



SCHOOL DISTRICT NO. 43 (COQUITLAM)

Facilities & Planning Services

MEMORANDUM

TO: Chris Nicolls, Secretary-Treasurer/CFO

FROM: Ivano Cecchini, Executive Director, Facilities & Planning Services

DATE: June 11, 2019

SUBJECT: **Burke Mountain Secondary School Environmental Initiative**

COPIED TO: District Leadership Team

Recommended Action: That the Board of Education support an initiative to create one of the “Greenest” schools in Canada.

Background:

Projections indicate that a new secondary school (beginning as a middle/secondary) will be needed for the 2023 school year. The District currently does not have support of the Ministry of Education to move forward with this project although a jointly owned school/park site is in place.

Along with strong and well recognized design practices for our new schools, our District is well recognized for being a leader in energy savings initiatives and conservation practices.

Discussion:

During a time where topics such as climate change, environmental education, and sustainability are at the forefront of minds in our community, and around the world, we have an opportunity to show the Province that along with the need for a new school, we are willing to support a much higher “Green” standard. Potential steps for the Board to engage this process could include:

- Commitment by the Board of Education to build to a much higher “Green” standard
- Seek endorsement from Coquitlam Mayor and Council to support initiative
- Public campaign to demonstrate leadership in environmental stewardship
- Seek partners to support premium cost between LEED Gold standard and an advanced educational standard that promotes environmental education for our students
- Seek commitment from the Province to advance this project based on municipal and private partnerships

Some high-level preliminary work has been done by CHP Architects to explore possibilities for constructing our new “Green” school. With Board support some of the areas that could be explored further include:

Energy – Net Zero Energy Program (the school does not use more energy than it can produce)

Possible Measures to employ include:

- 1. Photo Voltaics (PV):** Covering all roof surfaces and some site areas with Photo Voltaic panels. Depending on the number of PV surface employed up to 100% of the building energy or more use could be provided with the sun. The cost of PV’s has dropped in recent years with a current estimated payback on initial investment of approximately 18 to 20 years.
- 2. Geothermal Heating & Cooling:** Geothermal Heating and cooling uses the constant moderate temperature of the earth to supplement cooling loads in the summer and heating loads in the winter. Essentially ‘free’ heat and cooling is extracted from the earth which would greatly reduce energy demand. Further ground drilling and studies would be required to determine the capacity of the site to provide heating and cooling.
- 3. Wind:** Depending on local site conditions, smaller wind turbines can generate electrical energy for building use. Further study would be required to determine the site suitability. In most cases smaller wind generation may be less desirable to PV’s but it does display a visual ‘green learning’ initiative that is beneficial in a learning facility.
- 4. Solar Hot Water:** In addition to employing the sun to produce electricity, the project may explore using the sun’s energy to heat water through evacuated tubes which will provide hot water to showers and sinks and possibly to HVAC units for heating.
- 5. Enhanced Building Envelope:** Reduction of heat loss through the walls, floors and roof of the building will greatly offset the amount of heating, cooling and energy that needs to be produced by geothermal, wind and sun. The key principle of building envelope is to keep the conditioned space within the envelope and the unconditioned space outside of the envelope. The idea is that once the air is conditioned to a certain level it does not require much energy to keep the air at that level.

Windows and doors constructed as high-performance triple pane. Walls and roofs would be thicker with increased insulation and floors may be insulated below the slab. Insulation would be continuous on the outside of the structure to minimize thermal bridging through structural elements.

6. **Enhanced Efficient HVAC Systems & Heat Recovery:** Efficient centralized HVAC systems such as air source heat pumps use minimal electricity to provide maximum heating and cooling loads. These efficient systems will greatly reduce the demand on electricity and gas which in turn reduces the number of PV's and geothermal wells. Heat Recovery re-uses the heat that would be otherwise ejected to the exterior from ventilation.
7. **Building Orientation:** The project site is integral to the green programming and systems implemented into a building. The site of the Burke Mountain campus has a number of positive natural aspects that can allow it to harness the nature around it. The orientation and sloping nature from North to South allow for ideal daylighting conditions as well as optimal heating and cooling conditions.

Other Factors:

1. **Water conservation:** Water shortages are now prevalent as a result of the changing climate and over-development of natural vegetated areas.
2. **Low Energy Building Materials & Renewables:** Building materials use great amounts of energy to produce and ship to site which has an impact on the environment.
3. **Social, Community and Educational Factors:** Education of the community and students is paramount in a green building, particularly for a school. The potential for the Burke Mountain Schools to educated future decision makers and the community as a whole will spread the green message and ensure more sustainable measures are provided in the future.

Measures to employ include:

1. **Infiltrate 100% of storm water on the building site:** Rain-water would be filtered through rain gardens and either stored in tanks for irrigation or infiltrated directly into the earth. Green roof would also retain and filter water and provide an attractive learning feature on exposed roofs. The overall goal is to eliminate a storm connection to municipal storm system.
2. **On-site Sewer Treatment:** A more intensive measure may include using rain-water to flush toilets or on-site treatment of sewage. This may include on-site settling ponds, septic fields or mechanical treatment. While these are costly measures, they would set a huge precedent that is rarely employed.
3. **Specify local and renewable building materials:** Energy consumption is not just a product of the use of the building. A large portion of the energy consumed in the life of the building comes from the construction of the building and the energy required to make the materials. Fortunately, we in BC have locally available materials that can be used to create green buildings. Locally-sourced BC woods are an excellent building

material for green buildings. Wood has a lower embodied energy in the material itself as there's less manufacturing of the product. Because the wood is local, there's also less transportation of materials which also consumes energy. Another benefit of wood construction over steel is the low thermal conductivity of wood. This helps with energy transfer and helps with conditioning the building.

4. **Community and Education:** The most important aspect of any building is how it affects people. Great green buildings can change the way people think about their community and how they can be a part of the change towards a more sustainable future. Making the school the greenest around can have the added benefit of changing the habits of the people.

While at school, if student's and staff's activities are shifted to be greener, that mental shift can be carried on to their lives outside of the school. For example, providing bike racks and making the campus cycle-friendly encourages kids to use cycling as means of transportation. If cycling can be a viable means of transportation that may mean one less car on the road in the future. Some other enhancements that are meant to emphasize sustainable practices would be an emphasis on recycling in the school, providing electrical vehicle parking, and highlighting the benefits and meanings of the sustainable systems in the school.