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UNCOVERING THE IMPLICATIONS OF THE PARIS AGREEMENT

CLIMATE CHANGE AS A CATALYST FOR TRANSFORMATIVE SUSTAINABILITY IN CITIES

Sarah Burch

Key Points

- Synergies exist between climate change adaptation and mitigation that will help to accelerate progress toward climate change goals.
- Climate policy alone cannot deliver the transformative levels of greenhouse gas reduction and adaptation that are required to meet the goals set out in the Paris Agreement.
- Sustainability is a challenge of multi-level governance, and so requires policy coherence among municipal, provincial and federal levels of government.

Introduction: The Need for Transformative Thinking

Leaders, negotiators and scientists returned home from the recent United Nations climate change negotiations in Paris with a new mandate: to explore pathways to a world that warms no more than 1.5°C; to finance climate change adaptation and mitigation in developing countries at a meaningful pace and scale; and, ultimately, to create real policy tools that can deliver prosperity that is not so fundamentally tied to burning fossil carbon.

The Paris Agreement is historic in that it is universal (both industrialized and less-developed nations have agreed to the text), a heavy focus is placed on transparency and reporting of progress, and opportunities to periodically re-evaluate and ratchet up ambition are built into the process. The ultimate power of this agreement, however, is not in its technicalities and legal implications. Rather, the Paris Agreement represents the manifestation of collective ambition, creating and demonstrating shared norms around the reality of climate change and the responsibility to act. This international process of negotiation and commitment is triggering a wave of conversations about how to reach these ambitious greenhouse gas reduction and adaptation targets. This will require a rapid and fundamental transformation of all sectors, including the design of urban spaces and the ways in which we produce and consume energy.

Commitments made at the international level, whether in the context of binding or non-binding agreements, must be met through domestic legislation and policy efforts. The reputational penalties are likewise both domestic and international: as witnessed in the 2015 Canadian federal election, there are political repercussions at home associated with failing to meet both the target-setting and implementation obligations of an international treaty.[1] So, the challenge of meeting the Paris Agreement is one that is deeply local, and influenced by policy decisions at the federal, provincial and municipal levels. Furthermore, the scale of transformation required by the Paris Agreement suggests the need to look beyond "low hanging fruit" to holistic, systems-oriented sustainability strategies.

This policy brief examines the power of exploring synergies between responding to climate change and other development priorities in cities: in other words, can decision makers devise response strategies that are *both* adaptive and mitigative,

1 There were frequent questions and criticism during the campaign about Canada's withdrawal from the Kyoto Protocol and the level of ambition of future plans to reduce emissions.

while simultaneously creating healthy, vibrant, innovative communities? Using examples from communities around the world that take a holistic approach to sustainability rather than addressing climate change in isolation, this brief uncovers the roots of climate change co-benefits, and possible governance strategies for achieving them.

Linking Climate Change Adaptation and Mitigation

Communities, nations and individuals alike have a suite of options available to them as they consider responding to the challenge of climate change. Mitigation, the most talked-about option, involves either reducing the emission of greenhouse gases or enhancing the capacity of the planet to suck up and hold on to carbon. In other words, mitigation requires us to deal with the causes of climate change. Adaptation, in contrast, refers to addressing the impacts of climate change — protecting infrastructure, ecosystems and communities from rising sea levels, higher temperatures and changing precipitation patterns. But if a community chooses to mitigate, does this necessarily imply that the *only* result of the investment or project is reduced greenhouse gas emissions? Of course it does not, nor should it: the use of ecosystems such as wetlands to purify stormwater runoff, for instance, can also bind carbon dioxide in the living tissue of wetland plants, thus both reducing greenhouse gas emissions and responding to potential flooding events. Furthermore, these types of holistic responses can deliver other sustainability benefits as well: recreational areas that enhance public health, build community vitality and strengthen biodiversity. If synergies are not actively sought, however, crucial opportunities to pursue transformative solutions catalyzed by the climate change imperative can be missed.

Another reason exists for using a systems lens to explore sustainable community futures: actions to reduce greenhouse gases have the potential to be maladaptive, or increase vulnerability to climate change impacts (Wilbanks et al. 2007). Similarly, adaptation may yield increased greenhouse gas emissions. Examples include low-carbon energy produced by solar panels that are located in vulnerable, flood-prone areas, or the installation of air conditioners (which consume energy and produce additional greenhouse gas emissions) to address heat stress faced by elderly urban populations, respectively.

Reaching a goal of less than 1.5°C of warming, or an 80–90 percent reduction in greenhouse gas emissions this century (some might even say that "negative" emissions — sinking more carbon through afforestation or carbon capture and storage than we produce through fossil fuel combustion — is required), however, cannot be reached without addressing the underlying drivers of emissions.

Climate Policy Alone Won't Deliver Transformative Reductions in Greenhouse Gas Emissions

The causes and consequences of climate change pervade the socio-economic and cultural fabric of nations, cities and societies. Patterns of development, deeply rooted in values and worldviews, fundamentally shape vulnerability to climate change impacts, as well as the modes of production and consumption that give rise to greenhouse gas emissions (Shaw et al. 2014; Swart, Robinson and Cohen 2003). Demand for single-family detached homes and privately owned, single occupancy vehicles, for instance, arises out of perceptions of affluence and security, while resulting in low-density development often reliant on fossil fuel consumption. In other words, as demonstrated by nearly a decade and a half of research, the barriers to transformative action on climate change are rarely technical or economic (Kainuma et al. 2013; Skea and Nishioka 2008), but rather related to values, governance, institutions and policy design (Burch 2010).

For this reason, the pursuit of climate solutions is fundamentally intertwined with the more transformative and multi-faceted project of sustainability, highlighting the need for creative, systems-oriented policy solutions that deliver on multiple development priorities simultaneously. Unless climate change considerations are embedded in day-to-day decisions about land-use planning, technological innovation, waste management, community health and so on, the costs of effective climate change policy will be unacceptably high (Morita et al. 2000; Swart, Robinson and Cohen 2003). For instance, an urban land-use plan that creates compact, complete communities where residences are co-located with work and recreation enables a dramatic reduction in (even elimination of) the need for vehicles. A carbon tax that penalizes personal consumption of gasoline would have to be excessively (perhaps regressively) high in order to deliver the same result (Robinson et al. 2006). Ultimately, both tools are necessary to enable sustainable behaviours as well as reduce harmful ones.

Research has shown that policies that help to pursue transformative sustainability have a number of elements in common (Shaw et al. 2014): longer time horizons (Loorbach 2010); a systems lens that reveals sources of technological or behavioural lock-in (Burch 2011; Westley et al. 2011); frequent opportunities to revisit and adapt both goals and actions designed to reach them (Armitage et al. 2009); and integrated decision making at multiple levels of government involving a variety of actors (Bulkeley and Castan Broto 2013).

Learning from Leaders: Stories of Success Are Diverse and Abundant

Communities in Canada and elsewhere need not reinvent the wheel. The power of synergies between adaptation and mitigation, and the value of taking a more holistic sustainability approach has been demonstrated. Rather, the challenge is in monitoring the success of these efforts, sharing lessons learned and adapting the tools that have been built to unique and varying contexts.

The city of Malmö, Sweden, for example, sought to respond to the dual challenges of a changing climate (leading to more severe and frequent flooding events) and socio-economic decline in one of its core neighbourhoods, Augustenborg. Residents and decision makers sought improvements to biodiversity, waste management, flood resilience and economic development — a constellation of priorities that, with clever planning, can be addressed simultaneously. In responding to these challenges, the city employed an ecosystem-based (rather than hard or "grey" infrastructure) approach: a series of constructed wetlands comprised a sustainable urban drainage system that channelled and purified stormwater, and mitigated flooding (Kazmierczak and Carter 2010). In contrast with a concrete seawall or expanded sewer system, this green infrastructure approach also delivered a host of co-benefits. Wetlands absorb greenhouse gases, provide recreational opportunities and increase the desirability of the neighbourhood through improved aesthetics (Naumann et al. 2011). It is now estimated that 90 percent of stormwater runoff from roofs and other surfaces is managed by this open drainage system (MKB and City of Malmö, n.d.), rather than burdening the combined sewer infrastructure. Biodiversity has increased by 50 percent, carbon emissions and waste decreased by 20 percent (through added green roofs and wetland plants that sink carbon, for instance), turnover of tenancies declined by 50 percent and even participation in elections increased, from 54 percent to 79 percent (Kazmierczak and Carter 2010).

The German city of Freiburg offers another example of climate change acting as a catalyst for a renewable energy transition that places the city on a development path that is radically more sustainable. The city of 220,000 inhabitants is widely regarded as an "eco-city" and a leader in pursuing transformative sustainability policies. Combined heat and power production, solar energy, extensive public transit systems and extremely rigourous building standards (following the passive house model) have transformed Freiburg's energy consumption and production (Rohracher and Spath 2012). Like Malmö, green roofs, permeable ground surfaces and natural drainage to reduce the burden on traditional sewage systems while removing carbon dioxide and creating more attractive public spaces. Environmental sustainability in Freiburg is not divorced from its social dimensions; in car-reduced neighbourhoods such as Vauban, efforts are made to encourage aging in place, the attraction of younger residents and community building (Hamiduddin 2015).

Examples of a broader sustainability lens, catalyzed, in part, by climate-change-related concerns, exist in Canada as well. In British Columbia, for instance, the cities of North Vancouver, Vancouver, Revelstoke and Victoria have chosen to pursue integrated approaches to sustainability that are more likely than traditional siloed climate change policies to reveal powerful synergies between adaptation, mitigation, biodiversity, economic prosperity, human health and a host of other priorities (Shaw et al. 2014). Networks that link these cities, such as ICLEI Local Governments for Sustainability[2] and C40 Cities Climate Leadership Group,[3] may yield exciting results as the urban implications of the Paris Agreement crystallize and lessons in sustainability transformation are shared among actors that face similar challenges and opportunities.

It is important to recognize, however, that these examples of leadership remain the exception rather than the rule, even in Sweden and Germany. Cultural differences around energy use, urban design that fosters mass transit use, varying demands for material consumption and tax structures that directly incentivize conservation have combined to stimulate pervasive renewable energy and sustainable community design transitions in these cities. The challenge becomes mapping the first steps, or most important early triggers, of transitions in communities that have yet to pursue a sustainability agenda. It is clear that these triggers or tools include, among others, a price on carbon (Potvin et al. 2015), long-range integrated sustainable community plans (Shaw et al. 2014) and using new visioning techniques to explore both desirable and sustainable futures (Sheppard 2012).

Policy Recommendations

The ambitions set out in the 2015 Paris Agreement will not be met without transformative levels of climate change adaptation and mitigation.

Incremental greenhouse gas reductions, such as those obtained through modest efficiency gains in a system still fundamentally dependent on fossil fuels will not lead to mitigation of the pace and scale required to constrain warming to less than 1.5°C,

2 ICLEI Local Governments for Sustainability is an international network of cities that promotes sustainability by sharing resources and tools, and connects cities that face similar challenges.

3 C40 Cities Climate Leadership Program connects mega-cities around the world to accelerate climate change mitigation and adaptation. C40 facilitates dialogue among city officials, assesses the various actions that cities are taking, collects case studies and enables measurement of both emissions and climate change impacts.

an ambitious goal explored during the Paris climate change negotiations.

Technologies already largely exist that can deliver a carbon neutral (or carbon negative), resilient world. The challenge of transformative sustainability is one of political will, governance and values.

As such, visioning processes need to be implemented at all levels of government to engage citizens in a meaningful and creative conversation about what communities can and should look like in the future, and how to accelerate the uptake of sustainable technologies and behaviours.

Green infrastructure provides important opportunities to exploit synergies between climate change adaptation and mitigation.

Ecosystems provide multiple co-benefits: carbon capture and storage; water purification; biodiversity enhancement; attractive spaces to play; and protection from some of the impacts of climate change. Constructed wetlands, green roofs and walls, re-wetting of peatland, urban forest enhancement and other ecosystem-based strategies promise to accelerate sustainability transitions.

Long-range sustainability planning opens up the opportunity to design communities that are healthier, more prosperous and more environmentally sustainable.

Ultimately, the challenge of limiting warming to less than 2°C requires a vision of the future that is radically different from the path that most communities are following today. Plans must think beyond electoral cycles to assess whether decisions made today put communities on the path toward deeply sustainable futures, within a time frame that avoids the worst of projected climate change impacts. Without integrated long-range sustainability plans, it is likely that valuable opportunities for achieving co-benefits will be missed.

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About the Author

Sarah Burch is a CIGI senior fellow with the Global Economy Program, where she is contributing to research on financing sustainable development, focused on the exploration of innovative solutions to address challenges associated with climate change and sustainability.

Sarah is an assistant professor with the Department of Geography and Environmental Management in the Faculty of Environment at the University of Waterloo. In this capacity, Sarah helped launch a Master of Climate Change program, in which she has taught courses on climate change governance and mitigation. She has also conducted extensive research on climate change policy, urban planning and responses to climate change, and renewable energy. Sarah has been published in a wide range of distinguished academic journals. Sarah is a coordinating lead author of the *Second Assessment Report on Climate Change and Cities*, and was a contributing author to the *Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (winner of the Nobel Peace Prize in 2007). In her role at the University of Waterloo, Sarah is investigating the relationship between public and private sector actors to trigger transformative shifts toward more sustainable development pathways.

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Advancing Policy Ideas and Debate

The End of the Beginning: Paris COP 2015

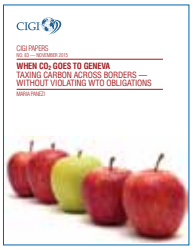
CIGI Special Report
David Runnalls

The Paris Conference of the Parties 2015 is designed to produce the next round of climate change action. There are reasons to believe that the chances for success at the multilateral level are better now than they were before, but even under the most optimistic scenarios, Paris will not be the end of the negotiations. The Paris summit will be crucial to maintaining the momentum that has been building in the private sector and civil society on the issue of climate change.

Assessing the Governance Practices of Sustainability Reporting

CIGI Policy Brief No. 71
Jason Thistlethwaite and Melissa Menzies

To promote climate change risk mitigation in financial markets, the Financial Stability Board recently proposed the creation of a Climate Disclosure Task Force, coordinated through the G20, to develop standards for companies to disclose their exposure to climate change risks. With more than 400 existing disclosure schemes, this task will be challenging. This brief identifies the key categories of governance practices that must be addressed, how these divergent practices challenge end-users, and how the establishment of criteria that define effective and efficient reporting is a critical first step for the Climate Disclosure Task Force.



When CO_2 Goes to Geneva: Taxing Carbon Across Borders — Without Violating WTO Obligations

CIGI Papers No. 83
Maria Panezi

Carbon taxes are relevant to international trade when they are coupled with border tax adjustment (BTA) legislation for imported products. BTAs are intended to level the playing field between domestic and foreign products. Such tax schemes, if not designed properly, however, can be found to violate a country's international commitments before the World Trade Organization (WTO). This paper argues that environmentally conscious governments can design a WTO-compatible BTA to offset domestic CO_2 legislation.

Growth, Innovation and Trade in Environmental Goods

CIGI Policy Brief No. 67
Céline Bak

Reporting on global trade in environmental goods would provide a comprehensive lens into diversification that will be needed for the transition to low-carbon economies, help countries benchmark the shorter- and longer-term impact of policies such as regulation and fiscal stimulus targeted at green growth, as well as innovation, and strengthen the G20 leaders' commitment to inclusive and sustainable growth by providing visibility into the pace of investments to address climate change.

Climate Change and Human Rights: How? Where? When?

CIGI Papers No. 82
Basil Ugochukwu

Actions taken to mitigate and adapt to the adverse impacts of climate change must be centred on human rights. In negotiations for a binding international climate change instrument, nation states have been called upon to fully respect human rights in all climate-related actions. As important as this demand is, there is also the need to describe and plan how human rights can be integrated into national, subnational and corporate climate change strategies. This paper analyzes a few examples of national, subnational and corporate climate change policies to show how they have either enshrined human rights principles, or failed to do so. It also examines the challenge of integrating human rights principles in climate change actions.

Global Treaty or Subnational Innovation? Canada's Path Forward on Climate Policy

CIGI Policy Brief No. 66
Sarah Burch

Canada's position on climate change is deeply contentious and constantly evolving, and presents a challenge of multi-level governance (across sectors, civil society and multiple levels of government). This policy brief describes examples of innovative climate change policy at the subnational level, articulates the roles played by different levels of government, and provides a series of recommendations on pathways to carbon-neutral, resilient communities.

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Le CIGI a été fondé en 2001 par Jim Balsillie, qui était alors co-chef de la direction de Research In Motion (BlackBerry). Il collabore avec de nombreux partenaires stratégiques et exprime sa reconnaissance du soutien reçu de ceux-ci, notamment de l'appui reçu du gouvernement du Canada et de celui du gouvernement de l'Ontario.

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