

# THE IMPORTANCE OF SCALE

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In previous articles in *Municipal World*, the concept of a “wicked problem” and its pernicious effect of preventing action has been discussed. In this article, we examine the concept of scale, and how our understanding of climate change and our responses to it, for both mitigation and adaptation, have to be taken at the appropriate scale in space and time.

What do we mean by scale? We use it here as a term borrowed from systems theory: a scale is a frame of reference, a defined extent of space and time in which various entities interact. Entities could be governments, organizations, individuals, or environmental factors, for example. A system is therefore made up of entities interacting on multiple scales, both temporal and spatial. Scales that occupy a larger space tend to function on longer time frames, while those in smaller spaces have activities that occur more rapidly. Key to our argument is the understanding that these different scales interact with one another, and can affect one another. Think of a forest: trees grow and die at much different temporal and spatial

scales than the overall forest, but the health of the trees can affect the forest, while a forest fire can affect individual trees.

Why is scale so important? It can help us to understand why some solutions to a “wicked problem” that appear reasonable on the surface can end up being both inappropriate and ineffective, because they address the problem on the wrong scale. The goal is to devise solutions to “wicked problems” that are more appropriate and effective at the relevant scale (witness Toronto’s success at diverting waste from landfill by implementing lower garbage pickup rates and increased composting/recycling rates). So, from a governance point of view, it is important to understand a problem in the context of the scale or scales on which it operates within a system. This can tell us where efforts to combat the problem should be effectively targeted for maximum effect.

## Canadian Context

In Canada, the three levels of government are currently structured at the federal, provincial/territorial, and municipal levels (with only the federal and provincial/territorial levels having constitutional standing). Obviously, this means that politicians and bureaucrats tend to focus on international/national, macro and micro-regional, and local problems respectively, because the levels of government are intended to correspond roughly to three distinct scales of action in time and

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space: from rapid, local actions by the municipalities to longer-term, farther-reaching action by the federal government. Within this framework of scales, the constitution specifically assigns certain responsibilities to the federal government (eg. defence), and others to the provincial/territorial governments (eg. municipalities), and still others are shared (eg. environment). For some problems, these assignments of responsibility function well, as the scale of government is appropriate to the scale of the problem for which it is responsible.

However, the constitutional separation of powers was originally made in the mid- to late-nineteenth century. Some of the decisions made on dividing the responsibilities were reasonable in that historical context, but are no longer so today. Climate change is an excellent example. Unfortunately for this “wicked problem,” the factors affecting climate change go beyond the environment and energy policy, which are a shared jurisdiction.

If we further analyze current government structures, we are left with two major temporal cycles: first and most important is that of the election cycle. Municipal councillors and provincial and federal representatives are all installed in office according to electoral cycles. Related to the election cycle is the relatively short attention span of the voting public. Second, government employees function on a career cycle (somewhere in the range of 30 years long). However, while government employees provide stability through transitions, as well as implementing programs and enacting governmental policy, it is at the political time-scale that key decisions are taken. The overall effect is a debilitating short-sightedness that hinders even the most advanced and democratic countries from acting

effectively to combat climate change in the long term.

### Right Tool for the Right Job?

What does all of this mean? Well, at the temporal scale, it means that we have institutions designed mainly to respond to stimuli on short-term time scales. The continuity function theoretically provided by public servants is too weak to persist over the kind of time scales on which climate change must be tackled, mainly because the major policy decisions are out of their hands. Those whose hands do hold the levers of power – the politicians – are not elected based on decisions that will have an impact five years in the future, let alone on their track record of decisions that will not have an impact on future generations (witness the curtailment of energy efficiency programs in the 1970s, after the OPEC embargo was cancelled).

While these short-lived governments and divisions of power might have been appropriate to the problems of earlier days, the advance of technology and social organization has changed their environment – so much that we should now actively question whether they should be redesigned. Two advances in particular, the widespread use of fossil fuels and the advent of near-instant global communications, have resulted in a “flattening” of scales. Movements of goods and people could once be done rapidly in a local area or more slowly over regional or international distances. Now, fossil fuels have allowed progressively faster movement to apply across progressively longer distances.

Most conventional thinking views this as a blessing, bringing greater wealth and welfare as the boundaries of time and space become less relevant to the individual.

However, at the same time, those limitations of speed, time, and distance serve a control function. Think of a disease: limited mobility of hosts is one way in which the spread of an infection could be self-contained in the past. Now, imagine disease containment in the era of rapid global air travel. As the twin drivers of technology and cheap energy override more of these control functions, problems caused by human activity can now manifest themselves at ever-higher scales in space and time. In other words, our technology has defeated many of nature’s safety systems, giving us the ability to create problems of a size and magnitude that can really hurt us – indeed, that can threaten the very survival of our own species and countless others.

At a given spatial scale, while causes are highly localized (eg. the burning of fossil fuels in cars or for power generation), the impacts may be felt halfway around the world. While the wealthiest countries have had the greatest effect on greenhouse gas emissions, it is the poorest, least resilient countries and populations that will feel climatic effects first. Again, our governance structures are not designed to take into account overseas impacts (only Canadian citizens may vote in Canada). This leads us to a further limitation: there is, as yet, no effective governance structure capable of forcing effective action at any scale beyond that of individual countries. Nonetheless, it is at this scale that most of the effects are being felt, and at which substantial action and leadership is urgently needed. There is a governance vacuum here.

Current emergencies are functioning on spatial and temporal scales for which our governance structure was not designed. Climate change is happening on a global scale, with cause and effect separated by time and space.

But, democratic institutions are not designed to be able to react and influence these scales – and therefore, these emergencies. The system of rewards, incentive, and punishment were originally designed in the city-states of Greece, and were thereafter extended to the nation-state level. They were designed to respond to the polity's need for leadership at a time when most problems within the power of humans to address were mainly local or small-scale. They were *not* designed to provide leadership and vision on a global, multi-decade scale.

### What is to be Done?

If we think back to our earlier discussion of scale, while an increase in global average temperature is a worldwide phenomenon, most of the consumption of energy forms that create greenhouse gas emissions occur on a local level (eg. home heating, electrical generation, etc.). At the local level, we have individuals making decisions that

help cause climate change. These decisions are made for a multitude of reasons, the primary ones being social and economic. But, these factors do not function on the same time scale as electoral cycles. Social and economic change is a long process, and proceeds very slowly, over the course of multiple electoral cycles. Not only are these slow changes, but they are also changes that happen on a national, societal scale. In the context of the “wicked problem” of climate change, we need to seek solutions that are local and rapid, and that will also affect the larger, slower scales above them.

This leads to the recognition that the municipal/local scale is the most important governance scale in regards to affecting the causes of climate change. Decisions on a local or regional scale (for example to install high-occupancy lanes on major highways) have an ability to change the process that goes behind individual decision making, resulting in changes in consumption patterns that, in turn, change the rate of green-

house gas emissions.

So, what does this mean for municipal governments? It leads to the acknowledgement that they need to learn to identify decision making points that can have cascade effects (eg. widening a road will encourage increased driving for much longer than one fiscal year, or one electoral cycle). Local governments will need to identify the kind of policies that can be effective at the municipal scale. In addition, they will need to consider what effects those policies will have in at least the next higher and next lower scales (i.e. the neighbourhood or household, and the region or province). They should also use the means at their disposal to promote the awareness of different scales of action among more senior governments. All governments need to realize that their actions will have consequences on multiple levels as a first step toward taking coherent action on the wicked problem of climate change. MW

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