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Innovative environmental municipal adaptation: Do local community political affiliations affect support for climate change mitigation efforts?

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Abstract
Cities have gained considerable importance in the dialogue of climate change and environmental sustainability. A majority of the earth's growing population is projected to live in cities. Not only are they responsible for a majority of earth's energy and resource consumption, cities also subsequently produces the highest amount of wastes and emissions, and are therefore most affected by the impacts of climate change – both now and in the future. Solutions to human caused acceleration of climate changes must be locally based – driven by local organizations and individuals. In drafting mitigation and adaptation policies or influencing sustainability practices, local governments are therefore increasingly stressing civic involvement and public engagement in relevant programs and initiatives. Various institutional problems and the lack of a universally accepted local sustainability framework have caused a significant stagnation in the collective progress to create appropriate action plans or meeting emissions or waste reduction targets. The current study explores local leadership and innovation strategies and national public opinion in the United States regarding solutions to global climate change and mitigation schemes from a multidimensional analysis, as well as briefly observing tentative local level adaptations plans designed in order to address this global change.

1. Introduction

The term "environmental sustainability" is highly ambiguous in common usage. With no specific meaning, it can encompass virtually anything at the municipal level – from cutting community wastes or switching fossil-fuels based public transport to those powered by renewable energy. Since the 1970s, environmentalism has given rise to "sustainable development" practices that evolved into "sustainability", which Brundtland and WCED (1987) defined as:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs,"

While in its most direct definition, environmentalism conceptualizes nature and refers to practices of conserving the natural world from man-made impacts, sustainability goes a step further by including the built environment in addition to

the earth's natural ecosystem. Contemporary efforts stemming from sustainable practices mostly include addressing the rapid depletion of the planet's resources and the threats of global climate change, caused primarily from emissions. Global Warming has therefore become a major political concern everywhere around the world. Although scientists, politicians and policy makers alike have varied views on this issue, many have been trying to find out how to stop it and what might be the most cost effective way of doing so. The problem is also an important issue commonly discussed by the public masses; however, their opinions are shaped by certain socioeconomic and geopolitical considerations. Knowing the trends about the issue, the public can gain a more comprehensive understanding of the causes of global warming and the specifics of the policy debate. On the other hand, the academia and the policy makers alike can gauge the awareness of the issue of global warming, as the perception of the level of agreement or concerns among experts from various fields can influence the way the impacts are mitigated. In addition, knowing the public's opinion regarding global climate change, administrators can observe the support for policy action and the potential economic costs as well as the support for many other international treaties that were put into effect to create global shift towards an equitable, sustainable future. With the general growth of scientific, industrial and political work across many academic fields, it is hardly surprising that the interrelated issue of depleted resources and climate change, and its possible solutions, have attracted considerable attention around the world in recent years. It is surprising, however, that there is still a significant amount of disagreement on the existence of this global issue, and our collective willingness to do something about it. One of the most prominent and sizable global efforts to address climate change is the mitigation of carbon emissions around the planet to a certain level (Earth Institute 2009). The current paper will therefore revolve around and focus on this scheme.

2. Global Situation

Greenhouse gases trap energy from the sun in the earth's atmosphere and heat it up. While this is necessary for life on the planet, higher amounts of emissions and increases in greenhouse gases are speeding up this warming. The change in temperatures is melting polar ice caps, which is increasing sea levels and displacing human beings from various coastal regions around the world. Hence, the most sensible option to addressing global climate change is to significantly reduce emissions so that heating could be slowed down. These emissions are mostly given off from industrial plants, locomotives, living things and buildings (Sunny, 2011).

2.1. Emissions

As a majority of GHG emissions come from energy, it is crucial to streamline this sector and bring technological innovation to the systems. Recent energy efficiency and de-carbonization of the U.S. economy falls short of the required level for achieving the goal. Eighty to eighty three percent of U.S. emissions are planned to be reduced by 2050 with CO_2 accounting for 80% of all U.S. GHG emissions, which is why carbon emission reduction is important. However, ambitious decarbonizing would still fail to yield desired emission reductions, unless the U.S. moves to rapidly reduce energy intensity and remains on the path for an extended period of time (Lester & Finan, 2009).

2.2. Barriers

Repeated studies have narrowed down the main barriers to clean technology developments. First, behavioral barriers exist in the form of knowledge gaps, incorrect perception, misinformed constituent opinions, concerns or stewardship. Next, limited action capacity, administrative issues or implementation problems make up the institutional barrier. In addition, there are technical barriers involving skills, complexity in technological systems integration, management and facilitation. Moreover, there exist political or regulatory barriers in discriminatory or regulatory policies and state monopolies. Finally, the financial problem, especially in incentives, conventional subsidies, risk-management in costs, the reality of inadequate investment returns and high upfront or transactional costs also serves as a major hurdle to comprehensively addressing this global change (Glemarec, 2010).

3. Local Condition

Cities will be the arena where the battle with climate change will be ultimately decided (Bestill & Rabe 2009). This is fitting as cities consume around 60-80% of the planet's energy production and give off about the same proportion of the world's carbon emissions to the earth's atmosphere (OECD 2010). Cities are and will continue to be an influential player in the grand scheme as population growth and migration patterns warrant that the majority of humans will ultimately reside in cities around the world. It is also for these reasons that cities are most at risk from the effects of client change, therefore, there is an immediate necessity for appropriate adaptation plans.

At the city level, various challenges can hinder tasks towards a sustainable community, and these challenges are often between or within cities and the region (Slavin 2011, Slavin & Snyder 2011). It is therefore difficult to understand what sustainability should look like at the city level, and most cities, as a result, are reluctant to tackle the

challenge making it a "truly daunting task" (Kreuger 2003, Hempel 2009 and Portney 2009).

Since a one-size-fits-all approach to local sustainability is currently missing, with countless U.S. cities constantly invested in sustainability programs regardless, these initiatives remain largely situational and are shaped by local circumstances. Researchers have argued that local governments have three main ways of implementing energy policies, which is one of the major sustainability considerations – regulatory mechanisms, financial incentives, and local relationships (Mackres et al 2012). Researchers further presented the 3E's framework, consisting of equity, economic and environmental considerations, and identified major secondary orientations such as social capital, urban design, urban ecology, metropolitan governance and 'eco-communities' (Hempel 2009, Maltzman & Shirley 2011). Within the 3E's spheres, tensions among these tenets are common. This is where conflicting perception permeates opinion – as there is a widespread idea that traditional economic development is at odds with current or future sustainability practices between the environment and economics. In terms of classical economic perspectives of growth, many costs may not have been factored into measurement of price and production. Hence, modern economists have recently noted that it is more sensible to be requiring something other than traditional economic growth in order for communities to be sustainable, with reduced costs and risks in urban areas by local governments to this cause (Daly 2007, Brugman 2012). For instance, empirical research shows that cities that rely on manufacturing for its economic sustainability are more prone to take environmental sustainability less seriously (Portney 2003).

3.1. Emissions Trading

Cap and trade mechanisms for carbon trading are a cost effective approach to mitigating or reducing emissions that municipal governments can oversee and local companies can participate in. Both market based and regulatory approaches would influence the total cost of the scheme and these costs would be distributed throughout the economy for society to bear. GDP-CO_2 relationships are hard to draw internationally as primary verifiable data remains highly variable over time and between nations (Grubb et. al 2006). It is however clearer for national considerations, for example, the cap and trade provision with the American Clean Energy and Security Act 2009 could potentially lead to a reduced U.S. GDP of 0.25 to 0.75% by 2020, and 1 to 3.5% by 2050 according to the Congressional Budget Office. With adjusted inflation, in 2050, the GDP will be 2.5 times as large as 2009 when the study was conducted. At the local level, GHG inventories can clearly illustrate the state of emissions from the city's operations and that of its surrounding areas.

Legislations have deep-rooted public implications, especially in terms of employment. Jobs are a hot topic in current times, and this aspect of climate regulations has received great importance recently, as stringent policies in carbon emission reductions would not benefit labor markets which is slow to adjust to the shift, compared to the output demands; CBO also estimates a possible loss to purchasing power, primarily affecting the middle of the income distribution (Elmendorf, 2009). American public opinion and support on this issue is generally skewed and divided. As an international problem, the issue of climate change cannot be resolved without significant international cooperation and coordination. Moreover, international CO_2 reducing energy policies are largely country specific and dependent on different variables (Dinica, 2002). While the challenge in the U.S. is to balance sectorial energy supply towards secure, affordable and clean technology for economic growth, simultaneously reducing emissions, in other developed countries like Europe, the economic system can respond to the carbon constrained parameters and maintain the same level of GDP at the same time. Also, in Europe's case, cap and trade can be fully utilized to reduce 75% of Kyoto costs when compared to zero use of carbon trading (Menyah and Wolde-Rufael 2010, Capros & Mantzos 2000).

Another benefit is that carbon markets can lead to enhanced renewable energy technological integration and greater environmental performance, as local solutions have lower costs and risks and more accommodating energy portfolios. Additionally, implementation at this level is not only just reliable or cost-effective, but more realistic and manageable than national energy policies, thus higher chances of success and addressing the issue (Capros & Mantzos, 2000).

But with increased population, income and economic growth, the intensity of emissions relative to activities must be evaluated. So even though individual energy sources may emit less or no carbon based particles, increases in total energy users due to population growth, lifestyle changes and higher consumption resulting from improved economic growth, may overall negate it. Adding to the mix is the complexity arising from the economic, technical and political difference among conflicting regional, national and local circumstances. Global growth rate for population and per capita income can outpace the rate of decline and intensity. This means that incremental changes affecting the latter cannot achieve sufficient overall decline to reduce emissions over decades. Higher costs of this initiative should be weighed with the dangerous costs of climate change. The two-fold challenge is also to adopt and implement policies to encourage the development and use of low GHG emitting technologies while maintaining a sufficiently high rate of intensity decline over the long term (Blodgett and Parker, 2007).

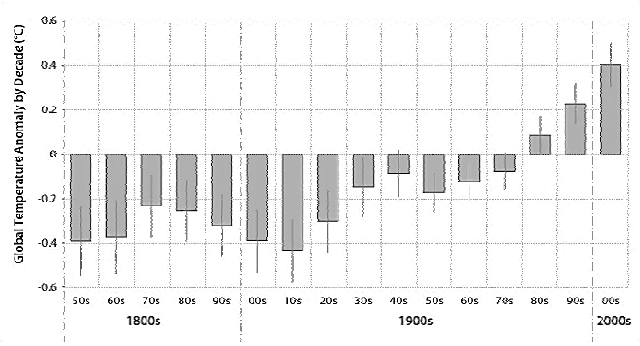

Figure 1. *Rising Global Temperatures.*

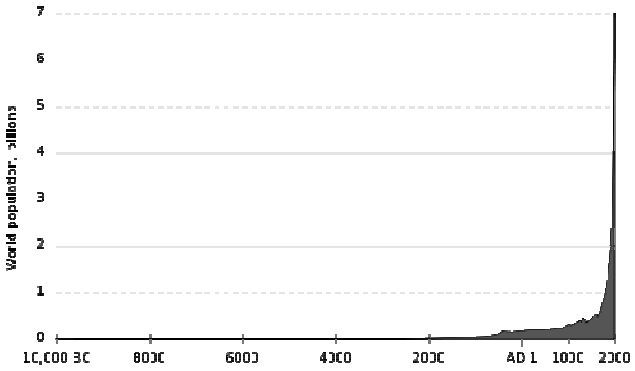

Figure 2. *Population Growth.*

3.2. Public Participation

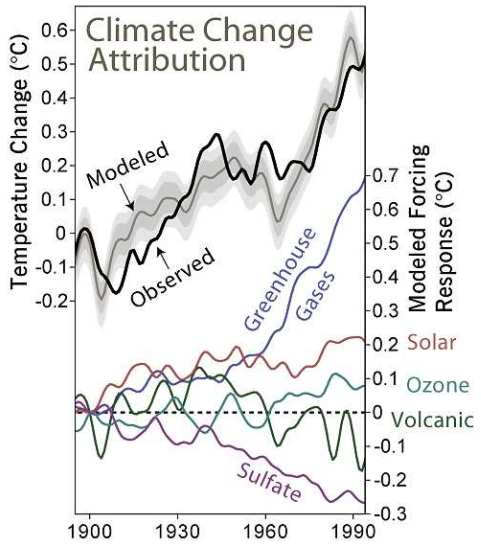

Figure 3. *(Left): Global temperature change due to GHG emissions, solar irradiance and ozone fluctuations.*

Equity based tensions also stem from public participation and the subsequent citizen's support of and involvement in local sustainable programs. Since sustainability policies are linked to a city's financial health (Lubell et al 2009), the current study evaluates the public perception before the economic meltdown of 2008, when cities started reporting affected municipal sustainable initiatives related to the recession (National League of Cities 2010). Participatory policy frameworks invite the highest citizen involvement levels, so cities need to identify relevant stakeholders from which to invite appropriate participation (O'Connell 2009, Zeemering 2009).

Democracies around the world, where the majority of the earth's population currently live, regardless of their actual operational definition, are ineffective in finding a solution for this eminent problem. Although democracies are designed to value citizen involvement in governance and public opinion, some common examples to its ineffectiveness are the extreme minority representation of almost all 'green parties' in the world's political stages (Hayward 1995). Larger democracies and economies like the United States have failed to partake or ratify important treaties on the environment even though they pioneered environmental legislations in the 1970s. Market based incentives might work, but corporations are seen as poor custodians of our future as they are driven mainly by profits. NGOs, research institutions and members of the academia are constrained within their frameworks and are, at times, excluded from global decision making.

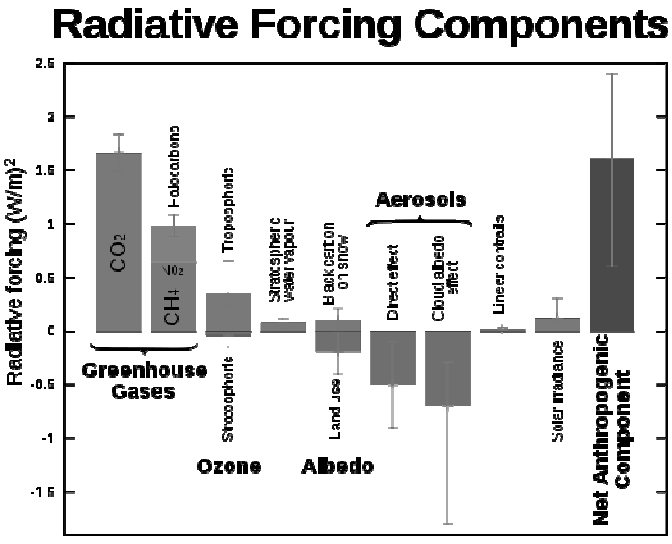

Figure 4. *(Right): Magnitude of GHG emissions relative to Ozone and other antropogenic components in the radiative forcings spectrum.*

Special attention also needs to be paid in the use of political rhetoric versus scientific persuasion – it is argued that, no progress has been achieved in combating global climate change problem because politicians and policy makers are skilled in using rhetoric and have been using it to delay any real action. Scientists suggests, that just stating 'boring' facts that are seemingly not interesting to anyone is the major reason behind this trend, which is why people rather listen to the dramatic politicians and media briefs for their translations of the issue (Romm, 2007). The posture of procrastination and maintain the status quo is no-longer justifiable, as doing nothing may seriously jeopardize not

only the environmental situation in the long run, but also market share of the innovative technologies in the short term (Kotter, 2008).

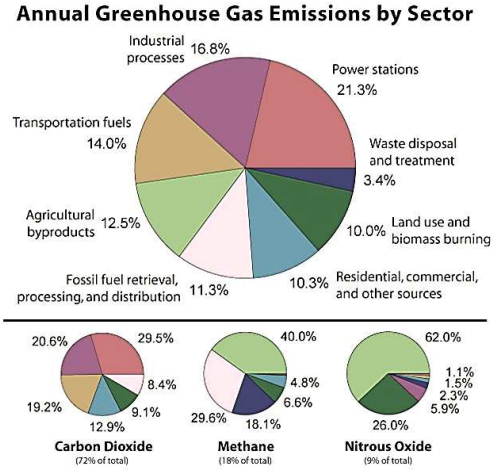

Figure 5. *Sectorial GHG Emissions per year in the United States.*

3.3. Complexity and Globalization

The trends of globalization have further unveiled greater influence of privatized environmental governance on the global scale (Falkner 2003). The essence of global environmental management with economic and social implications have started to shift away from state capacity thereby empowering the civil society which experienced the introduction of activity organizations and interest groups gaining power as non-state actors. These different actors are capable of having differential access to decision making (Hessing et al 2005). This has a profound effect on international relations as the trend predicts an inevitable and likely shift from states towards firms, which will herald a new dynamic of interaction between the public and private sectors (Jörgens, 2012). The main reason for this is the neoliberal notion of 'free trade' efforts where trade barriers have been sought to be removed completely and this is seen in various countries where the governments have resorted to replacing environmental regulations with standards such as the ISO series (Clapp 1998). Complex systems are constantly evolving to their surroundings where minute incremental changes, such as the shift from states toward firms in one level can potentially be compounded to major differences in the next level as far as governance is concerned. Climate change or sustainable development precepts are therefore social-ecological subsystems. Observing self-organization within these in particular, can be crucial in order to understand the patterns emerging from various inter-component interactions. For example, sustainable development or mitigation and adaptation for climate change tend to be rooted locally in the short term, with eventual global implications in the long run. Hence, rhetoric or willingness for national leaders affects municipal actions and this can impede the vision of sustainable development or fruition of the global climate goals (Norberg 2008).

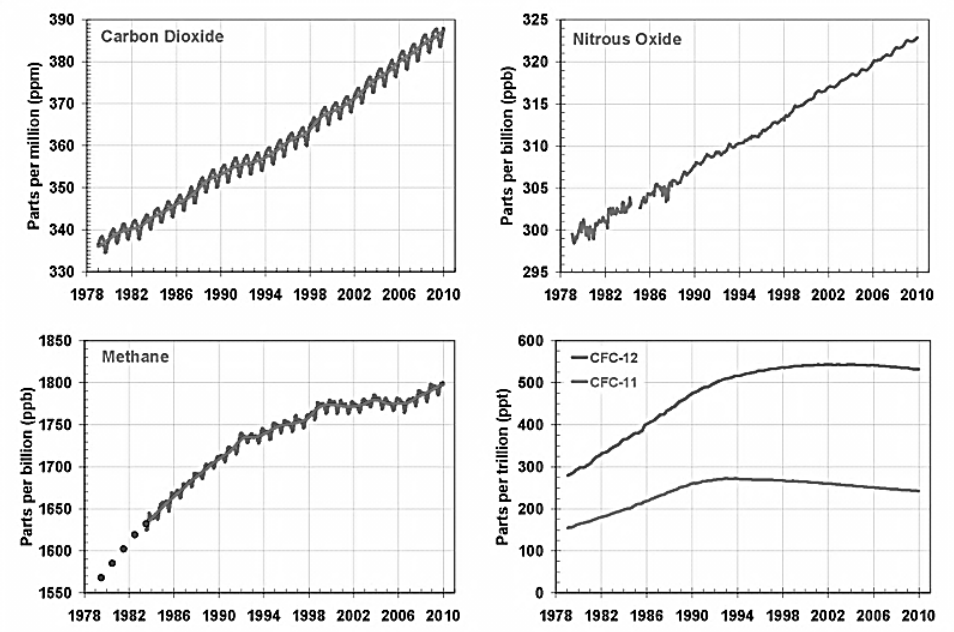

Figure 6. *The rise of GHG emissions.*

4. Municipal Adaptation

New urban ecosystems could be constructed by innovative strategies, thereby creating new economic opportunities that arise from shifts in municipal operations, fitting into regional climate change adaptation plans and ultimately making the phenomenon applicable to most entrepreneurs, businessmen, and scientists. In addition, it is also especially appealing to economists, politicians and environmentalists in the area, as a result. The solution

should not revolve around idealistic principles but elaborations of robust economic theories that pervade efficiency in terms of realistic life-cycle costs involved in business planning and operations, in both regional private and public sectors. The environment is treated as a resource input in the life-cycle of a real world business models, depicting ways to create a more interrelated assessment of the value of the resources that are used in cities. Attention should be paid to not pit the industry against the environment, and in no way does it lead to an anti-consumerism discussion; however, it implies a drastic change of lifestyle that we have gotten used to and possible financial and logistical hardship.

Economic competitiveness can be greatly constrained by inefficiency and lack of transparency on the part of the city's administration. As noted earlier, the financial state of the city government ultimately decides the local sustainability efforts. Recently, municipal governments have turned to technologies to cut down wastes and emissions by operating remotely. Stakeholders could therefore equally adopt electronic service deliveries in e-governance and e-commerce among all inner domain-city planning schemes, in order to stimulate deployment of innovative technological solutions. This can bring considerable enhancements to the quality and efficiency of services. In the long term, this trend will facilitate the popularization of city wide technological markets. This way the city will be both financially healthy, provide adequate services to its citizens while cutting wastes and lowering emissions from transportation and conventional operations.

4.1. Management Context

At first, city staff needs to evaluate current municipal operations to identify if there are any conflicting regulations, complicated processes or 'silo mindsets' within that hinder the full acceptance of an integrated innovative scheme to cut wastes and emissions. Next, the administration should conduct surveys to public officials, businesses and private individuals to understand any learning gaps between the key stakeholders regarding the issue, causation and probable solutions to climate change and its local implications. Municipal bureaucracies are structured to perform tasks with consistency and stability and are likely to resist change. Experimental innovation or risk taking can be institutionally blocked in such settings as technologically-driven public sector projects may fail if management does not consider and address risks. Any resistance among the staff, therefore, should be overcome with proper training and skills development.

This calls for careful handling of the project as with multiple and diverse stakeholders, there exists a high level of interdependence with competing values which leads to socio-political complexities. It would be beneficial for city council members to work with the departments to lead the change as management and policy needs to be considered alongside the implementation of technology. Beyond the typical sharing of knowledge, policy coordination across organizational norms and at all levels is critical. In addition, top-management support and cross-organizational leadership is also important if collaboration among the diverse actors is to be sought (Nam & Pardo, 2011).

In the short term, online portals on websites, text messages and smart phone applications can be popularized and in the long term, kiosks could be constructed through the outward growing circles of the city for easy access to regular services. This way commuting may be reduced as transportation can account for the highest municipal marker for GHG emissions, as is the case for the City of Kansas City, MO (KCMO). See Figure 7. Despite the city's continuous efforts for lowering emissions, forecasts show that emissions will only continue to grow. See Figure 8. Digital content and collaboration technologies can be popularized in a cost-effective effort to provide quality services and experiences in education and healthcare through storage systems for student or patient records and easier content sharing. Filling taxes, paying fees, applying for and issuance of licenses, permits and registrations and other online delivery of services should be made easier. This will reduce transaction times by foregoing unnecessary paperwork while improving transparency. Business transactions can be automated to be far quicker and simpler, cutting down processing times for most services and not requiring users to drive out and then wait in line. Automatic updates on changes and details, for example, GPS installment on public transport, paramedics, security services so that users can monitor location, deployment and arrival times can also be beneficial in cutting wastes and hence emissions (Economist Intelligence Unit, 2010).

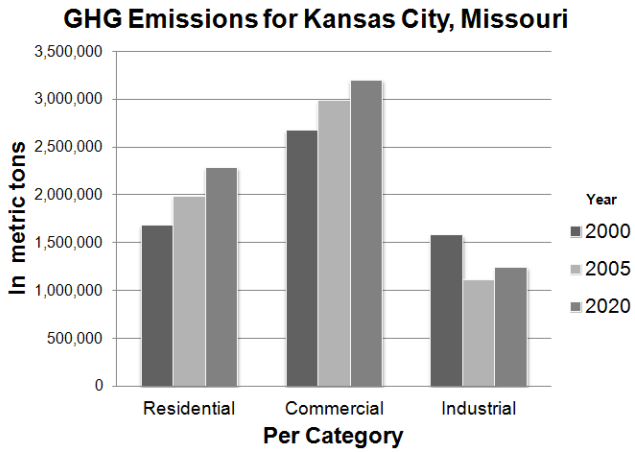

Figure 8. *The rise of GHG emissions in Kansas City, MO.*

In the long run, city utilities can depend on digital grids to optimize resource consumption in buildings and cutting wastes and losses by providing incentives to curb consumer behavior toward cleaner technologies. Similarly, traffic and transportation issues can be better managed through smart pricing by tolling higher for congested roads in rush hour to alleviate congestion and pollution while raising funds for

other programs. Conservation of conventional energy should be stressed from all fuels sources. For a breakdown of Kansas City specific energy sources and corresponding emissions proportions, see Figure 9.

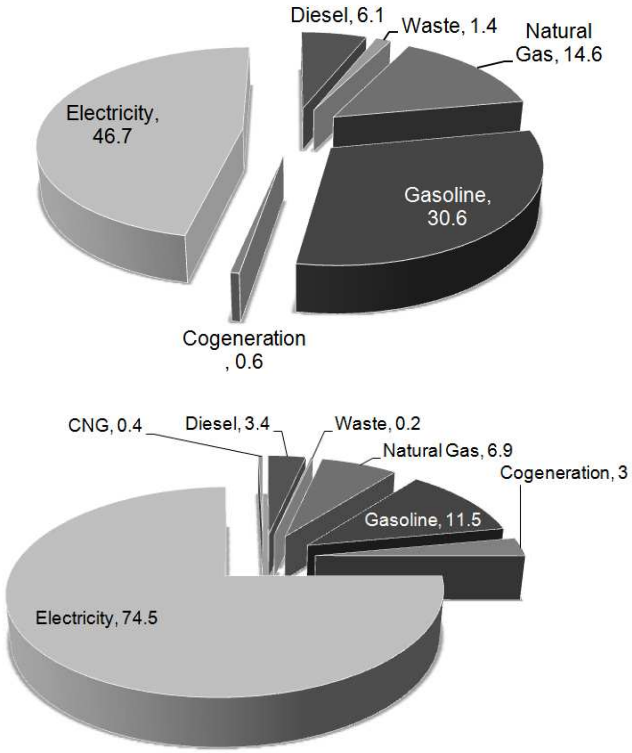

Figure 9. *The Kansas City, MO energy sources and sectorial GHG emissions contributions.*

A central database for city employees can also be created in which they can remotely connect to from anywhere, with an e-document management system, e-calendars, hours logged and progress, video-conferencing, tele-working and the ability to contribute to journal or log entries on 'how-to's and the 'know-how's for other personnel involved in similar projects or tasks. Putting more processes online can automate workflow, standardize procedures, reduce process times and complexity, ultimately leading to higher efficiency while incurring lower costs, while reducing travel and printing, among other things. The database will provide common access to information throughout all the departments leading to better bureaucratic connectivity by facilitating easier data exchange through a single standard. Instead of being required to deal with multiple departments, users will benefit from cross-departmental initiatives, which should be implemented by targeting the broader goal of technological innovation. This way, internal barriers that may exist among the existing and complex network of city activity may be broken down.

It will also not be enough to just switch from paper to electronic formats. More access to handheld devices besides regular desktop computers could also be provided. To reduce the number of approvals required processes inside the city council need to be streamlined and external actors need to be identified who can take part in the process. Given the involvement of the various departments in the city, as well as other jurisdictions, the processes, logistics and procurement can be planned to lead to better transparency. To coordinate the task across these departments, a committee can be established to develop the system and ensure proper implementation of different project planning stages in making the city one of the best managed in the region by supporting local technological entrepreneurship and economic growth.

4.2. Financing

Embracing a city's entrepreneurial nature, individual citizens and businesses can develop this software and make applications for smart mobile devices, according to their interests and service preferences, such as trails in city parks or better biking routes for cyclists. This provides a way for the stakeholders to be engaged as the citizens and businesses can be equally involved in the city while developing applications for better services through adequate utilization of technologies. The city could provide information and necessary data openly to interested parties or by launching competitions. Since this requires minimal financial responsibility on the city's part, events such as an open-source contest could be organized to promote such collaborations under sponsorship of local and interested entrepreneurs.

Initially, if budgetary constraints exist due to limited funds, individual citizens and businesses could themselves design applications and databases on the city's behalf, leading to cheaper, smarter and faster sources of innovation. The city can expedite this trend by bringing the interested parties together. This investment should lead to increased efficiency and generate returns in the form of lower costs in the municipal service provision. In the long run, government funding may be critical to cover capital costs through state-owned banks or direct public financing, in addition to private sector funds and third parties providing later capital for development after the completion of the initial phase.

Both long term and short term goals would need to be identified as the politically charged, short term delivery of results can take precedence over long term strategy. The initiative also needs to be marketed with promises, not just rhetoric, when the city evaluates and makes a public promise to the citizens and stakeholders. Data and informational use derived from these technologies have the ability to transform relations with citizens, businesses and the public officials. The city therefore needs to provide or help the private sector to complement provisions of this innovative municipal infrastructure. This way, businesses will be enabled to function effectively while the city authorities can offer appropriate and efficient public services.

4.3. Technological Innovations

With the advent of social media, cloud computing and a growing technologically savvy population in both urban and suburban spheres of cities, high speed internet connectivity can consolidate various needs and demands of the city and its people. The outcome of mitigated costs of increasing urbanization is beneficial to the growth of economic activity, business competition and public satisfaction of city services. Systems can be designed through smart phone applications, wireless gadgets and the internet to collect and analyze updated data that enhances the usability and efficiency of the city's infrastructure. The high-speed fiber is advantageous, as system efficiency and business completion of a city greatly hinges on the proper utilization of city-wide broadband and Wi-Fi connections.

But a more pressing question arises from such a proposal: How does one practice control in these times, when grievances regarding an organization's product or service are shared to the entire world the instant they are experienced? Just a few decades ago, executives of information technology bases had doubts about providing computers to their workers in fear of losing control of their command by giving them free access to information. The recent prominence of social media poses a similar yet far-reaching predicament to the leaders and managers of today. This can be a crucial roadblock in the acceptance of any innovative schemes in the municipal structure from both public and private sectors at the city level.

In a more general sense, the fact that more and more consumers are embracing enterprises with open models that listen to them and share ideas and beliefs, means that the old model of command and control is disappearing fast, with leaders having to either adapt to this novel concept or getting left behind. Leaders have taken to writing their own blogs realizing that this form of real time communication with both employees and customers builds the kind of relationships they want to ideally build. This is not only important, but makes sense logically. When most of the current executives of prominent companies were in universities or graduate schools, social media was not present. For some instances, the internet was not even a factor in regular operations. Now, almost each and every organization accepts the internet as a fundamental component of their business model and operations, but a majority of the world's cities do not make adequate use of available technologies and hence incur wastes.

Given various recent events, public confidence in many institutions and firms throughout multiple industries are at an all-time low, and this transfer of power and the idea of an open system of governance will have tremendous impact on the relationship of the leader, the management and those they serve. However, the archaic notion of the 'command and control' model is robust in a sense, as an open organization can be too open – leading to issues in risk management. It goes beyond an impulsive employee violating regulations that not only leads to fines but could potentially also significantly damage the public trust further. For example, sending a culturally insensitive tweet or hateful status update, could be some cyber threat problems in service delivery. The only way to address this is not through the openness, but stricter, non-open leadership much like the old model. This new system also does not address managerial challenges such as other legal problems with compliance, human resources, financial or quality control, almost all of which require a robust, centralized control system and strict operational protocols (Li 2010). Current trends constantly calls for a democratization of the organizations, but the attempt to maintain quality and stability and trying to meet the financial bottom line or adherence to the mission statements might take precedence over mere openness. At times, it can even be at odds with heralding new leadership processes, open communication, and related change or innovation. This is one of the reasons why cities and communities resist such a revolutionizing change.

5. Institutional Dynamics

5.1. Leadership

Researchers define leadership as a system of persuasion, where the leader persuades the followers to pursue the shared vision, or as a performing act where holistically, and with subtlety, the leader attempts to influence his or her followers by blending feelings, emotions, and actions in pursuit of the vision. Personal opinions and perceptions can easily influence decisions for a person in a position of leadership and addressing municipal adaptation programs is no different from either corporate or policy making perspectives. There are some key differences between public and general leadership as public leadership can be seen as the same as 'regular' leadership but with further constraints and additional challenges. This is based not only on the unique challenges and limitations of scope experienced by the public sector but also due to other complexity factors that they face.

Leadership demands to be viewed from two different sectors and between industries. Private and public sectors have historically been viewed as different, but with recent trends in globalization, drastic shifts are taking place that are altering these sectors to their very cores (Sunny 2013). For example, there is greater commercialization or privatization of public services around the world, as well as increased stakeholder awareness and analysis in the private sector. However, there still exist stark fundamental differences not only in each sector's structure, goals, purpose, drivers or values, but also in their organizational culture, environment and even skill set and talent management. It is due to this that the leadership for these two distinct yet somewhat similar systems is different, but, it also has to be noted that skills in one of these sectors can sometimes be useful or transferable to the other. The private sector leadership is profit based and revolves

around the idea of optimized efficiency, whereas public service leadership is goal oriented and suboptimal at best, and not only do they have to look at their program's or project's financial situation, they have to do so while providing the best services possible.

Leaders in the public sector do not pursue goals for monetary gains, but in an effort to solve some of humanities' most complex and pressing issues, such as climate change or resource conservation. When businesses choose a particular industry, product or service, they do so by picking one that is most likely to return investments or reduce risks in operations, but public sector organizations provide solutions for issues from which financial profits cannot be reaped or ones that are plagued with such social problems. In many instances, public service leaders regularly have to negotiate between constituencies and resolve conflict. This facet is rare or different in the private sector whose operations also allow for a degree of freedom or flexibility, a fact that is in turn rare in the public sector.

Businesses, for example, can outsource operations to cheap labor countries to help save money and hence increase the profit margin, making it easier to meet their primary objectives. Their public service counterparts, however, usually cannot do so. Not only are they structurally not able to do this, but their primary objective would be compromised as those they serve would then be worse off. This shows that in the case of public service leaders, the limiting factors can be disproportionately related, making key decisions and leading the followers towards the goals and visions much harder. This notion significantly illustrates the dilemma of the public service leaders.

In addition, there exists certain dynamics and additional challenges in forming and leading teams of diverse individuals, with sometimes conflicting personalities. How they can be best led towards verifiable completion of milestones considered integral to the shared vision is perhaps also a crucial question. From a public leader's perspective, understanding the mentality of the led, or opinion and perception of the constituency sheds further light on the leader's duties as well as the soundness of their vision – be it sustainable development, climate change or emissions mitigation. It is almost human nature to blame the top when things go wrong and it can be easy to overlook that the follower's ineffectiveness can be falsely reflected on policy makers or corporate management.

Both internal and external conflicts in operations can and will occasionally arise that are deemed detrimental to the goal and vision. The challenges of resolution can be especially difficult today with the greater diversity in background, identity or ideology. Coming to a consensus, therefore, is now more complex than ever. Despite coverage of contemporary organizational and institutional cultures and norms, today's leaders cannot escape the fact that the workplace, and in fact all of society is much more diverse, and successfully navigating through the variations of human interactions will be extremely crucial. With a field as varied as climate change or environmental sustainability, this challenge is magnified among municipal or local policymakers and businesses.

5.2. Monitoring and Effectiveness

Sometimes programs can be designed to fail due to mismanagement, so it is therefore crucial to evaluate or assess the program's effectiveness. Comprehensive monitoring systems could be one such measure which aims to support credible program evaluations targeted towards GHG emissions reductions by providing valuable feedback in the productivity, impacts and program effectiveness and subsequent feedback to the project components. So, sustainability evaluations can provide feedback throughout the project's or program's life cycles, improving overall efficiency, and subsequently helping the governments make decisions about budgets and funding or for allocating resources. This could also be a way to make the programs and projects accountable to the public while potentially providing organizational transparency, besides evaluating the effectiveness.

Depending on the program, the objectives, outcome and output indicators would need to be identified by a holistic and inclusive method. The next stage dealing with capable administration and infrastructure would stress on reliable and valid collection of data. In trying to find the effectiveness it is important to know who the audience is, or who would like to evaluate the program to find its effectiveness. Given the nature of the problem, the audience might be the citizens, businesses, city, state or federal/national government or a combination of these. Depending on the audience, the data from the district and regional offices could be collected in standardized government forms and then converted to analyze the data electronically which is discussed above. This is only possible if there no major obstacles in the monitoring or evaluation plan, such as lack of staff, high staff turnovers, poor management or infrastructure or under-qualified staff etc. If this is the case more resources should be invested in the evaluation budget and into staff training.

The team could further breakdown the task by forming smaller teams at the various levels, investing financial and logistical compliances, if applicable. The entire evaluation could review a sample of a specific number of public works projects per year or per a certain number of months to investigate the effectiveness. Each step is important as without them, it would be relatively difficult to measure program impacts or assess the effectiveness of the program on the beneficiaries.

Further, a cost-benefit or a cost-effectiveness analysis could be utilized to assess program efficiency. The benefits of the projects and their program cost could be compared, where a lower cost-benefit ratio would mean that the program is efficient. The obvious problem with this, however, is that while costs are monetized, benefits are usually not.

6. Public Perception

6.1. Economic Implications of Global Treaties

According to a study at Yale University, a large majority of Americans (68%) favored, at least in principle, an international treaty that goes far beyond the current Kyoto Protocol to require the U.S. to cut its CO_2 emissions by as much as 90% by 2050 (Leiserowitz, 2007). But again, this does not come without economic implications for the country and her people. The study, also found that there is continued strong opposition to carbon taxes, such as higher taxes on electricity with 71% of respondents strongly opposed or somewhat opposed to higher gasoline taxes. So, paradoxically, while most Americans strongly support national and international action on global warming, they remain adamantly opposed to higher taxation as a means to achieve goals. In addition, 82% of Americans were willing to spend an extra $100 a year by using electric utilities that are primarily produced by wind, solar and other renewable sources, and 89% of Americans agreed that any newly constructed home, be it residential or commercial building, will have to meet higher energy efficiency standards. Finally, 87% of Americans agree that the U.S. can take actions that will reduce global warming. On another note, 76% of the people disagree with the premise that the actions of a single country like the U.S. won't make a difference in the reduction of emissions or mitigating the causes and effects of global warming and climate change. Directed policies and cost implications for a shift will have an impact on the general public. For instance, the changes to policies and fuel regulations in the American transportation sector will likely change way of living for a majority of the American populace (Lee & Lovellette, 2011).

A pattern in the public opinion regarding this global issue emerged in the last 20 years as observed by Nisbet and Myer's. In 1998, 39% of Americans supported immediate steps, a percentage which decreased in 2004 to 31% but increased again to 34% in 2005 (Nisbet & Myers, 2007). Conversely, in the same year, 44% of Americans felt that although this pressing issue should be addressed, it should be done gradually. This percentage slightly increased in 2004 to 45% before going down to 42%. The year 2004 is crucial in the scene as it coincided with the U.S. Presidential Elections with Republican George W. Bush emerging as the winner – a politician who is against mitigation or emissions cap. Furthermore, George Bush did not ratify the Kyoto Protocol due to higher costs incurred from the U.S. perspective and according to public opinion and the percentage of people in agreement with his policies of taking no real steps to stop climate change was 23% in 2004, which was higher than both 1998 (15%) and 2005 (21%). Politics is a key consideration that goes into Climate Change policy as U.S. climate change politics and policy making are changing in the public, private and civil society sectors. These changes are likely to influence U.S. federal policies (Henrik & VanDeveer, 2007).

A year earlier, in 1997 during the Clinton era, 20% of the U.S. people felt that the U.S. efforts to mitigate the effect of climate change and global emissions would cost too much money and hurt the U.S. economy. The number increased to 29% in 2004, before decreasing to 23% the following year. However, on the other hand, 67% of the people felt that the U.S. economy would become more competitive because the mitigation efforts will result in more efficient energy use and save money in the long run. This number stayed the same in 2004 before increasing in 2005 to 71%.

Finally, in 2002, 64% of the U.S. public felt that they nation should participate in the Kyoto Protocol, which increased to 65% in 2004 and again to 73% in 2005. Only 21% of the people in 2002 felt that the U.S. should not participate in such treaties, and this number decreased to 16% in 2004, and stayed the same in the following year. The treaty provisions were legally binding with 42% of the polled U.S. public believing that the U.S. should in fact abide by, and this percentage remained the same in 2004 and 2005. Around 22% of the people thought that the U.S. should not abide by the limitations in the protocol, a number that increased slightly to 23% in 2005. In 2004, 36% of the people polled had no opinion or knowledge about the treaty, which became 35% the following year. President Bush's withdrawal from the treaty was a topic of discussion and scrutiny by the U.S. public which is why awareness about the program may have risen. In April 2001, a Gallup Poll observed that 41% of the U.S. public approved this decision while 48% disapproved it. By July of the same year the figures amounted to 32 and 51%, respectively.

6.2. Politics

Politics has the ability to play an important role in these issues (Sunny 2014). Differences in opinions according to the individual's political identity are also noted in the current study and other relevant literature. For instance, to gain a comprehensive understanding of the issue and why people reacted the way they did, political influences on the issue of climate change and mitigation was observed (Dunlap & McCright, 2008) where the paper further looked at comparative policy studies between nations adhering to emissions reduction policies and nations that decided not to, for many reasons, including the ones highlighted in this research study (Harrison, 2007).

Like President Bush, republicans have consistently downplayed the seriousness of global warming, and in 2003, 49% of republicans believed that the seriousness of global warming is exaggerated by the news which increased to 59% in 2004, before going back to 50 in 2005. This is in stark comparison to 21% of democrats who felt the same way in both the years of 2003 and 2004, and just 15% in 2005. In 2008, 49% of democrats felt that global warming will post a serious threat to them or their way of life within their lifetimes, compared to 26% of republicans (Dunlap & McCright, 2008). As socio-economic and geo-

political circumstances shape public opinion in the U.S., an eventual shift in the policy preferences of the American people is likely to lead to congruent changes in policy (Page and Shapiro, 1983). Specifically in the field of environmental policy, there exists a strong link between environmental conditions and opinion, as well as opinion and policy responsiveness (Johnson et. al, 2005). Participation among the citizens therefore is very important in the discussion of local-level sustainability (Portney 2005).

7. Conclusion

Local circumstances and public perceptions tend to shape municipal sustainability practices and determine the conceptual and operational definition of sustainability, and its applicability for a particular region. How it should be measured or what criteria should be used to assess them is left to individual communities. Since, a mainstream and universally accepted term is not applied; sustainability efforts in cities are largely shaped by circumstantial, locally based, internal and external perspectives.

In scientific terms, uncertainties in projections of global surface warming derive almost equally from uncertain emissions and uncertain climate science. While primary uncertainties are those that are a direct effect of a change climate, derivative uncertainty for a business stems from the political response to the climatic uncertainty. Moreover, non-trivial challenges persist in quantifying projections because existing model simulations that have been used to predict the future climate have used models with only subsets of the climate forcings and feedbacks. Addressing these challenges requires a greater focus on assessing key societal and environmental vulnerabilities. Further research is needed to translate this enhanced knowledge into an analytic framework for improved public policy-making and executive decision-making at the local level as decision makers need the most current knowledge and data to make informed decisions. Specifically, the framework for vulnerability assessments should be place-based, and have a bottom-up perspective, in contrast to the Global Climate Model (GCM)-focus which is a top-down approach from a global perspective. With this bottom-up perspective, the distribution of impacts across a region can be assessed (and objectively confirmed) as a more accurate assessment of the local impacts. It should then become possible to gain policy-relevant insights to the fundamental question of seeking ways to mitigate and/or adapt to the threats to these local resources. This is a more societally beneficial approach than seeking to downscale to the local region from a global climate model. Climate scientists are increasingly using a variety of diagnostic and climate modeling systems to study climate patterns and processes across a range of spatial and temporal scales. To date, however, evidence and climate change data have been globally based while the impacts of climate variability and mitigation strategies are always local in nature. Solutions to human-caused acceleration of climate changes must therefore be locally based – driven by local organizations and individuals.

Currently however, there is not a universal global, domestic, and regional, industry, or business-level agreement on the degree, cause, and severity of climate change. Regional industries are all highly impacted by climatological change or are subject to likely regulatory and/or policy change. Companies may incur costs to comply with the regulation of greenhouse gas emissions to mitigate climate change. The policy makers and regulators make value judgments on how to react to this data in designing the policies and regulations that affect aggregate behavior and responses. Sectorial and industry leaders therefore, have to take information from both the climatologists and the policy makers and turn it into corporate practice. The relationship between these three groups is symbiotic --- there is a necessary give and take of information and data to improve the process of policy making and implementation. This exchange will lead to improved understanding of all facets of decision-making processes for all three groups of climate change constituents. Further research should also aim to bring academic scholars, policy makers, and industry leaders to discuss the state of climate policy, advance the policy-making agendas at the state and regional levels, and design appropriate response at the industry and individual company levels.

For example, place based research can examine the premise of vulnerabilities and opportunities in the municipal area, and adopt a sector by sector approach that includes studying the pros and cons of a local food supply, potential evolution of transportation patterns, health impacts, water impacts, energy impacts, potential evolution of land use patterns, impacts on the public sector, and systemic vulnerabilities in relation to past climate variability and future anticipated shifts in the climate regime. A cardinal objective of any research should be to refine our knowledge about risk and uncertainty so that decision makers can better understand the immediate and local consequences of climate variability and policy and operational adaptations. Potential stressors can be considered in the proposed assessment framework and may include population growth, increasingly imbalanced wealth distribution, skyrocketing oil cost and reduced availability, continued sprawl and disintegration of community, cataclysmic weather events producing large population dislocations, and economic collapse. The ultimate goal is to identify, from the perspectives of the citizen stakeholders and local business owners and managers, the short and longer-term mitigation potentials such as a more locally-self-sufficient and resilient delivery of goods and services, development of mass transportation options, and the evolution of urban/suburban settlement patterns.

There is a need for a broad, far-reaching, and multi-faceted outreach and education program to help citizens understand the problem, the urgency of taking action, and

what they can do. There is also a need for a narrative of scenario specific perceived risks, opportunities, cost of living implications, public policy implications shaped by environmental justice and climate impact mitigation strategies. The risks and strategies inherent in each scenario should be assessed across the various sectors while the scenarios themselves should be suggested as likely potentials relative to regional weather variability, projection of societal reactions to climate related disruption and local momentum to address the issue. Hence, there is a need for a multidisciplinary focus on climate issues by university scholars, policy makers, and industry leaders and the research will observe immediate responses that best protects the interests of shareholders and serves the regions' responsibilities. In this paper, it is argued, that, solutions to the issue of climate change adaptation and mitigation plans are not technological or financial, but more of a problem of behavior and institutional barrier, with public opinion and political unwillingness. At the very basic local level, where action plans are ideally grounded, civic participation greatly influence regional policy making, and political and social circumstances further influence the opinion of the stakeholders who take varied views on the subject and therefore, no coherent action is taken to address the global issue to date.

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