CONCERNS FOR SOURCE WATER IN THE GREAT LAKE BASIN/WATERSHED

AND OFFSHORE INDUSTRIAL WIND TURBINE PROPOSALS OR DEVELOPMENTS

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INTRODUCTION:

I have researched my concerns regarding offshore IWT projects/proposals that have recently become prevalent in my county (Essex) and across Ontario's Great Lake Basin and have outlined these concerns in this paper primarily under adverse 'water quality effects'. I have based my strong opposition against building IWT factories in our Great Lake water supply using the Clean Water Act and the Source Water Protection Primer by Rick Findlay under the Watershed Approach Plan 2004 (www.pollutionprobe.org Tel: 613-237-8666). I have imparted what I have learned through the extensive research of the International Joint Commission within their Biennial Meeting Nearshore Paper of October, 2009, along with the IJC's Great Lakes Water Quality Agreement of 1978 (amended by Protocal, 1987). Other sites I have used are listed within the cited works of this paper.

I vehemently believe that IWT development should be banned from the Great Lake Basin and its watershed, in other-words, no distance from the shoreline is acceptable. Our source water supply should under no conditions, be the next industrial parkland. The Basin has undergone decades of serious pollution from industry/commerce and there should be a 'no regret' or 'precautionary principle' in place for the management of this vital source water system. This invaluable water supply must remain protected for the health and safety sake of future generations both in Canada and in the US.

I give permission to use or present this information to assist in 'policy-making decisions' on 'water management' of our source water within the Great Lake Basin and its watershed pertaining to IWT offshore developments provided it is referred to under my authorship.

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Authored by: Jane Rogers

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1.0 HEALTH AND WATER QUALITY:

1.1 Point Source Pollutants: Industrial Wind Turbines (IWT) are 'point source' pollutants and represent significant industrial vehicles of contamination upon surface, groundwater and source water systems within the Great Lake Basin and its watershed. Under the International Joint Commission's (IJC) Great Lake Water Quality Agreement (GLWQA), a 'Point Source Impact Zone is defined as an area of water contiguous to a point source where the water quality does not comply with

the General and Specific Objectives of the Agreement' (International Joint Commission, 2009).

1.2 Mechanical Failure: A measure of 'possible failure' of IWT components must be considered when accounting for industrial oil discharge during all phases within the life span of each IWT structure. Documentation of mechanical failure is on record as described in '*Are Wind Turbine Step-up Transformers the Weak Link in the Wind Energy Supply Chain?,* by Mike Dickinson (Dickinson, 2009). Other documented mechanical issues are blade disconnection, nacelle component breakdown, blade detachment, generator/transformer explosions and lightning strike failure (Archives and Collections Society, 2004). Further articles on the issue of mechanical failure have been noted by Sarah Arnott in The Independent and Angela Jameson in the Times On Line who indicate that there have been design flaws in the turbine monopile foundations of offshore wind turbines in the UK. Ms. Arnott describes that the offshore turbines in the UK have shifted several centimetres under the impact of offshore conditions. Purportedly, the grouting at the base of the turbine towers was unable to withstand the high energy nature of offshore conditions, leading to the possibility of turbine collapse (Jameson, 2010). This happened in water that doesn't freeze! What can be expected to happen in water that does?

Given the potential for topple-failure of offshore wind turbines, the possibility of industrial pollutant discharge is of environmental concern. According to the Essex Regional Conservation Authority's (ERCA) Environmental Peer Review by Baird & Associates, 'turbines have a minimum lubricant volume of approximately 1,030 gallons' (Baird & Associates 2009).

If a tower were to collapse into the waters of the Great Lake Basin, this volume of pollutants would be discharged into the water resulting in the potential for irreversible environmental damage. In addition, turbine lubricant seals have the potential to leak, which again may result in point source pollutants in the water supply. Many industiral lubricants have been proven to contain carcinogenic components posing a risk to both aquatic organisms and humans (Exxon Mobil, 2003-2008).

1.3 Chemical Discharge: The risk of chemical discharge exists along any one of the three turbine life-cycle phases from initial construction to operations & maintenance and decommissioning. Given that many of the proposed wind turbines to be installed in the Great Lakes will be in proximity to water intake sources (7 intake systems exist in Essex County and 1 on Pelee Island), careful management of all chemicals should be observed. If any chemicals did enter into the water inlet system, the increased treatment load may damage water treatment plant equipment or be passed on for human consumption. This may result in increased health risks for the residents of the water intake supply area. Any construction or wind turbine development within proximity to a water intake zone must abide by the terms of GLWQA, which designate these areas as protected and must be safe from chemical discharge (International Joint Commission, 2009).

As stated above, 'turbine lubricant volumes are stated to be 1,033 gallons (minimum) per turbine'. 'Impacts on water intakes and ambient Lake Erie environmental conditions could occur during any of the three IWT project phases and require greater detail from the proponent to mitigate hydrodynamic and

sediment transport concerns. This is of particular concern with respect to potential adverse effects

on water quality at Union Water Supply System intakes,'(Baird & Associates, 2009) or for that matter, on the Great Lake Basin's watershed as a whole.

Also, according to the IJC's Great Lakes Water Quality Agreement, intakes are protected areas or zones in particular to 'oil discharge' (International Joint Commission, 2009). Annex 8 includes definitions and principles as well as programs and measures to prevent discharges of oil and other substances into the Great Lake system from drill rigs, pipelines, wells and other on or offshore facilities.

According to a technical report prepared for the Environmental Commissioner's Office of Ontario by B. Edwards, the 'Ontario Water Resource Act' prohibits the discharge of any material into water or onshore that may impair the quality of the water'(Edwards, 2010). Also, how are IWTs in these zones going to impede future expansion of water intake systems as climate changes take effect upon lake levels and water quantity/quality?

1.4 Sediment Disruption: John Kehoe, the Advisory Board Manager of Union Water Treatment Plant in Ruthven, Ontario lays his concerns in an article entitled, 'Turbine Construction Could Stir Up Sediment, Toxins' when he said, 'The system might be prevented from extending its intake pipe into the lake if five to 55 turbines are built south of the pipe. Another concern is maintenance of the turbines which could increase boat traffic near the intake pipes.' Kehoe also states that 'the construction could cause weeks of turbidity in the water. If the plant can't filter the muddy water and be sure it is getting out pathogens such as E-coli, it could be shut down. To consistently filter that over a period of a long time would give me concern. Obviously there's more chance of failure of the treatment if we're facing that situation.' He said it is unclear what chemicals could be stirred up during construction 'We don't know what's in that sediment, either' (Offshore Wind News, 2010).

These statements prove that offshore IWTs will cause adverse and significant disruption of toxic sediments which may find their way into the source water supply, especially when constructed upwind or within 'intake protection zones' (IPZs) as in the case of SouthPoint Wind Inc. in Pigeon Bay (Lake Erie). 'Unlike the US, Ontario does not support the banning of environmentally sound directional drilling under the bed of the Great Lakes'(International Joint Commission, 2003). Perhaps now there should be a ban in Ontario as well. *Note: 2 500 offshore gas wells were drilled in Lake Erie from 1913-1970s. Oil and gas exploration, development and extraction activities are presently under moratorium thanks to the unprecedented work of the International Association of Great Lakes and St. Lawrence Mayors-(see also – The Chippewa Ottawa Resources Authority and http://msep.mcmaster.ca/epp/publications/nazhmetdinova.pdf)*

1.5 Areas of Concern: Windsor/Essex County and generally, southwestern Ontario, is an area of high-industrial-activity, therefore it is an area of high pollution and major stresses in the production of contaminated effluent and waste dumping (CSO-combined sewage overflows) within source water or

lake water. The nearshore areas, where most of the offshore proposals are taking place are hence, already under considerable stress. In fact, some areas along the "Hundred Mile Coast" such as

Wheatley Harbour, St. Clair River and Detroit River are considered as 'Areas of Concern' due to high levels of pollution, harmful contaminants or persistent toxic substances (Great Lakes Commission, 2001).

According to Pollution Probe Ontario, 'many parts of Canada continue to discharge completely untreated or poorly treated sewage directly into Canadian waters'(Findlay, 2004). Also, according to Environment Canada in a report entitled 'Threats to Sources of Drinking Water and Aquatic Ecosystem Health in Canada' by Tom Edge, and James M. Byrne, et al., 'municipal wastewater effluents comprise the largest source of effluent discharge to Canadian waters, and population growth and urbanization will continue to increase them'(Environment Canada , 2001). As well, in a Windsor Star article 'Dirty Water-Time for Detroit to Clean Up Its Act', 'more than 80 billion gallons of raw sewage and hazardous waste is dumped into the Detroit River every year'(Windsor Star, 2010). Wouldn't offshore IWTs add to this high urban stress?

In 2006, Sierra Legal (Ecojustice) released a report entitled, 'Waterproof 2: Canada's Drinking Water Report Card' where the author and legal staff member, Randy Christensen stated: 'Most Canadians would be alarmed to hear that Health Canada estimates that unsafe drinking water causes 90 deaths and 90,000 illnesses each year in Canada' (Ecojustice, 2006). 'Ontario alone had the highest number of 'boiled water' alerts in all of Canada (2006-2008) having 679 advisories out of the Canadian total of 1760 advisories excluding those in First Nations territories' (Toronto Star, 2008).

1.6 Contaminants: According to Environmental Defence in an article by Aaron Freeman entitled 'Great Lakes Still Being Toxic Waste Dump', 'more than 92 billion tons of raw sewage is dumped into the Great Lakes annually from Canada and US sources. More than 600 million kilograms of industrial pollution including methyl mercury, PCBs, dioxins, furans and a host of other chemicals are released each year into the air, water and land in the Great Lake basin'(Environmental Defence, 2007).

Recently, the Washington Post, Health Day News and Natural News released articles that stated; 'The findings published in the August 20 Issue of the Journal of the American Medical Association, are the first to link low-level exposure to arsenic with type 2 diabetes prevalence in the US' (Gardner, 2008) and (Chow, 2009). Furthermore, in USA Today, the Environmental Protection Agency (EPA) announced it 'is tightening drinking water standards to impose stricter limits on four contaminants that can cause cancer; tetrachloroethylene, trichloroethylene (TCE), acrylamide and epichlorohydrin. All four compounds can cause cancer. Tetrachloroethylene and TCE are used as industrial solvents and can seep into drinking water from contaminated groundwater or surface water. The other two compounds are impurities that can be introduced into drinking water during the water treatment process. The EPA will issue new rules on TCE and tetrachloroethylene within the next year. Rules for the other two

compounds will follow. Lisa Jackson (US EPA's Administrator) made the comments as she announced a new strategy to better protect public health from contaminants in drinking water (USA Today, 2010). Water certificate of analyses obtained by the author of this paper from Union Water Treatment Plant in

Ruthven, Ontario for Jan. 2009 and Jan. 2010 listed TCE and tetrachloroethylene as being present. Perhaps Ontario/Canada should follow suit with US, EPA concerns and use similar strategies for better protecting our public health from contaminants in our drinking water. 'According to the US, EPA, remediating groundwater can be 40 times more expensive than taking steps to protect the water at the source. Preventing contamination at the source also reduces the costs of treating water later in the drinking water treatment process.'(Findlay, 2004).

Do we need IWTs in our source drinking water to add to such costs? The Sierra Club 'identified nearly 500 chemicals found in the flesh of lake fish and contaminant levels in fish-eating birds are among the highest in the world. Cancer risks from these contaminants are 4 500 times above minimum acceptable levels for some populations'(Free Library, 2001). Thus terms like, "chemical valley" and "chemical soup" have been used to describe the levels of pollution in our basin. Also, the IJC in its GLWQA lists nearly 400 chemicals in Appendix 1 and 2 on 'hazardous polluting substances'. See also: Great Lakes Water Quality Board: Emerging Issues Workshop site.

With all this said, our part of Ontario is under extremely high stresses from a myriad of sources. IWTs will increase 'cumulative effects' and only further compound environmental stresses to near 'breaking-point' proportions. If ever there was a 'high sensitivity area' where all IWT developments were banned it should be this area or better yet, the whole of the Great Lake Basin AND its 'watershed'. Perhaps a 'polluter pays' principle along with 'multi-barrier' management practices should also be considered in the future to help curb these kinds of significant acts of pollution by industry within all aspects of the 'watershed protection plan'—especially including on land or offshore IWTs.

1.7 Threat to Source Waters: Industrial wind factories within source lake water are serious 'potential threats' to the degree of risk in impairing water sources and should be ranked 'high' on a Vulnerability Scale, a scale system already in use by Source Water Protection agencies under 'The Source Water Protection Primer' by Rick Findlay and the Pollution Probe Organization of Ontario. Use of this kind and other 'best management strategies' would greatly assist in ensuring for Canadians in general, a better quality of source drinking water supply. Recommendations under the Ontario government's 'White Paper on Watershed-based Source Protection Planning' (Ministry of Environment, 2004) should be widely used and strictly followed in the future to protect 'potential threats' from becoming significant threats or actions upon source water supply. This need can be greater realized in the tragic 'bogalanche' that took place from IWT failure in Derrybrien, Ireland outlined by Ed Douglas in the New Scientist Print Edition entitled, 'Hidden Cost of Wind Turbines' (Douglas, 2006) where contaminates entered the Galway county watershed and Abhainn Da Loilioch river system killing 100 000 fish. On land 'the construction of turbines and their enormous foundations has the potential to disrupt water flow to many shallow water wells. On the construction site, several liquids that can cause contamination are

used. If there is a spill of gasoline or hydraulic oil, many wells could be destroyed and many homes would be left without clean water' (Douglas, 2006). 'Fire is another risk' (Gipe, 2003). Also, within the maintenance regime of each turbine in every project there is a 'spraying of solvents' for the cleaning of

each blade. What are these solvents and how will they affect our water quality especially on or downwind of our water intake zones? (see: http://www.iberica2000.org/Es/Articulo.asp?Id=3566 regarding the Pairc Project in Isle of Lewis , Scotland)

1.8 Adverse Effects: Adverse effects on embryo development due to electro-magnetic changes, air pressure changes and general 'soundscape' or infrasound level changes for both 'animals' (Armstrong, 2009) or (Kemperman, 2008) or (Duchamp re: clam population decrease in Euro offshore affects duck numbers) and 'humans' (Pierpont, 2009) has only recently become known or studied. Due diligence is extremely necessary in further study in this important animal/human, health-related areas.

Electro-magnetic changes within surrounding waters could also affect the overall 'micro health' of the surrounding water near offshore IWTs. Annex 2 (c) (ix) of the GLWQA makes reference to water taste and odour problems. Furthermore, on land IWT sound studies often only include sound levels that are strictly relative to that from the IWT alone and don't include additional 'background' noises that may also be present in the existing landscape/waterscape around them so a 'total soundscape' is left unmeasured (Kemperman, 2008) or ((Great Lakes Commission, 2010). A website to go to where you can view the dBA measures of certain sounds is: [www.jegasho.net 'Noise Facts' or F:/Noise Level Chart.mht]

Infra-sound or 'tremor' effects to local species and humans where the noise generated by the IWTs is heard and 'felt' throughout the body (as in thunder) has been further proven in the work by Dr. Nina Pierpont in her book entitled 'Wind Turbine Syndrome.' The symptoms she recorded ranged from 'tinnitus (ringing in the ear), sleeplessness, headaches/migraines, and skin rashes within patients living in close proximity to IWT developments' (Pierpont, Wind Turbine Syndrome - CFCO Radio 'Ask the Health Expert' Interview July 2008). Such adverse health effects can be viewed on a recent You Tube video from 'Suncor Wind Farm in Ripley, Ontario'. See: www.youtube.com/watch?v=mabINxg3zE.
'The World Health Organization recommends that threshold standards for noise in communities be set lower than 30dB (as measured with the standard "A" filter) whenever the noise has a substantial low-pitched component — as it does from wind turbines. Again, this is because low-pitched noise is more disturbing and has a greater impact on health at low levels than higher-pitched noise. When measuring such noise, a "C" filter will give a more accurate reading of loudness by including more of the low-frequency sounds' (Archives and Collections Society, 2004).

1.9 Communication Interference: In keeping with these concerns, 'radio transmission interference has

been documented from IWT experiences in Europe' as well as in the US (Archives and Collections Society, 2004). In a White Paper by LJK Wireless Communications, Feb. 2005, it states that '911 services can be interrupted in areas where IWTs exist' (LJK Engineering Service, 2005) or (ATDI Ltd Worldwide,

2008) or (Ashley, 2007). In Europe there are strict restrictions to the locations of IWT factories near military locations or air-space (Archives and Collections Society, May 2004).

1.10 Source to Tap Info System: A limited amount of vital watershed information from a Geographic Information System or GIS is of great concern. The Great Lake Information Network (GLIN) has recently supplied this kind of technology (Great Lakes Information Network, 2008) which would prove to be important baseline data for identifying present and future 'threats' or stresses' or 'pressures' that IWTs pose within watershed source planning and protection. With this information, a 'multi-barrier' approach to protect source water quality from further contamination to drinking water could be developed hence a 'source to tap' water quality assurance could be met. Natural aquifers that exist beneath lake bedrock would be identified as well as other pertinent lakebed geographical/geological information (bedrock load, sediment quality). This type of information would greatly help prevent undo damages which may cause subsequent contamination of source water.

2.0 WILDLIFE/HABITAT IMPACTS

2.1 Migratory Pathways: Two major 'bird migratory pathways' exist within southwestern Ontario (Mississippi Flyway and Atlantic Flyway) 'where over 100 million plus birds fly during spring and fall migration seasons each year' (Windsor Star, Jan.22 'Time to Act on Wetlands Solution'). Some of these birds (indigo buntings) and insects (Monarch Butterflies) as well as bats, raptors and waterfowl that use and share these flyways are listed under the SARS Act and its subsequent protection. Some of these species are 'critically stressed' by existing habitat loss along their 'flyways' and at wintering grounds.

2.2 Habitat Fragmentation: According to MP Jeff Watson 'there is a critical problem of 'habitat fragmentation' which has left Essex County with the highest number of 'species-at-risk' in all of Canada' (Letter to Mrs. T. Adam). Jeff Watson also says that he is 'promoting the possibility of a feasibility study to render the area of the waters of the Western Basin of Lake Erie-a National Marine Conservation Area' (Letter to Mrs. T. Adam). Wouldn't the construction of offshore wind factories counter this effort? Shouldn't all of the Great Lake Basin and its watershed be considered a National Marine Conservation Area instead of just parts of it? After all, the 'whole' is greater than its parts, is it not? In SE Michigan, the Detroit River has been claimed as an International Wildlife Refuge; shouldn't Ontario/Canada do the same?

2.3 Population Density: This area also has a high 'population density' and in the case of Essex County, 'it has the second highest population in Ontario with 166, 000 people living within 1 722 km' (Essex County) or [www.countyofessex.on.ca]. Due to this, there is a lack of forest cover which affects the overall pathways (run-off) of surface and groundwater systems on land and eventually to the nearshore area of

the Great Lake Basin. Urban development particularly in Essex County has caused a serious

encroachment of 'wetlands' already under extreme stress and recent desperate efforts are being set into action to help preserve these areas, especially around Point Pelee National Park/Hillman Marsh in Leamington, Ontario.

2.4 Wetlands: These 'wetlands are among the most important ecological areas on Earth. They filter out sediment and pollution from the surrounding environment. Water that is discharged from a wetland is cleaner than that which entered it. Wetlands also store excess water, replenish local and regional groundwater supplies, and provide important fish and wildlife habitats' for a variety of species (Findlay, 2004). Wetlands 'provide critical places that are fundamental in sustaining life and ecological services- they are biological reservoirs' (North American Wetlands Conservation Council (Canada), 2003). Essex County also has the largest proportion of 'prime agricultural land' and potential 'specialty crop areas' which have not been mapped out or designated and which need preservation like the 'greenbelt' around Toronto. [www.pps@pps.org] 'IWTs take an average of 50 acres of land per megawatt capacity' (Wind-Watch). See also: Wind Farm Area Calculator at www.nrel.gov/analysis/power_databook/calc_wind.php] and http://www.everydaycitizen.com/2007/03/how_big_is_an_industrial_wind.html

2.5 Reserves/Refuge Areas: Essex County has several 'highly sensitive' wildlife reserves or protected ecological areas within its borders: Point Pelee National Park (15 km2), Jack Miner's Bird Sanctuary, Holiday Beach Conservation Area, Hillman Marsh, Pidgeon Beach Marsh, Clear Creek Watershed, Cedar Creek Watershed, River Canard Watershed, Belle River Watershed, Ojibway Prairie Complex (the largest protected tallgrass prairie and oak savannah in Ontario) and the near shores of Lakes St. Clair not to mention dozens of other smaller conservation areas (Balkwill Woodlot) and marshlands. Flight or migration pathways between these 'refuge areas' are not well known and demand further study so as to prevent significant interruption, barrier or negative wildlife redistribution that IWT sites on or offshore may cause and hence possible adverse affects on habitat especially for species protected under the SARS Act or under the federal 'Habitat and Stewardship Program For Species at Risk'. In a Windsor Star article 'Mad Rush to Wind Energy', 2010-04-15, Dr. Scott Petrie, a PhD waterfowl biologist says: 'The big worry for Ontario's valuable bird populations is 'displacement of waterfowl from their key foraging and staging areas.' These giant steel forests act as 'a barrier effect' for affected wildlife pathways and has been the case in Denmark when 25 000 turbines were installed on land.

2.6 Conservation: The goal of the Stewardship Program is 'to contribute to the recovery of endangered, threatened and other species at risk and to prevent other species from becoming a conservation concern by engaging Canadians from all walks of life in conservation actions to benefit wildlife' (Environment Canada, 2008). See also: http://www.ec.gc.ca/default.asp?lang=En&xml=08BA1EB4-D190-40E9-AEC7-F4502137E07F

Hence, IWTs offshore within the Great Lake Basin and its watershed will be in 'direct opposition' to these

efforts of conservation. Furthermore, the current Provincial Policy Statement says that 'citizens should be making efforts to 'create corridors' so that all wildlife protected areas should be

interconnected' [www.pps@pps.org]. Bats are of particular concern and recent studies have revealed that 'bats were actually 'drowning in mid-air' from 'lung hemorrhage' caused by changes in air pressure evident around IWTs' (Gramza, 2008).

*Note: for more information on the effects IWTS have on wildlife please refer to "Wildlife Wizard by Wayne Wegner at www.windconcernsontario.wordpress.com/2009/12/02 'Location, Location, Location, Migration, Migration, Migration'

3.0 SOCIO-ECONOMIC ISSUES

3.1 Industrialization of Source Water: Offshore IWT's represent the 'industrialization' of our source water supply --the Great Lake Basin and its watershed –'where companies or proponents will be making 3x the amount presently paid to conventional energy producers through the new FIT-(Feed-In-Tariff) Program outlined by the Ontario Power Authority' (Ontario Power Authority, 2010) and under the auspices of the 'New Green Energy Act' [www.ontario.ca/greenenergy].

There are over 40 'Areas of Concern' identified by the IJC within the Great Lake Basin where millions of dollars have been spent on both sides of the border to help clean-up environmentally adverse actions caused mainly from industrial sources upon the Great Lake system. IWT proposals are directly counter to these 'Remedial Action Plans and Lakewide Management Plans' pursuant to Annex 2 of the GLWQA. In Essex County alone, there are 3 'Areas of Concern': St. Clair River, Detroit River, and Wheatley Harbour, all of which comprise the '100 Mile Coast' of our county we wish to offer to potential 'ecotourists' ([Eberhardt, 2001). There are also 7 water intake systems around this coast and 1 at Pelee Island.

3.2 Decline in Property Value: A subsequent decline in property value and property assessment has already been witnessed as in the case of Paul Thompson of Amaranth Township, 'where the Assessment Review Board (ARB) based a 50% reduction on his property assessment because of excessive noise' (Aaron, 2010). Mr. Thompson's home was located near a transmission station which was emitting high noise levels. Infrasound levels may not have been included in this case. Mr. Thompson is no longer living in his home. MOE does not require that low frequency noise or infrasound levels meet a certain compliance level. They only regulate for audible noise (existing dBA scales are based on industry-led guidelines). See also F:\Noise Level Chart

3.3 Water Treatment Costs: As mentioned earlier, 'higher costs for water treatment will occur when

source water becomes more highly polluted' (Findlay, 2004). Will this be true of the Great Lakes when IWT factories become prevalent? This problem may manifest in higher costs; be it tangible direct costs

as in new wells/intakes, or indirect financial costs such as decreased property values (as mentioned above) and medical treatment of people having waterborne illnesses. A greater risk or chance of water contamination from possible 'oil spills' (mechanical/structural failure, lightning hits or maintenance regimes) from IWTs on land and offshore, may create these added costs to municipalities that already operate on limited budgets. The 'possibility of failure' must be considered when determining IWT factory locations whether they are located on or off shore.
[http://www.syracuse.com/news/index.ssf/2010/03/cause_of_collapse_at_fenner_wi.html

3.4 FIT/ Debt Load: There will be a significant debt load weighed upon affected Canadians if IWTs become mainstay 'power' generating sources as is currently being proposed especially within the latest agreement of the 'Ontario Government and Samsung Deal' [Windsor Star, '$7B Energy Deal Means Jobs' by Chris Doelen/ 2010-01-21]. See also: (Gallant, 2010) or Radio CFRA/April 16, 2010.

The FIT Program will strap citizens for 20 years or more into avarice-led, subsidy contracts with IWT factories which pose as heavy socio-economic nightmares. Assuming turbines in the Great Lakes (or on land) 'produce electricity 40% of the time, the electricity from a 1000 Mega-watt offshore wind factory would cost 665 million a year or 13.3 billion over the course of a 20-year contract with the government' (TO Star, 2009). Gwyn Morgan, retired CEO for EnCana Corp. stated that 'development of a multi-million dollar industry based entirely on public subsidies is both a hazardous road for investors and an unaffordable road for consumers' (Morgan, 2009).

Also a recent article by Andrew Walden entitled 'Wind Energy's Ghosts' warns about the faulty 'wind experience' in Europe when he begins his article by saying 'Bankrupt Europe has a lesson for Congress about wind power' (Walden, 2010). A brief review of the CN Railroad's White Paper on 'The Logistics of Transporting Wind Turbines' (Canadian National Railway, 2009) will reveal the high transport costs IWTs demand ($100 000- $150 000 per wind turbine) and the huge 'carbon footprint' they create at all levels of their production, construction, operation and final decommissioning. To date, Canada does not have the necessary ships, nor the large cranes for these vessels to use in the construction of offshore IWTs.

3.5 Impairment of Beneficial Uses: IWT developments within the Great Lake Basin and its watershed will not only cause changes in the chemical, physical and biological integrity of the source water it provides (discussed earlier) but will also cause the impairment of beneficial uses. Under Annex 2 of the GLWQA of the IJC, 'The Impairment of Beneficial Uses or IBUs' means 'a change in the chemical physical or biological integrity of the Great Lakes System sufficient to cause any of the following: (iii) degradation of fish wildlife populations, (vii) eutrophication or undesirable algae (ix) restrictions on drinking water, consumption or taste and odour problems, (xi) degradation of aesthetics (Helimax Energy Inc., 2008) claims 'that within a 1km perimeter turbines will appear to be 'prominent' in the landscape (ie: will seem

to have the same height of the foreground or greater)', (xii) added costs to agriculture or industry if water standards become adversely affected, (many dollars will be lost in the greenhouse trade), (xiv),

loss of fish and wildlife habitat'(International Joint Commission, 2009). All these issues are within Remedial Action Plans and Lakewide Management Plans (LaMP) on page 24 of the GLWQA. Hence, fishing, boating, recreational diving and swimming activities will definitely be negatively affected should offshore IWT factories become realities.

Possible changes in 'electro-magnetic' fields or 'stray electricity' caused during IWT operation will render these sites 'off limits' to both recreational and commercial activities within the Great Lake Basin. Subsequent loss of trade, tourism and commerce due to such impairments will prove to have significant negative effects on local and provincial commerce. According to Environment Canada, May 2000 (Great Lakes Research Conference in Cornwall) 'The Great Lakes are home to 45% of Canada's industries and provides the foundation for 180 billion dollars in annual US/Canada trade' (Environment Canada).

4.0 LANDSCAPE/HERITAGE LOSSES

4.1 Permanent Damage: The 'elimination' of rock bed or lakebed within the immediate vicinity of each offshore IWT will pose as permanent and irreversible damages/impacts within the Great Lake basin. If 'mono-pile' structural designs are used for offshore IWTs then 'encasement' of sediment and bedrock would be rendered unavoidable. According to the US Army Corp of Engineers, this 'preferred' design has 'a diameter of 14-16 feet which could be driven 50-90 feet into the lakebed depending on local sediment loads. As the water depths and loads increase, the pile diameter and trenching must increase as well' (US Army Corp of Engineers, 2004).

With thousands of IWTs being proposed for the Great Lake Basin (on both sides of the border) in factories as large as a '1 420MW (710 turbines) two phased proposal by SouthPoint Wind Inc. in Lake Erie and in Lake St. Clair' (SouthPoint Wind Inc., 2009) or a 710 MW worth as in 'Trillium Wind I (17-25km offshore) in the NE sector of Lake Ontario' (Versace, 2008), this will prove significant impact on our source water quality. The Helimax Study proved 'a wind generating potential or 'installable capacity' of wind energy in the Great Lake Basin equalling over 46 000MW in 65 sites' (Helimax Energy Inc., 2008). This study was commissioned by the Ontario Power Authority and completed in April, 2008. It should be noted that it takes 20 (5MW) turbines to produce 100MW capacity.

4.2 Adverse Climate Changes: Micro-climate changes to surrounding areas where IWTs exist (land or water) 'will create lower temperatures, pressure changes' (Gramza, 2008), fog and potential adverse effects on the general health of the 'water cycle' within the basin and its watershed.
In an article by Andrew Levy entitled; 'The Climate Changers: How Wind Turbines Make Their Own

Climate', Mike Page photographed such a phenomenon off the coast of England near Yarmouth in the Scroby Sands offshore project. Here Mike states; 'The spinning blades whip moisture into the air like

giant egg mixers'(Levy, 2010). Events like this will prove to be hazardous for both airplane and shipping routes within the Great Lake Basin.

The changing of surface water temperatures that such offshore IWT 'mini-climate' projects will cause, can also affect algae growth, furthering the effects perhaps of eutrophication (blue-green algae bloom or HABs-Harmful Algae Bloom) within the Great Lake system. We all can remember the "green glob" problem of the 1980s which was created from phosphates and nutrients present in the lake waters. Just this past Labour Day weekend 2009 in the SW basin of Lake Erie the 'green glob' came back. Will this become an on-going problem with irreversible or long-term effects once large projects of offshore IWTs are added in?

4.3 Ice Impacts: Ice effects, impacts or damages to offshore IWT structures is generally unknown since most studies on these kinds of IWTs are taken from those located in 'ocean' water and not in 'freshwater'. Recently, a spokesman from Consumers Energy in Michigan (an offshore wind turbine proponent) stated 'that it does not plan to build wind power plants in the lower Great Lakes due to ice that can freeze more than four feet thick and wind that can move ice floes with deadly force' (Hoenle, 2010) or see : www.mlive.com

The peer assessment by Baird & Associates (against SouthPoint Wind Inc.'s EA for Pigeon Bay) claims; 'should the proponent (SouthPoint Wind Inc.) utilize ice mitigation technologies to assist in reducing ice 'impacts' on the turbine structures this may lead to 'premature ice sheet fragmentation' and rupturing in Pigeon Bay. Possible impacts may include ice shifting on the shore of the western basin. Ice formation in the winter months in Pigeon Bay, helps shield the shoreline from erosion during extreme winter storm events' (Baird & Associates, 2009). 'The loss of protective nearshore sediment supplies has resulted in erosion and re-suspension of fine-grained cohesive sediments thereby increasing turbidity and reducing nearshore water quality' (International Joint Commission, 2009).

4.4 Land-Water Interface Modification: Within the IJC's nearshore report it also states that 'the single most important anthropogenic (human-caused) factor disrupting nearshore coastal processes and pathways is increasing shoreline development and the physical alteration of the land-water interface. These changes fundamentally change the coastal processes and pathways along which those coastal processes operate. These changes impact not only local areas, but have cumulative regional impacts as well. Coastal margin and nearshore zones are dynamic high-energy environments and sand is continually transported in a downdrift direction by waves and littoral currents. Physical modifications of the shoreline, altered water levels and flow regimes, and loss of littoral sediment supplies and hydraulic connectivity have changed the hydrologic interactions between watersheds, coastal margin and nearshore zones and waters of the open lake'. The Great Lake system hence, is a closed system whereby

what happens in one area eventually happens in all areas. Do we need to add offshore IWT factories by the hundreds to the equation of existing pressures?

4.5 Wave Climate/Erosion: Changes to the bedrock and subsequent changes to the "wave climate" within offshore sites may cause shoreline erosion and thinning of nearby beaches and advancement of sand displacement or transport. A disruption of natural littoral coastal transport, processes and water pathways may occur and will need extensive Canadian-based study. 'Beaches tend to become thinner and more narrow 'down current' from jetties, breakwaters and other hardened shorelines. This problem is pertinent on the sand beaches of Lake Ontario, Lake Erie and somewhat in western Lake Superior'. (International Joint Commission, 2009) 'Remedial Action Plans and Lakewide Management Plans shall embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses in Areas of Concern or in open lake waters'(International Joint Commission, 2009).

4.6 Historical Value Loss: There will be a loss or disruption of the geologic glacial history of the Great Lake Basin, a field not yet fully understood or developed. Even shipwrecks of historical significance could be rendered either damaged or unattainable if IWT factories choose mutual sites.

4.7 Aesthetic Value Loss: The ecological integrity changes in the 'waterscape' and geologic glacial history of the Great Lake Basin and its watershed will be greatly affected. A loss of aesthetic quality or aesthetic value is also a loss of Canadian Heritage. The Great Lakes are home to one of Canada's predominant national symbols-'the indigenous-born canoe'.

4.8 Adverse Nearshore Effects: The nearshore, according to the IJC study represents depths less than 15m and that it is a 'critical area' in the health and well-being of the lake system, for what affects the nearshore will eventually affect the farshore areas. 'Lake Erie's nearshore includes 60-90% of Lake Erie including most of the Western Basin. The Great Lake Basin is where physical processes are much more similar to marine coastal systems rather than the shallow inland lake systems'. Thus, 'the Great Lakes are sizeable bodies of water with the potential to rival many marine systems with respect to wave energy and ability to erode and transport geologic materials along the coast'(International Joint Commission, 2009).
Unfortunately, the overall data gathered by the IJC indicate 'an apparent deterioration of the physical, chemical and biological regimes, notably the Western Basin' (IJC 11th Biennial Meeting). 'Toxins in Lake Erie and associated channels and embayments are among the most severely harmful algae bloom-impacted areas of the Great Lakes' (International Joint Commission, 2009) or (IJC 2009 Biennial Meeting, 2009).

5.0 Political Issues

5.1 Acts & Policies: There are lists of Acts already in place that must be used and upheld when offshore

or onshore IWT developments are considered in the future when it comes to protecting the environment within the Great Lake Basin and Canadian borders.

There are sound environmental protective policies within these Acts that should not be rendered ineffective when considering future IWT developments across Canada's landscape. Under Schedule L of the Green Energy Act: 'The *Conservation Authorities Act* is amended such that, if a person requests permission under section 28 of the Act for development related to a renewable energy project, as defined in section 1 of the *Green Energy Act, 2009*, a conservation authority or the executive committee appointed by a conservation authority is not allowed to refuse the permission or to impose conditions on the permission unless it is necessary to do so to control pollution, flooding, erosion or dynamic beaches' (Government of Ontario, 2009) or (Green Energy Act , 2009 www.ontario.ca/greenenergy) Note the phrase 'is not allowed to refuse,' does this not sound an alarm toward the erasure of 'our voice' against IWT developments?
'Subsection 19 (2) of the *Provincial Parks and Conservation Reserves Act, 2006'* presently allows facilities for the generation of electricity to be developed in provincial parks and conservation reserves for use within communities that are not connected to the IESO-controlled grid if the Lieutenant Governor in Council approves. Schedule L changes the requirement for approval from the Lieutenant Governor in Council to the Minister responsible for the administration of the Act. Let's hope what we have built in 'reserves' and parks like Point Pelee National Park will not crumble under the adverse possibilities of this section.

Also under the Green Energy Act let us remember that 'Section 47.5 gives the Director broad discretion. The Director is authorized to issue or renew or to refuse to issue or renew a renewable energy approval if doing so would be in the public interest. The Director has the authority to impose terms and conditions on a renewable energy approval, to alter the terms and conditions, to impose new ones and to suspend or revoke a renewable energy approval. Given the broad definition of 'environment' and the specific purpose of the proposed Part V.0.1, these conditions could relate to social, economic and cultural conditions that influence human life or communities' (Government of Ontario, 2009). Perhaps our counter efforts should be toward educating the Director with present 'offshore' IWT concerns. After all, under Section 145.2.1 (3) 'we' have the onus of proving 'that engaging in the renewable energy project in accordance with the renewable energy approval will cause irreversible or permanent harm.' Won't IWT projects offshore do such harm?

T**he new Green Energy Act and subsequent "green action plans" by any government level should not take 'authoritative rule' over any such policy held thus far in place by these Acts.** These Acts and their 'protective-nurturing-nature' **must and should be upheld**. When any of these Acts are in anyway compromised, as they have been through the Green Energy Act's repeals, revokes or strike-outs, future IWT projects on or offshore will become easier to get approved. The amount of 'steel forests' already in operation proves this. This 'streamlined' process has become the major road-block to opposition by the citizens of the Canadian landscape. Just recently 184 renewable projects were approved by the government of Ontario. One has to question whether the EA studies completed by the proponents rendered due diligence and used viable 'Canadian-based' criteria since many EA studies are based on results in Europe and the US. It's like a 'comparing apples to oranges' kind of environmental assessment isn't it?

It has taken many years for Canadians to develop Acts of conservation or preservation. These Acts have used the 'precautionary type' format. They have been used to protect biodiversity and important eco-

systems across this country's landscape. IWT proponents and the 'big business' they represent are trying to erode these efforts in the form of lobbying to revoke these Acts meant to preserve our heritage through the new Green Energy Act (GEA). The GEA has provincial parks and reserves or areas considered crown land to be 'open' locations for IWT development, hence the recent thrust toward developing offshore IWT sites.

Some of these Acts revoked, revamped or repealed under the new GEA are:

Clean Water Act
Ontario Water Resources Act
Ontario Safe Drinking Water Act
Source Water Act
Canadian Environmental Assessment Act
Canadian Environmental Protection Act
Ontario Water Resource Act
Conservation Authority Act
Public Lands Act
Fisheries Act
Endangered Species Act/SARS Act
Migratory Birds Convention Act
Navigable Waters Protection Act

Planning Act

Provincial Parks and Conservation Reserves Act-2006

Building Code Act

Ontario Heritage Act (Section 25.2)
Renewable Energy Act
Highway Traffic Act

6.0 CONCLUSIONS:

In the words of Bill Gates: 'It is our responsibility to pursue technologies that achieve cheap energy with zero carbon emissions' (Vu, 2010).

IWT developments in Canada or in this province whether on or offshore do not prove this point. Terra Power's 'travelling wave reactor concept' in nuclear power technology might, or finding other innovative design technology that will transform my home into a 'giver of energy' rather than a user of it. My home is already connected to the grid, let's use new forms of material and building design to achieve, conserve and help create cheap energy with zero carbon emissions and have consumers benefit in sound monetary terms rather than big industry.

According to Rick Findlay, author of the Source Water Protection Primer, '**If water quality or quantity is in any way degraded, this can have a serious adverse impact on an ecosystem. Similarly, when ecosystems become degraded, this has a negative impact on water'** (Findlay, 2004).

As it now stands, there are enough impacts already causing significant stress on our source water supply, that being the Great Lake Basin and its watershed, which supplies over 40 million citizens of both Canada and the US with drinking water. We don't need expensive, outdated IWT developments to add to this. Mitigation, in environmentally damaging developments is not possible when permanent and irreversible damage is caused by any proponent for any reason. The 'solution-to-pollution-is-dilution-theory' industry followed in the past is no longer acceptable nor ethical by today's standards. Wind companies that lack indemnity requirements or regulations even when 'causing torts' openly within communities where they locate their factories, is a practice that must not be tolerated.

One has to take a close look at what has happened in Manitoba where 'Manitoba Hydro is lending the St. Joseph wind farm $260 million to rescue the shaky Southern Manitoba project. Hydro stands to make a small profit on the 20-year loan and if the wind farm company defaults, Hydro will simply assume ownership of the turbines' (Windsor Star, 2010 "Manitoba Invests in Wind Farm). Is this what will happen in Ontario as well? Who will pay for this huge debit-load in the end?

As citizens of this fragile landscape on this fragile planet we all call home, it is not only our duty but our ***right*t** to protect our natural heritage.

'Extending over 94 000 square miles and twice that in watershed and supplying a volume of water 6 quadrillion gallons, (22.8 quadrillion litres) worth 1/5 of the world's fresh water supply' (Great Lakes Information Network, 2008) or (Nazhmetdinova, 2008), we must take heed to the warning rendered by

the UN in the Source Water Primer: 'If current trends of wasting and polluting freshwater continue, two out of every three people on Earth will suffer moderate to severe water shortages in little more than

two decades from now. It is 'imperative' that we take measures to protect water sources today' (Findlay, 2004).

Organizing events such as 'World Water Day', planning water-related conferences specific to the Great Lakes and its Basin and supplying science–based research or resources such as a video entitled 'Water Under Fire' by Dr. James Byrne (et. al) (www.WaterUnderFire.com), or 'Blue Covenant' by Maude Barlow, must be continued on a grand scale. Easily accessible water education will be essential in spurring on greater public knowledge, awareness and support when it comes to future water issues in Ontario or for that matter across Canada. Government transparency and cooperation is a must in ensuring these proactive type programs become widely known and embraced. It is all about educating the public and adhering to their health needs.

Offshore IWT factories in the waters of the Great Lake Basin and its watershed are **not** the answer to our 'predicted' energy shortage needs or supply. I remain 'vehemently' opposed to these types of developments now and in the future. I strongly believe IWT factories in my source drinking water are against our rights as Canadians under the "Charter of Rights". If any IWT proponent wishes to further compromise our source drinking water, they further wish therefore, to compromise our 'security of the person' under this Charter and hence our liberty. The Green Energy Act is not where Ontario needs to go as a 'green strategy plan.' This act represents the ways and means a government can legalize the erasure of our freedom of speech and intrinsic rights as Canadian citizens. Let's bring it back to the table shall we, and start with a new 'green plan' that's more for the people, of the people and by the people.

"Our lives begin to end the day we become silent about things that matter." Martin Luther King

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