Policy Brief

More Trees in My City Means a Longer Life for Me

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Winter 2014

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Winter 2014 Internship

In 2014 the IHSP welcomed ten McGill students from across the University for a 14-week Internship. Training sessions focused on communicating research findings to the media or general public, and gaining insight into different disciplinary approaches. In addition to in-depth research projects carried out in collaboration with faculty and staff, interns devoted ten to fifteen hours to short policy projects on a topic of their choice. Students were asked to frame an issue, find at least two points of supporting evidence and develop rudimentary policy recommendations. The following document reflects the short timeframe given to students to complete this task, and may not be a polished product.

Please note the opinions reflected in this document do not necessarily reflect the opinions of the IHSP.

MORE TREES IN MY CITY MEANS A LONGER LIFE FOR ME

RESPIRATORY HEALTH BENEFITS OF URBAN TREES IN WINDSOR, ONTARIO

Research shows that increasing the number of trees in cities can lower hospital admission rates of respiratory problems such as asthma, resulting in decreased health expenses

CONTEXT AND THE ISSUE

- Particles in smog results in both short-term and long-term conditions including bronchitis, asthma and heart attacks
- Air quality in Windsor has been linked to increased respiratory hospitalization rates in both adult/elderly males and females of all age groups (Luginaah et al., 2005); in fact, rates of death from long-term conditions such as lung cancer is higher in Windsor than in any other region in Ontario (Gilbertson and Brophy, 2001)
- Reducing illness associated with air particles in Windsor can contribute to increased life span of residents

STAKEHOLDERS AND ACTORS INVOLVED:

- City of Windsor
- Private urban planners
- Local/national environmental groups (ex. Air and Waste Management Association, Citizen's Environment Alliance of Southwestern Ontario, Tree Canada)
- Tree nurseries (Maidstone Tree Farm, Blue Star Nursery, etc.)
- General public (especially very young and very old at greater risk)
- Health professionals

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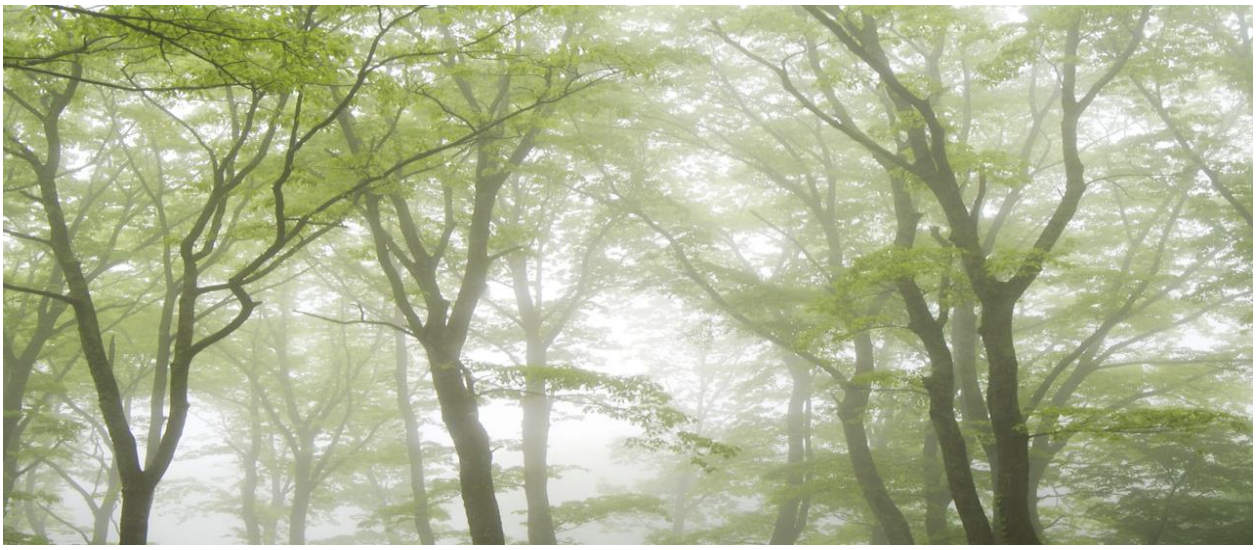
CONTEXT: WHY WINDSOR?

- Windsor has one of the highest levels of smog in Canada, due to both the city's own industrial actions as well as international pollution resulting from Windsor's location downwind from Ohio, Illionois and Michigan (Fung et al., 2007)
- Currently, Windsor has 200-600 more cases of short-term and long-term lung diseases than any other region in Ontario (varies with gender and type of disease) (Gilbertson and Brophy, 2001); If measures are not taken to reduce emissions levels, disease and death rates will increase as pollution levels climb
- Expanding urban tree cover has the potential to significantly decrease airborn particle levels in Windsor due to the city's long growing season (compared to other Canadian cities), high pollution levels, and existence of space available for urban expansion (unlike Montreal, where expansion is restricted by the confines of the island)
- The City of Windsor is collaborating with "Partners in Climate Protection" to identify the sources and magnitude of greenhouse gas emissions and set targets for green house gas reductions (City of Windsor, n/a), yet municipal emissions reduction policies face a number of barriers such as opposition from private organizations within and outside the city (Robinson and Gore, 2005)

Research has suggested that some deciduous species can absorb particles even in the winter due to ability of their stems to absorb airborne particles' evergreen conifers can remove airborne particles in the summer and winter.

(Freer-Smith et al., 2004)



KEY FINDINGS

- Tree cover has been shown to be effective in removing harmful particulate matter from urban air, with the amount removed ranging from 5 – 65 tonnes in US cities (Nowak et al., 2013)
- Improved air quality from increased tree cover has measurable health benefits: each hectare results in an average of $1600 in health expenditure savings within US cities (Nowak et al., 2013), while trees present in 1.4% of a study area near London, UK, found that particles removed by trees resulted in avoidance of 2 deaths and 2 hospital admissions each year (Tiwary et al., 2009)
- The quantity of pollutants removed by trees is dependent on the amount of tree cover, tree species present, urban pollution level, length of the growing season, tree physiology (ex. leaf area, tree size) and planting pattern (Nowak et al., 2013) (Roy et al., 2012)
- Maximal emission reductions is achieved when increased urban tree cover is combined with current initiatives to reduce greenhouse gases

VIEWPOINTS OF THE STAKEHOLDERS INVOLVED:

- Provincial Government: Benefits of increasing urban tree cover include enormous reductions in health care expenditure, although these stakeholders may need to provide municipal governments with the financial support necessary to enact the policy.
- Municipal Government: will be more likely to implement this policy if they have the financial support of the provincial/federal government and if the other benefits of increased urban tree cover are made clear to this stakeholder (aesthetic benefits, air quality improvements, storm water runoff, reductions etc.) (McPherson et al., 2011)
- General Public: increasing urban tree cover has been shown to benefit both the mental and physical health of citizens. However, some members of the public may be affected by increased allergies from the trees.

RECOMMENDATIONS

Plant more local tree species, especially evergreen conifers and deciduous trees (Freer-Smith et al., 2004), in low-density residential neighborhoods (McPherson et al., 2011) arranged in small clusters along roadways (Nowak et al., 2013) in Windsor

Increase Tree Cover to 25%

IMPLICATIONS AND NEXT STEPS

MUNICIPAL GOVERNMENT MUST:

- Recognize the role of greenhouse gas reductions in decreasing the rate of respiratory health problems in the city
- Collaborate with researchers to determine the city-specific potential/limitations of increasing tree cover in Windsor
- Allocate more funds towards urban restructuring and the maintenance of public spaces
- Develop more green public spaces and adjust infrastructure development protocol to accommodate and incorporate more trees
- Partner with local/national tree nurseries and non-profit organizations to access seeds and gain civil support of the policy

PROVINCIAL/FEDERAL GOVERNMENT MUST:

- Support municipal policy by providing subsidies for this municipal project

PRACTICAL STEPS TO IMPLEMENTATION:

- Identify size of tree cover area currently in Windsor and its impacts on municipal air pollution levels
- Based on the state current municipal infrastructure, identify the maximum number of trees that can be integrated into current and future public spaces and use this to develop a goal for total tree cover area; project the health benefits realized if this goal is attained
- Identify high-impact areas in the city where trees planted would have the greatest benefit
- Accommodate trees into urban design: restructure current public parks, develop new public parks, encourage plans for new infrastructure to incorporate green spaces (Center for Watershed Protection and US Forestry Service, 2008), etc.
- Identify local legal and financial resource constraints
- Develop implementation goals: have *x* number of trees planted in *y* areas over *z* timeframe by Party A and maintained by Party B
- Develop a strategy to monitor the results of increased tree cover on air pollution levels, hospital admission rates (for respiratory diseases like asthma, but also for allergic reactions) and health care expenditures
- Increased urban tree cover must be coupled with municipal reductions in greenhouse gases to achieve maximal health and climate benefits

LIMITATIONS

- Can current municipal infrastructure accommodate more trees? What is the size of the current tree cover area and what is the maximal tree cover area possible? Filling in these knowledge gaps is necessary to develop goals for the desired tree cover area and accurately project health benefits of goals
- More city-specific research is needed to determine the minimum tree cover area required to result in significant health benefits
- The amount of time required to observe significant health benefits is unclear; previous studies suggest that it may take 30 years after tree cover is increased until notable health impacts are seen (Tiwary et al., 2009)
- Identification of local tree species that result in maximal air particle reductions requires further research (Freer-Smith et al., 2004)
- What are the economic benefits of this policy? Economic limitations (ex. cost of implementation, long-term maintenance costs)?
- The severity of the negative health impacts (exacerbate allergic conditions, etc.) of increasing urban tree cover is unknown.

Thus, more research in this area is necessary to ensure that disadvantages of increasing urban tree cover does not overwhelm the advantages

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