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# Large Scale Wind Turbines

History, Policy, and Options

File #: P12-01

Ian Watson, Planner

January 10, 2012

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# Presentation Outline

- **Background:**
  - Municipal Government Act
  - Municipal Planning Strategy
  - Land Use Bylaw
- **History:**
  - The Process
- **Current Policy:**
  - Environmental Assessment
  - Municipal Planning Strategy
  - Land Use Bylaw
  - DND
- **Options**

# Background



Municipal Government Act (MGA)



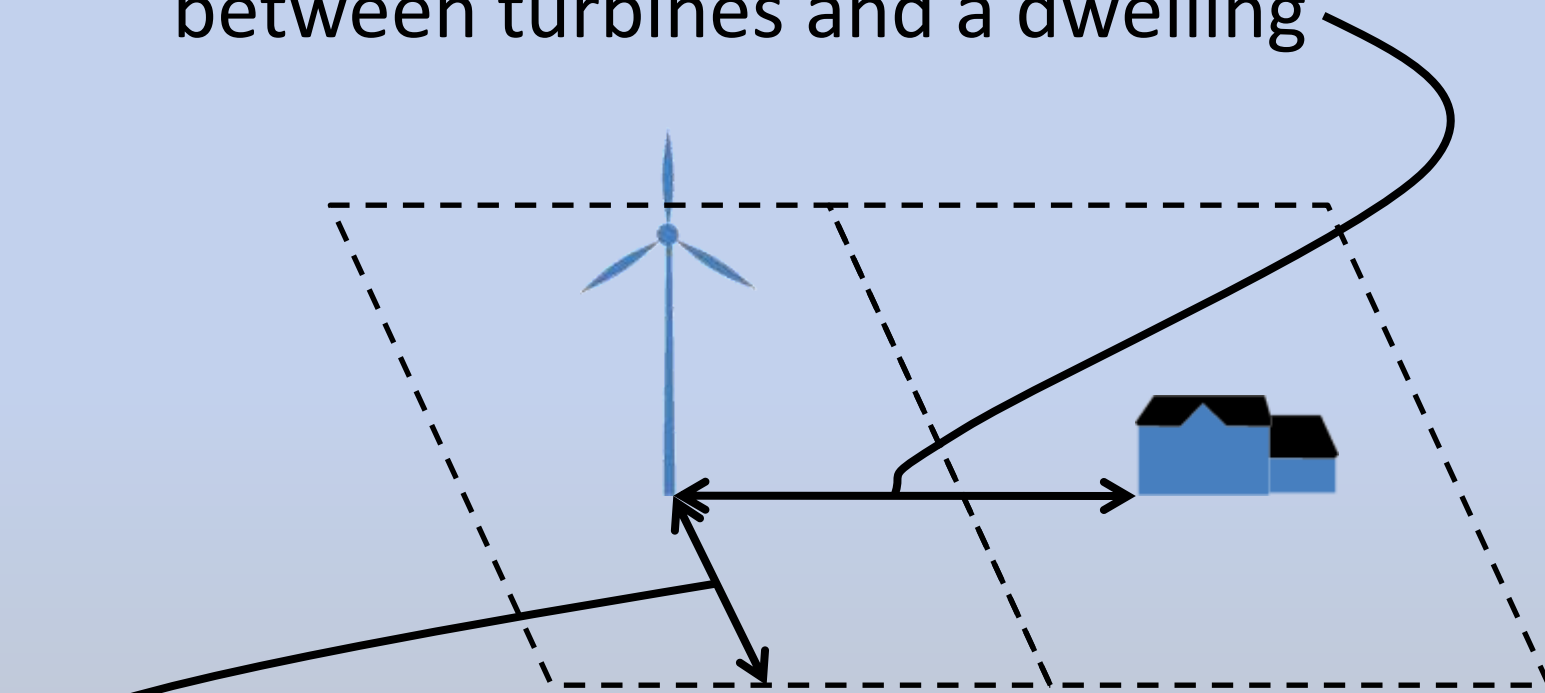
Municipal Planning Strategy (MPS)



Land Use Bylaw (LUB)

# Background

Separation Distance: Minimum distance between turbines and a dwelling



Setback Distance: Minimum distance between a turbine and property lines or rights-of-way

# History: The Process

- Three years from active project to Second Reading
- Open House & PPMs in Aylesford and Canning, June 2010





# History: The Process

- PAC selects as-of-right with 600m separation distance
- PPM in Kentville, January 2011
- PAC, Council, and Staff visit Digby Wind Park



# History: The Process

- PAC changes its recommendation to 700m separation distance
- First Reading in April, 2011
- Public Hearing in Kentville, April 2011
- Second Reading in May, 2011
- Enactment in June, 2011



# Wind Power Background Information

## What Are Wind Turbines?

A wind energy system is simply a **structure capable of converting the energy of the wind into a usable form of energy**. In the past this may have meant the pumping of water or the turning of a mill stone; however, wind energy is generally now associated with electrical power generation.

Power-generating wind turbines are typically placed into one of two size classes, based on their rated power output.

**Small-scale wind turbines = less than 100 kilowatts (kW).**

**Large-scale, or commercial-scale = greater than 100 kilowatts (kW).**

Kings County is currently in the process of developing policy for large-scale turbines.

### What is a Watt?

A watt is a unit of power. It typically takes 60 to 100 watts of power to run a common incandescent light bulb, around 1000 watts to run a microwave, and 3000 watts to run an electric water heater.

1000 watts (W) = 1 kilowatt (kW)

1000 kilowatts (kW) = 1 megawatt (MW)



Pictou Point wind turbines located in Yarmouth County — 1.6 MW, 263 ft (118 m)  
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## How Big Are Wind Turbines?



## How Much Power?

The amount of power a single turbine produces **varies** with the **wind speed** and the **size of the turbine's blades**. Rough terrain, vegetation, and buildings can slow wind speeds and cause turbulence. Generally, this effect is reduced at higher altitudes. Thus, **taller turbines** are able to access faster winds and generate **more power**.

The **size of a turbine**, and therefore its power output, is **limited by the size of the road network** required to move its components from the factory to the installation site, as well as the **strength of materials** used to build the turbine. The **economics** of a development also dictate the size of its turbines. Although modern land-based wind turbines exist that can generate up to 3 MW of power, **Nova Scotia's** current turbines are **less than 2 megawatts (MW)**.

Although wind power output varies as the wind blows, the **average 1 MW turbine will produce enough power in a year to supply 250–300 households**.

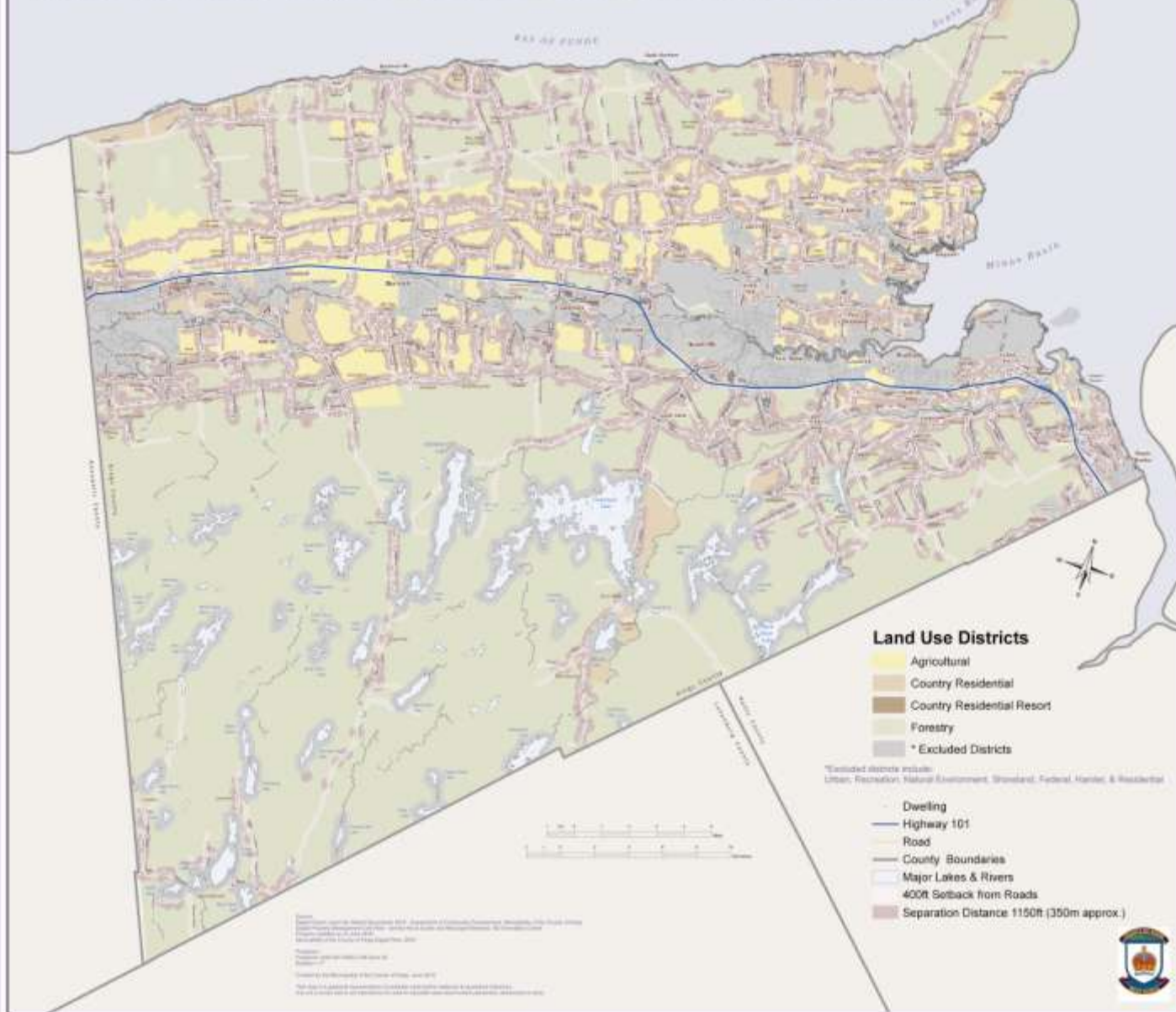
If more power is needed than is available from a single large turbine a collection of turbines, often called a **"wind farm"**, may be built. Turbines in wind farms are typically separated by great distances in order to prevent one turbine from **"stealing"** the wind of another turbine.

Wind farms are often considered very **compatible with agricultural uses** as they provide income to farmers from royalties, while taking very little arable land out of production. Approximately **5%** of the land area of a wind farm is used for tower footings and access roads. The other 95% is available to be farmed.



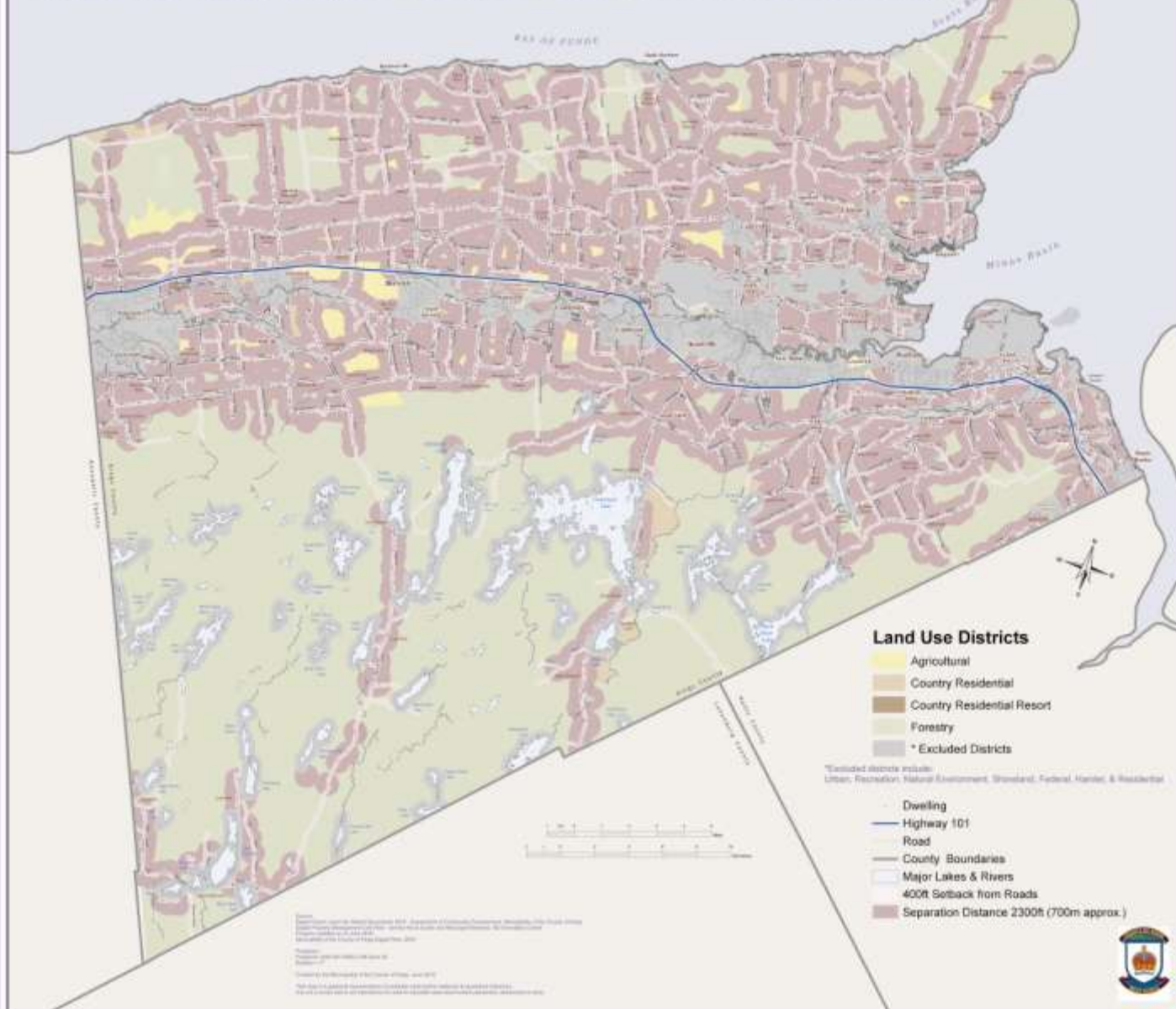
**1150 ft** ( Approximately 350 metres )

## Wind Turbine Separation Distance From Dwellings



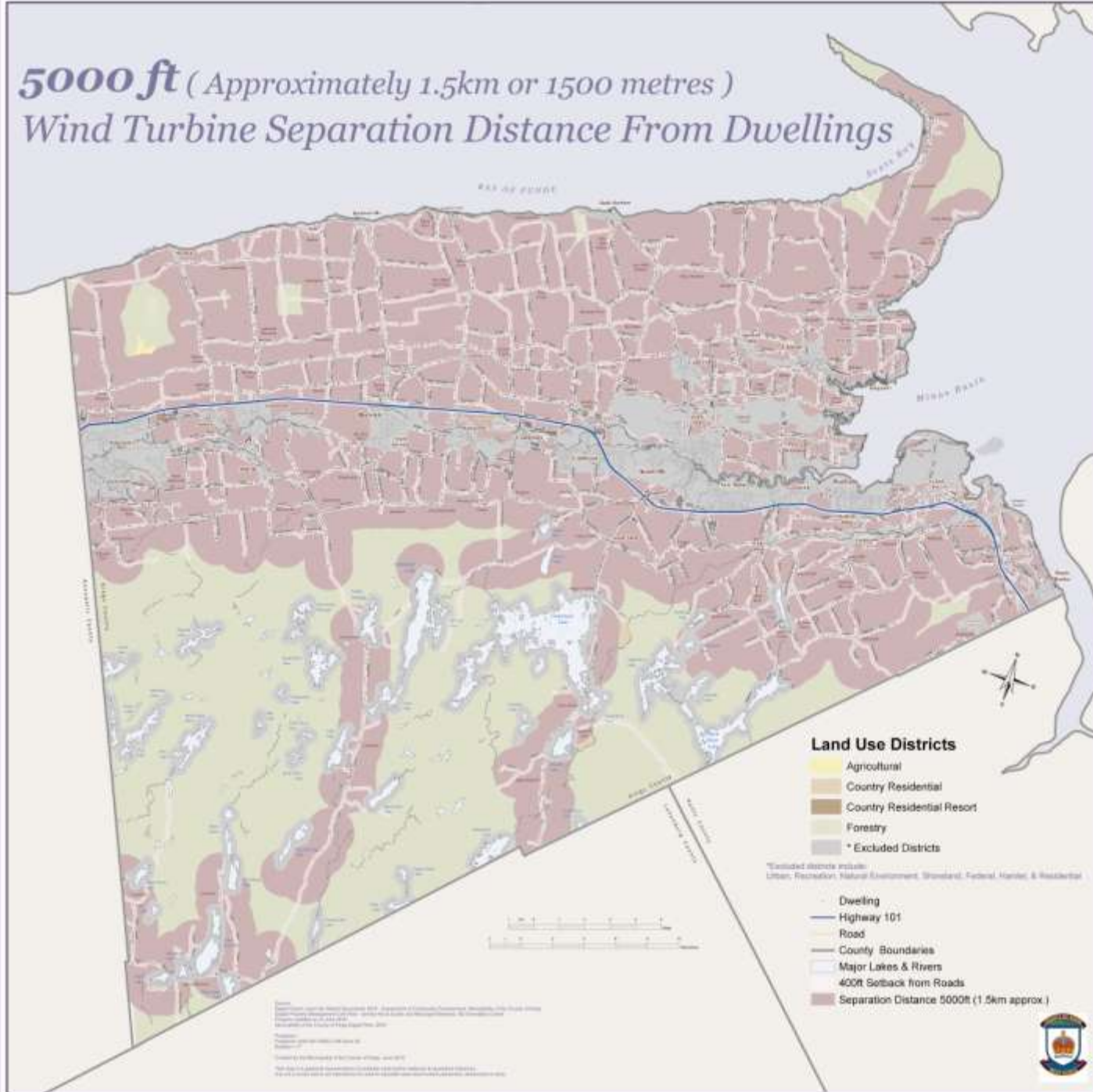
**2300 ft** ( Approximately 700 metres )

## Wind Turbine Separation Distance From Dwellings





# 5000 ft ( Approximately 1.5km or 1500 metres ) Wind Turbine Separation Distance From Dwellings



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# History: Information Discussed

- Comparison to other jurisdictions
- Union of Nova Scotia Municipalities model bylaw
- Integrated Community Sustainability Plan goals
- Municipal Planning Strategy
- Aesthetics
- Health and Safety Concerns: (noise, shadow flicker, ice throw, wildlife)

# Current Policy: Environmental Assessment

- Provincial process for wind projects with rated power greater than 2 megawatts
- Identifies potential impacts
- Works to adjust project to mitigate negative impacts



# Current Policy: Municipal Planning Strategy

## Section 5.5

### Objectives:

- *5.5.1.1 To promote the development of large-scale wind turbines in an effort to reduce the Municipality's dependence on non-renewable energy.*
- *5.5.1.2 To respond to the Provincial call for increased sources of renewable energy.*

# Current Policy: Municipal Planning Strategy

## Section 5.5

### Objectives:

- *5.5.1.3 To minimize the potential negative impacts of large-scale wind turbines on neighbouring land uses and to ensure an acceptable standard of safety and compatibility.*
- *5.5.1.4 To maintain consistency with and support for the rural goals of the Strategy.*

# Current Policy: Municipal Planning Strategy

## Section 5.5

- As-of-right permitting
  - Agricultural (A)
  - Forestry (F)
  - Country Residential (CR)
  - Shoreland (S)

# Current Regulations: Land Use Bylaw

## Section 10.1.6

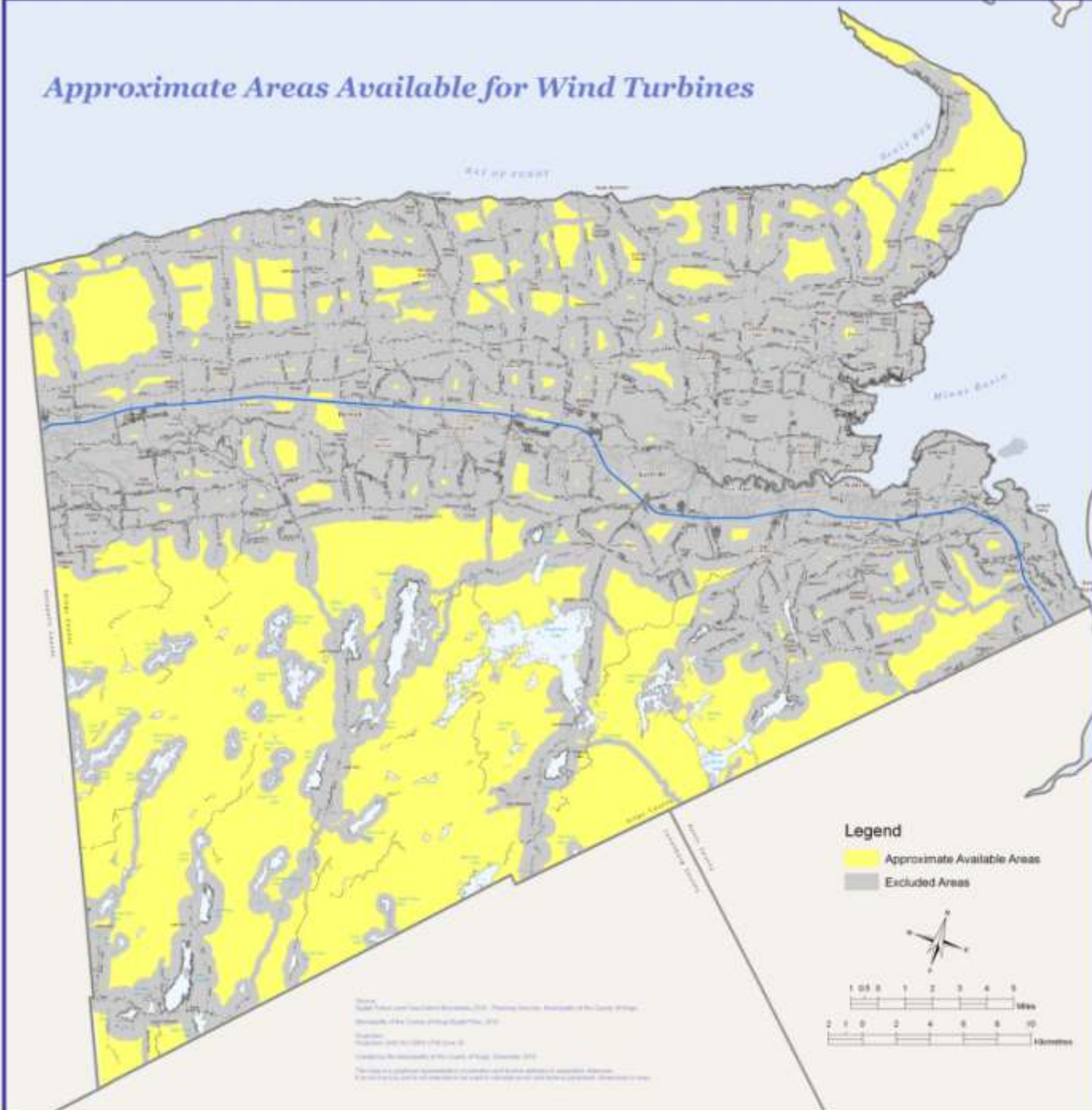
- A1, F1, R6, and S1 zones
- Separation distance of 2300 feet (700m)
- Setback distance of one (1) times the height of the turbine from property lines and ROWs
- Exemptions for properties and dwellings that are part of the wind project

# Current Regulations: Land Use Bylaw

## Section 10.1.6

- Provisions for clearance, distance between turbines, access, surface finishes, lighting, and signage
- Requirements for decommissioning
- Required documents, including project details, emergency plans, and approvals from federal and provincial departments

# Approximate Areas Available for Wind Turbines







# Options

**Option A: Recommend that Council confirms its current policy**

# Options

## Option B: Recommend that Council initiate a project to review the Municipal Planning Strategy

Public Process	Work Completed	Resource Needs Going Forward	Start Date	End Date
<ul style="list-style-type: none"><li>▪ Preliminary Public Meetings and/or Open House to assist in selection of policy options</li><li>▪ Additional Advertising</li><li>▪ Minimum MPS amendment Process (PPM + PH)</li></ul>	<ul style="list-style-type: none"><li>▪ Previous project work</li></ul>	<ul style="list-style-type: none"><li>▪ Staff time to prepare reports and manage MPS amendment process</li><li>▪ Input from various service areas</li></ul>	Winter 2012	Fall 2012

# Options

## Option C: Recommend that Council initiate a project to review the Land Use Bylaw

Public Process	Work Completed	Resource Needs Going Forward	Start Date	End Date
<ul style="list-style-type: none"><li>▪ Enhanced PIM</li><li>▪ Additional Advertising</li><li>▪ Minimum LUB amendment process (PH)</li></ul>	<ul style="list-style-type: none"><li>▪ Previous project work is available</li></ul>	<ul style="list-style-type: none"><li>▪ Staff time to prepare reports and manage LUB amendment process</li><li>▪ Input from various service areas</li></ul>	Winter 2012	Summer 2012

# Staff Recommendation

- Option A: Recommend that Council confirms its current policy
- Option B: Recommend that Council initiate a project to review the Municipal Planning Strategy
- Option C: **Recommend that Council initiate a project to review the Land Use Bylaw**

# Potential Motion

“The Planning Advisory Committee recommends that Municipal Council initiate a planning project concerning large-scale wind turbines by amending the Semi-Annual Work Plan, as described as Option C in the report dated January 10<sup>th</sup>, 2012. ”