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The impact of local government action on climate change : The City of Athens and the Town of Tecumseh

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ABSTRACT

Climate change is undoubtedly one of the biggest environmental threats of the twenty-first century. Recent developments have shown that we are highly vulnerable to climate change. Climate change is predicted to have harmful, and permanent consequences on the planet and the entire environment. Yet federal and national governments around the world are struggling to formulate policy initiatives to slow down or become resilient against the changes in the climate. The research goal of this paper is to understand the impact of local governments/municipalities on climate change and why their inclusion in the conversation on climate change response is important. Local government control of areas that include energy-use, land-use planning, waste and wastewater, disaster response, and transport makes them well-positioned to tackle climate change.

The impact of municipal governments on climate change are examined through US and Canadian case studies. Specifically, the paper examines the City of Athens, Ohio and the Town of Tecumseh, Ontario. The size, geography, population and the federal structure of the City of Athens and the Town of Tecumseh makes them comparable case studies for this study. The emergence of voluntary official plans by both municipalities despite the lack of guidance from federal and national governments demonstrate that local governments can be relied upon as an integral player in tackling climate change. This paper finds that local governments should be included in a multi-level approach to climate change to force more local progress and influence future action on regional, state, and national climate change.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

The clock for action on climate change is ticking! According to the UN Intergovernmental Panel on Climate change (IPCC) report, within less than 12 years, in order to keep the global average temperature increase to 1.5 degrees Celsius, and maintain a climate compatible with human civilization, there must be a reduction in carbon emissions of about 45% from 2010 levels, reaching net zero carbon emissions by 2050. Whilst natural activities like solar activity, cyclic changes of the earth's orbit and volcanic eruptions can cause changes in climatic conditions, it is widely accepted that the current climate change is caused by anthropogenic processes (Kern & Alber, 2006; Boykoff & Boykoff, 2007; Kousky & Schneider, 2003; Sheppard, 2012). It may therefore be argued that climate change requires a quick response from all levels of government. Despite this need for action on climate change, there seems to be a slow reaction to climate change from federal and national governments across the globe. The world's biggest contributors to greenhouse gases (GHG) have added to this conundrum. For example, Canada withdrew from the Kyoto Protocol in 2012 and the United States has yet to ratify. This - together with the WTO's overturn of the local content provisions of Ontario's Feed-in-Tariff (FIT) instrument under its Green Energy and Green Economy Act (GEA) in Canada - demonstrates that federal and national governments need to be complemented in combatting climate change. What is particularly inappropriate has been the conventional separation of the global/federal/national and municipal levels of government in climate change response discussion (Balaban, 2012). In the face of ineffective federal responses, municipalities are formulating and implementing climate change adaptation and mitigation with resources at their disposal.

According to Bulkeley & Betsill (2003); Bulkeley & Betsill (2005); and Gore & Robinson (2009), addressing climate change involves efforts at various levels of government (multi-level) and strategies ranging from global conventions and treaties to climate protection and municipality adaptation and mitigation initiatives. This paper argues that although municipalities are frequently excluded from climate change discussions, they need to be included in climate change response discussion. This is because municipalities have at their disposal a significant number of advantages which could be leveraged by federal and national governments for successful climate change policies. Municipalities for example, have significant control over areas such as energy use, land-use planning, waste and wastewater, and transport that makes them well-positioned to tackle climate change. This dovetails with Jordan & Jeppesen's (2000, p. 66) notion of subsidiarity where a viable climate change solution requires that "decisions within a political system should be taken at the lowest level consistent with effective action", in this case, municipalities. Furthermore, municipalities can serve as "laboratory" experiments for innovative policies for larger-scale efforts. Most importantly, there exists an increasing two-way relationship between municipalities and climate change which demands that municipalities are a part of climate change solution. As federal/national governments lag, municipalities have the potential to build more sustainable communities through leading people and shifting their attitudes towards risks associated with climate change (Balaban, 2012). Empowering municipalities will lessen the burden on federal/national governments and expedite climate actions, making adaptation and mitigation policies feasible.

In examining the role of governmental response to climate change, municipal governments have emerged as an integral player in a multi-level system of climate governance in terms of adaptation and mitigation policies. This paper shows that municipalities are proving to

be leaders in climate change responses through an examination of two case studies, the City of Athens, and the Town of Tecumseh. The argument for the inclusion of municipalities in climate change response discussion becomes apparent. Modes of governance through which these local governments execute their official plans also demonstrate the flexibility of operation that can benefit a multilevel climate change governance. The constitutional mandates of these two municipalities, the Ontario Municipal Act and the Ohio Constitution respectively, will determine their authority with respect to climate change. An overview of the federal structure also demonstrates how these municipalities fit within the US and Canadian governmental structure and highlight the abilities of both municipalities to set the pace for the discussion of local government inclusion in climate change responses.

CHAPTER TWO: LITERATURE REVIEW

Climate change is considered one of the most pressing issues and biggest threats facing human civilization today. It is expected to have dire consequences on the world's economy and, more broadly, for many areas of human activity. According to Gore (2010) and Martins & Ferreira (2011), a major part of the solution to adapt and mitigate this effect has centred largely on state led GHG reduction conducted within the context of global environmental governance. The position that other players, such as sub-national governments, can play in adaptation and mitigation strategies has also not been sufficiently discussed in climate change policy responses (Boykoff & Boykoff, 2007; Kousky & Schneider, 2003; Sheppard, 2012).

To justify municipalities' inclusion and empowerment in the climate change response discussion, it is important to grasp fully the concept of climate change. The World Meteorological Organisation (WMO) defines climate change as a "statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer)" (WMO, 2019). Thus, it involves change in the average weather conditions, temperature and rainfall change over a period of time. This is caused by natural events — including the sun's activity, volcanic eruptions, and cyclic changes of the earth's orbit – as well as largely human activities — including massive emissions of GHG, and the unsustainable exploitation of natural resources on land and the oceans. (Newman, 2004 ; Lindseth, 2004 ; Meehl et al. 2004 ; Lean et al. 2008 ; Mans, 2012 ; Preston et al. 2011). Highlighting the glaring effects of climate change is necessary to expedite the need for political and social interventions to avoid potentially devastating consequences. The Town of Tecumseh, Ontario is already witnessing significant and intensified impacts of climate change, including but not limited to overland floods, heavy rain events, the proliferation of invasive plants, an

increased number of extreme heat days, the growth of vector-borne diseases, the re-emergence of blue-green algae and toxic flooding of algae in lakes and rivers (Town of Tecumseh, 2019). Most municipalities across the United States and Canada face similar environmental challenges. The IPCC acknowledges that a continuous warming will result in a thermal expansion of the oceans and ice melting which will lead to sea-level rise, severe flooding, more frequent heatwaves, more forest fires and alter the seasonal patterns. It is impossible to know for sure if any single occurrence is a direct consequence of climate change since these types of events have occurred before. However, the observed increase in their frequency and intensity is a trend which can be attributed to climate change (Meehl et al. 2004; Lean et al. 2008; Mans, 2012; Preston et al. 2011). How then are climate change solutions being tackled currently? Can a multi-level governance approach to climate change help tackle climate change? What challenges exist and how are they being addressed to benefit climate change groups across the globe?

The call for action on climate change has been a subject of comprehensive study in recent times by numerous scholars (Betsill & Bulkeley, 2007; Kern & Alber, 2009; Balaban, 2012; Hari, 2017). Indeed, responses to changes of the climate system date back over 30 years. The international conference "On the Changing Atmosphere: Implications for Security" in Toronto in 1988, is argued to have been the first wave of municipal responses to climate change (Bulkeley, 2010). Pioneering municipal governments such as Leicester, Kirklees, and Newcastle in the United Kingdom and Heidleberg, Munich, and Frankfurt in Germany introduced policies which focused on energy saving and promoting sustainable development (Corfee-Morlot et al. 2009; Bulkeley, 2010). Involvement of municipalities in transnational networks boosted and made noticeable the efforts of these European municipalities. According to Betsill & Bulkeley (2007); Bulkeley (2010) three different transnational municipal networks sprung out of these initiatives;

the International Council for Local Environmental Initiatives, now known as ICLEI Local Governments for Sustainability, the Climate Alliance, and the Energie-cités. A combination of North American and European cities' ambition to reduce global anthropogenic GHG was on the rise. Municipal governments have long been having significant impact on climate change even when federal/national governments paid little attention and interest to these activities. What came out of these local initiatives are municipal transnational networks which became a catalyst for the second wave of municipal action on climate change (Bulkeley & Kern, 2006). Municipalities are able to perform experiments on climate change policies at a local level that are not feasible at the international, national or regional level (Toly, 2008; Gore & Robinson, 2009; Mans, 2012; Hill & Perun, 2017; Bloomberg, 2015).

The flexibility of municipal operations mean they can make minimal errors with even minimal impact at the local level making them key to climate change solution across the globe. This is because municipal actions can serve as a pilot exercise where failure costs little and success can lead to larger scale implementation. Many municipal networks are nationally organized in terms of regional or country-based campaigns. Examples include the Cities for Climate Protection (CCP) in Australia, and most notably the U.S. Mayors Climate Protection Agreement (Gore & Robinson, 2009). While it was in the year 2000 that the United States Mayors' Conference first recognised the crucial role that mayors could play in tackling climate change, it was in 2005 that Seattle Mayor Greg Nickels encouraged mayors across the United States to act on the subject (Bulkeley, 2010). This call attracted over 180 mayors, and by 2009 over 900 mayors had signed the Climate Protection Agreement (Bulkeley, 2010). Secondly, the ability for municipalities to work with a gamut of private organizations makes them important in tackling climate change (Balaban, 2012). An example is how private actors are central to C40

Cities Climate Leadership Group (a climate change organization formed by 18 cities in 2005) (Bulkeley, 2010). In the form of collaboration with Microsoft, this climate change city group produced software for GHG emissions accounting at the city scale and in Energy Efficiency Building Retrofit Program, mobilizing municipalities, building owners, banks, and energy service companies to reduce GHG emissions from large buildings (Bulkeley, 2010). Thirdly, a number of climate organizations tackle climate change from the grassroots level. The Transition Town network, which originated in 2006 in Totnes, England, is the most prominent here. By 2008, it comprised 100 communities as participants, mostly in the United Kingdom, but also included some in the United States, Australia, Japan, and Chile (Hari, 2017; Bulkeley, 2010). These developments suggest that municipal response to climate change can occur in several ways and an inclusion of local governments in climate change discussion will make them an important actor in a multilevel system of climate change governance.

Just like the United States Mayor Conference, Canadian municipalities have embraced the climate change challenge through the Federation of Canadian Municipalities (FCM). Though FCM is a specialized association that serves elected local officials, policy issues are also promoted. The FCM is an advocacy group that represents over 2000 Canadian municipalities with the aim of delivering tools that help municipalities tackle local challenges (Federation of Canadian Municipalities, 2020). The FCM has played a major role in fostering a strong and effective climate change response in Canada (Robinson & Gore, 2005; Gore & Robinson, 2009). In cooperation with ICLEI, the Partners for Climate Protection (PCP) program is one of FCM's most influential projects. Prior to partnering with ICLEI, FCM organized its own emissions reduction program called the "20% Club" (Gore, 2005) which started in 1995. The goal for members in this club was to cut back carbon footprints below 1994 levels. The PCP's five-step

milestone framework guides members in GHG reduction goals but achieving the target of reducing the carbon footprint of municipalities has been difficult. FCM data reveal that only a small subset of Canadian municipalities has attained four out of five milestones, while the majority of municipalities have met just one or two milestones. As a result, several member municipalities are unable to significantly reduce GHG, although there are a few success stories. For example, Calgary's corporate climate change plan has been commendable and includes the first wind-powered light-rail transit system, methane capture from landfills and wastewater treatment (Federation of Canadian Municipalities, 2020). Calgary's success story highlights a glimpse of the range of activities municipalities have taken and continue to carry out which should be encouraged across two of the major contributors to GHG emissions, the United States and Canada.

Despite this significant response to climate change by municipalities, there are several criticisms of municipalities' ability to spearhead climate change action, with critics or sceptics more often categorizing them into an area of "low politics" (Gore, 2010). The Canadian constitution identifies only two sovereign levels of government: national and provincial. The implication of this is that municipal governments operate within a framework of legislation that is set by provinces which inhibits the implementation of some GHG reduction measures. Kousky & Schneider (2003) argue that this means municipalities cannot be relied upon to fix the climate change problem. Local governments keep getting frustrated as emission reduction goals are short of the reductions that are ultimately needed to slow down climate change. Though this forms a valid critique, one should consider this a legislative barrier which can be reviewed, and opportunities identified that can enable municipalities to slow down climate change. In the face of ineffective action by federal and provincial government, the formal commitments by

municipalities should inspire federal and provincial governments to work in conjunction with municipalities in responding to climate change.

Municipal responses to climate change have become a promising movement which has the capacity and potential to reduce GHG emissions, while at the same time improving the quality of life in cities and promoting greater citizen participation in the response to climate change. The fight against climate change utilizes an important concept, the green economy. This concept emphasizes the economic opportunities associated with a climate change initiative and encourages a multi-level approach to climate change. A realization of a green economy will increase the number of jobs thereby boosting green development. The FCM argues that municipalities' investment in greening the economy is feasible using municipal policy toolkits (McBride et al. 2015). According to this view, cities have the potential to refocus on the issue of climate change by organising and addressing concerns such as mass transit and other travel, zoning, land use and planning (McBride et al, 2015).

Local governments are constantly demonstrating their flexibility in implementing climate change policy by adopting four modes of climate change governance: self-governing, governing through enabling, governing by provision, and governing by authority (Bulkeley & Kern ,2006). All of these modes are showcased below when the climate change plans of the City of Athens, Ohio and the Town of Tecumseh are examined.

Firstly, 'self-governing' can be described as the capacity of local government to control its own affairs, for example by enhancing energy efficiency in government offices and other municipal buildings. Self-government depends on consolidation, structural creativity and strategic investment. In several countries, the majority of climate protection policies rely on this mode (Bulkeley & Kern, 2006; Kern et al., 2005; Bulkeley & Betsill, 2003). Improving energy

efficiency in municipal facilities has become a crucial area of focus in several cities. In Sweden, 95% of municipalities and all regions are committed to enhancing energy efficiency in their own housing (McBride, 2015). Cities can reduce their own usage and carbon footprint through operation of municipal activities. The City of Athens has already purchased two electric vehicles for the city's use and improving the energy efficiency of their own buildings. Some other cities like Boston also purchase a certain percentage of their energy from "green" sources (Bulkeley & Kern, 2006). These plans are mainly driven by both environmental and economic concerns.

Secondly, 'governing through enabling' explains the coordination of cities with external forces, including in public-private partnerships for the provision of services, and infrastructure. This mode of governance has multiple elements, which include education, awareness-raising and advocacy campaigns, local government policies and strategies to protect climate change (Alber & Kern, 2008). For example, the City of Leicester (United Kingdom) carried out an energy education initiative that involved the use of electric energy-advice bus tours to local schools and the development of best-practice case studies that helped other communities find potential and challenges to the development of green energy (Newman, 2004; Magnusson, 2005). Some municipalities in Europe partner with private firms to help in the creation of low-carbon finance and community heating (Bulkeley& Kern, 2006).

Thirdly, 'governing by provision' emphasizes the municipality as a provider. Through the delivery of services such as water, electricity and public housing, municipalities can modify public consumption to combat climate change. Cities in this capacity will significantly affect the generation of electricity, give preference to district heating and combined heat and power (CHP) systems and/or combined cooling and power systems, promote investment in energy efficient and clean energy technology, and also combine this with financing schemes for private

developers. Low carbon infrastructure, changing carbon intensity for household and business actors in the reduction of GHG in the municipal border are just some of the advantages of this governance mode, while the financial constraints and dependency on capital condition are among the limitations (El Sioufi, 2009).

Lastly, ‘governing by authority’ (municipality as a regulator) mostly focuses on what local councils do within their legislative authority to regulate urban climate change, in particular through strategic energy, transport and land-use planning. The literature demonstrates that all four modes work hand in hand on a wide array of policies in the fight against climate change (Kern & Alber, 2009; Gore & Robinson, 2009; Kamal-Chaoui & Robert, 2009; El Sioufi, 2009). Local governments’ legal authority and executive power can be used in creative ways, even to generate funding for the implementation of their climate protection policy which can play an important role in sectors such as energy, transport, building and land-usage. It can range from by-laws on reducing the fossil fuels for all new buildings such as in Santa Barbara, California; and restrictions on the use of cars as in Munich and Paris (Kern & Alber, 2009). Modes of governance vary from city to city, depending on the countries’ economic, political and socio-cultural systems. In their policies and strategies, local authorities have deployed the four management modes separately or concurrently at a given time for their mitigation and adaptation initiatives (Kamal-Chaoui & Robert, 2009).

CHAPTER THREE: METHODOLOGY

The purpose of this paper is to showcase the climate change responses of two relatively small and similar cities, the City of Athens, Ohio, and the Town of Tecumseh, Ontario in order to demonstrate that municipalities deserve to be included in a multilevel climate change response. The limitations present in municipal response to climate change demonstrate that despite cities taking a leadership role in climate change response, a multilevel climate change governance is a necessity. This study will be completed through looking at substantive by-laws/initiatives of both towns, town projects and official plans. The focus will be on how the cities' attempt to reduce GHG and increase resiliency. Each case choice was chosen due to the similarities that exist between them. The study is based qualitative and exploratory research.

A portion of the paper will be dedicated to the general background of the City of Athens, Ohio and the Town of Tecumseh, Ontario in terms of the geography, politics and the similarities and differences of the federal structures that exist in each country to help understand their policies better. The City of Athens, Ohio is located in Southeastern Ohio and is the largest city and the county seat of Athens County. It has a population of about 25,000 and is governed by a mayoral-council form of government. Elected officials include the mayor, auditor, treasurer, seven council members, and council president (City of Athens, 2020). The mayor, auditor, and treasurer are elected for four-year terms. Council members and council president are elected for two-year terms. Four council members represent each of the city's four wards (City of Athens, 2020). Three council members are elected at-large and council president only votes in case of a tied vote (City of Athens, 2020). The Ohio Constitution is what governs the City of Athens (Steinglass & Gino, 2004).

The Town of Tecumseh also has this mayoral-council structure. There exist five wards at the Town of Tecumseh comprising five councillors headed by a mayor and a deputy mayor. Each ward is represented by a councillor. The role of the mayor in the town of Tecumseh's council is much like the City of Athens where the mayor presides over council meetings so that its business can be carried out efficiently and effectively. The town also has directors and managers that support the running of the town. The Ontario Municipal Act, 2001 is what governs the Town of Tecumseh. This is a consolidated statute governing the extent of powers and duties, internal organization and structure of municipalities in Ontario (Association of Municipalities of Ontario, 2020).

The Town of Tecumseh, just like the City of Athens, has a population of about 25,000. They both exist in a county with the city of Athens, the seat county of Athens County, and the Town of Tecumseh in Essex County. County governments are federations of the local municipalities within its boundaries (Association of Municipalities of Ontario, 2020). Counties are referred to as "upper tier" municipalities (Association of Municipalities of Ontario, 2020). The similarity of political, economic, and cultural background of both towns makes them useful for this study. The Ontario Municipal Act, 2001 and Ohio constitution are vital for understanding for how the City of Athens and Town of Tecumseh operate in executing local initiatives, especially action against climate change.

CHAPTER FOUR: DISCUSSION

Overview of the federal structure of the United States and Canada

Municipalities in Canada and the United States are not recognised as a different level of government. Historically, only two sovereign orders of government, federal and state/provincial, were specified in the national constitutions of each country. There is not much documented in the constitutions of each country about municipalities other than that provinces and states have exclusive control over them. Section 92(8) of Canada's Constitution Act 1867 gives the ten provinces exclusive powers to make laws in relation to "municipal institutions in the province" (Constitution Act 1867). In other words, the powers a municipality has depends almost entirely on the powers the province wishes to grant.

This limited ability of local governance in a majority of key areas in the lives of its citizens has led to the general argument by scholars such as Magnusson (2005) that municipalities are "creatures of provinces" or "creatures of states," and that legally, they have no inherent right to exist. In the United States, for example, this argument was backed by the 1907 Supreme Court ruling that enshrined the "Dillon's Rule", which granted states supremacy over municipal governments (Gore & Robinson, 2005). In section 92 (8) of Canada's national constitution, provincial authority over municipal government is derived from the clause which states that "each province may exclusively make laws in relation to municipal institutions in the province." A significant distinction between sub-national governments in Canada and the United States is that states have their own written constitutions and can list the duties and responsibilities, as well as the rights, of lower-level governments, which provinces do not.

Regardless, municipalities in both countries are bestowed with powers granted through the statutory authority of the state or province. Therefore, in the United States and Canada, municipalities generally exist in tension with higher government orders, especially around finance and autonomy issues (Gore & Robinson, 2005). Municipalities vary by province and state across Canada and the United States. Consequently, a thorough and extensive analysis of climate mitigation and adaptation for municipalities in all provinces and states cannot be easily produced. However, in general, municipalities have jurisdiction over the following roles in both countries that can influence GHG emissions and adaptation plans:

- Agricultural land-use and general land-use.
- Community development and Business Improvement Areas (BIA).
- Building, housing and development code standards.
- Natural resources and hazard management.
- Energy-efficient infrastructure
- Water and wastewater management
- Garbage collection and recycling
- District heating and cooling systems
- Transportation infrastructure
- Landfill gas

This sets the framework for the discussion of the City of Athens and the Town of Tecumseh's climate change plans focusing on these jurisdictions covered by both municipalities.

Overview of the City of Athens and Town of the Tecumseh climate change policies

In this section, both the City of Athens and Town of Tecumseh's official climate change plans will be discussed to understand local government's contribution to reducing GHG emissions and resilience against flooding and natural disasters arising from climate change. The argument that local governments need to be included in climate change response discussion to make them an important actor in a multilevel system of climate change governance is strengthened through an examination of these plans.

CLIMATE CHANGE POLICY OF THE CITY OF ATHENS

Municipal officials in the City of Athens have taken major steps to create and introduce new actions against climate change. Committed to ensuring an enabling environment, the city has developed a well-grounded official plan dubbed the "Athens Sustainability Action Plan" (ASAP). Key priorities of ASAP fall under the municipality's designated powers such as use of natural resources, economy, energy-use, waste and wastewater, food, transportation, flood and GHG emissions. Subsections under these key priorities include reducing the use of water and electricity, concentrating on zero-waste strategies and educating the community on issues of sustainability.

Energy Policy

Energy generation for human activities is of vital importance for long-term sustainability. The need to cut global GHG emissions is paramount and nothing less than urgent, considering the high impact of climate change in our environment. Solar development, electrical aggregation, incentives for renewable energy use, and ground source heat exchange are the major components

of ASAP's energy targets. The City of Athens has the power to regulate where renewable generation is permitted through zoning and local licencing and to use its oversight to influence investment in renewable energy. ASAP facilitates this by coordinating with private and community actors to establish public-private partnerships for the provision of services and infrastructure by employing the model of governance through enabling. ASAP positions the city as an environmental steward by encouraging energy-efficient development in the entire community through their system of zoning. In order to encourage the use of solar panels on homes, the city's plan supports community co-operatives which gives them the flexibility to purchase equipment and installation services. Thus providing financial support to cooperatives in the form of equity or other financial support such as loans or guarantees (City of Athens, 2020). ASAP promotes the transition of fuel from coal and oil to low or no-emission energy sources, such as combined heat and electricity, clean energy and energy conservation, to minimise GHG emissions. The goal of this policy is to enhance the quality of local environment and minimise emissions, conserve water quality and increase energy security, all of which will provide local benefits. To date, the City of Athens has achieved per capita emission reductions of 13% since ASAP(2018) while also experiencing strong economic growth (City of Athens, 2020).

Economic Policy

The economy is another focal point of the City of Athens ASAP. Funding for most city climate action plans have been from local governments' property taxes, sales, and other taxes; charges and fees; and in part, transfers from federal and state governments. Not all funds invested in climate change response are generated by the municipalities themselves. Almost 80% of the local programmes chosen for review are paid by municipalities own-source taxes,

compared to 17% from national funds and 4% through federal transfers (City of Athens, 2020). Taxes accounted for 42% of local general revenue in 2017.

The introduction of the Athens Farmers' Market, the 30-Mile Meal project, and the popularity of local establishments are innovative investments for reducing the carbon footprints of the city. Reliance on foreign agriculture using shipping with significant quantities of natural resources (especially fossil fuels) leads to deforestation and produces extra packaging waste. The ASAP aims to support the local economy and adopts techniques – such as support for local production and consumption – that mitigates the effect on the planet. Greening the local economy is also a major part of ASAP. Greening refers to the "integration of policies concerning economic development and the mitigation of climate change" (Shields & Tombari, 2015). ASAP engages the private sector through green-procurement policies to facilitate the market transformation required to meet the city's green building standards and energy conservation programs. Merging two or more governing models here is essential for these plans to work. For example, the City of Athens with respect to greening the local economy adopts governing by authority where strict rules and plans are enforced to encourage shopping locally to reduce carbon footprints of the city. Self-governing mode of governance complements "governing by authority", where the city leads by example and most of the municipal buildings will have to use energy efficiency schemes, and strategic planning thus to enhance energy conservation. The city's projection of this plan is that around 55 % of the city's overall emissions will be catered for, delivering a reduction of around 10 % in total GHG emissions compared with 2005 levels.

Transportation Policy

Researchers have concluded that in the near term, reducing on-road transport pollution will be unambiguously advantageous for the environment and public health (Betsill & Bulkeley,

2006; Alber & Kern; 2009). Since vehicles are one of the largest contributors to GHG emissions, improving biking infrastructure (bike lanes, bike parking, bike share programs) appear on ASAP as this is key in reducing carbon emissions. A series of campaigns by the local council about energy efficiency and provision of grants by the federal government to support local initiatives helps share the financial burden. The ASAP plan also features improvement of bicycle racks and bike lanes on public roads in different places across the city, and changes made to existing bike path to reduce human induced changes in the climate. The City of Athens has also purchased two city electric vehicles and installed electric charging stations that seek to encourage electric vehicles (EVs) usage in the city. This is due to the fact that gasoline vehicles (GVs) generate more GHG from production to distribution than EVs (Environmental Life Cycle Assessment of Electric Vehicles in Canada, 2018). The city predicts that the promotion of this EVs can pay off the city's environmental burden within three years.

Recycling Policy

Waste & wastewater/recycling forms part of the mandate of most municipalities across Ontario and Ohio as enshrined the Municipality Act, 2001 and Ohio constitution. The fundamental physical issue of climate change is very straightforward and easy. The disposal of carbon dioxide and other greenhouse gases into the air increases atmospheric concentrations and induces global warming. In several cities, waste produced every day includes readily biodegradable organic matter such as kitchen waste, garden waste and paper, which accounts for around 58% of the total weight of waste generated on average (Newman, 2004). As the plan postulates; reducing, reusing, and recycling will be a key strategy in reducing the city's carbon footprint. Recycling is important for the atmosphere since it can control GHG pollution in two ways; increasing recycling rates and extended producer responsibility. Increasing recycling rates

means fewer virgin resources are being used in manufacturing processes. More recycling means that there is less waste that ends up in landfills, decreasing landfill emissions. It should be noted that recycling paper products both saves GHG emissions that would have been generated from cutting and processing trees as well as allowing trees to continue to act as carbon sinks. Extended producer responsibility is a waste management framework that seeks to shift the responsibility for managing the end-of-life of a product from the government and taxpayer to those in charge of designing and producing the product. This will generally conserve resources and minimize pollution. The idea behind this is that if a producer is burdened with the cost of disposing of a product at the end of its life, it has an incentive to design the product for recyclability or reusability as well as to reflect on the environmental cost of the product. Between 2001 and 2007, waste generation was reduced by 38.7% (from 1.6 million to 1 million tons) despite population increase, and waste reduction resulted in 840,000 tons of CO2 reduction. These reductions are clear evidence of what municipalities are in their own way doing to counter climate change and the massive impact on climate change there would be should there be support from all levels of government.

However, there is more to be covered in this regard. City-wide zero-waste should not involve only recycling or banning of plastic bags. For instance, take bottled water; whilst 100% of bottled water containers have been recycled, tap water still uses far fewer resources, produces far fewer emissions of greenhouse gases, and helps reduce toxic emissions. Reframing our view of the emissions of carbon dioxide will help to clear the way for realistic atmospheric carbon mitigation approaches.

Limitations

The City of Athens ASAP omission of a strong political and civic involvement reflects Moore's (1994) idea of a potential information barrier. A lack of public understanding of climate issues can serve as a barrier to the city's response. A successful climate change policy requires it to be a priority for both council members and residents (Robinson & Gore, 2005). Also, climate change policies in ASAP as a municipal priority is not enough because the paucity of citizens' involvement in climate policies can also serve as a barrier. The literature reveals that in order for municipal government to respond to climate change, there must be an awareness of the opportunities to reduce emissions and the political will to support the response, in part stemming from public support (Robinson & Gore, 2005). This is a major reason for a multilevel climate change response with the inclusion of municipalities, federal, and national government. The inclusion of citizens at the grassroot level forms an important part of multilevel climate governance.

The City of Athens historic and present leadership status in climate change action, along with its physical size, population despite this challenge justifies the idea suggests that it will benefit even more in a more concerted framework of multilevel governance.

CLIMATE CHANGE POLICY OF THE TOWN OF TECUMSEH

Climate change policy making in the Town of Tecumseh has been ongoing under the Town's "New Official Plan Draft" (NOPD), the new storm water management standards, the flood emergency preparedness plan, with associated action plan, and the Tecumseh Storm Drainage Master Plan. The NOPD's core policies in the fight against climate change include disaster mitigation and initiatives that lead to being resilient against flooding, high water, and

erosion. The Town's plans tend to be tied with the support of the provincial and federal government. The most obvious reason is that, constitutionally, provinces are responsible for local government and most funds from internal revenue are limited which causes NOPD's implementation to be dependent heavily on federal funding. For example in tackling its flooding problem, the town sought the help of the federal government. The Government of Canada in 2020 made available $10.7 million for the flood-resilience programme through the Disaster Mitigation and Adaptation Fund (DMAF) to the Town of Tecumseh. This assistance from the federal government has contributed to the improvement of four infrastructure assets to tackle flooding in the community. Municipal efforts on climate change will require the necessary funding of ongoing projects. This is another typical example of the mode of governing through enabling as the partnership of Town of Tecumseh with the Essex Region Conservation Authority (ERCA) and the federal government resulted in workable flood resiliency program. The town has made significant achievement in the area of in-house pollution reduction initiatives by raising a series of annual grants and loans, from the community resulting in significant emissions reductions.

Energy Policy

The energy sector is of crucial importance in climate change mitigation. To curb GHG emissions much could be expected from policy responses in energy sector. NOPD policies aim to reduce energy consumption, encourage energy-savings, and improve access to clean and renewable energy in affordable manners. To achieve this, the Town of Tecumseh has adopted the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection program's five-step process for addressing climate change: (1) creating a GHG emissions inventory and forecast; (2) setting an emissions reductions plan; (3) developing a local action

plan; (4) implementing the local action plan; and (5) monitoring progress and reporting results. Basically elaborating a baseline emissions inventory, adopting emission targets, developing local action plan and implementing specific policies and measures (ICLEI, 1993) can drastically reduce GHG emissions. While the benefit of this program is yet to be realized, Puppim de Oliveira (2009) highlights how this five-step process implemented in Mie Prefecture in Japan reduced overall GHG emissions. FCM data reveals Calgary's success story in implementing this five-step process. The town's central energy plant established is to ensure a district heating and cooling system that supports most of community. It generates steam and chilled water to flow between municipal buildings. How this central plant operates makes it more cost efficient than individual boilers and air conditioners in the town's buildings. Self-governing style of this initiative cuts down the carbon footprint of the municipality to serve as an example to citizens and encourage global action. The heat recovery system of the town also improves boiler efficiency that is to save an estimated two million cubic meters of natural gas annually. The leadership position and innovative plans of the town demonstrate how important municipalities are to climate change response discussion.

Building, Housing and Development Policy

At the heart of the town's climate change policy is to reduce the use of non-renewable resources including fossil fuels. NOPD works with the Association of Municipalities of Ontario (AMO) to apply smart growth principles which are then used to advocate for green building and the preservation of open space. The smart growth principle has been widely adopted across Canada and entails enhancing the quality of life and promoting economic development. NOPD requires building developments to incorporate and meet Leadership in Energy and Environmental Design (LEED) standards. LEED is a green building certification program that

recognizes best-in-class building strategies and practices across the globe to promote better buildings that complement the environment and enhance municipalities ensuring better, brighter, and healthier spaces to live (Shields & Tombari, 2015). The projected goal of this policy is to reduce GHG emissions in municipal operations by 20% below 1994 levels throughout the community within 10 years. The Town of Tecumseh – in co-ordinating and facilitating partnerships with private entities and encouraging community engagement – will be important in the realization of this viable adaptation strategy. Governing through enabling will mean supporting and providing building owners and operators with the tools they need to have an immediate and measurable impact on their building's performance. This initiative will promote and facilitate the global acceptance of sustainable green building and construction activities through the development and application of widely agreed tools and quality standards.

Transportation Policy

The town in conjunction with the County of Essex have adopted the popular "cap-and-invest" policy and is already tackling challenges in the electric power sector to help reach its transportation goals. The goal of this policy is to expand renewable energy, reducing utility bills, and ensuring state investment in clean energy, all while cleaning up the power grid. The policy establishes a local limit, or cap, on the amount of pollution from vehicle fuels across the town. The cap would decline over time, reducing more and more tailpipe pollution and making communities healthier. To enforce the cap, major fuel suppliers would be required to buy carbon allowances—each equal to one ton of carbon dioxide emitted—in proportion to the pollution from the fuels they sell. As the cap ratchets down, suppliers would have to reduce their pollution, switching to cleaner alternatives. At the crux of this policy is to accelerate the transition to cleaner, more efficient, and more affordable transportation options.

County council members prioritize investments in projects that benefit the town which are most harmed by pollution; improve public transportation and public health; accelerate the deployment of clean, electric buses and trucks; and lower the cost of purchasing clean vehicles, all while helping to grow the town's economy and create jobs. Combined with complementary policies—such as clean car standards; measures to reduce congestion; and additional investments in public transportation, electric vehicles, and walkable and bikeable communities—a cap-and-invest program will yield sizable benefits. It could transform the transportation system into a world-class network that provides more transportation options, improves the quality of life, and in the long run reduce the carbon footprint of the town.

Limitations

Identifying climate change as a matter of local concern is only one element of a successful municipal response to climate change. NOPD's over-reliance on funding from federal government shows that many local governments do not have the capacity to fund all requirements into their climate change programme. The lack of appropriate funding also explains why certain cities do not formulate major mitigation policies and focus on adaptative ones to resolve immediate problems like flooding. Due to differences in financing structures, some local governments shoulder greater financial burden than others to fund climate change plans. Despite these challenges, local government such as the City of Athens and the Town of Tecumseh are independently showing that they are policy leaders in climate change policy making and that should figure prominently in any future climate governance regime.

CHAPTER FIVE: LESSONS

The case studies of the City of Athens and the Town of Tecumseh highlight the idea that local governments in North America should be included in climate change response and that collectively they have real and potential power to drive further municipal action and to shape future federal, and national climate change action. Nonetheless, it remains clear that the limitations existent in both climate change policies prove that provincial, state, and national governments must embrace and promote local government enthusiasm for climate change response and build on municipal innovation. US and Canadian municipalities have achieved emission reduction success with initiatives such as building retrofits and landfill gas capture but continue to be vexed by the demand for low-density, automobile oriented, residential land uses (2005). The solution proposed by this challenge is the allocation of more powers to municipalities and the extensive support from federal government to solidify climate change solutions.

The Town of Tecumseh's nascent NOPD differs with that of ASAP as NOPD focuses on adaptation modules. However, climate change requires a dual approach of mitigation and adaptation as by mitigation, cities can substantially reduce their environmental impact and consequently transform their infrastructure and consumption patterns thereby improving the global environment. By adaptation, cities become resilient to climatic impacts and reduce risks from climate change. Omission of mitigation policies can be attributed to the presence of short mandates for local authorities, the lack of financial and human resources available at the local level and the lack of autonomy to regulate specific sectors and economic agents faced by the town's council (Puppim de Oliveira, 2009; Martins & Ferreira, 2010). The barriers of NOPD suggest that local governments alone may have limited capacity to address the causes and cope

with the unavoidable impacts of climate change without strong commitment and leadership from national governments and the international community.

Conclusion

Climate change is one of the fundamental environmental problems affecting all levels of government across the globe. The discussion on climate change responses has been focused on the actions of federal and national governments. Whilst a quick response is required to meet IPCC targets of reducing carbon emissions of about 45% from 2010 levels and be able to reach net zero carbon emissions by 2050, there has been a slow reaction from federal and national governments. This paper acknowledged how municipalities are constantly proving independently and collectively that they can be influential in every potential climate governance regime. The case studies of the City of Athens and the Town of Tecumseh demonstrated the tools and increased responsibilities available to municipalities in certain sectors such as land-use zoning, transportation, natural resources management, buildings, waste, and water services to tackle climate change. Throughout this study it has been shown that municipalities are well-positioned to combine both adaptation and mitigation strategies to combat climate change. Governing modes in implementing climate change policies showcased the level of flexibility in implementing strategies at the disposal of local government in implementing climate goals.

The glaring limitations such as the information barrier and funding constraints existent in the climate change policy of both case studies solidifies the argument that local governments taking a leadership role by adopting voluntary official plans on climate change are important but not enough. There is the need for a unified multi-level approach to be established to halt climate change that contribute to natural disasters already affecting the human civilization.

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