Renewable Energy Technology in the Trust Area: *Topic 1 - Domestic Small Scale Wind Energy*

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Islands Trust

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Introduction

The Islands Trust Local Planning Committee (LPC) was tasked by Trust Council with developing model land use bylaw definitions and regulations for renewable energy technologies to assist Local Trust Committees with better enabling renewable energy production in the Islands Trust area. Wind, tidal, solar, geothermal/hydrothermal heating, micro hydro, along with rainwater capture/storage structures are targeted by LPC. This task is considered a logical extension of the work currently being implemented Trust wide by Local Trust Committees in order to reduce greenhouse gas emissions. This report focuses on the development of model land use bylaw definitions and regulations specifically for domestic small scale wind energy. Related work is identified to be undertaken in the future for other renewable energy technologies such as, tidal energy, solar energy, geothermal/hydrothermal exchange, micro hydro electricity, in addition to water conservation/rainwater capture.

Domestic Small Scale Wind Energy

The LPC has requested targeting the domestic use of small scale wind turbines. Domestic use, for the purposes of this report, is defined as - for use by the average residential lot owner up to farmstead size, in order to produce electricity on their own lot for their own use. The wind industry identifies small scale wind turbines that are appropriate for residential and smaller farm purposes in the size range of 1 to 50 kilowatts (kW).[1] [2] [3] [4]

There are two basic types of wind turbines: horizontal axis wind turbines and vertical axis wind turbines (see Figure 1). Horizontal wind turbines rotate perpendicular to the ground, while vertical wind turbines rotate parallel to the ground. Horizontal axis wind turbines are more common. Some vertical axis wind turbines are not required to be as tall as horizontal wind turbines. Regardless of the type, wind energy systems include a wind turbine or generator, rotor with blades, tower and supporting electrical equipment (see Figures 2 and 3).

[1] Woofenden, I., M. Sagrillo. June & July 2010. Home Power: 2010 Wind Generator Buyer's Guide.
[2] Endurance Windpower: Products. Accessed Sept. 28 – 29. http://www.endurancewindpower.com/products.html
[3] Distributed Wind Energy Association: What is Distributed Wind. Accessed Sept. 28-29. http://www.distributedwind.org/what-is-distributed-wind
[4] Canadian Wind Energy Association. Small Wind Purchasing Guide: Off-grid, Residential, Farm and Small Business Applications.

Figure 1: Two Basic Types of Wind Turbines[5]

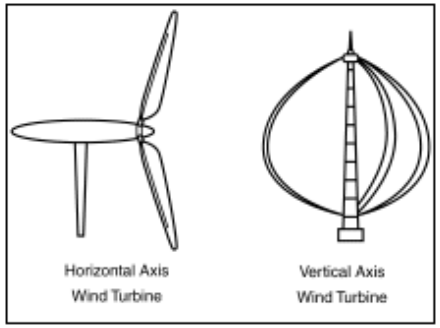


Figure 2: Components of a Typical Wind Energy System[6]

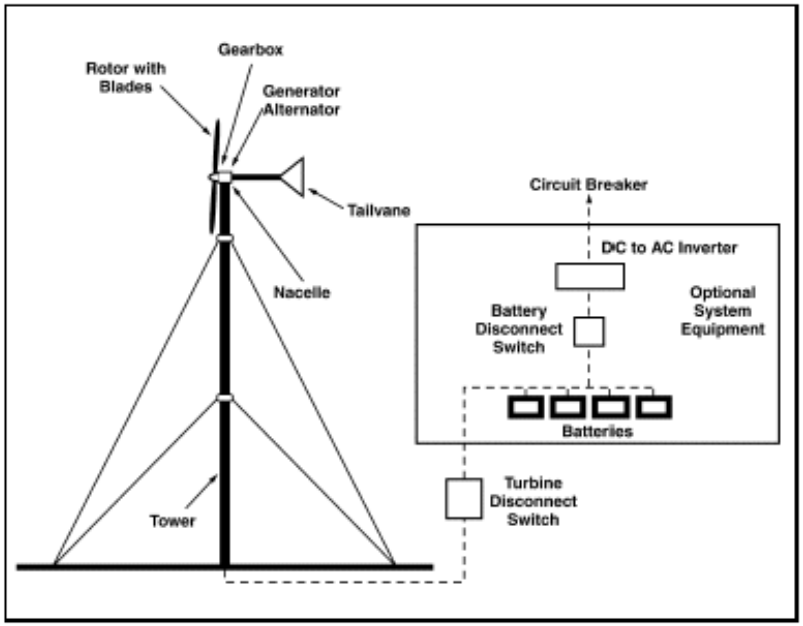
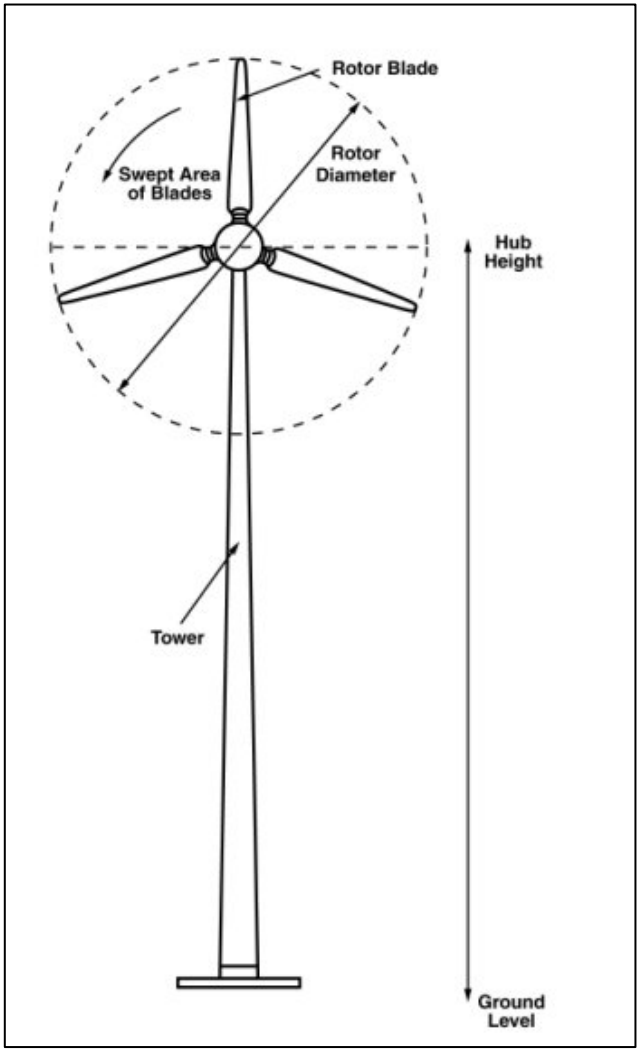


Figure 3: Schematic of a Typical Wind Turbine[7]



[5] Ontario Ministry of Agriculture, Food and Rural Affairs: Electricity Generation Using Wind Turbines at your Home or Farm. Accessed May 18. http://www.omafra.gov.on.ca/english/engineer/facts/03-047.htm

[6] Natural Resources Canada. 2003. Stand Alone Wind Energy Systems – A Buyers Guide.

[7] Ontario Ministry of Agriculture, Food and Rural Affairs: Electricity Generation Using Wind Turbines at your Home or Farm. Accessed Sept. 20. http://www.omafra.gov.on.ca/english/engineer/facts/03-047.htm

Small wind turbines in the 1 to 50 kW size range can vary in specifications. Table 1 provides example specifications (the upper limit is listed for 50kW size).

Table 1: Small Scale Wind Turbine Specifications

Wind Turbine Specifications	Wind Turbine Size (Rated Capacity)	
	1 kW	50 kW
Wind Swept Area The area of wind swept by the rotor. A measurement of the size of the "wind collector," being the largest factor in influencing turbine output.	2m^2 (21.5 ft^2)	290 m^2(3121.5 ft^2)
Rotor Diameter The cross sectional dimension of the circle swept by the rotating blades.	1.6 m (5.3 ft)	19 m (62.3 ft)
Rotor Blade Length Measured from centre of the hub to tip of blade for horizontal axis wind turbines. Blade length for vertical axis wind turbines varies greatly with design.	n/a	9m (29.5 ft)
Hub Height or Height Measured from grade to height of the centre of the hub for horizontal axis wind turbines. Height of a vertical axis wind turbine is measured from grade to height of the highest point of the turbine. This is another factor in influencing turbine output. Generally, the taller the tower the more access to faster and better quality winds.	6m (19.7 ft)	43 m (141 ft)

Challenges to Implementing Domestic Small Scale Wind Energy in the Islands Trust Area

There are some challenges for landowners who are interested in implementing small scale wind energy on their property. Most notable are the capital cost, economic feasibility, and the site and wind requirements. In addition, land use planning provisions not designed with wind energy in mind can unnecessarily inhibit their development. Public perception of wind turbines can also present some difficulties to those proposing an installation.

Costs and Economic Feasibility

Although the cost of small scale wind turbines are decreasing as the industry grows and becomes more standardized, purchasing a small scale wind turbine remains quite cost prohibitive. Smaller turbines (1 to 10 kW) range from under $10, 000 up to $80, 000, while the larger ones (up to 50kW) range from around $100,000 up to $400,000.[8] [9] This represents about 12% - 48% of the cost of a wind energy system. [10] Additional costs of a wind energy system include inverters and batteries, sales tax, installation charges and labour and any necessary permitting. As a result of the high cost, most often financing is required.

In addition, the cost-benefit of installing a wind turbine in areas that are grid connected may be lost because the BC Hydro residential rate is relatively low, at an approximate average of $0.08/kWh. A matching or lower rate of electricity may be difficult to achieve with a small wind turbine given the associated high costs and the average wind speed in Islands Trust area (see Wind Resource and Siting Requirements Section below for more information). For example, the Victoria Harbour Authority estimates that a 10kW wind turbine installed at Ogden Point in Victoria which averages a wind speed of 5 metres/second (m/s), will generate electricity at an approximate cost of $.87/kWh.[11] This is substantially higher than the average BC Hydro rate. For properties that are not easily connected to the grid, renewable energies including wind may be a more cost effective alternative than say diesel power generation.

There are some programs available in BC that provide incentives and support for those interested in implementing small scale wind turbines to help offset the costs. These include the following (See Appendix A for details of programs):

- *BC Hydro Net Metering Program* offers customers the opportunity to sell or "bank" their excess electrical generation from small generating facilities they have installed.
- *Live Smart BC Efficiency Incentive Program* offers homeowners cash up to $1300 for a certain amount of electricity generated from renewable energy.
- *Farm Credit Canada "Energy Loans"* intend to help farmers make the switch to renewable energy sources including wind through no loan processing fees.

[8] Woofenden, I., M. Sagrillo. June & July 2010. Home Power: 2010 Wind Generator Buyer's Guide.
[9] M. Sagrillo, Woofenden, I. June & July 2007. Home Power: 2007 Wind Generators Buyer's Guide.
[10] Ontario Ministry of Agriculture, Food and Rural Affairs: Electricity Generation Using Wind Turbines at your Home or Farm. Accessed Sept. 20. http://www.omafra.gov.on.ca/english/engineer/facts/03-047.htm#f5
[11] Jordan Fisher and Associates Ltd., EA Energy Alternatives Ltd., and Sustainable Systems Design Lab, Institute for Integrated Energy Systems, University of Victoria, 2011. Renewable Power Generation Conceptual Plan for Ogden Point, Victoria. pp 14-17.

- *BC Ministry of Agriculture and Lands Agricultural Farm Plan and Beneficial Management Practices Program* offers farmers cost sharing incentives up to $70,000 for wind energy implementation aimed at addressing environmental risks, such as riparian protection and GHG emission reduction.

Although the costs of implementing small wind turbines are great, some residents in the Islands Trust area may be motivated to install renewable energy technologies because of concern for local and global sustainability and a desire to be more self-reliant.

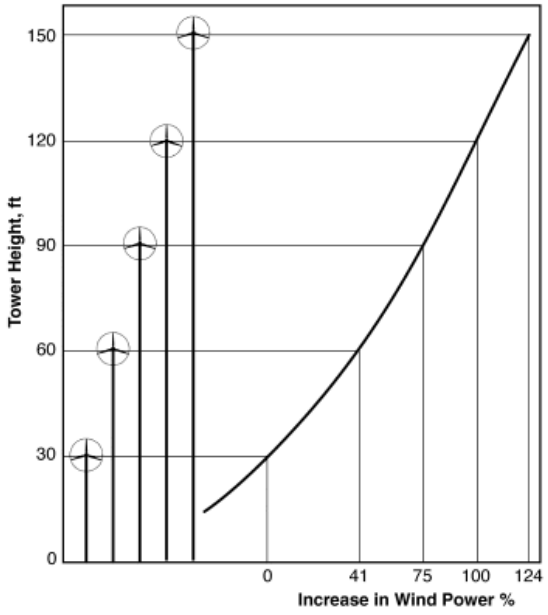
Wind Resource and Site Requirements for Wind Turbines

Most small wind turbines require at least a wind speed of 15 km/hr (4 metres/second) just to operate. For wind turbines connected to the grid, 18 km/hr (5 metres/second) is required.[12] The average wind speed in the Islands Trust area is 5 metres/second, which provides an approximate idea of the wind in the area, but local geography plays a big part in whether a particular site is better or worse than the average. [13] Generally speaking the taller the wind turbine and the fewer natural and man-made features nearby, the higher the wind speed achieved (see figure 4 below). Given the average wind speed of the Islands Trust area, topography of the islands, and the high percentage of tree cover, appropriate sites may be limited to areas such as coast lines and higher elevations.

[12] Canadian Wind Energy Association. Small Wind Purchasing Guide: Off-grid, Residential, Farm and Small Business Applications.

[13] Environment Canada: The Canadian Wind Atlas. Accessed November 30. http://www.windatlas.ca/en/nav.php

Figure 4: Wind Speed Increases with Height[14]



"A [wind] tower that is too short for the site is like putting a solar system in the shade"

Mike Bergey, Bergey Windpower Co., (small wind turbine manufacturer)

Land Use Planning Regulations

Many Official Community Plan policies in Islands Trust now promote and encourage the development of renewable energy as a part of their greenhouse gas reduction initiatives. It is important to note that most renewable energy policies target small scale residential use, which is consistent with the aim of this project. See Appendix B for a current listing of renewable energy policies in Islands Trust. However, few zoning regulations include provisions for small scale wind energy at this time. See Appendix C for a list of Islands Trust land use bylaws and wind energy related regulations. Land use planning regulations that have not been designed with wind energy in mind can further discourage the installation of small wind turbines and add to the time and costs required to implement them. For example, given the general requirements for wind turbines to be tall and have access to unobstructed winds, a variance to a height limit in a land use bylaw will be required in many areas of Islands Trust.

Public Perceptions

Depending on where a wind turbine is sited and the local perceptions of them and their potential impacts, the installation of a small wind turbine may be met with some public opposition. Given that some of the potential impacts of wind turbines can be fairly

[14] Ontario Ministry of Agriculture, Food and Rural Affairs: Electricity Generation Using Wind Turbines at your Home or Farm. Accessed Sept. 20. http://www.omafra.gov.on.ca/english/engineer/facts/03-047.htm#f5

controversial and the research inconclusive (see section on Impacts Associated with Wind Turbines and Land Use Considerations below), people may be sceptical of this newer technology and what it means to live near one, even though they may support the idea of renewable energy.

Other Challenges

Other challenges for land owners to implementing small scale renewable energy include the following as identified by the BC Sustainable Energy Association:[15]

- Disproportionately high cost of electrical code permitting for renewables;
- Lack of renewable energy training for electrical engineers, electricians and safety inspectors;
- Limitations of Canadian Certification Standards causes some small wind turbines to not be approved for use in BC.

Impacts Associated with Wind Turbines and Land Use Considerations

Wind turbines are recognized as a maturing and promising renewable energy technology; however, there are potential impacts associated with wind turbines that require consideration in light of developing enabling regulations. These relate to noise, property values, visual impact, birds and bats, blade throw, ice throw, shadow flicker, and structural failure. Not only can the impacts be very controversial, but it is important to note that much of the research surrounding these impacts is not conclusive, particularly for smaller wind turbines. Although, the uncertainties are expected to lessen with further development of the industry, local governments shall continue to play an important role in better enabling this type of development while minimizing the risks to the social and natural environment.

The following is a summary of impacts associated with wind turbines and some land use considerations. Land use considerations are drawn mainly from Canadian sources including a review of current identified best practices in land use planning, current local government approaches to regulating small wind turbines, as well as consideration of the wind industry's land use planning guides for local governments.

[15] BC Sustainable Energy Association. 2010. Ten Barriers to Small Scale Renewable Energy.

Noise

While they are in operation, wind turbines produce noise from the mechanical components and from the interaction of the air with the turbine blades and structure. The noise that a wind turbine creates is normally expressed in terms of its sound power level, usually described in decibels or A-weighted decibels (dB(A)). This is not a measurement that people hear, but the noise power emitted by the turbine. Generally, wind turbines emit more noise as wind speed increases. However, the increased noise generation is often argued to be less perceptible to people because of the concurrent increase of background sound levels generated by higher winds, masking the sound of the wind turbine sound.[16]

Noise is identified in the wind industry as unwanted sound emitted from a wind turbine. There is considerable debate regarding the noise of wind turbines. Issues include the sound emission, vibration and acoustics emitted from wind turbines, possible health effects, and appropriate separation distances to protect residents and properties that are adjacent to wind turbines. It is important to note that noise concerns related to small wind turbines are as not well documented as they are for large wind turbines.

Ontario is emerging as a Canadian leader in renewable energy production. Some provincial and federal agencies appear to be following the lead of the Province of Ontario when it comes to guidelines for noise setbacks of wind turbines.[17] [18] Through their approval process, the Ontario government requires that wind turbines 50 kW and greater must be a minimum noise setback distance of 550m to the nearest residence. Wind turbines less than 50 kW are not required to meet this setback, but may be subject to local government permits and approvals. The province requires that these smaller turbines demonstrate that noise does not exceed a 40 dB noise level, which is consistent with the night time noise guideline of 40 dB that the World Health Organisation recommends for the protection of public health from community noise.[19] There is a varied range of approaches to addressing noise through land use planning that can be categorized into three groups:

1. To require a maximum allowable noise level (dB(A)) either at the lot line or the nearest dwelling;

[16] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 25 -30.
[17] EDS Consulting. 2009. Land Use Planning for Wind Energy Systems in Manitoba**.** Final Report to Manitoba Intergovernmental Affairs on Land Use Planning for Wind Energy Systems in Manitoba. pp.16.
[18] David Hutton. Jan. 12, 2012. Starpheonix. "Saskatchewan to follow Ontario's lead with wind turbine setbacks."
[19] Chief Medical Officer of Health Report. 2010. The Potential Health Impact of Wind Turbines. pp. 14.

2. To require a separation distance either from the lot line or nearest dwelling large enough to ensure that noise does not negatively impact others; or
3. To require a combination of a maximum allowable noise limit and minimum separation requirement, where the separation can be reduced pending demonstrated levels.

Out of all of the setback distances considered for wind turbines, the setback for noise can require the largest separation distance.

Islands Trust does not regulate noise directly, however, Regional Districts have the authority to do so. As a result, Local Trust Committees may choose to address noise in cooperation with the local Regional District.

Property Values

The wind industry claims that property values are not negatively affected by nearby wind turbines;[20] [21] however, there is indication otherwise, particularly in Ontario where utility sized turbines are increasingly becoming a part of the rural landscape.[22] The same maybe true for small wind turbines. On the other hand, people may place more value in homes equipped with renewable energy generation.

Viewscape

Wind turbines must be mounted on tall towers in order to reach the necessary wind conditions and as a result they will likely be quite visible. While some people object to the appearance of wind turbines, others may not. Since the visual impact of wind turbines is quite subjective and often controversial, permitting wind turbines in a community where they would be a new addition to the landscape will require balancing the perceived or desired character of a community, the public and private benefits of a renewable energy and property rights.

[20] American Wind Energy Association. 2008. In the Public Interest, How and Why to Permit for Small Wind Systems: A Guide for State and Local Governments. pp. 13.
[21] eFormative Options, LLC & Entegrity Wind Systems, Inc. 2006. Small Wind Siting and Zoning Study Development of Siting Guidelines and A Model Zoning By-law for Small Wind Turbines (under 300 kW). Developed for the Canadian Wind Energy Association. pp.14-15.
[22] John Nicol and Dave Seglins. Oct 1, 2011. CBC News. "Ontario Wind Power Bringing Down Property Values." Accessed Oct. http://www.cbc.ca/news/canada/story/2011/09/30/ontario-wind-power-property-values.html

Some aspects of wind turbines that can be considered in minimizing the visual impacts of wind turbines through land use planning include location, number of turbines in a viewscape, and signage.

Birds and Bats

It is recognised that wind energy, as a clean alternative energy source, is a part of the solution to combat global warming which is one of the threats to species extinctions.[23] [24] It is also recognised that larger wind turbines can have detrimental impacts on bird and bat populations, such as direct mortality and habitat loss and fragmentation.[25] While wind turbines are known to cause far fewer bird fatalities in comparison to other human related causes such as collisions with buildings or fatalities due to pesticides, there is an effort from the wind industry and wildlife conservationists to learn more about how to minimize the impacts.[26][27] Collaborative work is also being undertaken for bats. Larger wind turbine projects are typically subject to environmental assessment requirements or guidelines that direct the assessment of the potential impacts to birds and bats, and help to mitigate effects before a project is undertaken.[28] [29] Potentially sensitive sites identified for birds and bats are those areas where there is high species activity, such as migratory movement corridors or areas where there large concentrations. While small wind turbines are less likely to have as much of an impact on birds and bats as larger wind turbine projects, land use planning decisions are suggested to include the same considerations when it comes to siting small wind turbines:

- locate wind turbines away from known environmentally significant bird areas, such as Important Bird Areas, major migratory corridors or where there are large concentrations of birds;
- locate wind turbines away from areas of high bat activity, such as migratory corridors, forested ridgetops and lakeshores.

[23] National Wind Coordinating Collaborative. 2010. Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions. pp. 1.
[24] Canadian Wind Energy Association & Natural Resources Canada. 2006. Wildlife, Birds, bats and wind energy.
[25] National Wind Coordinating Collaborative. 2010. Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions. pp. 2-7.
[26] National Wind Coordinating Collaborative. 2012. Accessed Feb. http://www.nationalwind.org/about/default.aspx
[27] Wind Energy Bird and Bat Monitoring Database. 2012. Accessed Mar. http://www.bsc-eoc.org/birdmon/wind/main.jsp
[28] Ontario Ministry of Natural Resources. 2010. Bats and Bat Habitats: Guidelines for Wind Power Projects.
[29] Environment Canada & Canadian Wildlife Service. 2006. Wind Turbines and Birds: A Guidance Document for Environmental Assessment.

Blade Throw and Structural Failure

Blade throw is when a wind turbine blade or part of one becomes detached from the wind turbine and falls or is thrown through the air. Structural failure is when part or all of the wind turbine structure fails and collapses. Either can be due to mechanical failure, human error, or environmental events. Structural failure is considered a relatively rare occurrence.[30] Again, there is less known about small wind turbines than there is for larger wind turbines in regards to these issues. However, approaches to regulate these issues for larger turbines are also suggested to be applicable to small wind turbines.[31] [32] Approaches for consideration:

- To require a setback distance of at least the wind turbine height plus the length of one blade from the property line;
- To require a setback distance of 1.25 to 3 times the total height of the wind turbine;
- Require that the wind turbine meets approved safety standards of responsible safety associations. Two certification bodies that local governments may look to:
    - The Canadian Certification Standards Association: a Canadian body that tests products, such wind turbines for compliance to national and international standards, and issue certification marks for qualified products.
    - The Small Wind Certification Council (SWCC):[33] an independent certification body, and certifies that small wind turbines meet or exceed the performance and durability requirements of the American Wind Energy Association (AWEA) Small Wind Turbine Performance and Safety Standard**.** The certification is designed to promote consumer confidence and mainstream acceptance of small wind technology, and standardizes North American reporting of turbine energy and sound performance. Note that only two wind turbines have been approved to date, with 27 others pending and expected to be assessed within a year or two.
- Local Trust Committees may consider working with the local Regional District Building Department in regards to whether building permits are required for small wind turbines and requesting additional information from applicants such as:

[30] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 31 -32.
[31] American Wind Energy Association. 2008. In the Public Interest, How and Why to Permit for Small Wind Systems: A Guide for State and Local Governments. pp. 8
[32] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 23.
[33] Small Wind Certification Council. 2012. Accessed Mar.http://www.smallwindcertification.org/about/

- Wind turbine manufacturer's specifications including plans and photos of turbines showing wind turbine height, blade diameter, manufacturer's nameplate rated capacity;
- Canadian Standards Association (CSA) approval and proof of conformity with the provincial electrical code and/or proof of certification from the Small Wind Certification Council (SWCC);
- Professional engineer's design and approval of the wind turbine base and tower.

- Local Trust Committees may consider requiring Siting and Use Permits for small wind turbines and include the requirement for additional information from applicants as outlined in the preceding bullet.

Ice Throw

Ice throw is when ice builds up on the blades of the wind turbine which can drop to the area below or possibly be thrown during operation. Ice throw may be less of a factor in the Islands Trust area because of the temperate climate. Approaches suggested to regulate for this issue is to consider a setback distance of 1.25 to 3 times the total height of the wind turbine or if possible, request an ice throw assessment report.[34]

Shadow Flicker

Shadow flicker happens when the shadow of the rotating blades flicker over an area affecting those in the near vicinity. As small wind turbines are generally shorter and have smaller length blades than larger turbines, there is reason to believe that shadow flicker isn't an issue. However, some may argue that given that small wind turbines are expected to be sited in closer proximity with residential areas that it may not be just an issue associated with large turbines. Approaches to regulate include consideration for limiting any shadow flicker on any non-participating landowner's property to a maximum of 30 hours per year or requiring a shadow flicker study for larger wind turbines.[35] [36]

[34] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 79.
[35] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 80.
[36] Richard Lampeter, Epsilon Associates, Inc. 2011. Webinar on Shadow Flicker Regulations and Guidance: New England and Beyond. Assessed Mar.
http://www.windpoweringamerica.gov/newengland/filter_detail.asp?itemid=2967

Small Turbine Tower Design Considerations

Issues related to safety and tower design include:

- Guy wire anchors:
    - that they be clearly visible to a height of 2 m as recommended by the Canadian Wind Energy Association; [37]
- Small wind turbines mounted on roofs and attached to sides of buildings:
    - There is growing interest in mounting small wind turbines on roofs and attaching them to sides of buildings; however, there is varying opinions on their safety and not much North American practical experience with this application.[38] Of the few approaches to this, some local governments only permit these with a height limit equivalent to a nameplate rated capacity of 1 kW or less.

[37] eFormative Options, LLC & Entegrity Wind Systems, Inc. 2006. Small Wind Siting and Zoning Study Development of Siting Guidelines and A Model Zoning By-law for Small Wind Turbines (under 300 kW). Developed for the Canadian Wind Energy Association. pp.15.

[38] Jacques Whitford. 2008. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unicorporated Areas. New Brunswick Department of Energy. pp 50.

Model Land Use Bylaw Regulations and Definitions for Domestic Small Scale Wind Energy

The following are suggested options of model regulations and definitions aimed to assist Local Trust Committees in developing provisions to better enable small scale wind turbines, with consideration of the potential impacts associated with wind turbines. Model regulation options are provided along with reference to the impacts considered and staff comments. Definition options are provided and are supportive of the regulation options. Given that most land use bylaws in the Islands Trust area are uniquely structured and worded, model regulation and definition options are provided in a way that can be considered by all Local Trust Committees, and intended to be adapted to meet the needs of the particular community. Regulations are provided in Table 2 and Definitions are provided in Table 3. Note that options provided below do not include those related to Development Permit Areas at this time.

Table 2: Model Regulation Options for Domestic Small Scale Wind Energy

Regulation Options	Impacts Considered	Staff Comments
Height		
• Include no height maximum for wind turbines or include a total maximum height of the wind turbine.	viewscape	Height maximums present the biggest challenge in Islands Trust land use regulations for installation of small wind turbines. However, without appropriate setback regulations, exemption from height alone does not address other issues, such as safety or noise. Consider a height maximum if visual impacts are a concern. Consider that in doing so it may limit the size (nameplate rated capacity) of the wind turbine that can be installed and may also prevent an installation that would otherwise be permitted by setback regulations.

Regulation Options	Impacts Considered	Staff Comments
Signage		
• Include provisions for signage, such as signs shall not be permitted on the wind turbine, wind turbine tower building or other structure associated with the small scale wind energy system, other than the manufacturer's or installer's identification, appropriate warning signs, and owner identification.	viewscape	Consider provisions around signage to reduce visual impact of wind turbine.
Permitted uses		
• Include small scale wind energy systems in permitted accessory uses for residential and agricultural zoned lots. Consideration should be given to avoiding known locations of significant bird and bat habitats.	viewscape, noise, safety, property values, birds and bats	Consideration should be given to the appropriate size of lot to site a wind turbine and/or zones, given setback requirements to address noise and safety, and height specifications for wind turbines. A height maximum should be considered if visual impacts are a concern. Consider whether or not to permit wind turbines to be mounted on or attached to other structures/buildings and appropriate provisions around them (e.g. height maximum, nameplate rated capacity).

Regulation Options	Impacts Considered	Staff Comments
• Permit those small scale wind energy systems that are certified by the *Small Wind Certification Council* or consider working with the local Regional District building permit department in regards to requiring documents related to wind turbine specifications and certifications as noted in the section on Impacts above. For areas with Siting and Use Permits, consider adding small wind turbines to the SUP bylaw.	safety, noise	Certification provides a standardized measure of safety that assesses performance, strength and safety, and acoustic sound of small scale wind turbines up to 50-65 kW; however, only two small wind turbines have been certified to date. Regional District building bylaws will vary from one to another and a small wind turbine may not require a building permit. Consider working with the Regional District to address issues of safety such as structural failure and blade throw.
Permitted Buildings and Structures		
• Include small scale wind energy systems in permitted buildings and structures for residential and agricultural zoned lots. Limit number of permitted small scale wind energy systems per lot for residential use. Set a limit of permitted number of small scale wind energy systems per lot for farming purposes.	viewscape	Consideration should be given to the maximum number permitted per lot based upon desire of community in terms of visual impact.

Regulation Options	Impacts Considered	Staff Comments
Setbacks for Wind Turbines		
• Setback to all lot lines or a habitable dwelling of at least the total wind turbine height, subject to meeting the Regional District noise bylaw requirements (see third bullet in section below).	safety, noise	Provides a measure of safety for neighbouring properties should the turbine collapse. Will likely be limited to lots 50 m in width and wider, subject to noise requirements. Applicants may apply for variance to locate within setback (e.g. to access better wind; for smaller lots without large enough lot dimensions to meet setback requirements).
• Setback to all lot lines or habitable dwelling of at least 1.5 to 3 times the total wind turbine height, and subject to meeting the Regional District noise bylaw requirements (see next bullet below).	safety, noise	Provides an increased measure of safety for neighbouring properties addressing safety issues including blade and ice throw. Further decreases available area to site turbine on a property. Applicants may apply for a variance to locate within the setback.
• Islands Trust does not regulate noise directly; however, Regional Districts have the authority to do so. Local Trust Committees could work with the local Regional District to ensure noise bylaws include general provisions limiting sound levels to at least a 40 dB(A) minimum and/or 6 dB(A) limit above background noise levels at all lot lines or neighbouring dwelling.	noise	This may be the most limiting factor for installing a wind turbine in terms of setbacks.

Regulation Options	Impacts Considered	Staff Comments
Setbacks Applied to Associated Structures and Buildings		
• All associated structures and buildings of a small wind energy system, except the actual wind turbine and guy wire anchors to meet current LUB setback regulations OR permit a building/structure that houses the control and electrical conversion equipment of the small wind energy system of a limited size to be sited within the setback area, analogous to provisions for "utility/pump houses" or as a part of the definition of "utility/pump houses." Include guy wire anchors that are clearly visible in current provisions for projections into setback areas.	n/a	This is in keeping with current setback provisions for structures and buildings, and allows guy wires to project into setback areas and associated buildings/structures to be located within setbacks.
Lot Coverage		
• Exempt structures and buildings used for the purposes of small wind energy systems from lot coverage requirements.	n/a	Consider lessening lot coverage regulations on renewable energy installations.

Table 3: Model Definitions Options for Domestic Small Scale Wind Energy

Definition Options
Guy wire anchor: a cable or wire used to support a wind turbine tower.
Nacelle: the frame and housing at the top of the wind turbine tower that encloses the gearbox and generator and protects them from weather.
Nameplate capacity: the wind turbine manufacturer's maximum rated output of the electrical generator found in the nacelle of the wind turbine.
Rotor blade clearance: the distance between the bottom tip of the blade at its lowest possible extension and the ground.
Rotor blade: the part of the wind turbine that rotates in the wind and extracts kinetic energy from the wind.
Rotor blade's arc: largest circumferential path traveled by the wind turbine's rotor blade.
Small wind energy system: a wind energy conversion system consisting of a wind turbine, a wind turbine tower, and associated equipment, machinery, structures and buildings, which has a nameplate rated capacity of not more than 50kW, and which provides power for use on-site only (grid connected or off-grid).
The Small Wind Certification Council: The Small Wind Certification Council (SWCC) is an independent certification body, and certifies that small wind turbines meet or exceed the performance and durability requirements of the American Wind Energy Association (AWEA) Small Wind Turbine Performance and Safety Standard**.** This certification provides a common North American standard for reporting turbine energy and sound performance, and helps small wind technology gain mainstream acceptance.
Wind turbine height: height from grade to the highest vertical extension of a wind turbine at the top of the rotor blade's arc.

Definition Options
Wind turbine tower: a freestanding structure or a structure attached to guy wires that serves to support other parts of the wind turbine.
Wind turbine: A structure that produces power by capturing the kinetic energy from the wind and converts it into energy in the form of electricity and includes the wind turbine, wind turbine tower, rotor blades and nacelle.

Conclusion

The aim of this project was to generate model land use bylaw definitions and regulations specifically for domestic small scale wind energy. There are a range of options put forward that, if Local Trust Committees are interested in pursuing, will require several decisions about how to regulate small wind energy and what specific regulations to include. Since there are no accepted standards for addressing some of the most controversial issues associated with wind energy, a range of possibilities are provided, each with their own advantages and disadvantages. Elected officials will have to decide how restrictive they want to be in their approach to regulation based on the community's goals and objectives and balancing the various risks.

A suggested supplementary step to this project is consideration of the exploration and generation of model development permit area tools for small scale wind energy - domestic use and other appropriate small scale applications in the 1 to 50kW wind turbine size range (approximately half of the larger Island OCPs in the Islands Trust target "small scale" renewable energy).

While including small wind energy provisions in land use bylaws is an important step towards enabling renewable energy production and addressing some of the questions around wind energy development, these provisions are likely to be most effective in the context of Islands Trust's broader efforts towards greenhouse gas reduction. For example, pursuing the development of model regulations for the remaining identified renewable energy technologies as identified by LPC will assist with rounding out the suite of potential provisions that will help to achieve the current policies aimed at renewable energy production. Additionally, achieving these policies is just one part of the larger initiative to reduce greenhouse gas emissions within the *Climate Wise Islands Program*, which also includes other important policies such as those directed at energy efficiency and transportation planning.

Appendix A: Financial Support and Incentives for Small Scale Renewable Energy

- ***BC Hydro Net Metering Program***
  This program is intended to promote small-scale, grid-connected green electricity generation at homes and businesses. These are typically defined as systems of less than 50 kW in size. The program is designed for customers with small generating facilities, who may sometimes generate more electricity than they require for their own use. The program allows their customers to sell or "bank" their excess generation, increasing the value they derive from their on-site electrical generation. By being able "bank" excess generation, the customer can save money on the cost of electricity storage devices to capture the excess generation for use when consumption exceeds generation. (The Feed-in-Tariff – policy currently being drafted by the Ministry of Energy for renewable energies up to 5 MW does not include wind energy at this time.) http://www.bchydro.com/energy_in_bc/acquiring_power/current_offerings/net_metering.html

- ***Live Smart BC Efficiency Incentive Program***
  Among the many incentives offered in this program, they offer homeowners $260 per 0.6 kW generated from wind up to a maximum of $1300.00. The program is currently offered between 2011 through to 2013. http://www.livesmartbc.ca/attachments/brochure.html?src=/incentives/efficiency-home/brochure.html

- ***Farm Credit Canada "Energy Loans"***
  Farm Credit Canada offers "Energy Loans" that are intended to help farmers make the switch to renewable energy sources including wind energy. They offer no loan processing fees on the first $500,000. http://www.fcc-fac.ca/en/aboutus/media/news20100222_e.asp

- ***BC Ministry of Agriculture and Lands Agricultural Farm Plan and Beneficial Management Practices Program***
  This program offers farmers cost sharing incentives to address environmental risks, such as riparian protection and GHG emission reduction. For example, the program offers the following related to wind energy:
    - Sixty percent of the cost of implementing watering systems with alternative energy to manage livestock up to $70,000; and

- Thirty percent of the cost of implementing alternative energy technology including wind for powering previously fossil-fueled dependent farm equipment and replacement of diesel generators up to $50,000. http://www.bcefp.ca/

Appendix B: Current Renewable Energy Policies in the Islands Trust

Bowen Island Official Community Plan Bylaw No. 282, 2010

September 2011

2.5 Climate Change Mitigation

Objective 11 To meet or exceed Provincial targets for reductions in Greenhouse Gas (GHG) emissions by creating a more energy efficient community.

Policy 19 In cooperation with public agencies and community stakeholders, the Municipality will strive to reduce GHG emissions through:

☐ planning for efficient land use, energy use and transportation;

☐ infrastructure design;

☐ green procurement;

☐ building retrofits;

☐ solid waste diversion; and

☐ low carbon, clean, sustainable, and renewable energy.

Objective 15 To establish the importance of climate change-related concepts of energy consumption, energy security, GHG emissions, carbon cycling, and local food production in land and site planning, building and transportation.

Policy 26 In pursuit of the foregoing objective, the Municipality:

☐ supports initiatives to diversify and secure the community's energy supply through local low carbon, clean, sustainable, and renewable energy sources and emerging technologies such as solar photovoltaic, solar hot water, geothermal, bio-fuel from waste, heat recovery from waste, wind and tidal;

☐ will proactively work with development and building industry representatives to build knowledge, capacity and experience in energy efficient and green building practices;

☐ will consider supporting small-scale, locally generated, zero-carbon, renewable power for new and existing development in Snug Cove;

Objective 16 To house residents and visitors in smaller, energy efficient new and retrofitted homes constructed of local materials and powered, in large part, by local low carbon, clean, sustainable, and renewable energy sources.

Objective 17 To reduce the dependence on private vehicle travel.

Policy 28 The Municipality supports the development of local low carbon, clean, sustainable and renewable energy production while decreasing energy consumption and improving energy efficiency.

Denman Island Official Community Plan Bylaw No. 185, 2009

November 2011

C.4 – CLIMATE CHANGE ADAPTATION AND MITIGATION

Climate Change Adaptation and Mitigation - Objectives

Objective 2 To promote the use of renewable energy and the development of renewable energy sources

Policy 9 The Local Trust Committee should encourage the generation of renewable non-polluting energy as long as it is on a small scale.

Policy 10 Landowners erecting structures for the generation of wind energy are encouraged to work with research scientists gathering data on the potential negative environmental impacts of small wind-energy installations.

Policy 11 Residents are encouraged to limit the use of fossil-fuel burning engines or generators and to use alternative energy sources where possible.

Policy 13 A number of Climate Change Adaptation and Mitigation Policies have been identified by the community that can only be achieved through initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations. The following actions are encouraged to reduce greenhouse gas emissions:

a. The Local Trust Committee should develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when it is processing land use applications. Application checklists should be revised to include climate change mitigation and adaptation criteria, such as energy efficiency, renewable energy and carbon sequestration impacts.

c. The Local Trust Committee should work with residents and community groups such as Renewable Energy Denman Island - REDI) to reduce the carbon footprint of Denman Island by supporting initiatives to lower greenhouse gas emissions, focusing on community education, personal awareness, and individual involvement.

Executive Islands Area Official Community Plan

DRAFT November 2011

4. CLIMATE CHANGE ADAPTATION AND MITIGATION

4.4 ACTIONS

4.4.2 Residents are encouraged to:

(b) Limit the use of fossil-fuel burning engines or generators and use alternative energy sources where possible;

4.4.5 Zoning regulations should support small scale residential solar and wind power generation on residential lots.

Gabriola Island Official Community Plan Bylaw No. 166, 1997

November 2011

SECTION 8 – CLIMATE CHANGE ADAPTATION AND GREENHOUSE GAS EMISSION REDUCTION

Advocacy Policies for Climate Change Adaptation and Greenhouse Gas Emission Reduction

A number of climate change adaptation and greenhouse gas emission reduction actions are identified that can only be achieved through cooperation and initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations.

ix. *residents are encouraged to work beyond the requirements of Provincial and National Building Codes and find new ways to incorporate high energy efficiency into building design and construction. In addition, residents are encouraged to seek out new ways of reducing their own greenhouse gas emissions through alternative transportation methods, reduced use of fossil-fuel burning engines or generators, and increased use of alternative energy sources.*

xiv. *the production of renewable energy for local consumption on Gabriola is encouraged, and residents with successful and appropriate alternative energy production methods are encouraged to share their methods with other residents.*

Mudge Island Official Community Plan Bylaw No. 227, 2007

January 2011

3.6 Climate Change Adaptation and Greenhouse Gas Emission Reductions

Policies

Policy 1 The Local Trust Committee encourages information sharing and education on reducing greenhouse gas emissions and on producing energy from alternative sources.

DeCourcy Island Official Community Plan Bylaw No. 16, 1981

April 2011

8. CLIMATE CHANGE ADAPTATION AND GREENHOUSE GAS EMISSION REDUCTION

Climate Change Adaptation and Greenhouse Gas Emission Reduction Policies

1) The Local Trust Committee encourages information sharing and education on reducing greenhouse gas emissions and on producing energy from alternative sources.

Galiano Island Official Community Plan Bylaw No. 108, 1995

November 2011

SECTION IV CONSERVATION AND ENVIRONMENT

6. Climate Change Mitigation and Adaption

c) The Local Trust Committee should consider amending zoning regulations to permit or facilitate small-scale renewable energy production, such as solar collectors, wind turbines and Geothermal heating.

Gambier Island Official Community Plan Bylaw No. 73, 2001

January 2011

PART 11 – CLIMATE CHANGE ADAPTATION AND MITIGATION
POLICIES CLIMATE CHANGE ADAPTATION AND MITIGATION

Policy 6.8 A number of Climate Change Adaptation and Mitigation Policies have been identified by the community that can only be achieved through initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations. The following actions are encouraged to reduce greenhouse gas emissions:

i. The Local Trust Committee encourages residents to work beyond the requirements of Provincial and National Building Codes and find new ways to incorporate high energy efficiency into building design and construction. In addition, residents are encouraged to seek out new ways of reducing their own greenhouse gases emissions through alternative transportation methods, reduced use of fossil-fuel burning engines or generators, and increased use of low impact alternative energy sources.

Gambier Associated Island Official Community Plan Bylaw No. 109, 2009

5 – CLIMATE CHANGE ADAPTATION AND MITIGATION
5.4 ACTIONS

5.4.1 The LTC should develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when considering land use applications. Application checklists may be developed to encourage climate change mitigation and adaptation criteria, such as energy efficiency, energy security, renewable energy and carbon sequestration impacts.

5.4.4 Residents are encouraged to:

b) Limit the use of fossil-fuel burning engines or generators and use alternative energy sources where possible;

5.4.7 To encourage alternative energy use, the Islands Trust should investigate the feasibility of the bulk purchase of small scale residential solar or other alternative energy equipment for resale to Island residents.

5.4.8 Zoning regulations should support small scale residential solar and wind power generation on residential lots.

Keats Island Official Community Plan Bylaw No. 77, 2002

January 2011

6. CLIMATE CHANGE ADAPTATION AND MITIGATION

Keats Island Policies

P 6.7 A number of Climate Change Adaptation and Mitigation Policies have been identified by the community that can only be achieved through initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations. The following actions are encouraged to reduce greenhouse gas emissions:

i) The Local Trust Committee should develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when it is processing land use applications. Application checklists should be revised to include climate change mitigation and adaptation criteria, such as energy efficiency, renewable energy and carbon sequestration impacts.

iii) The Local Trust Committee encourages residents to work beyond the requirements of Provincial and National Building Codes and find new ways to incorporate high energy efficiency into building design and construction. In addition, residents are encouraged to seek out new ways of reducing their own greenhouse gases emissions through alternative transportation methods, reduced use of fossil-fuel burning engines or generators, and increased use of alternative energy sources.

Hornby Island Official Community Plan Bylaw No. 104, 2002

November 2011

SECTION VI—OBJECTIVES AND POLICIES FOR SUSTAINABLE DEVELOPMENT

6.1 Objectives and Policies for Development

Policies:

6.8.6 This Plan strongly encourages the incorporation of green building techniques and alternative energy systems (solar, wind, geothermal, or water based) into residential housing, whether it is new construction or renovations.

6.8.10 A number of Climate Change adaptation and mitigation actions are identified that can only be achieved through cooperation and initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations. In order to foster such actions the Local Trust Committee should:

a. develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when it is processing land use applications. Application checklists should be revised to include climate change mitigation and adaptation criteria, such as energy efficiency, renewable energy and carbon sequestration impacts.
b. support opportunities for incentives to encourage "climate wise" actions, including water conservation, storm water retention, the use of alternative energy sources for home use, and the use of alternative transportation methods

Lasqueti Island Official Community Plan Bylaw No. 77, 2005

January 2011

Objectives for Climate Change Adaptation and Mitigation

Objective 1 *To promote the use of renewable energy and the development of renewable energy sources, and consider the impacts of climate change in all land use decisions; and*

Objective 2 *To maintain Lasqueti Island's lower than Canadian average rates of greenhouse gas emissions and seek out new means of further reducing greenhouse gas emissions through reduced fuel consumption and shifts to alternative forms of energy. While a detailed inventory is required to fully measure greenhouse gas emission rates on the Island, an aspirational target of maintaining Lasqueti Island's greenhouse gas emissions at or below 50% of the Canadian per capita average rate is set, to be verified in 2020 and 2050.*

Advocacy Policies

Policy 11 The implementation of fuel saving measures at public and community buildings should be investigated by a team of island residents, and new methods proposed to reduce GHG emissions through the use of alternative energy sources.

Mayne Island Official Community Plan Bylaw No. 144, 2007

July 2011

4.7 CLIMATE CHANGE MITIGATION AND ADAPTATION

4.7.9 The LTC should consider amending zoning regulations to permit or facilitate small scale renewable energy production, such as solar collectors, wind turbines and geothermal heating.

North Pender Island Official Community Plan Bylaw No. 171, 2007

June 2011

4.7 CLIMATE CHANGE MITIGATION AND ADAPTION
Policies and Actions

4.7.10 The Local Trust Committee may consider amending zoning regulations to permit or facilitate small-scale renewable energy production, such as solar collectors, wind turbines and geothermal heating.

North Pender Associated Islands Official Community Plan Bylaw No. 147, 2002

June 2011

Climate Change Mitigation and Adaption

- no policies at this time

Saturna Island Official Community Plan Bylaw No. 70, 2000

December 2010

E.5 CLIMATE CHANGE MITIGATION AND ADAPTATION

E.5.10 The Local Trust Committee should consider amending zoning regulations to permit or facilitate small-scale renewable energy production, such as solar collectors, wind turbines and geothermal heating

E.5.22 The Local Trust Committee should support incentives to incorporate alternative energy feature and energy efficient building design in all buildings.

Salt Spring Island Official Community Plan Bylaw No. 434, 2008

September 2010

A.6 CLIMATE CHANGE AND ENERGY EFFICIENCY

A.6.1 OBJECTIVES

A.6.1.3 To promote the use of renewable energy and the development of renewable energy sources.

A.6.2 POLICIES

A.6.2.16 The Local Trust Committee should review zoning to relax height restrictions for solar and wind power generation on residential lots.

A.6.2.17 The Local Trust Committee should consider supporting small-scale, locally generated, zero carbon, renewable power for new and existing development. Such facilities should be located on the same, or an adjacent site, as the user.

Piers Island Official Community Plan Bylaw No. 51, 1982

- no policies at this time

South Pender Island Official Community Plan Bylaw No. 107, 2011

- no policies at this time

Thetis Island Official Community Plan Bylaw No. 88, 2011

SECTION 5 CLIMATE CHANGE ADAPTATION AND MITIGATION
CLIMATE CHANGE ADAPTATION AND MITIGATION OBJECTIVES

2. To promote the use of renewable energy and the development of renewable energy sources;

CLIMATE CHANGE ADAPTATION AND MITIGATION POLICIES

g) The Local Trust Committee encourages local, small-scale generation of alternative non-polluting energy sources with limited noise, visual impacts and safety risks

j) Residents are encouraged to work beyond the requirements of provincial and national building codes and find new ways to incorporate high energy efficiency into building design and construction. In addition, residents are encouraged to seek out new ways of reducing their own greenhouse gas emissions through alternative transportation methods, reduced use of fossil-fuel burning engines or generators, and increased use of alternative energy sources with limited noise, visual impacts, and safety risks.

The following activities are encouraged as possible actions that can be taken to reduce greenhouse gas emissions:

i. The Local Trust Committee should develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when it is processing land use applications. Application checklists should be revised to include climate change mitigation and adaptation criteria, such as energy efficiency, renewable energy and carbon sequestration impacts.

vii. The size, siting and height of wind turbines should be regulated in order to minimize environmental impacts and safety risks. Land use regulation should differentiate between wind turbines for onsite use and those that generate energy for use offsite.

Appendix C: Wind Turbine Related Regulations in the Islands Trust

	Land Use Bylaw	Wind Turbines Exempt from Max. Height	Wind Turbine Max. Height	Wind Generating Stations Exempt from Min. Lot Size	Small Wind Turbines Defined	Renewable Energy Permitted as a Use
1	Bowen Island Municipality Land Use Bylaw No. 57, 2002 *Dec 2010*	☑	☒	☒	☒	☒
2	Denman Island Bylaw No. 186, 2008 *Nov 2011*	☒	☒	☒	☒	☑
3	Gabriola Island Bylaw No. 177, 1999 *Oct 2011*	☒	☒	☒	☒	☒
4	Mudge Island Bylaw No. 228, 2007	☑	☒	☒	☒	☒
5	DeCourcy Island Bylaw No. 44 , 1987 *Jan 2008*	☒	☒	☒	☒	☒
6	Galiano Island Bylaw No. 127, 1999 *June 2011*	☑	☒	☒	☒	☒
7	Gambier Island Bylaw No. 86, 2004	☑	☒	☒	☒	☒
8	Keats Island Bylaw No. 78, 2002 *Sept 2009*	☑	☒	☒	☒	☒
9	Bowyer & Passage Islands Bylaw No. 114, 2011	☒	☑	☒	☑	☑
10	Gambier Associated Islands Bylaw No. 96	☒	☒	☒	☒	☒
11	Hornby Island Bylaw No. 86, 1993 *Feb 2012*	☒	☒	☒	☒	☒
12	Lasqueti Island Bylaw No. 78, 2005 *Sept 2010*	☒	☒	☒	☒	☒

	Land Use Bylaw	Wind Turbines Exempt from Max. Height	Wind Turbine Max. Height	Wind Generating Stations Exempt from Min. Lot Size	Small Wind Turbines Defined	Renewable Energy Permitted as a Use
13	Mayne Island Bylaw No. 146, 2008 *July 2011*	☑	☒	☒	☒	☒
14	North Pender Island Bylaw No. 103, 1996 *Nov 2010*	☒	☒	☒	☒	☒
15	North Pender Assoc. Islands Bylaw No. 148, 2003 *July 2008*	☒	☒	☒	☒	☒
16	Saturna Island Bylaw No. 78, 2002 *Sept 2010*	☑	☒	☑	☒	☒
17	Salt Spring Island Bylaw No. 355, 2001 *Mar 2012*	☒	☒	☒	☒	☒
18	Piers Island Bylaw No. 373, 2003	☒	☒	☒	☒	☒
19	South Pender Island Bylaw No. 92, 2003 *Nov 2011*	☒	☒	☒	☒	☒
20	Thetis Island Bylaw No. 89, 2011	☒	☒	☒	☒	☒
21	Valdes Island Bylaw No. 42, 1998	☒	☒	☒	☒	☒
22	Ruxton Island Bylaw No. 13, 1984	☒	☒	☒	☒	☒