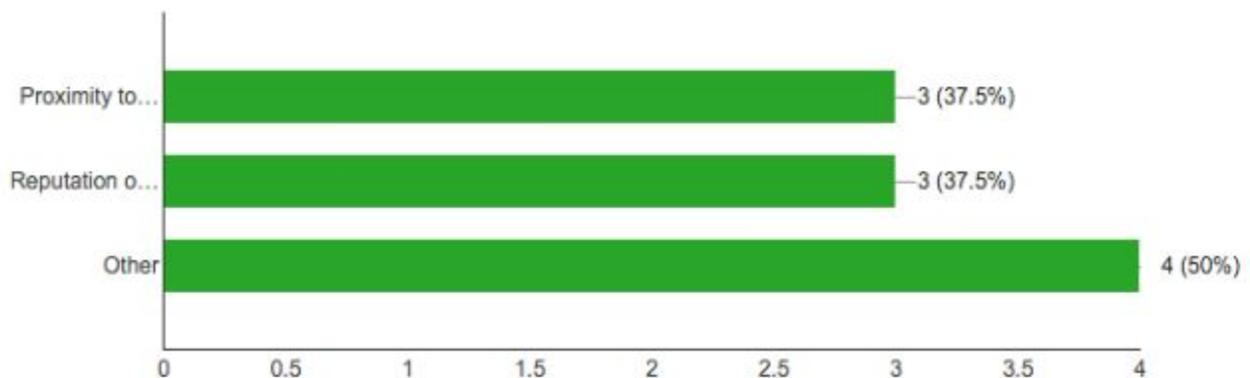


Table C

### What has been the experience living in proximity to the small wind turbine?

(8 responses)

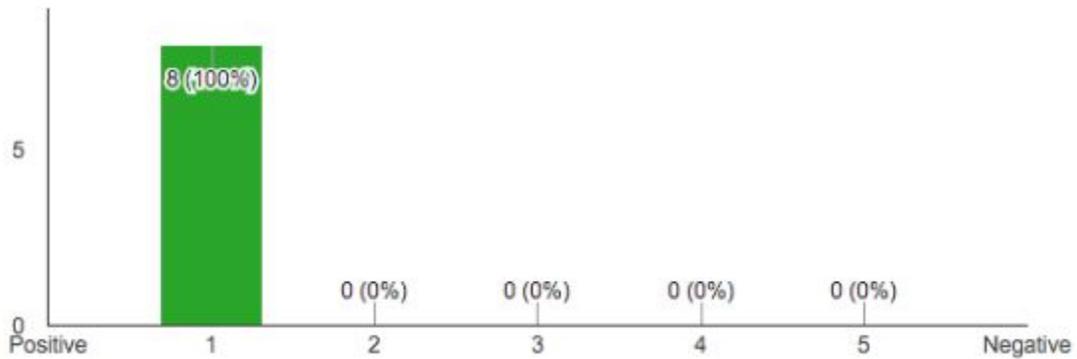


Table D

### Other Comments you wish to make about living across from the small wind turbine at Olympic Heights

(8 responses)

We were concerned about the noise that might be generated, but we now absolutely no concerns...we never hear a noise!

I don't hear the turbine when it's spinning. It doesn't bother me at all. It's quite windy on the hill and it's spins often.

It's a good investment

We like it. We watch it when it's windy!

Na

No problems at all  
very Quiet  
it is a selling feature

1986  
Show home built  
Kids attended future school  
No affect  
It's handy For telling if it's windy

It has apparently no negative impact