

# Canada - Germany

## Cities and Climate Change Research Brief



# Acknowledgements



This research brief was made possible with funding from the Konrad Adenauer Foundation (Konrad-Adenauer-Stiftung). KAS is committed to achieving and maintaining peace, freedom and justice through political education. KAS promotes and preserves free democracy, the social market economy, and the development and consolidation of the value consensus.

ICLEI acknowledges the following who graciously shared their experience and knowledge to help shape this resource. The insights they provided are based on their own experience and do not necessarily represent the opinions or positions of their respective institutions:

- Abba Hann, Natural Resources Canada Office of Energy Efficiency
- Anja Bierwirth, Wuppertal Institute
- Beate Lange, City of Bremen
- Chris Caners, SolarShare
- Christine Behrisch, City of Munich
- Christine Schimpfermann, City of Regensburg
- Constanze Böning, German Corporation for International Cooperation (GIZ)
- Dirk von Bracht, City of Dortmund
- Gerhard Schlaudraff, Embassy of the Federal Republic of Germany
- Hanna Rhein, Deutsche Umwelthilfe
- Hemant Grover, Region of Peel
- Jason Owen, City of Surrey
- Katja Müller, Competence Center for Public Economy, Infrastructure and Public Services (KOWID), and the Saxon State Ministry for Regional Development
- Kevan Marshall, Region of Waterloo
- Kevin Lockhart, Efficiency Canada
- Lizzi Sieck, German Environment Agency
- Mickael Brard, Formerly with Jalon
- Nancy Lea Smith, The Center for Active Transportation
- Nicolai Pogadl, Canadian German Chamber of Industry and Commerce
- Oscar Espinosa, Low Carbon Cities Canada
- Ralph Matousek, Municipality of Rosenberg
- Silja Fischer, Embassy of the Federal Republic of Germany
- Stefan Synek, City of Munich
- Stuart Galloway, Energy Services Association Canada
- Thomas Mueller, Canadian Green Building Council
- Waleed Giratalla, Federation of Canadian Municipalities
- Yves Sagnières, Coop Carbone

This publication was researched and authored by the staff of ICLEI Canada and ICLEI Europe.

Recommended Citation: ICLEI Canada and ICLEI Europe, Cities and Climate Change Research Brief - Canada - Germany, Toronto, Canada & Freiburg, Germany, November 2021.

# Message from Our Leaders

Climate change is undisputedly one of the greatest challenges facing mankind. The international discourse on this topic is complex and often polarizing. The numerous opinions and solutions proposed by experts are not infrequently contrasted by a public that wants implementable strategies for overcoming the climate crisis, strategies that ideally should have been developed taking into account the living conditions of people in their various contexts.



This is where cities and other local governments come into play – local units at the lower hierarchical levels of each nation state whose elected representatives – municipal and city councils as well as mayors – are usually closest to the reality of people's lives and stand for pragmatic, implementable and therefore promising solution strategies, not only in environmental and climate protection. Not for nothing is it said that "all politics is local."

Canada and Germany have much in common in a rapidly changing world. Not only do both countries share a common set of values as liberal democracies governed by the rule of law. They have a vital interest in maintaining and consolidating a rules-based international order that uses the instrument of multilateralism to solve problems at hand. It is therefore worthwhile for both countries to cooperate closely in the area of climate protection as well. This also applies analogously to the municipal levels of both countries.

The Konrad-Adenauer-Stiftung (KAS) has always been committed to the basic principle of subsidiarity, which means that the level of regulatory competence should always be "as low as possible and as high as necessary". Higher state institutions should only intervene in a regulatory way if the possibilities of the individual, a smaller group or lower hierarchical level alone are not sufficient to solve a certain task. The principle of subsidiarity is an important concept for federal states such as Germany, Austria, the United States or Switzerland, as well as for federal associations of states such as the European Union. It is also a central element of the regulatory concept of the social market economy.

It is therefore to be welcomed if the approaches of local authorities in general, and those in Canada and Germany in particular, to meeting the challenges of climate change are given greater attention and made accessible to a wider public. This publication, among others, serves this goal. KAS is very grateful to our competent and proven partner ICLEI for the good cooperation in this project. We wish this paper a broad and interested readership.

**NORBERT ESCHBORN**  
**DIRECTOR, KAS CANADA**

# Message from Our Leaders

Climate change is one of the defining issues of the 21st century. The latest Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) stressed that 1) the impacts of a changing climate are already being felt in every region of the world, 2) climate change is unequivocally caused by human activity, 3) we are getting closer to irreversible climate tipping points, and 4) we need to rapidly reduce greenhouse emissions now for the world to stay within 1.5 degrees of warming.

Virtually every sector of society has a role to play in a problem as complex and transcendent as climate change. The November 2021 COP 26 Glasgow Climate Pact explicitly called out multilevel, cooperative action, and the role of local and regional governments in advancing and implementing climate goals. The preamble of the Pact makes this explicit reference, “Recognizing the important role of indigenous peoples, local communities and civil society, including youth and children, in addressing and responding to climate change, and highlighting the urgent need for multilevel and cooperative action,”.

As the lowest level of governance, particularly in western liberal democracies, cities have a strong role to play. Digitalisation and the fight against climate change or the even wider ecosystem crisis, will ask for potentially disruptive changes that will not find easy acceptance in the population. Therefore, real experiences of impacts and benefits, testing and laboratories in cities are important elements to find this acceptance based on participation and a more direct democratic experience at the local level. In consequence, to stabilise liberal democracies, the role of local governments in the multilevel governance system needs to be strengthened.

Canada and Germany both have a long history of action on climate change at the international and national levels, as well as the local level. This Cities and Climate Change Research Brief shines a light on these experiences and explores opportunities for multilateral cooperation on climate change action at local level. We highlight the key thematic policy and programming mechanisms being used by local governments in both Canada and Germany. We explore how policies, programming and practices compare and contrast, what makes them effective in their countries, and which elements or insights might be transferable to other countries. To rapidly reduce greenhouse gas emissions and stay within 1.5 degrees of warming, we must act quickly and draw from the best Canada and Germany have to offer.

As an international city network, ICLEI highly values the learning and advancement that comes from multilateral cooperation. Our global network of more than 2500 local and regional governments influence sustainability policy and drive local action for low emission, nature-based, equitable, resilient and circular development. Our Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability. ICLEI is pleased to collaborate with Konrad-Adenauer-Stiftung (KAS) to produce this Canada-Germany Cities and Climate Change Research Brief and looks forward to continued collaboration to reach Canada and Germany's mutual climate goals.



**MEGAN MEANEY AND WOLFGANG TEUBNER**  
**EXECUTIVE DIRECTORS OF ICLEI CANADA AND ICLEI EUROPE**

Introduction .....	5
Overview of Local Governments and Climate Action .....	8
Canada.....	8
Germany .....	9
Energy Performance in Buildings .....	13
Energy Efficiency Retrofitting .....	13
Germany .....	13
Canada .....	14
New Buildings .....	16
Germany .....	16
Canada .....	17
District Planning and Infrastructure .....	18
Germany .....	18
Canada .....	18
Smart Solutions and Digitalization .....	19
Germany .....	19
Canada .....	20
Mobility and Transport .....	24
Introduction .....	24
Local Government Area of Influence .....	24
Key Policy and Programing Mechanisms in Place .....	25
Active Transport in Canada .....	25
Active Transport in Germany .....	26
Distribution of Goods in Canada .....	27
Distribution of Goods in Germany .....	27
Electric Vehicles in Canada .....	28
Electric Vehicles in Germany.....	29
Intra-Country Compare and Contrast.....	29
Potential Focus Area for Intra-country Exchange .....	30
Just Transition .....	33
Just Transition in Canada.....	33
Energy Poverty & Climate Impacts .....	34
Implementation and Promising Practices.....	34
Just Transition in Germany.....	35
Energy poverty .....	36
Just coal transition.....	36
Implementation and Promising Practices.....	37

Intra-country compare and contrast.....	38
Potential focus area for intra-country exchange.....	38
Climate Change Adaptation .....	42
Introduction .....	42
Relationship with Climate Mitigation .....	42
Governance Context and Policy Direction on Adaptation .....	42
Canada .....	42
Germany .....	42
Two approaches: Planning and service delivery .....	43
Planning Approaches .....	43
Service delivery or Operations-based Approaches .....	43
Local Government Areas of Influence in Adaption.....	45
Asset Management .....	45
Land-use planning .....	45
Emergency Management .....	45
Health and Well-being.....	46
Funding Mechanisms.....	46
European Union .....	46
National.....	46
Sub-National .....	46
Third-party Funding.....	47
Internal and Revolving Funding Mechanisms .....	47
Opportunities in Canada and Germany .....	47
Challenges in Canada .....	48
Promising Practices .....	49
Selkirk, Manitoba .....	49
Windsor, Ontario.....	49
Dortmund, Germany.....	49
Regensburg, Germany.....	49
Intra-country Compare and Contrast .....	49
Potential Focus area for Intra-country Exchange.....	50
Emerging Action Areas .....	54
Low Carbon Resilience .....	54
Energy Communities/Energy Co-operatives.....	54
Nature-Based Solutions .....	56
Climate Emergencies .....	57
Circular Economy .....	57

Embodied Carbon.....	58
Carbon Budgeting .....	58
Migration.....	59
Climate Related Financial Disclosure.....	59
Conclusion and Recommendations .....	62

# Introduction



## Introduction

The COVID-19 pandemic has challenged traditional multilateral cooperation mechanisms due to travel restrictions and virtual meeting fatigue. However, the pandemic has not stopped the need for such cooperation. This research brief is intended to lay a strong foundation for mid-and long-term multilateral cooperation between Germany and Canada on the theme of cities and climate change. Cities in both countries have a long history of action on climate change, yet there is little mutual awareness of the unique climate change policy and programming between the respective countries, or the opportunities multilateral cooperation might present. Through the Cities and Climate Change Research Brief we highlight the key thematic policy and programming mechanisms being used by local governments in both Canada and Germany to address climate change. The research brief answers questions such as: What are the promising practices in each country? How do the policies, programming and practices compare and contrast? What makes them effective in their countries, and which elements or insights might be transferable from one country to another?

This report is targeted at a variety of audiences:

- International foundations, NGOs, or embassies and consulates supporting climate policy development in Canada and Germany.
- Municipalities in both Canada and Germany interested in developing a deeper understanding of international climate governance and practice drawing from best and promising practices.
- National and sub-national governments supporting international relations and/or advancing climate change policy and practice among local governments.

This research brief builds on a long foundation of multilateral cooperation between Germany and Canada. Both countries are committed to bolstering multilateralism and rules-based international order, as demonstrated recently through participation in the [Alliance for Multilateralism](#). Long-standing partners in the North Atlantic Treaty Organization (NATO), Canada and Germany cooperate on security and defense issues, and are also both members of the G7 and G20, the Organisation for Economic Co-operation and Development (OECD) and the World Trade Organization (WTO).<sup>i</sup> The Canadian embassies can be found in Berlin, and consulates can be found in Munich and Düsseldorf, as well as an Honorary Consul in Stuttgart. The German embassy is in Ottawa and consulates can be found in Toronto, Montréal and Vancouver. The German Academic Exchange Service (DAAD) and Goethe Institute also have offices in Canada.

Germany and Canada have long cooperated on energy and climate change issues and signed a bilateral Memorandum of Understanding (MOU) on the establishment of an [Energy Partnership](#) in March 2021. The Energy Partnership will foster the energy transition through exchanges on policy, best practices, and technologies as well as through cooperative activities and projects focused on i) Energy policy, planning and regulations, ii) Resilient electricity systems, iii) Energy efficiency, iv) Sector coupling and low carbon fuels, and v) Innovation and applied research.<sup>ii</sup> The Energy Partnership builds upon the work of the Transatlantic Climate Bridge (TCB), established in 2008 to stimulate and expand transatlantic exchange on climate and energy policy between Germany, USA and Canada. The TCB is supported by Germany's Federal Foreign Office, Federal Ministry for the Environment and the foreign missions in North America. Most recently, Canada and Germany co-authored the [Climate Finance Delivery Plan](#) upon the invitation of the COP 26 Presidency, demonstrating how and when developed countries will meet their US\$ 100 billion international climate finance goal.

At the local government level there have been some limited multilateral cooperation opportunities between German and Canadian communities. Local government networks and international organizations have organized exchanges via programmes like the [World Cities Programme](#), the [International Urban and Regional Cooperation Programme](#), the [Global Covenant of Mayors](#), [Renewable Cities](#), [Local Renewables](#) and numerous other international networking events. These programmes and events were not focused exclusively on Canada - Germany relations, but often included such elements.

With such a long history of national level multilateral cooperation and shared interest in energy and climate change issues, there is great opportunity for local government multilateral cooperation as well. This research brief helps to set the stage for such collaboration by focusing on how climate change is being addressed at the local level in each country and identifies areas for collaboration under the themes of i) energy performance in buildings, ii) mobility and

transportation, iii) just transition and iv) climate adaptation. There is also a chapter on emerging action areas, where newer trends and thematic areas of activity are starting to take shape.

---

<sup>i</sup> Government of Canada (2021) Canada–Germany Relations. Retrieved October 7, 2021 from <https://www.international.gc.ca/country-pays/germany-allemande/relations.aspx?lang=eng>

<sup>ii</sup> Department of Natural Resources Canada and Federal Ministry for Economic Affairs and Energy in the Federal Republic of Germany (2021). The Establishment of an Energy Partnership. Retrieved October 6, 2021 from <https://local-renewables-conference.org/freiburg-and-basel-2018/home/>

# Overview of Local Governments and Climate Action



## Overview of Local Governments and Climate Action

### Canada

In Canada, there are three orders of government: federal, provincial/territorial and local/municipal. The Canadian Constitution defines local governments as 'creatures of the provinces', therefore the areas of local government jurisdiction are determined by the country's 10 provinces and 3 territories. Local governments can take the form of cities, towns, villages, regional authorities, upper tier, lower tier, etc. For the purposes of this research, this area of governance is referred to as local governments or municipalities. There are approximately 3,570 municipalities in Canada, 54 of which are above 100,000 in population.<sup>iii</sup>

The powers and functions of municipalities are formed by a charter or act granted by the provinces or territories. While their areas of jurisdiction differ, they generally include: land-use planning and development; water, waste-water and sometimes electrical and natural gas utilities; emergency management services, police, fire and ambulance; road safety and maintenance; public transit; property taxation; education management or funding school boards.

Canada's national response to climate change is affirmed by a commitment to the Paris Agreement, and a goal of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C. In November 2020, the [Canadian Net-Zero Emissions Accountability Act](#) was introduced to parliament, formally committing Canada to achieving net-zero emissions by 2050. The next month, an updated plan to realize this goal was released, known as [A Healthy Environment and a Healthy Economy](#). In April 2021, at the Leaders' Summit on Climate, Canada announced its enhanced target to reduce domestic greenhouse gas emissions by 40 to 45 percent below 2005 levels by 2030. And finally, on June 29, 2021, the Canadian Net-Zero Emissions Accountability Act received Royal Assent.

Canada's federal government reports its progress in achieving its climate goals to the international community via its [INDC \(International Nationally Determined Contribution\) Submission to the UNFCCC \(United Nations Framework Convention on Climate Change\)](#) as well as its [National Inventory Reports](#). The INDC report outlines the regulator approach being taken, the conditions of the commitment and the NIR provides a detailed presentation and analysis of GHG emissions and trends.<sup>iv</sup> Canada's total GHG emissions are 730 Mt, slightly less than 1.5% of the global total (from 2019, the most recent dataset). Overall progress to date is a net decrease of 9 Mt or 1.1% from 2005 emissions.<sup>v</sup>

In Canada, climate change is considered a shared responsibility that requires action from all levels of government. Canadian provinces and territories have jurisdictional authority over the fields of natural resources, energy and many aspects of the environment. Each province and territory has its own legal framework, policies and measures in place to reduce GHGs. While municipalities are not formally recognized as part of Canada's INDC or national plans to address climate change, they have demonstrated their voluntary commitment to act on climate change and reduce GHG emissions. Over [500 municipalities](#) have formally declared climate emergencies, and over 450 have joined the [Partners for Climate Protection](#) program to build capacity and support them in realizing their climate mitigation goals. There are numerous climate-oriented municipal communities of practice, programs and collaborations happening at the regional, provincial, territorial, national and international levels.

The mechanisms through which municipalities receive support and finance their climate work varies. The Federation of Canadian Municipalities (FCM) is a national advocacy group that represents the interests of municipalities at the national level. Federal government funds directed to municipalities for sustainability and climate activities typically go through FCM, through programs like the Green Municipal Fund, the Municipal Asset Management Program and the Municipal Climate Innovation Program. Alternatively funds may go directly to municipalities for climate projects via Infrastructure Canada programming or Gas Tax funding. Provincial governments also fund climate planning, programming and projects through many different mechanisms such as Ontario's Municipal Energy Plan Program, Alberta's Municipal Climate Change Action Centre and Quebec's Climate Municipalities Program.

## Germany

Unlike in Canada, the German governance framework consists of four administrative levels, the national, the federal (states, Länder), the regional (counties and districts) and the local level (cities and municipalities). There are 16 states, 401 districts and independent cities and approximately 10,800 cities and towns, of which 80 have 100,000 or more inhabitants. Adhering to the subsidiary principle, there is a complicated distribution of responsibilities among government levels. While the national level takes charge of key laws, regulations and fiscal policies, the federal (province) level is tasked with e.g. education or police laws. The federal level is also mandated with the local (district and municipal) constitution which outlines key rights and responsibilities. Key municipal tasks include the provision of services of common interest, e.g. housing, water supply, sanitary infrastructure, heating, waste collection. Funds are passed down from the national level to the states, which distribute them among regions and municipalities.

The national level is, as part of its obligations within European and international governance frameworks (EU, UNFCCC), the sole entity setting climate targets and negotiating emission reduction trajectories. The local level plays only a marginal role in national plan or NDC development due to the fact that the German contribution is determined through the EU-wide NDC. It is estimated that the annual municipal share in country-wide emissions is sizable with around 100 Mt of CO<sub>2</sub> eq.<sup>vi</sup> The local level engages in voluntary climate action planning and implementation with varying levels of ambition.<sup>vii</sup>

The [National Climate Initiative](#) (NCI), a federal entity, finances municipal climate protection concepts (though not climate adaptation), climate managers, potential studies, energy management systems and other pilot projects. Despite these efforts, climate protection is not a municipally mandated task, which leads to a discrepancy between the expectation to implement climate action and the provision of regulatory and financial power at the local level. Nonetheless, numerous cities and regions are leading the way and taking responsibility. The state of Baden-Württemberg, for instance, has adopted its own Climate Protection Law, making heating planning mandatory for most cities in the region. Meanwhile, cities like Mannheim, Essen, Bonn, Hamburg, etc. have decided to become climate neutral by 2050 or earlier. Furthermore, over 70 German cities have declared a climate emergency, calling for a paradigm shift in administrative and council practices, as well as among citizen lifestyles.

The most important mechanisms of climate funding and multi-level governance (MLG) in Germany include the aforementioned Climate Protection Initiative, as well as Climate Active Municipalities and the European Energy Award. Most of these focus on financing, creating incentives, or the provision of consulting services, revealing a lack of political MLG formats in the sense of participatory co-creation and co-development. Regional representatives in Germany have repeatedly identified a lack of target-oriented climate action planning at the local and regional level, as well as a lack of overall coherence of plans and strategies among different government levels. In view of the current European debate on MLG, it becomes clear that such governance must be integrated both vertically and horizontally.<sup>viii</sup>

In 2016, the German government introduced the Climate Protection Plan 2050, which constitutes a key planning instrument designed to implement the Paris Agreement. The Climate Protection Plan 2050 and the Climate Protection Law (2019, amended 2021) are the main national policy documents, feeding also into the design of the German national energy and climate plan (NECP) the 5-year planning of Nationally Determined Contributions (NDCs) at European and international levels. In 2021 however, national targets were increased further, due to a lawsuit induced by climate activist groups (e.g. Fridays for Future). The thereby-revised Climate Protection Law (24. June 2021) states that emissions must be reduced by 65% in 2030 (compared to 1990) and by 88% in 2040 (see figure 2). Climate neutrality must be reached by 2045.<sup>ix</sup>

## Comparative charts of GHG emissions by sector in Canada and Germany

### Emission of greenhouse gases covered by the UN Framework Convention on Climate

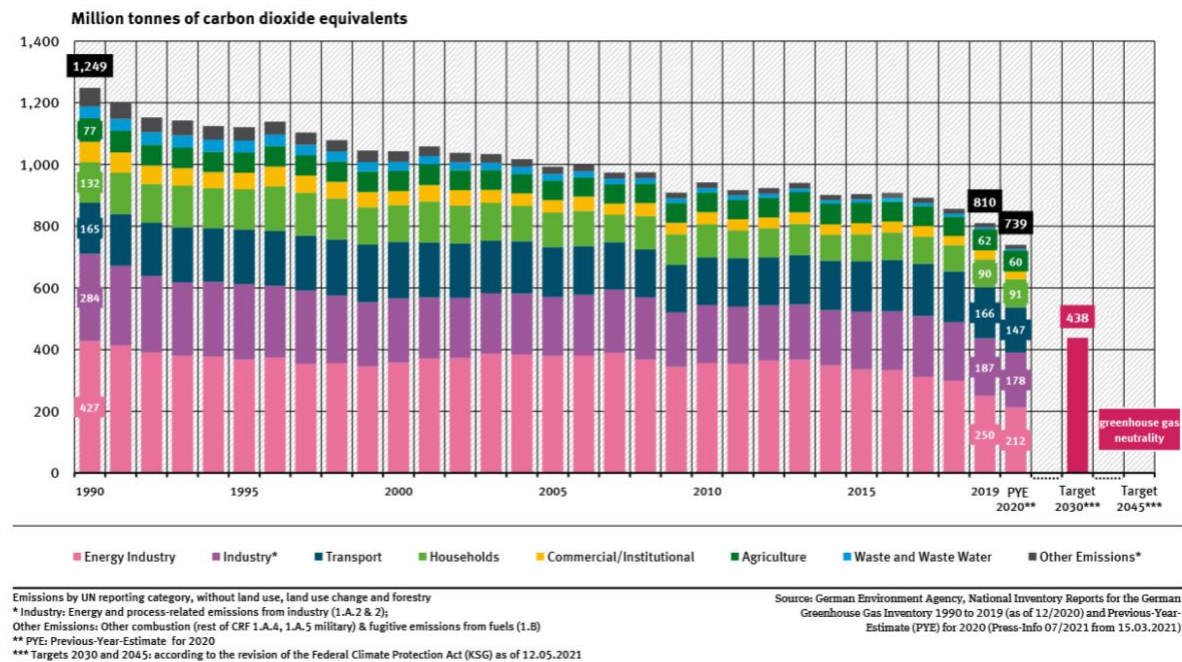


Figure 2: Source: German Environment Agency (2021).<sup>x</sup>



Source: Government of Canada (2021), Canada. 2021 National Inventory Report.

<sup>iii</sup> Wikipedia (2021), List of largest municipalities in Canada by population. Retrieved September 7, 2021 from [https://en.wikipedia.org/wiki/List\\_of\\_the\\_largest\\_municipalities\\_in\\_Canada\\_by\\_population](https://en.wikipedia.org/wiki/List_of_the_largest_municipalities_in_Canada_by_population)

---

<sup>iv</sup> Government of Canada (2021), Canada's INDC Submission to the UNFCCC. Retrieved September 7, 2021  
<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Canada%20First/INDC%20-%20Canada%20-%20English.pdf>

<sup>v</sup> Government of Canada (2021), Canada. 2021 National Inventory Report. Retrieved September 6, 2021  
<https://unfccc.int/documents/271493>

<sup>vi</sup> German Environment Agency (2021), forthcoming

<sup>vii</sup> Climate Action Alliance <https://www.bmu.de/themen/klimaschutz-anpassung/klimaschutz/nationale-klimapolitik/aktionsprogramm-klimaschutz/aktionsbuenndnis-klimaschutz>

<sup>viii</sup> Adriázola, P., Dellas, E., Tänzler, D., 2018. Multi-Level Climate Governance Supporting Local Action. Instruments enhancing climate change mitigation and adaptation at the local level and ICCA (2019) Heidelberg Outcomes. Retrieved October 7, 2021 from <https://www.icca2019.org/wp-content/uploads/ICCA2019-Heidelberg-Outcomes-English.pdf>

<sup>ix</sup> Federal Ministry for Economic Affairs and Energy [www.bmwi.de](http://www.bmwi.de)

<sup>x</sup> German Environment Agency (2021) Emission of greenhouse gases covered by the UN Framework Convention on Climate. Retrieved September 2021 from: <https://www.umweltbundesamt.de/en/data/environmental-indicators/indicator-greenhouse-gas-emissions#at-a-glance>

# Energy Performance in Buildings



## Energy Performance in Buildings

Increasing the energy efficiency of new and existing building stock is recognized as a critical pathway to reaching Canada's and Germany's respective national GHG targets. In Germany, an estimated 16% of GHG emissions can be attributed to the building sector.<sup>xi</sup> Energy efficiency standards have contributed to emissions from buildings dropping from 210 million tCO<sub>2</sub>e in 1990 to 120 million in 2018,<sup>xii</sup> yet even greater efforts will be required to drive emissions down to the nationally targeted 67 million tCO<sub>2</sub>e by 2030.<sup>xiii</sup> Against this backdrop, national policy makers in Germany are redoubling their efforts to improve the energy efficiency of buildings and catalyze the replacement of inefficient fossil fuel heating systems. In Canada, buildings accounted for 12% of total GHG emissions in 2019 and have increased by 27% since 1990 primarily as a result of increases in the service industry.<sup>xiv</sup> Canada's Net-Zero Advisory Body has recognized efficiency and electrification (i.e. natural gas fuel-switching) as foundational elements across all net-zero scenarios, and the federal government has recently released landmark policy and financial support for energy efficiency, although it too is recognized as being insufficient to meet national targets.<sup>xv</sup>

In Canada, while reliant on provincial building code regulations and land use planning legislations, municipalities are well positioned to improve building efficiency due to their ability to set land use planning policies, work with developers to provide high performance buildings and influence the form and design of the built environment. They have played an integral role in improving building energy performance by establishing retrofit financing programs, implementing green development standards, establishing support and awareness campaigns, as well as through retrofitting and building municipal buildings to high efficiency standards. Federal and provincial funding has also played an important role in enabling municipal energy efficiency initiatives.

Energy efficiency policy in Germany is strongly influenced by European agreements, with EU directives being transposed into national acts that are then translated into laws at the level of federal states. Key EU initiatives that will set the trajectory of building regulations include the [EU Green Deal](#), the [European Renovation Wave](#) and the [Fit for 55](#). Whilst influence on overarching policy making is largely limited to consultation process inputs and advocacy, German counties, districts and municipalities do have considerable leverage to enhance the sustainability performance of building stock in multiple domains. In the context of new construction, for instance, local governments can specify ambitious requirements in land sales contracts and are key actors in establishing citizen advice and support services to raise local energy retrofit rates. Another area where subnational governments play an important role relates to strengthening the supply-side in the construction and renovation market: by creating demand via sustainable procurement practices and rolling out training schemes to re- and upskill professionals in the construction industry.

## Energy Efficiency Retrofitting

### Germany

#### [Local government areas of influence](#)

Against the backdrop of EU, national<sup>xvi</sup> and regional frameworks, local governments are driving the decarbonisation of the building stock in multiple ways in Germany. Areas where cities can be considered change agents in the retrofit market include the deep retrofitting of public buildings (introducing sustainable public procurement practices), the establishment of local retrofit programs, launching initiatives to train stakeholders in the retrofit market value chain, operationalizing citizen advisory hubs and carrying out awareness raising campaigns.

#### [Key policy and programming mechanisms in place](#)

Mechanisms to increase the rates of deep retrofits in Germany can be said to be quite advanced, particularly when compared to many European peers. Regulations in place to encourage retrofits and supporting financing mechanisms are well developed.

**Regulation:** The German [Building Energy Act](#) (GEG) was passed in 2020, consolidating a range of previous laws related to the energy performance of existing buildings as well as new construction. The GEG, which forms the basis for federal state laws, is in line with European directives, but is seen by some as insufficiently ambitious to decarbonise the country's building stock by 2050.<sup>xvii</sup> In accordance with the "energy efficiency first" principle and considering that over

half of final energy use in Germany can be attributed to heating buildings,<sup>xviii</sup> policy makers have mandated via building codes that heating systems in buildings must be replaced if they are older than 30 years. Further building code stipulations for retrofits pertain to insulating building envelopes, carrying out comprehensive energy audits and obtaining energy performance certification, amongst other measures.

**Grants, loans and subsidies for energy efficiency retrofits:** The national Credit Institute for Reconstruction (KfW) bank plays a key role in providing [grants and loans](#) to home and property owners seeking to increase building energy efficiency. The offerings of the KfW are administered by local banks and are complemented by further schemes of the Federal Office for Economic Affairs and Export Control (BAFA), as well as additional support from federal states. Municipalities can offer additional subsidies of their own, but instead largely focus more on supporting citizens to gain access to national or state-level funding programs.

**Private Sector Financing:** In addition to traditional financial offerings by banks and other financial actors, it is worth noting that energy service performance contracting is gaining traction in Germany, and companies engaged in various forms of such contracting were estimated to bring in revenues of between EUR 6.7 and 9.7 billion (9.6 and 14.0 billion CAD) in 2019 alone.<sup>xix</sup> Emerging innovative financing solutions such as on-bill finance or the [PACE approach](#)<sup>xx</sup> are not being rolled out in Germany. In the case of PACE it is not clear whether property owners and municipalities have an appetite for such a mechanism and in-depth research on legislative reform needs have yet to be carried out.

#### [Promising practices demonstrating potential](#)

The importance of supporting subnational governments in operationalizing retrofit programs is increasingly recognized and the KfW bank, as well as federal state schemes, have emerged to encourage their establishment. Funding for the setup and running of citizen advisory service hubs, or so-called One-Stop-Shops (OSS), deserve a special mention, as raising the awareness of homeowners and addressing barriers associated with local retrofit market fragmentation are much needed to raise energy retrofit rates. Existing funding schemes are well received at the local level, but funding timeframes can be seen as a limitation. OSSs typically require 3 years to begin to deliver significant impact, yet current financial support offerings cover a maximum of 5 years.

### [Canada](#)

#### [Local government areas of influence](#)

Canadian municipalities are important drivers of energy efficiency retrofitting and have incentivized and enabled residents and business to retrofit their buildings by establishing financing programs, leveraging federal and provincial government grants and rebates, creating awareness and providing education and support to builders and homeowners, and by demonstrating leadership by conducting deep retrofits in municipally-owned buildings.

#### [Key policy and programing mechanisms in place](#)

**Property Assessed Clean Energy Loans (PACE) and On-Bill Financing:** PACE and utility on-bill financing are emerging as key models for providing long-term financing for energy efficiency and renewable energy. While widespread in the U.S., Canadian examples of PACE implementation are limited, as programs are still emerging, though they are becoming a more common feature of municipal climate action plans. Most provinces have enabling mechanisms for PACE financing in place that allow the costs of public infrastructure to be recuperated by adding a property tax charge to adjacent properties. However changes to legislation in some provinces are still required to allow this to be applied to private property for energy efficiency upgrades.<sup>xxi</sup> Once enabled, municipalities can establish the program specifics and implement it through bylaw amendments.

Administration of PACE programs has taken different forms in Canada, including province-wide administration by third-party non-profit organizations or arm's length government agencies, and by the municipality itself. While in the U.S. many programs use third-party lenders, Canadian programs to date have used municipal government funds.<sup>xxii</sup> On-bill financing schemes have been implemented by provincial level electric utilities, as well as in individual cities in British Columbia, with some provinces experiencing success, while others did not achieve enough uptake and have since

transitioned to third-party financing models<sup>xxiii</sup>. Some municipalities have also developed Green Bond programs to finance energy efficiency and other sustainability projects using the municipalities' low cost of borrowing, with 42% of green bonds in Canada have been issued by municipalities.<sup>xxiv</sup>

**Grants, loans and subsidies for energy efficiency retrofits:** The provision of national government funding has been a key mechanism to advance energy efficiency for municipalities. National support has primarily been provided through the [Green Municipal Fund](#) (GMF), which has invested over \$1.6 Billion over 20 years for municipal projects and capacity building. The recently launched 2021 [Canada Greener Homes Grant](#) will also provide \$2.6 billion over 7 years to homeowners for efficiency retrofits through grants and interest free loans, as well as provide free energy evaluations and training for energy advisors. Provincial support for energy efficiency varies widely from province to province, however many provinces establish independent non-profit corporations or arm's length government agencies to administer energy efficiency programs, some of which have been funded by provincial carbon taxes or levies. Most electric and natural gas utilities also administer provincially funded rebates and grants and other supports and incentives for energy efficiency. Many grants and incentives target replacement of fossil fuel heating systems with electric heat pumps, however, the low cost of natural gas in Canada is still a major barrier to more widespread adoption.

**Private Sector Financing:** Development and leveraging of private sector financing models for energy efficiency is growing in Canada. Third-party clean energy financing programs are offered by banks, the Canada Mortgage and Housing Corporation, as well as by energy utilities.<sup>xxv</sup> At the municipal level, Energy Service Performance Contracting (ESPC) has been used for public buildings in some jurisdictions, however this sector is primarily driven by federal government procurements. Around \$350-\$400 million CAD (241-276 million Euro) in contracts are estimated to be signed every year.<sup>xxvi</sup> Where ESPC has been used in the apartment/condo sector, it has been mainly for public housing agencies. ESPCs have also been most widely used in Quebec, particularly in the commercial and industrial sectors.

#### [Promising practices demonstrating growth and potential](#)

The establishment of [SOFIAC](#) in Quebec at the beginning of 2021 from a partnership between the Ministry of Energy and Natural Resources, an energy efficiency consulting company and a capital investment firm is showing promise to increase the uptake of ESPC in the commercial and industrial sector through the use of alternative financing models. In Ontario, [Efficiency Capital](#) has begun targeting the wider multi-unit residential building market outside of the public housing sector. At the municipal level some cities are currently considering the use of the ESPC model to retrofit their municipally-owned building portfolios.

Establishment of non-profit organizations by municipalities and partnerships with existing ones to oversee long-term implementation of climate action over political cycles and to incubate and scale up innovative ideas is growing in popularity. Due to the success of this model, pioneered by the Toronto Atmospheric Fund (TAF), the [Low Carbon Cities Canada](#) program is funding the establishment of similar organizations in 6 other communities.

Canada has also recently established a public investment bank, the [Green Infrastructure Bank](#) (GIB), similar to the German KfW model, which has earmarked \$2 billion for large-scale energy efficiency projects in public and commercial buildings, and is intended to create a self-perpetuating model for private sector investment. The federal government also aims to create retrofit codes and standards that can be adopted by the provinces and territories.<sup>xxvii</sup>

British Columbia and Ontario have piloted the Energiesprong model from the Netherlands for scaling up deep retrofits using prefabricated construction materials and aggregating retrofit opportunities to present equipment suppliers and constructors with a large enough demand that encourages them to consider large-scale investment in providing technical solutions.<sup>xxviii</sup>

#### [Intra-country compare and contrast](#)

Energy contracting for retrofits is experiencing growth in both Canada and Germany. Canada may be more advanced in rolling out PACE and is focused on creating an EE market and scaling up private financing models whilst Germany stands out for its very comprehensive national funding programme and clear direction provided by the Long-term Renovation Strategy. In both countries, public funding alone will not suffice to drive decarbonisation by 2050, and therefore the

setting up of OSSs in Germany and establishment of non-profits at the municipal level in Canada can be seen as useful efforts to drive greater private investment.

#### Potential focus area for intra-country exchange

An intra-country exchange on the financial support frameworks to catalyse on-the-ground energy retrofits would certainly be a great opportunity for mutual learning. Germany's KfW bank and BAFA retrofit funding programs could be discussed in more detail and inform the development of similar schemes in Canada such as the GIB. Equally, a discussion of Canada's public grant system and experience in rolling out market-based approaches could provide valuable insights for experts in Germany. Further potential areas for future exchanges include contracting approaches / ESCO models, approaches to one-stop shops, citizen advisory hubs and awareness campaigns, municipal roles in aggregating retrofit projects to make these more "bankable", as well as the role of Energy Performance Certificates or home labelling schemes in Canada and Germany.

### New Buildings

#### *Germany*

##### Local government areas of influence in thematic area

Local governments are tasked with the enforcement of federal state codes and are relatively limited with regard to setting higher performance requirements for new buildings. A case where local governments in Germany can influence minimum standards of new construction is when land is owned by a municipality itself. In such cases, sales contracts for land parcels can include stipulations that go beyond those mandated at a state level. Another important area where local authorities have control over the design and performance of buildings is where they are publicly owned (e.g. public administration buildings, schools, etc.). Here, local governments in Germany are increasingly introducing sustainable public procurement practices, to ensure that sustainable construction approaches and materials are used.

##### Key policy and programming mechanisms in place

**Regulatory:** The nationally developed Model Building Code (Musterbauordnung) provides a framework for federal states to develop their respective building codes governing how and to what specifications new buildings must be erected at a local level. Furthermore, the German DIN standards clarify how building products, building elements and construction systems are to be specified. The GEG defines the maximum calculated energy use a new building may have to be approved and also sets minimum levels of energy consumption from renewable sources.

For new construction, building codes stipulate that a minimum percentage of the calculated thermal energy consumption of a building must be drawn from renewable sources, unless a building is connected to a district heating network. These regulatory conditions serve to catalyse the adoption of lower carbon heating systems, yet it is unclear whether current requirements are sufficiently strict to achieve the needed decarbonisation rates in the sector.

Grants, loans and subsidies for new construction: As with retrofitting buildings, the national KfW bank is the central institution offering schemes to incentivize sustainable construction that goes beyond minimum requirements. The bank offers a range of programs to increase energy efficiency, encourage the specification of low- or zero-carbon heating systems and encourage building-integrated renewable energy generation.

##### Promising practices demonstrating growth and potential

Supporting innovation, skills development and talent-attraction for the construction industry are areas where the EU, national government and federal states are, and must, continue to be very active. National funding schemes, such as the EnEff.Gebäude.2050 (2018), the EU Horizon Europe funding program, and initiatives to re- or upskill construction industry actors (by the German government, as well as via the European DG<sup>1</sup> Grow) are key to paving the way for a decarbonized built environment.

---

<sup>1</sup> Directorate-General, functioning similar to a national ministry, but EU-wide

## *Canada*

### Local government areas of influence in thematic area

Building codes in Canada are set by each province individually, and local governments are required to enforce them. However, municipalities can have influence over new construction through the development and application process, zoning bylaws that define the overall character and built form of a neighbourhood, the establishment of mandatory or voluntary green development standards (GDS), as well as the ability to incentivize or require developers to meet standards through the use of land use planning tools enabled by planning legislation.

### Key policy and programing mechanisms in place

**Green Buildings Standards and Codes:** GDSs are beginning to be more commonly utilized by municipalities to encourage increasing levels of building energy performance in new construction beyond provincial building code requirements. Depending on the enabling provincial land use planning legislation, municipalities may establish mandatory or voluntary standards and have varying approaches to enforcement or incentivization including sustainability checklists and use of existing third-party green building standards. In either case GDSs serve as a way for municipalities to engage developers on how to improve building energy performance, as well as to prepare the building sector, its workforce, and supply chains for the delivery of high-performance buildings at scale.<sup>xxix</sup> In recent years, building standards have begun to shift towards the use of performance-based targets such as thermal energy demand intensity (TEDI) and GHG Intensity (GHGI) and encourage the use of low carbon heating systems and renewable energy to meet GHG performance targets. Use of onsite-renewable energy such as solar, however, has been limited due to a lack of enabling policies. Currently, net-metering is the main option available, but the business case is limited due to long payback periods, particularly for the residential sector.

The two leading examples of GDSs are in [Vancouver](#) and [Toronto](#), both of which use a phased, tiered approach to increasing energy performance designed to allow developers to prepare and adapt to the coming performance increases.

### Promising practices demonstrating growth and potential

In British Columbia the Energy Step Code is a provincial-level voluntary GDS that provides an optional compliance path in the building code that local governments may adopt in order to incentivize or require higher levels of energy efficiency in new developments. The Code provides increasing steps of energy performance across building types and regions, and allows designers or builders to choose prescriptive or performance-based compliance approaches. This has proven to be a successful means of creating a consistent approach for municipalities and developers across the province and has removed the need for municipalities to develop their own standards, particularly for those that do not have the same capacity and resources as larger cities. In addition, the federal government is in the process of updating the National Model Energy Code that can be adopted by provinces, which also includes a tiered approach increasing to net-zero performance.<sup>xxx</sup>

Mandatory home energy labelling programs continue to be discussed in Canada and have been used in Vancouver and Edmonton. However jurisdictional issues prevent other municipalities from replicating this program as enabling provincial legislation must be in place.

### Intra-country compare and contrast

Overall, municipalities in Canada appear to have more control in terms of influencing and incentivizing green building standards, whilst in Germany the federal states are chiefly responsible for transposing national - and by extension European - guidelines into law. Lastly, it should be noted that the verification/monitoring of in-use energy performance in new construction is an increasingly important priority for policy makers in both Canada and Germany.

### Potential focus area for intra-country exchange

Against the backdrop of current supply chain issues, rising construction material prices, labour shortages and skills gaps, an intra-country exchange on the construction industry's readiness to construct high performing sustainable buildings in Canada and Germany could be highly interesting. Furthermore, an exchange in which ambitious, newly

constructed (or renovated) public buildings are showcased could prove to be very inspirational. Particularly in light of such buildings' important "lighthouse" function and their role in strengthening local markets as well as in raising the awareness of citizens.

## District Planning and Infrastructure

### Germany

#### Local government areas of influence in thematic area

District-level planning is arguably one of the most impactful spatial scales at which local authorities can catalyze holistic sustainability transformations in Germany. Local governments have a solid understanding of the socio-economic make-up and physical form of their own neighbourhoods and can, on the basis of quantitative and qualitative data, craft policies and actions that are tailored to the specific characteristics of these areas. The sustainable management of districts extends to the identification and protection of vulnerable groups, the preservation and enhancement of community services or biodiversity hotspots, urban design interventions for place-making as well as integrated sectoral and physical infrastructure planning.

#### Key policy and programming mechanisms in place

In Germany, spatial planning responsibilities are decentralized to the local level, with municipalities developing plans in line with state laws and aligned with overarching (state and regional) plans and strategies. Typically, municipalities draw up strategic sectoral and cross-sectoral strategies and plans that establish a long-term vision that is broken down into priority action areas. Such strategies inform the development of two mandated plans, namely the preparatory land-use plan (Flächennutzungsplan) and the binding land-use plan (Bebauungsplan). In practice, municipalities often develop land-use plans at neighbourhood-level, which are informed by more detailed studies and concepts, and connected to the city-wide preparatory land-use plan. Binding land-use plans specify in greater detail, the form and function of the built environment in a focus area and tend to be informed via public consultation processes.

Local authorities are central to providing citizens with advice, raising their awareness and supporting them in accessing subsidies to make privately owned buildings more sustainable. At district and neighbourhood-level, OSSs play a key role in this regard in Germany - functioning as intermediaries between "customers", energy advisors, heating system installers and grant/subsidy providers at national and state levels.

#### Promising practices demonstrating growth and potential

The district or neighbourhood approach to establishing regeneration programs or new development has proven to be conducive to the integrated, cross-sectoral development or renewal of urban areas in Germany. Good practice examples abound across the country, ranging from green-field developments that have achieved high levels of energy performance, as well as architectural and urban design quality. To name but a few, successful examples of new district developments include the quarter of [Vauban in Freiburg](#) and the [Bahnhofstadt in Heidelberg](#), whilst promising planned neighbourhood development schemes include the [Schumacher Quartier in Berlin](#) or the [Connected City - Hamburg Oberbillwerder](#).

Considering that an estimated 14% of residential buildings in Germany are connected to district heating systems (and 25% of newly constructed homes)<sup>xxxi</sup> municipalities in Germany are under considerable pressure to decarbonise thermal energy sources feeding into these networks. To do so, municipalities can use generous national funding programs to decouple and feed industrial and commercial waste heat into heating networks. An example of an innovative district heating network that deserves to be mentioned is the [Wohnen am Campus](#) in Berlin where new developments were enabled to feed excess solar thermal energy back into the network.

### Canada

#### Local government areas of influence

Broader sustainability at a district level in Canada has been implemented as part of master planned communities or showcase/pilot projects undertaken by developers seeking to demonstrate leadership in sustainability and are often

pursued by municipalities as part of the development or redevelopment of a neighbourhood or district, or even more comprehensive community revitalization strategies.

#### Key policy and programing mechanisms in place

While municipalities must adhere to provincial land use planning laws, they have considerable influence over the long-term vision, form and function of the built environment in their communities. The overarching vision for the community and enabling policies are set in Official Plans, and more localized neighbourhood plans build on and implement the Official Plan. Municipalities have influence over district-scale developments primarily through policies that encourage or require sustainability in these plans. District energy and net zero buildings are common elements of these plans and municipalities have a range of land use planning tools at their disposal to incentivize sustainable development, such as granting higher density allowances, fast tracking approval processes, or reducing municipal fees.

#### Promising practices demonstrating growth and potential

Examples of sustainable district-scale developments in Canada include [Blatchford, Edmonton](#), [Drake's Landing, Okotoks](#), [City Centre, Surrey](#), the [West 5, London](#), [Dockside Green in Victoria](#), and the upcoming [Toronto Portlands redevelopment](#). In Toronto, the City is leveraging private finance for low carbon district energy systems by connecting real estate developers with private energy developers that are able to provide a cost-effective solution by amortizing the upfront costs of the system over a 20-year period and basing the revenue off of the avoided cost of the heating equipment and energy sales.<sup>xxxii</sup>

#### Intra-country compare and contrast

District (re-) development is arguably a more prominent municipal strategy in Germany than it is in Canada. While both countries influence sustainability in the built environment through the development of neighbourhood land use plans, local governments in Germany appear to be taking a more active role in driving the development of neighbourhood or district-level schemes, whilst in Canada private developers play a stronger role. It should be noted, however, that integration of broad-scale sustainability at district-level granularity is increasingly common in Canada.

#### Potential focus area for intra-country exchange

The role of citizen engagement in (re-)developing neighbourhoods, as well as the establishment of OSSs at district-level to support homeowners to retrofit their homes, could be explored more deeply in the context of a future intra-country exchange. Considering the different approaches to district-level development as well as district energy in Germany and Canada it may also be fruitful to compare concrete case studies, exploring differences between schemes developed under public leadership, ones co-developed via public-private partnerships and purely private schemes.

### Smart Solutions and Digitalization

#### Germany

##### Local government areas of influence

The digitalization of local administrations in Germany is not only concentrated on e-government, but also extends to the promotion of digital and smart solutions in the building sector. Local authorities are driving the adoption of smart technologies in the context of public buildings as well as in the context of district-level regeneration and new development. The drive to digitize operations and systems in Germany is arguably held back by local budgetary constraints and technical capacity limitations, particularly in smaller municipalities.<sup>xxxiii</sup>

##### Key thematic policy and programing mechanisms in place

Subnational smart city efforts are supported at a national level, with the establishment of dialogue platforms, a "Smart City Charta" (BBSR) and guidelines as well as via calls for innovative model projects and the facilitation of international exchanges.<sup>xxxiv</sup> A 2019 study<sup>xxxv</sup> of 50 German cities suggests that funding calls are an important catalyst for the adoption of smart solutions and national efforts to support municipalities. The "[Modellprojekte Smart Cities](#)" program is particularly worthy of note, not least because funding was recently boosted from EUR 500 to EUR 820 million (720 million

to 1.182 billion CAD). The latest national funding call received 94 applications of which 28 cities across Germany were selected in 2021 to receive KfW funding so as to pilot smart city solutions.<sup>xxxvi</sup>

Moving from broader city or district-wide applications, it should be noted that smart solutions are recognized as being essential to plan, build and operate buildings sustainably. The use of so-called digital twins, to improve design and planning as well as the specification of Internet of Things (IoT) technologies is growing in Germany. As already mentioned in this chapter, local authorities can encourage and accelerate sustainable building practices (including smart technologies) via sustainable public procurement policies, by specifying requirements in land sales contracts and by offering smart-oriented training to actors in the construction industry.

#### Promising practices demonstrating growth and potential

The already mentioned 2019 study of smart city efforts,<sup>xxxvii</sup> which examined 50 German cities, revealed that smart city approaches at municipal level tend to focus on administrative processes, mobility solutions, energy systems and environmental issues. In relation to buildings, energy grid and electrical vehicle integration appear to be topics that are growing in importance. The identification and dissemination of good practices to inform and inspire both public as well as private stakeholders will be an important activity to drive greater adoption.

With regard to smart grids, six regional pilots were nationally supported in 2008-2013,<sup>xxxviii</sup> to drive innovation in energy efficiency, renewable energy generation, decentralisation, market deregulation, supply security, energy storage, load flexibility and ICT solutions. Further regional pilots were supported via the [2017-2020 SINTEG program](#) to pave the way for the country's energy transition.

### *Canada*

#### Local government areas of influence in thematic area

Smart solutions and digitalization continues to be a growing area of focus for Canadian municipalities and municipalities. They play an important role as a catalyst for smart solutions by developing strategies and actions plans, bringing together stakeholders, as well as delivering smart services themselves. In regard to smart energy solutions, projects are commonly led by the local energy utility and are supported by the municipality. Where the utility is owned by the municipality, there is more direct municipal control over the project, though in many provinces utilities are province-wide government entities or are private investor-owned companies. Many municipalities are seeking to implement more smart energy solutions, suffer from an absence of business and governance models to support deployment at scale.<sup>xxxix</sup>

#### Key thematic policy and programming mechanisms in place

Smart energy and city solutions are in the pilot phase in Canada, with projects being undertaken primarily with support from the federal government via utilities and municipalities (e.g., the [Smart Grid Fund](#) and [Smart Cities Challenge](#)) as well as some provincially funded projects. Since 2003 the federal government has invested \$261 million CAD (178 million Euro) to fund \$758 million CAD (523 million Euro) in total project value in over 135 projects.<sup>xl</sup> In addition, 17 smart grid projects have been funded from the Smart Grid Program which provides \$100 million CAD (69 million Euro) of funding over four years for smart grid integration via utilities in cities across Canada. These projects include advanced metering infrastructure, EV integration, new markets and rate options, demand response, distributed energy storage, grid automation, microgrids and advanced inverter function.

#### Promising practices demonstrating growth and potential

Some local utilities in Canada are piloting advanced grid communication and monitoring systems to enable aggregation and control of distributed energy and/or behind-the-meter resources, to coordinate bidirectional flow of energy on the grid, to improve efficiency, support EV integration and provide services such as load flexibility and demand response, such as Alectra's [Power.House](#), York Region's [Non-Wire Alternatives](#), and Ottawa Hydro's [GREAT-DR project](#).

#### Intra-country compare and contrast

Just as Germany's drive to enact a fundamental energy transition reaches back to the 1970s, the country has a longer track record in nationally supporting smart grid innovation than Canada. Both countries are endeavouring to increase the

“smartness” of their grids, and with topics such as demand response, renewable energy integration and overall energy management being amongst the shared areas of focus. With regard to smart city solutions, it would appear that national stakeholders in both Canada (e.g. Smart Cities challenge) and Germany (e.g. Modellprojekte Smart Cities) are keen to drive innovation and uptake. Whilst national support for smart city projects may be somewhat more substantial in Germany, the rankings of selected municipalities from both countries in the [IMD Smart City Index](#) appear to be quite comparable.

#### Potential focus area for intra-country exchange

The roll-out of smart city solutions to enhance the sustainability and energy performance of the built environment should be explored in more detail and an exchange in relation to concrete projects in both Canada and Germany could add significant value for local decision makers. Moreover, it would be interesting to explore how municipalities and private sector partners collaborate on smart city solutions and drive innovation in both countries.

---

<sup>xi</sup> Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU) (2021). Klimaschutz in Zahlen.

[https://www.bmu.de/fileadmin/Daten\\_BMU/Pool/Broschueren/Klimaschutz\\_zahlen\\_2021\\_bf.pdf](https://www.bmu.de/fileadmin/Daten_BMU/Pool/Broschueren/Klimaschutz_zahlen_2021_bf.pdf)

<sup>xii</sup> Die Bundesregierung. (2021). Bauen und Wohnen. <https://www.bundesregierung.de/breg-de/themen/klimaschutz/klimafreundlich-wohnen-1672900>

<sup>xiii</sup> Haufe. (2021). CO<sub>2</sub>-Klimabilanz im Gebäudesektor besser als gedacht?

[https://www.haufe.de/immobilien/wirtschaft-politik/klimaschutzbericht\\_84342\\_523630.html](https://www.haufe.de/immobilien/wirtschaft-politik/klimaschutzbericht_84342_523630.html)

<sup>xiv</sup> Environment and Climate Change Canada. (2019). National Inventory Report 1990-2019.

[https://publications.gc.ca/collections/collection\\_2021/ecccc/En81-4-2019-1-eng.pdf](https://publications.gc.ca/collections/collection_2021/ecccc/En81-4-2019-1-eng.pdf)

<sup>xv</sup> Pembina Institute. (2021). Federal energy efficiency grant for homeowners falls short on funding, program design.

<https://www.pembina.org/media-release/federal-energy-efficiency-grant-homeowners-falls-short>

<sup>xvi</sup> At the national level, [Germany's 2020 Long-term Renovation Strategy](#) provides an overview of how regulations and incentive schemes will drive on-the-ground energy efficiency retrofitting

<sup>xvii</sup> Baden-Württemberg. (2021). Land wirbt für ambitionierteres Gebäudeenergiegesetz

<https://www.baden-wuerttemberg.de/de/service/presse/pressemitteilung/pid/land-wirbt-fuer-ambitionierteres-gebaeudeenergiegesetz/>

<sup>xviii</sup> Bundesverband Erneuerbare Energie. (2021). Erneuerbare Energien im Wärmesektor

<https://www.bee-ev.de/unsere-argumente/erneuerbare-energien-im-waermesektor#:~:text=Mehr%20als%2050%20Prozent%20des,f%C3%BCr%20Heizung%20und%20Warmwasser%20ben%C3%B6tigt>

<sup>xix</sup> Bundesamt für Wirtschaft und Ausfuhrkontrolle. (2021). Energiedienstleistungen [https://www.bfee-online.de/BfEE/DE/Energiedienstleistungen/Contracting/contracting\\_node.html](https://www.bfee-online.de/BfEE/DE/Energiedienstleistungen/Contracting/contracting_node.html)

<sup>xx</sup> The PACE model is being used in North America. Upfront costs for renovations are covered by a financial services provider or municipal debt and the loan to be repaid is attached to the property title rather than an individual.

<sup>xxi</sup> Kennedy, M., Frappé-Sénéclauze, T., and Agar, B. (2020). Property Assessed Clean Energy in Canada: Design considerations for PACE programs and enabling legislations. The Pembina Institute. <https://www.pembina.org/reports/property-assessed-clean-energy-2020.pdf>

<sup>xxii</sup> Toronto Atmospheric Fund. (2017). Energy efficiency financing tools for the Canadian context. <http://taf.ca/wp-content/uploads/2017/03/Public-Financing-Tools-Guidance-Note-Mar-2017.pdf>

<sup>xxiii</sup> Energy and Mines Minister's Conference. (2016). Financing Energy Efficiency Retrofits in the Built Environment.

[https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc\\_en.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf)

<sup>xxiv</sup> Climate Bonds Initiative. (2019) Green finance state of the market -2018).

<https://institute.smartprosperity.ca/sites/default/files/cbiccanadasotm2018web.pdf>

<sup>xxv</sup> Urban, Ryan. (2021). Clean Energy Financing Programs Canada. <https://www.energyhub.org/financing/>

<sup>xxvi</sup> Energy Services Association of Canada. (n.d). Energy Service Performance Contracts.

[https://sencanada.ca/content/sen/committee/421/ENEV/Briefs/StuartGalloway\\_Follow-up2\\_e.pdf](https://sencanada.ca/content/sen/committee/421/ENEV/Briefs/StuartGalloway_Follow-up2_e.pdf)

<sup>xxvii</sup> Government of Canada. (2021). Homes and Buildings.

<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/federal-actions-clean-growth-economy/homes-buildings.html>

<sup>xxviii</sup> Sustainable Buildings Canada. (2017). Energiesprong Summary Report. <https://sbcCanada.org/wp-content/uploads/2017/09/Energiesprong-Summary-Report.pdf>

<sup>xxix</sup> Clean Air Partnership. (2020). Towards low carbon communities: Creating Municipal Green Development Standards.

<https://www.cleanairpartnership.org/wp-content/uploads/2020/10/GDS-toolkit.pdf>

<sup>xxx</sup> Government of Canada. (2021). Homes and Buildings.

<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/federal-actions-clean-growth-economy/homes-buildings.html>

- 
- xxxix Die Agentur für Erneuerbare Energien. (2018). Deutschlands Wärmenetze – die großen und die kleinen Unbekannten. <https://www.unendlich-viel-energie.de/erneuerbare-energie/erdwaerme/deutschlands-waermenetze-die-grossen-und-die-kleinen-unbekannten#:~:text=W%C3%A4rmenetze,25%20Prozent%20deutlich%20h%C3%B6here%20Werte.>
- xxxii Partners for Climate Protection. (2021). District Energy: Policies and Governance Models Webinar. <https://iclei.ca/project/webinar-district-energy-policies-and-governance-models/>
- xxxiii KfW. (2021). Digitalisierung in Kommunen. <https://www.kfw.de/%C3%9Cber-die-KfW/KfW-Research/Digitalisierung-in-Kommunen.html>
- xxxiv Bundesministerium des Innern, für Bau und Heimat. (2021). <https://www.bmi.bund.de/DE/themen/bauen-wohnen/stadt-wohnen/stadtentwicklung/smart-cities/smart-cities-node.html>
- xxxv Bitkom. (2019). 50 deutsche Städte sind auf dem Weg zur Smart City. <https://www.bitkom.org/Presse/Presseinformation/50-deutsche-Staedte-sind-auf-dem-Weg-zur-Smart-City>
- xxxvi Bundesministerium des Innern, für Bau und Heimat. (2021). 28 Modellprojekte Smart Cities für die dritte Staffel ausgewählt <https://www.bmi.bund.de/SharedDocs/kurzmeldungen/DE/2021/07/smart-city.html>
- xxxvii Bitkom. (2019). 50 deutsche Städte sind auf dem Weg zur Smart City. <https://www.bitkom.org/Presse/Presseinformation/50-deutsche-Staedte-sind-auf-dem-Weg-zur-Smart-City>
- xxxviii Federal Ministry for Economic Affairs and Energy (2013) E-Energy. Decentralised energy marketplaces of tomorrow. [https://www.digitale-technologien.de/DT/Navigation/EN/Service/Abgelaufene\\_Programme/E-Energy/e-energy.html](https://www.digitale-technologien.de/DT/Navigation/EN/Service/Abgelaufene_Programme/E-Energy/e-energy.html)
- xxxix <https://questcanada.org/project/leveraging-the-great-pause-accelerating-our-smart-energy-transition>
- xl NRCan. (2018) Smart Grid in Canada 2019. <https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/Smart%20Grid%20in%20Canada%20Report%20Web%20FINAL%20EN.pdf>

# Mobility and Transport



## Mobility and Transport

### Introduction

To meet NDCs established by Canada and Germany, it will be critical for both countries to decarbonize their own transportation sectors, which account for 25 and 20 percent of total emissions, respectively.<sup>xli</sup> Emissions from the transportation sector in Canada have been steadily rising, increasing by 54 % from 1990 levels, and along with the oil and gas sector, are responsible for most of the growth in emissions nationally over the last 30 years.<sup>xlii</sup> The rise in emissions from the sector are attributable to a significant increase in the number of heavy-duty freight trucks, as well as passenger light duty trucks on Canada's roadways, which have substantially outpaced the gains made by fuel efficiency regulations first established in 2011.<sup>xliii</sup> In Germany, emissions in the transportation sector have not increased over the last 30 years and are currently at the same level as they were in 1990.<sup>xliiv</sup> On-road transportation accounts for 72% of the emissions from the sector, though unlike in Canada, the majority comes from passenger cars. There was a decrease in emissions in 2020, though it was almost exclusively due to an effect of the COVID-19 pandemic.

In both Canada and Germany, higher levels of government are also investing in decarbonizing the transportation sector which is an important backdrop to the efforts being undertaken by local governments. In Canada, the federal government is playing a key role in initiating the transition of the sector by establishing a variety of funding programs, investing in infrastructure as well as research and design, advancing regulations for vehicle performance standards, looking to support the growth of clean hydrogen manufacturing in Canada, and providing direction to automakers by setting a target that all new light-duty car and passenger truck sales be zero-emission by 2035. The federal government in Germany also has a large impact on transportation, with influence over highways, railways, large infrastructure projects and funding mechanisms. Key ministries are the Ministry of Transport and Digital Infrastructure and the Ministry for the Environment, Nature Conservation and Nuclear Safety. The federal [Climate Change Act](#), which was amended in 2021, is one of the central laws guiding federal strategies on transport planning.

### Local Government Area of Influence

In both Canada and Germany, local governments have a significant influence over transportation networks within their communities, with responsibility for the safety and maintenance of streets and roadways, land use planning and development, and in many cases, have ownership of local transit systems. Local governments in both countries are using these traditional areas of influence to shift, if not transform, transportation and mobility systems within their communities to low-carbon modes (active transportation, public transit, and low and zero carbon vehicles).

In the past, transportation planning in Canada has prioritized private vehicles over other road users (such as cyclists, pedestrians, and persons with disabilities). This is reflective in how streets and roadways were designed, though most urban municipalities have adequate public transit options, as well as some degree of pedestrian and bicycling infrastructure. Transportation and planning values have been changing in Canada, with municipalities recognizing the social, economic, and environmental benefits of mixed-used, densified communities, as well as roadways that are designed for all road-users. The effort to transform how people move around cities has been accelerating in recent years, and with many municipalities having declared a climate emergency, and a need to decarbonize transportation systems by shifting people away from combustion engine vehicles has become a priority for municipal climate and transportation planning.

Post-war transportation planning in Germany has also traditionally prioritized cars over pedestrians, cyclists, or public transport. However, most cities in Germany still have basic cycling infrastructure and a well-functioning public transport service. Nonetheless, there is a wide range of experiences, with some cities being renowned for their safe cycling paths or strong subways system, and others having the reputation of being "car-cities" and known for their poor air quality. However, this has changed in the last few years with civil society demanding more rapid change in light of the climate crisis. The focus in Germany is pushing for better and safer cycling infrastructure, and the need and desire to reduce the number of cars in city centers. City administrations lead the way here, in particular those in areas with a strong support for active modes of transport in their constituencies.

## Key Policy and Programing Mechanisms in Place

### *Active Transport in Canada*

Encouraging the uptake of active transportation has been recognized as a key component of decarbonizing transportation at the local level. Municipalities are advancing active transportation by installing safe and accessible bicycling and pedestrian infrastructure and networks. Positive results have been identified in some of Canada's largest cities - in Vancouver, for example, the vehicle kilometers travelled by private vehicles continues to trend downwards. Alongside other alternative modes being promoted (public transit and car sharing), active transportation has grown steadily over the last ten years, seeing a 22% increase between 2013 and 2018.<sup>xiv</sup> In 2018, the modal split between alternative modes outweighed private vehicles for the first time, with 53% of trips made by active transportation and public transit options within the city.

Active transportation has also been identified by the federal government as a key component of mitigation strategies in the transportation sector, and in 2021 the government launched the [National Active Transportation Strategy](#) and established the [Active Transportation Fund](#) which will see \$400 million CAD (276 million Euro) distributed to local, regional, provincial governments and Indigenous governing bodies over the next five years.

The concept of 'Complete Streets', known as 'Rues Conviviales' ("friendly streets") in Quebec, has been in existence for nearly 20 years in Canada, though has only gained traction in recent years. The concept provides an alternative vision for how streets and roadways should function, moving from the traditional view that prioritizes private vehicles on roadways to street design that is inclusive to all transportation modes and all road users regardless of age or physical ability. Complete streets also consider non-transportation related design elements such as green infrastructure and the creation of public spaces, as well as the integration with public transit networks.

There are now over 100 complete street policies adopted by municipalities across Canada. Several municipalities have also established comprehensive complete street guidelines, including Toronto, Halifax, Calgary, Ottawa, London, Edmonton, Waterloo, and York. While not all municipalities have a complete streets policy or set of guidelines, inclusion of pedestrian and cycling infrastructure is often present within transportation planning. However, due to the high capital cost of redesigning streets and a lack of adequate implementation planning, there remains a large gap in most cities between adopted policies and actual implementation. Another gap that currently exists is to consider active transportation plans with an eye for equity, though this is already changing, with equity being identified in complete street policies, many active transportation plans still do not offer tangible steps to ensure concerns regarding equity are addressed.

In addition to active transportation infrastructure, bicycle share programs have been created in most major cities in recent years. Governance models differ from city to city, though are generally operated by or in partnership with municipal governments. These programs have proven popular amongst both residents and tourists, and are now a well-established component of active transportation networks in urban centers.

### Promising Practices

In response to the COVID-19 pandemic, cities in Canada implemented temporary bicycling infrastructure so that residents would have a safe alternative to public transit. The City of Toronto established a program called [ActiveTO](#) which accelerated the installation of 16km of pre-approved cycling lanes identified in the 2019 [Cycling Network Plan](#) as well as 24km of temporary new bike lanes with a focus for establishing routes alongside major public transit corridors. This was the single largest increase in cycling infrastructure in the city and was completed in just two months in the summer of 2020, demonstrating what is possible to achieve in a short timeframe.

The temporary bike lanes have been well received in Toronto and are currently being monitored to determine whether these should become permanent within the city. ActiveTO also included many temporary road closures on weekends and holidays, particularly near existing trails, in order to maximize physical distancing while allowing residents to get outside and be active. This was also well received, with the most popular route seeing nearly 18,000 cyclists and 4,000 pedestrians each weekend during the summer.<sup>xvi</sup> [CaféTO](#) was another program implemented by the City of Toronto

which enabled restaurants impacted by the COVID-19 pandemic access to sidewalks and street lanes to offer outdoor dining. In April 2021, the city combined these two programs along a major corridor in the city to create a temporary complete street pilot project.<sup>xlvii</sup> Though these programs have been in response to the pandemic and the permanence of these programs is not yet known, they have introduced a new vision to both decision-makers and the public for how streets can function. Temporary installations were also implemented in many other cities as well, including, Moncton, Kitchener, Ottawa, Montreal, Vancouver, Victoria, Calgary and Winnipeg.

### *Active Transport in Germany*

Active transport has been getting a lot of attention in the last few years in Germany, especially in light of the climate crisis and civil society's efforts to further promote and support sustainable forms of mobility. In 2021, a new [National Cycling Plan](#) was approved by the German government with one of the main goals being an uninterrupted cycling network in Germany. The Federal Government's [Climate Protection Program 2030](#) also provides funding for cycling, with 900 million Euros (1,305 million CAD) dedicated to infrastructure projects by 2023.

While the federal government's actions play an important part in promoting cycling and federal funding is essential for many cities, how cities then implement cycling strategies is one of the key factors for successfully promoting cycling in Germany. Cycling has become even more popular in recent years and the number of cyclists in cities is on the rise. Other sustainable mobility options such as public transport have changed little, and its use has remained at around 9% in terms of household expenditure on transport for years. Public transport use decreased because of the pandemic, and it will have to be seen how quickly it can rebound. Free public transport is discussed time and again in Germany, but aside from pilot projects and individual one-day events, large scale tests have not been conducted.

Cars still make up a large percentage when looking at the modal split in cities. Only in bike-friendly cities like Münster, the modal split is in favor of cycling with 39%, compared to 29% cars. In most cities, cars still make up a higher percentage than bikes. However, about 40-50% of car trips in German cities are less than 5km, a distance generally considered to be quicker by bike than by car.<sup>xlviii</sup> Bike share programs have become very popular and are common in all larger cities in Germany.

The share of bikes being used per trip, expectedly, is much higher in cities than it is in rural areas. The COVID-19 pandemic has increased the number of cyclists in cities even more, with many regular public transit users trying to avoid close exposure to other people. Sales of bikes increased noticeably and even led to shortages. In Berlin, for example, the number of cyclists in June 2020 was 26% higher than in 2019.

### *Promising Practices*

In response to the pandemic and the resulting increase in cyclists, Berlin was the first European city to establish so-called "pop-up bike lanes" in April 2020. These bike lanes were impromptu and mostly created protected bike lanes on streets without proper cycling infrastructure, but which were still key to travelling through the city. This was undertaken by the Berlin city administration as well as its district administrations. One Berlin district, Friedrichshain-Kreuzberg, in particular led the way by establishing, within four weeks, 4.2km of temporary bike lanes, more than all other Berlin districts combined. In total, as of May 2021, 27km of pop-up bike lanes have been created in Berlin.<sup>xlix</sup>

The costs of pop-up bike lanes are less than for regular bike lanes. A pop-up bike lane costs 10,000 Euro per km (14,507 CAD) whereas a regular bike lane would easily cost more than 100,000 Euro per km (145,079 CAD). From decision making to implementation, it took Berlin's administrations only about 10 days, as compared to the planning of a regular bike lane taking up to 10 years.<sup>l</sup> Pop-up bike lanes also allow for easier planning, since they are constructed in a way that can be easily adapted before then being implemented permanently. In fact, Berlin's bike lanes are slowly losing their temporary "pop-up" character and are being reconstructed as permanent bike lanes. This new way of planning is the most innovative character: testing out the bike lane where a proper bike lane was planned anyway, possibly adapting it, and then installing the proper permanent cycling infrastructure.

Nonetheless, some people and politicians have voiced concerns about pop-up bike lanes and their legality under German federal law. According to road traffic regulations, cities must prove the necessity of a bike lane. Even so, Berlin won a court case and was able to prove the pop-up bike lanes' need with data on accidents and traffic patterns. Other German cities have since followed suit and by the summer of 2021 48 pop-up bike lanes totaling more than 60 km have been established in 20 cities.

### *Distribution of Goods in Canada*

On-road freight transportation has played a significant role in the large increase of emissions in the transportation sector in Canada since the 1990s. While municipalities do not have jurisdictional control over regional transportation and the movement of goods inter-provincially or internationally, the distribution of goods within urban centers, or urban logistics, has very recently become a field being explored by Canada's largest municipalities. The City of Toronto has developed a [Freight and Goods Strategy](#) in 2021 which recognizes the impact that the growing demand of parcel delivery from e-commerce has substantially increased during the COVID-19 pandemic, resulting in issues with traffic congestion, air quality, and GHG emissions. There has been large growth in the variety of electric mobility devices, as well as bylaws restricting some forms, such as e-scooters, from streets and sidewalks due to safety concerns. Even so, in light of the need for more sustainable urban logistics, Toronto became the first in the province to amend bylaws to allow for e-cargo bikes to operate on streets and within bicycle lanes.

### Promising Practices

[Project Colibri](#), a one-year urban micro-logistics pilot project, was launched in 2019 in Ville-Marie, a borough in the center of Montreal, by the nonprofit Jalon and working with four local bike courier companies, as well as the large delivery company Purolator. The pilot project established a micro delivery hub in an old bus station where large diesel trucks could unload parcels en masse that were then picked up by e-cargo bikes to complete the last mile of the delivery. The project made nearly 5,000 deliveries each week by zero emission cargo bikes, significantly reducing the mileage required by large delivery trucks within the city center.

The pilot project found that this system of deliveries was both less expensive to Purolator and proved to be profitable for the local courier companies, and decreased overall delivery times within the city. Reducing the number of diesel trucks in Montreal, has been identified as an opportunity to reduce air pollution, lessen congestion and reduce wear on the city's streets caused by large trucks. Though the pilot project did not assess the emission reduction from the program, the use of zero emission bikes in place of diesel trucks and the reduction in urban congestion have both direct and indirect effects on emissions from transportation within the city. Due to the success of the pilot project, Montreal has contributed funds to the establishment of several more micro-logistics hubs to expand the geographic area serviced by the program. Vancouver has also launched its own 14-month micro-logistics hub pilot project beginning this year and Toronto is exploring the option of developing micro-logistics hubs within the city center as well.

### *Distribution of Goods in Germany*

In 2019, the total volume of goods in Germany totaled around 4.7 billion tons. The market share of rail freight transport is only increasing very slowly, while transport performance on the road continues to increase. The [Federal Transport Infrastructure Plan](#), which runs until 2030, provides 133 billion Euros (193 billion CAD) for the road network, compared to 112 billion euros (162 billion CAD) for the railways. In cities, around a third of the traffic volume is currently caused by freight or delivery purposes. Obviously, this represents a lot of traffic, most of which is still almost entirely based on vehicles with combustion engines.

Between 2000 and 2017, the shipment volume transported by courier, express and parcel services doubled in Germany, a 98% increase. In 2020 alone, the number of shipments increased by around 11% to 4.05 billion tons, though a 4% increase had been predicted before the pandemic struck.<sup>ii</sup> Aside from environmental consequences, delivery traffic can also negatively impact the quality of life in cities and decrease safety, in particular for cyclists and pedestrians, due to a lack of parking spaces available and, thus, the need to park on the road. To counteract these problems, many cities have started to focus on last-mile delivery, via the creation of micro hubs. Small, emission-free vehicles such as e-cargo bikes can pick up the goods in a micro hub and then complete the final delivery of goods. In order for these to be used

effectively and on a larger scale, various providers, from parcel services to food retailers, have to work together with the cities.

#### Promising Practices

Munich has implemented multiple pilot projects to test zero-emission delivery options. One project, which ended in 2020, was [City2Share](#). The international delivery corporation UPS set up three micro hubs in the city to receive mass shipments by large trucks. From there, conventional and electric cargo bikes were used for delivering the packages. Based on their own data, this reduced the number of trucks in the city by 14 and saved 65 tonnes of CO<sub>2</sub> per year. Some of these micro hubs are still in use by UPS, which would like to expand such last-mile delivery services in Munich. However, here, as in all other cities the availability of free public spaces for such hubs is a problem. Delivery services also look at private spaces such as existing parking garages, but these often do not always fulfill requirements such as trucks being able to easily deliver the packages to the hubs. In City2Share, a problem arose that local residents often moved the provisional barricades around the micro hubs to park their own cars in the evening, which then led to them blocking the way for cyclists and pedestrians. Finding sufficient space for such hubs is one of the biggest problems in many cities in Germany that are already struggling with providing enough public land for affordable housing or other services.

#### *Electric Vehicles in Canada*

Sales of low emission vehicles have been increasing in Canada since 2011, across all electric vehicle types (battery electric vehicles, hybrid electric, and plug-in hybrid electric) with an average annual growth rate of 63%.<sup>iii</sup> Nearly all electric vehicle sales have occurred in the three largest provinces, Quebec, Ontario, and British Columbia. Provinces where rebates exist for electric vehicles have seen the highest rate in sales growth, and where rebates were discontinued (Ontario) the rate of growth declined sharply, indicating a strong correlation between the availability of rebates and consumer behaviour.<sup>iiii</sup> At the federal level, the [Incentives for Zero-Emission Vehicles](#) program also provides a rebate for zero emission vehicles which can be accessed in conjunction with provincial rebates. The federal government is also funding electric vehicle infrastructure through its [Zero Emission Vehicle Infrastructure Program](#), which funds charging stations on-street, in public parking, at commercial and municipal fleets and in multi-unit residential buildings, a building type that presents a significant barrier to electric vehicle ownership.

As consumer demand grows for electric vehicles, local governments in Canada have been focused on creating electric vehicle-ready cities, so that access to charging infrastructure is not a barrier to uptake. This is particularly urgent given the need to prevent technological lock-in and reduce the number of combustion engine vehicles on roads at 2030 and beyond. Many municipalities have created comprehensive electric vehicle strategies for their own communities so that cities are ready to meet the demand, including Toronto, Montreal, Vancouver, Victoria, Calgary, and Edmonton to name a few.

Along with installing charging stations on municipally owned properties, local governments are incorporating EV infrastructure into development standards for new buildings and, where possible, creating zoning bylaws to require charging stations in new developments. For existing buildings, some municipalities are incorporating EV infrastructure into building retrofit programs and financing structures to encourage uptake.

In addition, municipalities are incentivizing EV adoption through the creation of preferred parking spaces with reduced fees for electric vehicles, supporting low carbon car-sharing organizations, and transitioning their own vehicle fleets to electric and hydrogen vehicles. The transition of public transit fleets to electric and hydrogen has seen much progress in many municipalities, with Toronto leading the way, operating the largest electric bus fleet in North America.

#### Promising Practices

Regional networks have been recognized as an important option to reduce the barrier of so-called "range anxiety" especially in rural locations in Canada. Local governments are not only installing infrastructure in their own communities but collaborating with neighbouring communities to create charging networks. [Accelerate Kootenays](#), is an example of a community driven project, which received support from three local governments, the provincial government, the Federation of Canada Municipalities, utility companies, as well the private sector. The network was created over two years, between 2016-2018, and saw the installation of over 13 fast-charging stations and 40 level 2 charging stations

across 1870 kilometers of highway.<sup>liv</sup> A key component of the program was not only the installation of the network but its marketing campaign to promote the network to residents. With light-duty trucks accounting for much of the rise in emissions from the transportation sector nationally since 1990 and initial electric models of such vehicles now on the market, the installation of regional charging infrastructure in rural locations will become increasingly important to transition not only passenger vehicles but Canada's light duty truck fleet as well.

### *Electric Vehicles in Germany*

Germany has the goal to have at least seven to ten million electric vehicles on its roads by 2030. In addition, one million charging points are to be established. The federal government plays a crucial role in promoting electric mobility, in particular by encouraging the purchase of electric vehicles. This is done by providing purchase premiums, tax breaks and extensive grants to improve the charging infrastructure. A [charging infrastructure master plan](#) was adopted in November 2019. Funds are also made available to promote private charging options.

Purchase premiums play a large role in Germany's strategy to promote electric mobility even though they are also criticized by many, such as environmental groups. Car owners receive up to 6,000 Euros (8,695 CAD) for electric or fuel cell vehicles and up to 4,500 Euros (6,521 CAD) for rechargeable hybrid electric cars. In addition, further tax incentives for electric vehicles have been in effect since the beginning of 2020, for example through special write-offs for e-commercial vehicles and cargo bikes, or a tax exemption for charging private cars at work.

In July 2021, the government achieved its 2020 goal of one million registered electric vehicles. The second half of 2020 was marked by new records for monthly new registrations, and in the first seven months of 2021 alone approximately the same number of electric vehicles were registered as in the whole of 2020, namely 350,000. Among the one million electrically powered vehicles, 54% are purely electric vehicles and 46% are hybrids, both of which receive subsidies from the government. However, according to experts, the new target for 2030 should be raised to 14 million electric vehicles if Germany wants to reach its climate goals.<sup>lv</sup>

The availability of charging points is a significant problem for further promoting electric mobility. As of August 2021, there are about 46,000 publicly accessible charging points in Germany (of which about 6,000 are fast-charging points). On average, 17 electric cars share one charging station (up from 13 cars in November 2020).<sup>lvi</sup> New programs and tenders to increase the number of charging points are currently underway, but implementation has been slow. The goal is to have a charging point in everyone's vicinity by 2023 without which a further increase in EVs will be difficult to achieve.

To support the electrification of public transport in cities, the government has also been funding the procurement of electric buses. Specifically, the purchase of more than five electric buses is subsidized with up to 80% of the additional investment costs.<sup>lvii</sup>

### *Promising Practices*

Many cities in Germany are coming up with concepts to promote e-mobility uptake in their city. An approach that Hannover has taken and that is proving successful is the development of its own brand "[Hannover stromert](#)" (roughly translated as "Hannover electrifies"). Alongside the emphasis on the communication campaign, Hannover has introduced measures in its own electric mobility concept that, for example, aim to increase charging infrastructure in the city and provide free parking spots for electric cars. In addition to the public charging infrastructure, electrification of the city-owned car fleet is the key focal point of Hannover's e-mobility concept.

### *Intra-Country Compare and Contrast*

In both countries, municipalities have similar responsibilities when it comes to transportation and can influence how people move around cities. Municipalities in Canada and Germany are both equally considering the need to create infrastructure that promotes active transportation. In Canada, the concept of Complete Streets has been accelerating and is starting to expand to include considerations for equity to ensure that all communities have equal access to active

transportation networks. This is particularly important due to the health and economic benefits of active transportation and the need to ensure that access to transit, safe pedestrian options, and bicycle friendly infrastructure is available to low income and marginalized communities.

In Germany, there is also a strong push, in particular from civil society, to create greener streets with more space for pedestrians and cyclists. However, the formal concept of Complete Streets is not yet applied there. While some streets may be designed similarly to a Complete Streets concept using familiar ideas and principles, the actual term (or any variations thereof) is not used in Germany.

In both countries streets have been traditionally designed for cars. The push to change the focus on private vehicles and give more space to pedestrians and cyclists has again accelerated since the start of the pandemic. Provisional bike lanes are being established in both countries, and in particular German pop-up bike lanes have become a popular concept, with many now becoming permanent.

Bikes are also becoming more common in the delivery of goods. Micro hubs are being established in cities in both countries, whereby goods are delivered to these hubs and then distributed via cargo bikes to their final destination. Last mile delivery is becoming more of a focus in recent years, but such developments are still in their early stages, though there are pilot projects in both countries.

The electrification of transport continues to trend upwards in both Canada and Germany. Federal funding for the electrification of municipal bus fleets is available to local governments in both countries and is supporting the transition in this area. Rebates or purchase premiums from higher tiers is having a large influence on consumer behaviour, especially since price parity with internal combustion engines has not yet been reached. However, the current rate of uptake in both countries still needs to increase in order to reach 2030 climate goals. Germany is ahead of Canada in terms of registered electric vehicles, having reached 1 million in 2021, while in Canada there have been 200,000 battery electric and plug-in hybrid electric and 240,000 hybrid electric vehicles sold since 2011. When broken down to population size and total number of cars registered, both countries look at a share of EVs of only about 1.5%, of which about half are zero emission electric vehicles. This number further highlights the need in both countries to drastically increase the share of EVs on roads.

In Germany, the availability of charging points has become a problem, and as Canadian municipalities strive to create EV-ready cities, it will be important to learn from challenges facing German cities to ensure that charging networks meet the demand in future years. Charging points, particular fast chargers, are particularly important in city centers where people are not able to charge their cars at home. Canada has installed a fast-charging network from coast to coast, with a charger at least every 250 kilometers from Halifax to Victoria. However, outside of this network many highways do not have fast charging or even level 2 charging networks, and many gaps exist at local levels.

### Potential Focus Area for Intra-country Exchange

**Active Transportation:** Infrastructure and networks are being further expanded and funding in both countries from federal governments has recently been announced to support an increased implementation of infrastructure. Addressing equity in active transportation has been underdeveloped, and therefore collaboration to more comprehensively and concretely ensure that active transportation planning includes an equity lens could be valuable. This is particularly important due to the health and economic benefits of active transportation and the need to ensure that access to transit, safe pedestrian options, and bicycle friendly infrastructure is available to low income and marginalized communities as well.

**Electric Vehicle Infrastructure:** Access to charging infrastructure will be critical to support a much-needed rapid uptake of electric vehicles in both countries. While the present challenges with supply and demand in Germany differ from Canadian cities, many similar obstacles exist with providing adequate infrastructure deployment that ensures citizens without access to at-home charging can still find convenient and fast options, and also ensures that fast charging networks are available regionally to reduce range anxiety. There is potential to collaborate and further develop both

countries' innovative solutions and financing mechanisms that are being implemented as opportunities addressing common challenges.

**Good Distribution & Urban-Logistics:** In both countries urban-logistics and micro distribution hubs are being explored and are in their early stages. Since it is in a nascent stage within both Canada and Germany, there is opportunity to share knowledge gained from early programs as each expand into cities in both countries.

---

<sup>xli</sup> Government of Canada. 2021. Greenhouse Gas Emissions. <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

<sup>xlii</sup> Government of Canada. 2021. Greenhouse Gas Emissions. <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

<sup>xliii</sup> Government of Canada. 2021. Government of Canada Review of Fuel Efficiency Standards Confirms the Economic and Environmental Benefits of Ambitious Action. <https://www.canada.ca/en/environment-climate-change/news/2021/02/government-of-canada-review-of-fuel-efficiency-standards-confirms-the-economic-and-environmental-benefits-of-ambitious-action.html>

<sup>xliiv</sup> Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU).(2021). Press release: Treibhausgasemissionen sinken 2020 um 8,7 Prozent. <https://www.bmu.de/pressemitteilung/treibhausgasemissionen-sinken-2020-um-87-prozent>.

<sup>xlv</sup> City of Vancouver. 2021. Annual Transportation Survey. <https://vancouver.ca/streets-transportation/annual-transportation-survey.aspx>

<sup>xlvi</sup> City of Toronto. 2021. COVID 19: ActiveTO – Closing Major Roads. <https://www.toronto.ca/explore-enjoy/recreation/covid-19-activeto/covid-19-activeto-closing-major-roads/>

<sup>xlvii</sup> City of Toronto. 2021. COVID 19: ActiveTO – Midtown Complete Street Pilot. <https://www.toronto.ca/community-people/get-involved/public-consultations/infrastructure-projects/activeto-midtown-complete-street-pilot-project/>

<sup>xlviii</sup> Umweltbundesamt(German Environment Agency). 2021. Radverkehr. <https://www.umweltbundesamt.de/themen/verkehr-laerm/nachhaltige-mobilitaet/radverkehr#gtgt-schnell>

<sup>xlix</sup> Deutsche Umwelthilfe (Environmental Action Germany). 2021. Pop-up-Radwege. [https://www.duh.de/fileadmin/user\\_upload/download/Projektinformation/Verkehr/Pop-up-Radwege/Infografik\\_Pop-up-Radwege.pdf](https://www.duh.de/fileadmin/user_upload/download/Projektinformation/Verkehr/Pop-up-Radwege/Infografik_Pop-up-Radwege.pdf)

<sup>l</sup> Ibid.

<sup>li</sup> Süddeutsche Zeitung. 16 June 2021. Bestellboom hält Paketboten auf Trab.

<https://www.sueddeutsche.de/wirtschaft/dienstleistungen-bestellboom-haelt-paketboten-auf-trab-dpa.urn-newsml-dpa-com-20090101-210616-99-18779>

<sup>lii</sup> Government of Canada. 2021. Greenhouse Gas Emissions. <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

<sup>liii</sup> Government of Canada. 2021. Greenhouse Gas Emissions. <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

<sup>liiv</sup> Accelerate Kootenays. 2021. Project Successes and Outcomes. <https://acceleratekootenays.ca/about/successes/>

<sup>liv</sup> Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy).2021. Erstmals rollen einen Million Elektrofahrzeuge auf deutschen Straßen. <https://www.bmwi.de/Redaktion/DE/Pressemitteilungen/2021/08/20210802-erstmals-rollen-eine-million-elektrofahrzeuge-auf-deutschen-strassen.html>

<sup>lvi</sup> Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy).2021. Elektromobilität in Deutschland. <https://www.bmwi.de/Redaktion/DE/Dossier/elektromobilitaet.html>

<sup>lvii</sup> Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety). 2021. Förderung der Elektromobilität <https://www.bmu.de/themen/luft-laerm-mobilitaet/verkehr/elektromobilitaet/foerderung>

# Just Transition



## Just Transition

In the past, many municipalities did not prioritize an active or explicit societal perspective as part of their work to address climate change. Their responsibilities and interests tended to focus more on reducing emissions from city operations (e.g., municipal buildings, transport, waste and water). The extent of their role in social aspects related to the energy transition involved encouraging, or perhaps even obligating, citizens and private businesses to follow suit via the sponsorship of community programs and selected environmentally-focused community events.

However, in response to an evolving economic, social and political context that has created new pressures and new opportunities, the social role of local governments has expanded well beyond these domains and strives to address a wider sense of justice across the community. Local governments are in a position to promote awareness of the pressing social needs in the community and of the importance of social investment as part of their climate and broader sustainability efforts. They can foster a sense of responsibility for social well-being among all sectors including business, academia, civil society, community groups and other levels of government. They can help build relationships among the diverse organizations and sectors that comprise the community to further the energy transition, inclusive mobility, emissions reductions and urban resilience. More specifically, there are several roles that local governments can play in moving towards a just transition. In Canada these include acting as an exemplary employer, service provider, investor, customer, leader, champion, convener and partner. Meanwhile, in Germany the emphasis of the term "just transition" lies on developing a fair and acceptable phase-out strategy, especially for those municipalities and regions whose energy production and jobs are still dependent on fossil fuels, particularly brown coal, seeking to "leave no one behind".

### Just Transition in Canada

The concept of a people-centred, just transition is relatively new in Canada. It has gained recognition through Canada's engagement in the Paris Agreement, which includes a commitment to take "into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities".<sup>lviii</sup> Action on this commitment has been tied to supporting Canadians and businesses affected by the COVID-19 pandemic through historic investment in climate action, skills and training, including:

- Reducing emissions, strengthening the economy, and creating jobs through climate action – including specific funds and accelerators supporting transitions in the industrial sector, manufacturing sector, and residential and commercial building retrofits.
- Equipping Canada's workforce through skills development and training – targeting education and accreditation in clean energy sectors, a community workforce development program for communities with economies undergoing transformation as well as a future skills initiative designed to address the evolving needs of jobseekers, workers and employers in a low-carbon economy.
- Creating and maintaining jobs in the energy sector through economic diversification, sustainability measures and emissions reductions – including a commitment to phasing-out unabated domestic coal-fired electricity by 2030, a commitment to deter future coal mining projects, with a focus on supporting communities in New Brunswick, Nova Scotia, Saskatchewan and Alberta where coal is still an important component of their energy systems through the Task Force on Just Transition for Canadian Coal Powered Workers and Communities and the Canada Coal Transition Initiative.
- Supporting Canadians through the income support system – including increased access to Employment Insurance during the COVID-19 pandemic, and consultations to inform future reforms to Employment insurance to ensure it meets the needs of the labour market and the transition to a low-carbon economy.<sup>lix</sup>

In June 2021, the Government of Canada launched an engagement process calling on stakeholders such as labour, NGOs, industry, local government, as well as provincial, territorial and Indigenous partners to provide feedback on potential elements of proposed [just transition legislation](#).

Two of the most prominent industrial communities in Canada are Edmonton, Alberta, and Hamilton, Ontario. Edmonton is known as the oil capital of Canada and Hamilton known as the steel capital of Canada. Both of these municipalities are playing an active role in the energy transition, Edmonton with its [Community Energy Transition Strategy and Action Plan](#)

and Hamilton with its [Community Energy and Emissions Plan](#). Even metropolitan regions are active in the energy transition. Montreal is supporting greater energy efficiency in buildings within its boundaries, while reducing the use of fossil-based natural gas and eliminating the use of heating oil, which will reduce the community's GHGs by about 5 percent.<sup>lx</sup>

### *Energy Poverty & Climate Impacts*

One of the topics that often arises in conversations about the just transition in Canada is the concept of energy poverty. Advocacy groups commonly accept the definition of energy poverty as a household that spends 6% of its income on household energy costs (excluding transportation), or double the average Canadian household of 3%. By this measure, 20% of Canadian households experience energy poverty.<sup>lxi</sup> Rural householders are more likely to experience energy poverty due to the larger size of rural homes as well as higher transmission charges. However, since most Canadians live in urban centers, there are more households in urban areas that experience energy poverty.<sup>lxii</sup> While low income and energy poverty are linked, they are not the only contributing factors. Households with moderate incomes also experience energy poverty through variables such as household incomes, home energy performance, access to networks of affordable energy, and energy prices.

Municipalities in Canada are starting to build an understanding of energy poverty into the climate planning processes. This has been driven in part by the Local Energy Access Programs (LEAP) project, a multi-city and multi-sector initiative led by the Canadian Urban Sustainability Practitioners (CUSP) network. CUSP's [Energy Poverty and Equity Explorer](#) was developed as a mapping tool from which to gain insights into community disparities related to energy costs and access, and other inequities at the neighbourhood level. Small municipalities like [Bridgewater](#), Nova Scotia, northern communities like [Inuvialuit Regional Corporation](#), and metropolitan areas like [Metro Vancouver](#), among many others, are all developing strategies to address their unique energy poverty situations, including targeted energy efficiency upgrades, rooftop solar installations, and improved access to transportation services.

Canadian municipalities that have signed onto the [Global Covenant of Mayors](#) (47) have been consulted in the development of the pending energy access pillar expected in the coming months. It is expected that through GCoM reporting more Canadian municipalities will develop strategies to address energy access, energy security, energy poverty and other related energy issues.

#### **SIDEBAR –**

There is overwhelming evidence showing that climate change and social vulnerability (e.g. poverty, isolation, race) are locked in a vicious cycle, whereby climate hazards aggravate the socio-economic inequalities that underpin exposure and vulnerability, leading to high-risk groups experiencing disproportionate losses in terms of their lives and livelihoods (United Nations Department of Economic and Social Affairs, 2016).<sup>lxiii</sup> If this cycle is left unaddressed, climate impacts will perpetually erode adaptive capacity by deepening vulnerability in high-risk populations.

### *Implementation and Promising Practices*

Just transition also encompasses ensuring equal opportunity to the emerging low-carbon society and economy. Over 65% of communities in Canada's North rely solely on diesel fuel to meet their basic energy needs. By developing local renewable energy sources, utility service providers, communities and Indigenous governments work together in partnership to enable participation in the energy sector, create jobs and reduce GHG emissions. This is demonstrated in the Quatsino First Nation Community Energy Plan,<sup>lxiv</sup> where an analysis for renewable energy potential confirmed the opportunity for several run-of-river hydropower projects, high-potential wind areas, solar photovoltaic potential and wave energy. Concerns for the equitable distribution of the benefits emerging from the transition to a low carbon society are also reflected in emerging climate planning efforts, such as that of the Region of Waterloo,<sup>lxv</sup> as well as the Partners for Climate Protection (PCP) program's pending Equity, Diversity and Inclusion Toolkit.<sup>lxvi</sup> Much of the work of the 8-80 Cities organization is complementary to this effort, ensuring public spaces have equity considerations such as race, income, and age in their design. Toronto's Tower Renewal Partnership<sup>lxvii</sup> works to ensure the city's affordable housing towers and neighbourhoods are transformed into sustainable and resilient places.

At the federal level, one of the most recent examples of just transition support is the Healthy Communities Initiative (HCI). HCI was created by Infrastructure Canada to help Canadian cities respond to the challenges of COVID-19. It funds projects that help communities: create safe and vibrant public spaces, improve mobility options or provide innovative digital solutions. As these types of infrastructure projects play a significant role in contributing to community health, by either increasing or diminishing social equity, the fund has a significant focus on supporting those initiatives that centre on reducing inequalities across communities. For example, NunatuKavut received funding to build digital infrastructure to support public engagement across remote communities and agricultural infrastructure to improve food security. Hundreds of other projects are highlighted on the [interactive map](#).

Another example of efforts towards the just transition is the recent creation of the [Hydrogen Strategy for Canada](#), led by the Government of Canada in consultation with industry stakeholders including private sector, associations and NGOs, academia and research groups, Federal and Provincial Governments, and Indigenous Organizations, communities, and businesses. A clean hydrogen economy is a strategic priority for Canada because it will diversify the future energy mix, generate economic benefits and help the country achieve net-zero emissions by 2050. It will also help address the energy poverty, GHG emission and economic development concerns in many of Canada's rural and remote communities. It is forecasted that the hydrogen economy will generate 350,000 stable jobs across the country over the next three decades. Germany is expected to be a major export market for Canadian hydrogen, as well as Japan, South Korea, California, the UK, and the rest of Europe.

### Just Transition in Germany

Though the concept of just transition has been rooted in Germany for a long time, it is only recently that its literal translation, "gerechter Übergang," has gained traction in broader discourse. In 2020, the EC launched a set of mechanisms for a just transition under the heading of "leaving no one behind".<sup>lxviii</sup> This EU-wide initiative, with Germany as one of its key drivers, seeks to ensure that the transition to a climate-neutral economy happens in a socially-inclusive manner and leads to a more resilient, green recovery.

In 2021, the German government committed to a more ambitious target date for net-zero emissions by 2045.<sup>lxix</sup> This requires a drastic increase in both energy efficiency and alternative energy production, including more renewable energy (RE) infrastructure across the country. Past experience proves that local concerns need to be better taken into account for RE deployment (e.g., new wind turbines or large-scale solar parks). The NIMBY (Not In My Back Yard) effect is prevalent in projects put in place without meaningful local involvement and when revenue flows out of the region, or towards individual companies or land owners, without any real benefit for the local community. A just transition implies that they should have a voice and ideally also some concrete benefit which goes beyond the (abstract) goal of saving the climate. Therefore, the energy transition should be seen as an opportunity to foster inclusivity, regional value creation and overall citizen engagement, including those who are particularly vulnerable (e.g., energy poverty).

Local and regional authorities in Germany already act as powerful agents ensuring a just and inclusive energy transition. They have an important say in the siting of RE infrastructure and frequently promote citizen involvement in new projects. Acting by example, they even create or join (inter-)municipal energy projects. This can take different forms, but most often refers to energy cooperatives and/or limited liability companies with citizen involvement. For example, Neunkirchen's wind energy cooperative project benefits the community at large and the municipality supported it administratively and financially (more information on energy communities can be found later).

Although important challenges like energy poverty and inclusivity are key components, the EU concept of a just transition is more dominated by efforts to trigger a just phase-out from fossil fuels, particularly for coal, as is the case in Germany. The [Just Transition Mechanism](#) mobilizes support (65-67 billion Euros, 95-98 billion CAD) to mitigate socio-economic effects in the most affected regions, mainly those centered on fossil fuels. It aims to stimulate both physical infrastructure (e.g. closures, repurposing or deploying RE) and socio-economic transformations (e.g. economic diversification, reskilling workers or social cohesion).

It should be noted that just transitions have a long history in Germany not exclusive to climate change or coal. The more common term “economic structural change” (ökonomischer Strukturwandel) captures a general transformation of cities centered around heavy industry (e.g., coal and steel) to become more service-orientated (e.g., tourism or logistics). Decision-makers and local stakeholders across the country are all beginning to better grasp the importance of energy transitions being done in a just manner.

### *Energy poverty*

Energy poverty, as a social problem, is gaining traction in Germany. Some families, unable to pay their household electricity costs, have their power cut off (230,000 in 2020).<sup>lxx</sup> This drives an important public debate about whether or not energy suppliers should be able to impose these cut-offs (Stromsperren). The EU and several Member States apply tailored, exact definitions of “energy-poor” households, but Germany does not. Instead, the Federal government stresses that alleviating energy poverty be addressed through a holistic approach to general poverty alleviation as part of social policy not focused on specific elements (such as energy).

Households suffering from energy poverty generally own older and more inefficient electricity appliances, and therefore consume more than those affording modern households. There is also public debate about how just the “Renewable Energy Levy” (Erneuerbare Energienumlage) is, which is paid by all German residents, despite their economic status, as part of their electricity bill to finance RE-based electricity. A reduction, waiver or even complete removal of this fee could significantly reduce electricity prices for households suffering from energy poverty. In fact, this approach becomes all the more advisable as RE production has by now become fully competitive and more profitable than energy based on fossil fuels. Furthermore, despite the fact that every German household is able to choose its preferred supplier on the free market, energy-poor households can face difficulties in this (e.g., due to a poor credit rating or a customer history) and therefore fail to benefit from typically cheaper electricity resulting from a switch.

Despite such potential gaps, many services are available to deal with energy poverty. Some examples include cooperation between consumer associations and energy companies to provide tailored advisory services. These activities make clear that being “energy poor” is often a result of different factors (e.g., high energy consumption, unemployment or limited financial planning abilities).<sup>lxxi</sup>

German local governments have an important role to play in alleviating energy poverty, not least by facilitating the above services. For example, [Caritas](#) and the [Association of German Energy Agencies](#) are running the “Electricity-saving Check” ([Stromspar-Check](#)), which sends “energy savings supporters” to households that struggle to pay their electricity bills. These supporters are themselves long-term unemployed and have received special training on energy savings, and then advise how to reduce consumption. About 300,000 households have profited from this programme, reducing energy use and lowering annual bills typically between 100 and 250 Euros (146 and 364 CAD) each. Around 120 German municipalities ([map](#)) actively support this programme, for example Wuppertal integrates it into its own 14-step mitigation plan for and cooperates with its local Caritas, job center and city energy utility.

### *Just coal transition*

As described earlier, the just transition in the European context is strongly linked to a fossil-fuel phase-out. Germany’s most-affected areas have been near five major coal fields used since well before the Industrial Revolution.<sup>lxxii</sup> Though all hard coal mines have been closed<sup>lxxiii</sup> in the Saarland and in the Ruhr area (Germany’s largest urban area), their respective local authorities continue to transform both regions. Lignite coal is still mined in three other regions, with nine large, open-pit surface mines still operating: three in the Rhenish area in the west, two in the Central Germany area and four in Lusatia.<sup>lxxiv</sup> Most German power plants<sup>lxxv</sup> and heavy industries<sup>lxxvi</sup> are also located near these five traditional coal regions, and obviously would do well to undergo a just transition of their own, as well.

Though many of these areas have already witnessed a decline for decades due to technical, economic and even environmental reasons, the transition is becoming more urgent. Most Germans favor a swift “coal exit”, but social acceptance is hardly uniform by the affected regions, such as in German Lusatia.<sup>lxxvii</sup> It is not yet adequately resolved how

to transform these communities equitably for their workers and local businesses, not to mention their families and wider communities. Those living there are justifiably concerned about on-the-ground costs associated with structural change.

This is precisely where local authorities can positively steer a just energy transition. Recent state-defined regulations in Germany designate specific municipal duties for their jurisdictions' just transition – this is a welcome difference from the lack of municipal obligations to address climate and energy issues. At the least, local authorities should convince their own citizens and businesses of the need to prepare well for structural change not only for the likely costs (e.g., job losses or community identity crisis), but also worthwhile opportunities, solutions and benefits.<sup>lxxxviii</sup>

A just coal transition also has clear overlaps with interests related to municipal mandates. For example, Germany may have the most severe health impacts related to coal of all European countries,<sup>lxxxix</sup> which should especially interest nearby communities. Meanwhile, local leaders in coal regions are already concerned with “brain drains” and population declines, up to nearly 10%.<sup>lxxx</sup> Municipalities may also be best placed to coherently address other societal challenges (e.g. unemployment, domestic violence, addiction, mental health, etc.) and services (e.g. urban regeneration, transport, heating, etc.) impacted by the coal transition.

### *Implementation and Promising Practices*

Leipzig is seeing a resurgence since substantial influxes from surrounding coal-related areas (as their mines and industries went into decline). Unemployment has decreased dramatically, partially because it and other nearby cities founded a [Central German Metropolitan](#) strategic body to help coordinate innovation in the wider area (e.g. smart specialization evolving its industrial core). The city continues enhancing urban regeneration, social cohesion, public transport, housing, heritage, etc. along its latest 2030-oriented strategy, using public participation methods to ensure wide acceptance.<sup>lxxxxi</sup>

Essen, in the heart of the Ruhr area, is often cited as Germany's post-industrial success story, achieved through a combination of education, innovation, culture and sustainable infrastructure. Though its last coal mine closed in 2018, the world's formerly most productive coal mine, [Zollverein](#), is now famous as a UNESCO World Heritage site. Two new Ruhr universities established in the 1970s to build up a long-term transition were also complemented by reskilling programmes successfully shifting coal workers to new jobs. Meanwhile, with modern topics like green growth and the digital economy key to its own 2030 strategy, Essen has already been named the [2017 European Green Capital](#) (and of [Culture in 2010](#)), in recognition of its substantial success in transforming itself from a coal and steel town, into a cultural, healthy and green city on the move.<sup>lxxxii</sup>

At a federal level, Germany set up in 2018 the so-called “Coal Commission”<sup>lxxxiii</sup> to provide multi-level/-sectoral recommendations related to a decarbonised energy transition.<sup>lxxxiv</sup> The major outcomes of this cooperative work have been two 2020 national laws:

- The “Act on the Phase-out of Coal-fired Power Plants” stipulates complete German coal phase-out of power production and mine closures by 2038 at the latest (with a possibility by 2035 already built in), defined on a rolling basis and reviewed every two years;
- The complementary “Structural Reinforcement Act for Mining Regions” designates around 40 billion Euros, most meant for federal projects (e.g. transport infrastructure or establishing agencies and institutes) benefiting the Rhenish, Central Germany and Lusatian areas.<sup>lxxxv</sup>

Currently, the phase-out date outlined by this pair of acts hardly sets the most ambitious timeline when compared to others in the EU,<sup>lxxxvi</sup> and is also not compatible with Germany's new climate neutrality target by 2045. Thus it is likely that an even earlier closure may be necessary to remain on track with EU and German climate ambitions.<sup>lxxxvii</sup> Nonetheless they still have at least placed a final binding “expiration date” onto Germany's continued reliance on burning coal, which then crucially provides public authorities and others with a definite planning horizon.

However, the latter law at least sets up and monitors funding mechanisms not only for federal projects, but also with up to 14 billion Euros for significant investments into the three targeted coal regions, with an additional 1 billion Euros additionally set aside for communities located near “economically significant” coal power plants,<sup>lxxxviii</sup> and could even be

used to facilitate industrial coal phase-outs (e.g. via new business models). A viable example is the state of Saxony facilitating the introduction of three prominent new research institutes in two Lusatian cities: a branch of the federal [DLR](#) (on low-carbon industrial processes) in Zittau, and [CASUS](#) and [Fraunhofer Hydrogen Lab](#) in Görlitz. What remains to be seen is how other towns and cities across Germany can take advantage of these funding schemes to ensure that the national energy transition also benefits their local communities.

### Intra-country compare and contrast

In summarizing the just transition experience in Canada and Germany, it is clear that the use of the term has slightly different meanings in each country. In Germany it is most-often linked to a just transition away from coal, and in Canada it is more often linked to a broader transition to a low-carbon economy. In both countries, concerns for the coal transition are highly regionalized, with local governments in those regions playing an active role shaping their own future low-carbon economies.

Just transition work in both nations is tied to concerns for energy poverty, though this issue has a more prominent connection in Canada than Germany due mainly to Canada's size and the number of rural and remote communities. Local governments in both countries are addressing the issue through energy efficiency programming and upgrades, as well as working with social services and other orders of government to support residents living in energy poverty.

Energy communities as a mechanism to support citizens to share in the just transition, as well as the positive role which municipalities can play in it, is relatively unique to Germany. While Canada has a small number of energy cooperatives, they are not as prevalent in the just transition discourse. Energy communities is highlighted more in the Emerging Action Areas section, but due to its relevance to just transition, is also profiled in this section.

Finally, Germany and Canada have identified next generation energy technologies, including hydrogen, as an important part of their energy and economic future, at least on a national level, though their links to a just transition must still be explored adequately. Like other emerging fields and next generation technologies, hydrogen development might possibly have relevance at various higher levels, from federal policy to industry transition to international trade. What still remains to be made clear is the role that local governments should play in supporting, or even not supporting, hydrogen and other emerging industries within their jurisdictions. In any case, local authorities should definitely ensure that any such transition to hydrogen or other emerging fields is truly just and beneficial to their own communities.

### Potential focus area for intra-country exchange

**Just Transition:** Post-industrial communities in each country could exchange strategies and lessons learned in their efforts towards transitioning away from carbon-intensive economies (e.g. Edmonton, Hamilton, Leipzig and Essen). This could focus on the governance aspects of the just transition, and related socio-economic and cultural concerns, as well as how local governments can work with both regional and federal partners in applying a justice lens to broader economic and climate goals.

**Energy Poverty:** Canadian and German local governments could benefit from learning from each other's policies, programmes and plans relating to energy poverty. Germans could learn from Canadians' mapping and work with indicators, as well as the formulation of energy strategies through the Global Covenant of Mayors, of which there are relatively few in Germany. Canadians could learn particularly from the western German communities affected by the recent flooding in 2021, particularly in relation to the way they are recovering and addressing issues of energy poverty.

**Energy Communities:** Canadian cooperatives and local governments could benefit greatly from learning about how energy communities contribute to Germany's just transition efforts, including the role German local governments have in facilitating them.

**Hydrogen and Emerging Technologies:** Local governments in both countries could benefit greatly from identifying both potential benefits and pitfalls from emerging technologies and the hydrogen economy, the latter of which is a priority at

the federal level for both Germany and Canada. This could include establishing mechanisms for exchange on attracting and incubating next generation energy companies, as well as critical thinking about them. The Germany and Canadian embassies and consulates should be engaged to explore how their interest in trade promotion and investment relationship could dovetail with energy transition activities. At the same time local authorities in both countries should still build up their own knowledge and capacities to ensure that any emerging industries which they consider supporting truly will deliver just benefits to their communities.

- 
- <sup>lviii</sup> UNFCCC (2016). Just Transition in the Workforce, and the Creation of Decent Work and Quality Jobs. Retrieved September 28, 2021 from <https://unfccc.int/sites/default/files/resource/Just%20transition.pdf>
- <sup>lix</sup> Government of Canada (2021) People-Centred Just Transition: Discussion Paper. Retrieved September 23, 2021 from [https://www.rncanengagenrcan.ca/sites/default/files/pictures/home/just\\_transition\\_discussion\\_paper\\_-\\_en\\_-\\_july\\_15.pdf](https://www.rncanengagenrcan.ca/sites/default/files/pictures/home/just_transition_discussion_paper_-_en_-_july_15.pdf)
- <sup>lx</sup> City of Montreal (2021) Climate Plan 2020 - 2030. Retrieved September 3rd from [https://portail-m4s.s3.montreal.ca/pdf/climate\\_plan\\_2020\\_2030\\_vdm.pdf](https://portail-m4s.s3.montreal.ca/pdf/climate_plan_2020_2030_vdm.pdf)
- <sup>lxi</sup> Efficiency Canada (2020) Energy efficiency programs can change the energy poverty conversation. Retrieved on September 3, 2021 from <https://www.efficiencycanada.org/energy-efficiency-programs-can-change-the-energy-poverty-conversation/>
- <sup>lxii</sup> <https://energypoverty.ca/backgrounder.pdf>
- <sup>lxiii</sup> UNDESA [United Nations Department of Economic and Social Affairs] (2016). The World Economic and Social Survey 2016: Climate Change Resilience “an Opportunity for Reducing Inequalities.” United Nations. Retrieved from <https://wess.un.org/archive/2016/index.html>
- <sup>lxiv</sup> Federation of Canadian Municipalities (2021) Quatsino First Nation Community Energy Plan. Retrieved October 7, 2021 from <https://fcm.ca/en/case-study/mcip/quatsino-first-nation-community-energy-plan>
- <sup>lxv</sup> Region of Waterloo (2021) Transform WR. Retrieved September 7, 2021 from <https://www.engagewr.ca/waterloo-regions-climate-action-strategy>
- <sup>lxvi</sup> ICLEI Canada Webinar, (2020) Let's Discuss Climate Ambition Webinar <https://icleicanada.org/insights-and-updates-from-2021/>
- <sup>lxvii</sup> Tower Renewal Partnership (2021) Retrieved October 6th from <http://towerrenewal.com/about-us/>
- <sup>lxviii</sup> European Commission (2020) The Just Transition Mechanism: Make Sure No One Is Left Behind (leaflet). Retrieved from [https://ec.europa.eu/info/sites/default/files/just\\_transition\\_mechanism\\_no\\_one\\_is\\_left\\_behind.pdf](https://ec.europa.eu/info/sites/default/files/just_transition_mechanism_no_one_is_left_behind.pdf)
- <sup>lxix</sup> Die Bundesregierung (2021) Generationenvertrag für das Klima. Retrieved from <https://www.bundesregierung.de/breg-de/themen/klimaschutz/klimaschutzgesetz-2021-1913672>
- <sup>lxx</sup> Deutsche Presse-Agentur and Heise Online (2021) Bundesnetzagentur: Anzahl der Stromsperrungen 2020 zurückgegangen. Retrieved September 2021 from <https://www.heise.de/news/Bundesnetzagentur-Anzahl-der-Stromsperrungen-2020-zurueckgegangen-6193405.html>
- <sup>lxxi</sup> Bundesverband Neue Energiewirtschaft e.V. (2020) Stellungnahme Energiearmut Position zu Stromsperrungen und zugehörigen sozialen Fragen. Retrieved from: [https://www.bne-online.de/fileadmin/bne/Dokumente/Positionspapiere/2020/20200114\\_bne\\_Stellungnahme\\_Energiearmut\\_final.pdf](https://www.bne-online.de/fileadmin/bne/Dokumente/Positionspapiere/2020/20200114_bne_Stellungnahme_Energiearmut_final.pdf)
- <sup>lxxii</sup> Deutsche Welle (2007) The Rise and Fall of Germany's Coal Mining Industry. Retrieved September 2021 from [www.dw.com/en/the-rise-and-fall-of-germanys-coal-mining-industry/a-2331545](http://www.dw.com/en/the-rise-and-fall-of-germanys-coal-mining-industry/a-2331545)
- <sup>lxxiii</sup> Bock, N., Litz, P. and Agora Energiewende (2020) Germany's long goodbye from coal - Part 11 of the Agora webinar series (in English). Article and video recording retrieved September 2021 from [www.agora-energiewende.de/en/events/?tx\\_agorathemen\\_themenliste%5Bprodukt%5D=1924&cHash=a47ed8edec9ec225b5d41c3d39c01b1a](http://www.agora-energiewende.de/en/events/?tx_agorathemen_themenliste%5Bprodukt%5D=1924&cHash=a47ed8edec9ec225b5d41c3d39c01b1a)
- <sup>lxxiv</sup> Global Energy Monitor (2021) Global Coal Mine Tracker. Retrieved August 2021 from <https://globalenergymonitor.org/projects/global-coal-mine-tracker>
- <sup>lxxv</sup> Global Energy Monitor (2021) Global Coal Plant Tracker. Retrieved August 2021 from Global Energy Monitor (2021) Global Coal Mine Tracker. Retrieved September 2021 from <https://globalenergymonitor.org/projects/global-coal-mine-tracker>
- <sup>lxxvi</sup> European Union Emissions Trading System (2021) Installations. Retrieved September 2021 from <http://www.euets.info/installations>
- <sup>lxxvii</sup> Rinscheid, A. and Greenpeace (2018) Soziale Akzeptanz eines Kohleausstiegs in Deutschland und in den Kohlerevierern: Ergebnisse einer Umfrage und Joint-Analyse. Retrieved from [https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/2018-05-07\\_energie\\_kohle\\_studie\\_-\\_soziale\\_akzeptanz.pdf](https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/2018-05-07_energie_kohle_studie_-_soziale_akzeptanz.pdf)
- <sup>lxxviii</sup> de Grandpré, J., Blahova, K. and Pötzsch, T. (2019) WWF presentation "Forum of Mayors on Just Transition - Climate Ambition and Just Transition Hand in Hand" at the 6<sup>th</sup> Working Group meeting of the Just Transition Platform (Brussels, 16 Oct 2019). Video recording and presentation file (pgs 13-22) retrieved September 2021 from <https://ec.europa.eu/energy/topics/oil-gas-and-coal/EU-coal-regions/working-groups-meetings/6th-working-group-meeting-en>
- <sup>lxxix</sup> Europe Beyond Coal (2021) Coal Exit Tracker - map layer "Health Impacts". Retrieved September 2021 from <https://beyond-coal.eu/coal-exit-tracker/?type=maps&layer=2>
- <sup>lxxx</sup> EIT Climate KIC: Re-Industrialise (2021) European Union Coal Regions - map layer "Population Variation [2017 compared to 2010 in %]". Retrieved September 2021 from <https://re-industrialise.climate-kic.org/maps/co2-map>
- <sup>lxxxi</sup> Woitek, F. (2019) Free State of Saxony Ministry for Economic Affairs, Labour and Transport presentation "Transition success stories - The case of Leipzig" at the 6<sup>th</sup> Working Group meeting of the Just Transition Platform Platform (Brussels, 16 Oct 2019). Video recording and presentation file (pgs 71-87) retrieved September 2021 from <https://ec.europa.eu/energy/topics/oil-gas-and-coal/EU-coal-regions/working-groups-meetings/6th-working-group-meeting-en>
- <sup>lxxxii</sup> Pliessnig, M. (2020) "The city of Essen as a model for structural change" at [IUC final event](#). Presentation file received directly from its author in December 2020.

- 
- <sup>lxxxiii</sup> Litz, P. and Agora Energiwende (2019) The German Coal Commission – A Roadmap for a Just Transition from Coal to Renewables. Article and report retrieved September 2021 from [https://www.agora-energiwende.de/en/publications/?tx\\_agorathemen\\_themenliste%5Bprodukt%5D=1534&cHash=2c8b692281784a873eee5785b1ed37cb](https://www.agora-energiwende.de/en/publications/?tx_agorathemen_themenliste%5Bprodukt%5D=1534&cHash=2c8b692281784a873eee5785b1ed37cb)
- <sup>lxxxiv</sup> German Federal Ministry of Economic Affairs and Energy (2019) Commission on Growth, Structural Change and Employment – Final Report. Retrieved August 2021 from <https://www.bmwi.de/Redaktion/EN/Publikationen/commission-on-growth-structural-change-and-employment.html>
- <sup>lxxxv</sup> German Federal Ministry of Economic Affairs and Energy (2020) Final decision to launch the coal-phase out – a project for a generation (press release). Retrieved August 2021 from <https://www.bmwi.de/Redaktion/EN/Pressemitteilungen/2020/20200703-final-decision-to-launch-the-coal-phase-out.html>
- <sup>lxxxvi</sup> Europe Beyond Coal (2021) Coal Exit Tracker – map layer "Phaseout Plans". Retrieved August 2021 from <https://beyond-coal.eu/coal-exit-tracker/?type=maps&layer=4>
- <sup>lxxxvii</sup> Gagnebin, M. and Agora Energiewende (2020) What's the timeline for Germany's coal phase out? Germany will phase out coal by no later than 2038, but it may happen sooner. Retrieved September 2021 from [www.agora-energiwende.de/en/publications/?tx\\_agorathemen\\_themenliste%5Bprodukt%5D=1964&cHash=39a7a1b8fbfa7cff591766cd43991e1a](http://www.agora-energiwende.de/en/publications/?tx_agorathemen_themenliste%5Bprodukt%5D=1964&cHash=39a7a1b8fbfa7cff591766cd43991e1a)
- <sup>lxxxviii</sup> L'Hoest, R. (2019) German Federal Ministry of Economic Affairs and Energy presentation "The 'Structural Strengthening Act' Implementing the recommendations of the German Commission on Growth, Structural Change and Employment" at the 6<sup>th</sup> Working Group meeting of the Just Transition Platform (Brussels, 16 Oct 2019). Video recording and presentation file (pgs 23–27) retrieved September 2021 from [https://ec.europa.eu/energy/topics/oil-gas-and-coal/EU-coal-regions/working-groups-meetings/6th-working-group-meeting\\_en](https://ec.europa.eu/energy/topics/oil-gas-and-coal/EU-coal-regions/working-groups-meetings/6th-working-group-meeting_en)

# Climate Adaptation



## Climate Change Adaptation

### Introduction

The recent [Intergovernmental Panel on Climate Change 6th Assessment Report](#) is a wakeup call to the scale and pace of action required to prevent and cope with severe future climate change impacts. Global surface temperatures are projected to rise until at least 2050 and are likely to exceed 1.5°C and 2°C before the end of the 21<sup>st</sup> century unless immediate and deep greenhouse gas (GHG) emission reductions occur over the next decade.<sup>lxviii</sup> The report's regional risk assessment also supports research highlighting the disproportionately greater climate impacts that Canada will continue to experience and underlines the increased risks and vulnerabilities of Canadian municipalities.<sup>xc</sup> Even with mitigation targets becoming increasingly more aggressive, current atmospheric GHG concentrations commit us to future warming and climate impacts for decades to come.<sup>xcii</sup> Given this certainty, climate adaptation is a necessity for all municipal governments to tackle. Adaptation addresses the impacts of climate change, and involves measures to reduce the vulnerability of social, environmental and economic systems. Engaging in adaptation encourages municipalities to recognize that climate change is happening, identifies risks and vulnerabilities (e.g. flooding or coastal erosion), prepares and implements risk responses (e.g. flood management) and evaluates the outcomes of the responses.

### Relationship with Climate Mitigation

Mitigation at the municipal level aims to reduce the production of GHG emissions through policies, regulatory instruments, and programs. Simply put, mitigation aims to avoid the unmanageable, while adaptation aims to manage the unavoidable.<sup>xcii</sup> In both Canada and Germany, mitigation has been the primary focus over the past decade of climate action. Nonetheless, adaptation has been gaining momentum in recent years, likely due to the increase in extreme weather events (e.g. wildfires, floods, and heat waves) that have caused municipalities significant social, environmental and economic damage.

Though mitigation and adaptation have often been addressed separately, incorporating both types of interventions is necessary for a comprehensive response to climate change. Municipalities have begun to apply nature-based solutions (NBS) and a so-called low carbon resilience (LCR), also known as integrated climate action, lens which integrates mitigation and adaptation through municipal planning and decision-making approaches that reduce GHG emissions and vulnerabilities to the impacts of climate change, and realizes co-benefits of their activities<sup>xciii</sup> (e.g. Montreal's Urban Forest Action Plan and Dortmund's integrated transition ambitions). Both NBS and LCR are discussed further in the Emerging action areas chapter of this document.

### Governance Context and Policy Direction on Adaptation

#### Canada

In addition to signing onto the Paris Climate Agreement, the Government of Canada has produced several reports that inform and guide decision-makers on climate change adaptation. In 2016, it released the Pan Canadian Framework on Clean Growth and Climate Change, which includes adaptation considerations and actions to improve climate resiliency. Major focus areas include building climate resilience through infrastructure, protecting and improving human health and well-being, and reducing climate-related hazards and disaster risks. The framework recognizes the important role that municipalities will play in implementing climate solutions locally. Following the launch of the Paris Agreement, the Government of Canada has undertaken the development of a National Adaptation Strategy done collaboratively with provincial, territorial and municipal governments, as well as Indigenous peoples and other key partners. The strategy is set to be completed in the summer of 2022. While federal and provincial governments provide strategic focus, standards, and potential funding streams for adaptation, it will be up to local governments to tailor climate change adaptation strategies to their local circumstances and the unique set of climate change impacts they already do, or expect to, face.

#### Germany

In February 2021, the European Commission updated the EU Strategy on Adaptation to Climate Change<sup>xciv</sup>, which complements the European Green Deal, and is related to the European Climate Law with an overarching goal to achieve net-zero GHG emissions by 2050. It contains an obligation for EU member states to implement their own national

adaptation strategies, which Germany already adopted in 2008. Germany's Climate Action Law is more ambitious than the EU law, with a goal of achieving its targets by 2045 with an associated German Strategy for Adaptation to Climate Change.

### Two approaches: Planning and service delivery

Many local governments in both Canada and Germany have initiated some form of adaptation to counter the effects of climate change. However, it still varies where these measures fit within the adaptation continuum, and the degree to which adaptation has been formalized within municipal planning, policies and programs. Adaptation in both Canadian and German cities is being addressed primarily through two broad approaches: planning and service-delivery, or a combination of both. In fact, applying both approaches in a complimentary fashion encourages the mainstreaming of adaptation throughout decision-making processes and into the culture of municipal organizations and their activities.<sup>xcv</sup>

#### Planning Approaches

Planning-based approaches integrate climate change considerations within higher-order planning processes that facilitate decision-making with adaptation already "baked in" (e.g. official community plans, official plans or regional growth plans). Approaching adaptation within planning also creates more opportunities to identify and leverage multiple tools for adapting to climate risks (e.g. policies, regulations, operational decisions and maintenance procedures).<sup>xcvi</sup>

Approaching climate change adaptation from a comprehensive planning perspective creates opportunities to identify and leverage co-benefits of multiple strategies and tools (e.g. local policies, programmes, infrastructure functions, citizen engagement and bottom-up initiatives). It also harmonises local policy with regional, state/provincial and national policies, allowing for greater impact of climate change adaptation action.<sup>xcvii</sup>

#### Service delivery or Operations-based Approaches

Climate change poses a significant risk to municipal services. While planning approaches have long been argued to be the most effective way to address climate change, they can be slow to develop, difficult to implement and planning cycles may limit responsiveness. Integrating adaptation into service-delivery plans (e.g. Asset Management, Infrastructure, Emergency Management or Transportation) and daily operational decisions are increasingly being seen as practical, responsive and cost-effective approaches to bolstering climate resilience.<sup>xcviii</sup>

Adaptation to climate change as a municipal task is a relatively new and not yet well recognised action area in Germany,<sup>xcix</sup> even though climate change clearly poses a risk to municipal services. Therefore, municipal governments have needed to respond by incorporating climate adaptation decisions and actions into their service-delivery planning (e.g. (Critical) Infrastructure, Emergency Management, Mobility and transport, or land use and buildings). Such operational decisions are often associated with response to cost-effectiveness, and practicality.

Local governments in Germany are at varying stages in the process towards developing and implementing a climate adaptation strategy - some are more advanced and many more are just starting. German cities and urban planners in all stages of the planning, implementation, and monitoring process have a variety of standards, tools and processes available to them to organize their work, including ISO 37101 standard, which presents a coherent, community-based management approach to help cities better coordinate participatory development and implement local adaptation programs.<sup>c</sup> Based on such standards, the Climate-Adapt [Urban Adaptation Support Tool](#), created by the European Environmental Agency, outlines a six step process needed to make progress towards climate change adaptation goals, and it is the official support tool of the European Covenant of Mayors for Climate and Energy. Climate-Adapt also promotes the [Ramses Urban Support Tool](#), which builds upon Climate-Adapt's own planning framework to include flexible planning under uncertain conditions.<sup>ci</sup> German climate related services, data, and information at the national and state governmental level are made accessible in one central location via the [KliVO Portal](#).

## STAGES OF LOCAL GOVERNMENT CLIMATE ADAPTATION CONTINUUM

### Stage 1: Initiation and Engagement

During this initial stage, cities focus on a number of enabling actions which drive successful implementation of adaptation measures. Adaptation requires building capacity and high-level support within and across government departments, as well as amongst relevant external stakeholders and Indigenous actors. Engagement and partnership building are critical activities to deepen understanding of the risks and impacts, reduce uncertainties, improve efficacy of adaptive measures and increase buy-in.<sup>cii</sup>

### Stage 2: Impacts, Risk and Vulnerability Assessment

Climate change risk assessments, in their various forms and applications, form the basis for adaptation action in a growing number of municipalities across Canada. Risk assessments are particularly critical in identifying existing context-specific vulnerabilities and can also be used as a predictive tool to determine the likelihood and consequences of future risks under varying climate scenarios. There are a number of risk assessment and management frameworks currently employed by local governments, including:

- Ontario Climate Change and Health Toolkit, risk assessment framework (2016);
- International Organization for Standards (ISO) products such as the ISO 31000 Risk Management Guidelines, ISO 31010 Risk Assessment Techniques, ISO 14090 Adaptation to Climate Change and ISO 14091 Adaptation Guidelines on Vulnerability and Risk Assessment;
- Building Adaptive and Resilient Communities (BARC) – Milestone 2 – Vulnerability Risk Assessment; and
- Public Infrastructure Engineering Vulnerability Committee (PIEVC) – Engineering Protocol.

Municipalities are able to choose an approach and risk framework that best suits their own needs, priorities and capacities in order to inform adaptation planning.

### Stage 3: Planning

Local governments can develop an adaptation vision and objectives with clear goals to address the priority areas identified by the climate impact, risk and vulnerability assessments. A number of planning actions are carried out during this stage, including: identifying appropriate adaptation options, selecting relevant baselines and indicators to be used for monitoring and evaluation, identifying financing and developing budgets, developing an implementation schedule, and creating action and launch plans. Adaptation options need to cover a broad range of climate risks and address both current and future vulnerabilities. Adaptation options include: capital investments (e.g. investing in blue-green infrastructure and building retrofits); education and awareness building; bylaws, policies and economic instruments; and changes to service-delivery and operations plans.

### Stage 4: Implementation

Implementation is where planned actions are finally put into place. Implementation of the adaptation measures requires a number of activities including: solidifying support from the city council and community; using a wide variety of implementation tools; tracking and reporting on interim progress (challenges and successes) to maintain momentum; and continued training, education and awareness initiatives for city staff, related stakeholders and the public.<sup>ciii</sup>

Although adaptation planning has been progressing quickly in cities and towns, adaptation implementation has been slower to advance due to a variety of barriers (e.g., financing, decision-support tools, competing priorities, governance and professional silos).<sup>civ</sup> A number of emerging strategies to address these barriers including: developing adaptation plans that explicitly focus on implementation; mainstreaming of adaptation into existing service-delivery and operations; incorporating climate risks into asset management; and including multiple stakeholders and Indigenous actors throughout all adaptation stages from initiation to implementation and beyond.<sup>cv</sup>

### Stage 5: Monitoring, Evaluation and Reporting

As local governments begin to move from adaptation planning to implementation, there is an urgent need for monitoring and performance evaluation approaches that can be used to identify baseline conditions, guide actions, track progress and evaluate the performance of adaptive measures. To do this, cities will need to develop monitoring and evaluation protocols (MEPs) including specific indicators and performance benchmarks. While promising approaches exist, monitoring and evaluation of adaptation measures are still uncommon in Canada at the local level. This is partly due to the fact that cities are only just beginning to enter the implementation stage in a significant way,<sup>cvi</sup> however, there are some examples beginning to emerge.

## Local Government Areas of Influence in Adaption

Adaptation cuts across all municipal planning and service-delivery in both Canadian and German cities, most notably asset management, land-use planning, emergency response, health, and well-being.

### Asset Management

Canadian cities are beginning to embed adaptation into asset management planning in order to ensure they are well adapted and resilient to increasing climate change risks. This can be done through capital investments into grey infrastructure (e.g. storm water management infrastructure or passive cooling in buildings) or blue-green infrastructure (e.g. ecological restoration, bioswales or green roofs) or through incorporating adaptation principles into the design or approach of an infrastructure project.<sup>cvii</sup>

EU member states are required to design national energy and climate plans (NECPs) that include analyses of current investment flows related to decarbonisation in their economy. At the EU level, climate specific investments do not differentiate between climate change adaptation and mitigation. This, in turn, poses challenges at the state and local levels, which in the case of Germany also do not systematically track budget contributions to climate-specific activities. At the municipal level, cities regularly make infrastructure investment choices based on their local land use and climate adaptation strategies, if any, which include investing into grey, green, and blue-green infrastructure and NBS.

### Land-use planning

Land-use planning at the local level can support an integrated approach to addressing climate risks, since the spatial configuration of cities has direct implications for both adaptation and mitigation.<sup>cviii</sup> Land-use planning can encourage development (e.g. zoning bylaws) in areas less susceptible to current and future climate change risks, and also bolster more sensitive areas through greater integration of NBS. For example, cities can avoid the risks of flooding by planning growth in areas less susceptible to floods, and instead integrating and preserving green assets in areas prone to flooding.

In Germany, landscape plans (Landschaftspläne) are city-wide instruments that often include neighbourhood-scale open space structure plans (Freiraumplanung) and connections to regional landscape structure plans (Landschaftsrahmenpläne) and the state level landscape programme. At the city level, the green space, land use, and development plans (Grünordnungsplan/ Flächennutzungsplan/ Bebauungsplan) define the built environment, nature areas, recreation areas, agriculture, forestry and water quality. During planning process, the effects of existing and foreseeable land-use changes are analysed and assessed. These binding plans include a public participation process and socio-economic factors, as well as specifying protection, management, and development measures in great detail. They also have the potential to align cities with national and European policy and initiatives such as the European [Water Framework Directive](#), [Floods Directive](#), [Strategic Environmental Assessment](#), [Biodiversity Strategy](#).

### Emergency Management

Climate change is increasing the frequency and severity of a number of extreme weather hazards that pose a risk to Canadian cities (e.g. wildfires, flooding, heat waves, hurricanes and tornadoes).<sup>cix</sup> In response, Canadian cities have begun to re-develop emergency management plans and protocols to factor in the effects of climate change. These set out the guidelines for coordination between government departments and include communication plans and procedures for the public to ensure a swift response during emergencies. For example, Toronto's Hot Weather Response Framework<sup>cx</sup> includes planning and service-delivery plans for expanded cooling centre infrastructure, a detailed communication plan, and a heat alert response system to address increased heat health risks.

Disaster management in Germany is rooted in state and municipal structures. The states are responsible for legislating rescue services and disaster control (technical and natural disasters) and they delegate several administrative and operational tasks to the regional and local level. In emergencies, county governors can request assistance from other regions to combine resources in crisis-fighting situations with task forces set up by a regional state government. Risk assessments happen at the national level and are supplemented by specific risk analyses conducted by the state and

local authorities, which municipalities use to plan for preventative measures largely through climate adaptation strategies.

The National Focal Point for the [Sendai Framework for Disaster Risk Reduction \(SFDRR\)](#) is the German Federal Office of Civil Protection and Disaster Assistance, which then sets the framework for disaster reduction. As described by Climate-Adapt, the Sendai Framework outlines seven clear targets and four priorities for action to prevent new disaster risks and reduce existing ones: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

### *Health and Well-being*

Climate change is impacting the health (physical and mental) and well-being of individuals and communities across Canada.<sup>cxii</sup> Moreover, there is increasing evidence that complex interplay between socio-economic factors and increased vulnerability and exposure to the effects of climate change means the health consequences are often not felt equally across cities<sup>cxiiicxiv</sup> Municipal health agencies must therefore apply an equity lens and work across sectors and departments to address health and well-being issues. For example, cities can use the Government of Ontario's [Climate Change and Health Toolkit](#) which provides guidance on assessing the unique health risks and vulnerabilities associated with climate change as well as develop strategies that can be implemented to build resilience and increased equity.<sup>cxv</sup>

### *Funding Mechanisms*

Financing is one of the key barriers to adaptation at the local level. However, there are a number of conventional and innovative funding pathways that Canadian and German municipalities have access to already.

### *European Union*

The European Union adopts [missions](#), which are commitments to solving some of the greatest challenges facing the world. One such proposed mission is "A Climate Resilient Europe" to prepare Europe for climate disruptions and accelerate the transformation to a climate resilient Europe by 2030. This gives Europe the chance to turn the challenge of adapting to climate change into an opportunity to "make Europe resilient, climate-prepared, and just."<sup>cxvi</sup> Such missions are an integral part of the Horizon Europe programme, which is the EU's key funding programme for research, innovation and coordinated support actions, which in turn municipalities access through joint partnerships and consortia with other public sector peers, NGOs, academic and research institutions, SMEs, etc. The European Commission has also published an action plan for financing sustainable growth and it includes green bonds (to raise capital from private markets) and resilience and catastrophe (CAT) bonds (involving local authorities and insurance companies to fund resilient infrastructure). The European Covenant of Mayors also has established an [interactive funding library](#) useful for guiding its municipalities<sup>cxvii</sup>.

### *National*

Canadian national mechanisms include federal carbon pricing (e.g. gas tax) or granting programs aimed at funding local climate action. In some cases, federal funding programs are operated by the Federation of Canadian Municipalities (FCM). Federal funding programs include: Disaster Mitigation and Adaptation Fund (DMAF); Municipalities for Climate Innovation Program (MCIP); and the Green Municipal Fund (GMF).

The Nationale Klimaschutzinitiativ (NKI/ National Climate Initiative – NCI) funds local projects in which municipalities can be direct or secondary beneficiaries, co-financing is also available from the *Kommunalrichtlinie* (Local Authorities Guideline), and since 2012, local initiatives have been supported within the framework of the DAS programme, "Promotion of Measures for Adaptation to Impacts of Climate Change" operated by the federal environmental ministry.

### *Sub-National*

Sub-national counterparts in Canada include provincial and territorial funding programs aimed at local climate action. Funding mechanisms and priorities vary by province and territory. Examples include the Carbon Fund and Climate Action

Revenue Incentive Program (CARIP) in British Columbia), Community Environment Fund of Ontario, Quebec's Climate Municipalities Program, Conservation and Climate Fund of Manitoba, GHG Grant Program for Government in the Northwest Territories and Climate Challenge Fund for Prince Edward County.

Funding mechanisms and priorities at the German state level vary from state to state, but generally focus on local climate action. The JESSICA Programme is the Joint European Support for Sustainable Investment in City Areas. This initiative was developed by the European Commission and the European Investment Bank (EIB), in collaboration with the Council of Europe Development Bank (CEB). Under this programme, EU Member States may use a portion of their EU grant funding and Structural Funds to make repayable investments into projects forming part of an integrated plan for sustainable urban development. These investments could be in the form of equity, loans and/or guarantees, and are delivered to projects via Urban Development Funds and, if required, Holding Funds.

### *Third-party Funding*

In Canada, third-party funding might be raised through donations from philanthropic organizations (e.g. financing for municipal park initiatives); public-private partnership (often abbreviated P3 or PPP) which include contractual agreements with private sector partners for the delivery of specific infrastructure projects. Meanwhile in Germany, third-party funding opportunities include raising funds through similar means (e.g. donations and PPPs), but also schemes such as energy performance contracting are relatively common.

### *Internal and Revolving Funding Mechanisms*

From a Canadian perspective, another kind of funding might be: raised through borrowing or the allocation of reserve funds; funding raised directly through property taxation (e.g. tax increment financing), permits or service fees; development cost charges; incentive-based tools such as local improvement charges;<sup>cxviii</sup> revolving funds where generated savings can be used for adaptation projects; density for benefit agreements; and conservation land tax incentives. Meanwhile, German municipalities finance a significant amount of climate adaptation related investments from their own funds, which are based on tax revenue, fees for tasks (e.g. trash collection), and grants from the state (awarded based on size, financial capacity, and local tax revenue).

## *Opportunities in Canada and Germany*

### Access to data and science

Canadian municipalities have the advantage of having access to national, regional and locally relevant data from a wide number of reputable sources. Data is open and free to use, including databases and tools for exploring the projections of climate change effects under different scenarios in the future such as the [Climate Atlas of Canada](#) and [Climate Data Canada](#).

### Abundance of support tools and resources

Currently within the Canadian adaptation landscape there is an abundance of tools and resources to assist local governments in moving through the adaptation continuum. These resources range from guidebooks, online tools, case studies, checklists, and best practice documents; and can be accessed through several libraries and databases of content.

German municipalities have access to the Climate-Adapt information platform, which shares data and information related to climate change and planning with interactive climate indices from the Copernicus Climate Change Service and publications from the European Climate and Health Observatory

### Momentum

Advancing adaptation is currently gaining critical momentum across the public landscape in Canada with interest from federal, provincial and local governments. This advancement has mainly been in carrying out vulnerability and risk assessments, integrating climate change into asset management, and the development of adaptation plans.

## *Regulatory Instruments*

Trading of land planning permits is a new instrument to promote land restoration. It is currently being tested in a pilot project commissioned by the Federal Environment Agency. Similar to trading of CO<sub>2</sub> emission allowances, it aims to set financial incentives for municipalities which redevelop brownfield sites and use land efficiently.<sup>cxi</sup>

## Challenges in Canada

A number of barriers make it difficult to implement adaptation, though it should be noted that they can. The barriers presented below are drawn from Canadian and international literature, and vary in their extent across Canada.<sup>cxi</sup>

### Finance and resourcing

- Conflicting incentives when municipal revenue is contingent on development (e.g., property tax, development cost charges)
- Funding largely limited to large-scale infrastructure projects, which favour larger cities
- Limited innovative financial models (e.g. green/resilience bonds, cost-sharing schemes, public-private partnerships) and public opposition to innovative approaches to financing adaptation
- Limited internal capacity, combined with limited national mandates for adaptation
- Limited collaboration across professional associations
- Compartmentalization and institutional fragmentation

### Prioritizing/Governance

- Federal departments are politically limited in direct transfer payments to local governments, requiring coordination and relationships with provincial governments and/or third parties
- Limited enabling conditions, such as mandates, policy, regulations, standards and guidelines
- Limited political will, motivation, willingness to act and belief that action will be effective
- Limited coordination with private sector and property owners, as well as vulnerable groups

### Challenges in Germany

While climate adaptation work is taking off in Germany, there are a number of interconnected barriers and challenges to action that municipalities have identified:

- Competing land-use when municipal revenue is contingent on development (e.g., property tax, business and economic development)
- Compartmentalized and siloed departmental budgets
- Limited or still-emerging alternative financial models
- Limited public support or outright opposition to funding and/or project implementation
- That the field of climate adaptation, as well as climate mitigation even, remains a voluntary effort for municipalities, thereby limiting regulations, budgetary lines and even political appetite in many cases
- Limited staff capacity and expertise
- Limited jurisdictional power over private and/or state-owned property

## Promising Practices

### *Selkirk, Manitoba*

The City of Selkirk (Manitoba) developed its Climate Change Adaptation Strategy 2019-2029 (CCAS) as part of a proactive approach to asset management that integrates climate change into planning, policies and programming. Through broad consultation across multiple service areas, the city conducted impact and risk assessments to ensure a range of perspectives were incorporated in the CCAS.<sup>cxix</sup> Selkirk's Capital Asset Management Program (CAMP) is used to establish baseline levels of service that the City is expected to achieve in the future. As climate change will have significant impacts on municipal services and assets and infrastructure, the City uses recommendations from the CCAS, including risk assessment and adaptation planning to inform ongoing CAMP activities.<sup>cxxii</sup> This provides a great example of applying an asset management approach that also prioritizes mitigation and adaptation.

### *Windsor, Ontario*

The City of Windsor (Ontario) has experienced a number of recent extreme weather events that have caused hundreds of millions of dollars in damage; additionally Windsor is also one of Canada's hottest cities. To address the continued climate change impacts, the City developed [Degrees of Change: Climate Adaptation Plan](#) (2020). This adaptation plan is comprehensive and addresses a number of climate change impacts (e.g. extreme heat, flooding, freshwater availability and pests). One of the innovative practices within the plan is the consideration of the costs of inaction as part of building the business case for action. Windsor assessed the costs of past events, climate modelling and literature to demonstrate the cost of doing nothing to address climate change.<sup>cxixiii</sup>

For more details and examples in Canada, see the [Map of Adaptation Actions](#). This interactive resource provides a wide range of Canadian case studies that can support municipal decision-makers as they develop their adaptation measures.

### *Dortmund, Germany*

The City of Dortmund is the largest city (pop. 602,000), in the Ruhr metropolitan region in the state of North Rhine-Westphalia, the first German state to adopt binding GHG-reduction targets. As a city with an industrial legacy, Dortmund is reinventing itself. The local initiatives started over twenty years ago by decontaminating brownfield sites, improving water quality, committing to reducing GHGs, enhancing and restoring nature, biodiversity and green spaces, and focusing on the innovation economy. More recently (2019-2021), the city partnered with the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety to finalize a city Masterplan that integrates climate adaptation ([Masterplan integrierte Klimaanpassung Dortmund "MiKaDo"](#)) as a central component. The four components of the plan are - environment and nature protection, city planning, health, social and emergency services, economy. Dortmund emphasizes both technical and social innovations to lead their transition<sup>cxixiv</sup>.

### *Regensburg, Germany*

The City of Regensburg (population 170,000) in the state of Bavaria is a medieval city and has been a UNESCO World Heritage site since 2006. Though charming, the old city poses challenges to climate adaptation. The dense historic building structure with stone squares and alleys, few trees in public spaces and a high usage density ends up not just heating up quickly in the summer, but also storing the heat. Regensburg has taken a holistic approach to addressing climate. They have adopted an [Energy and Climate Action Plan \(APEK\)](#) and are creating a Regensburg Green Deal aligned with the European Green Deal to become net zero by 2050, and partner with the private sector and civil society on projects. "With the Green Deal we want to achieve a more ambitious goal than before, including a 65% reduction in greenhouse gas emissions compared to 1990 by the year 2030," said Mayor Gertrud Maltz-Schwarzfischer.<sup>cxixv</sup>

## Intra-country Compare and Contrast

Upon initial examination it appears that there are significant similarities in approaches used by Canadian and German cities to advance climate adaptation at the local level. Perhaps one of the fundamental explanations for this similarity is in analogous components that make up the adaptation planning frameworks used by local governments in both Germany and Canada. In both contexts the following elements are included as core activities: (1) Preparing or Initiating Adaptation,

(2) Assessing climate change risks and vulnerabilities, (3) Identifying adaptation options, (4) Assessing and selecting adaptation options (note in Canada steps 3 and 4 are combined), (5) Implementing options, and (6) Monitoring and evaluating adaptation interventions.

One of the innovations within this multi-step approach is the focus at the earliest stages into establishing a collaborative and interdisciplinary methodology to work through the various stages of adaptation planning. For both German and Canadian cities this is at the cornerstone of building long-term success and creating systemic change. Another similarity between the approaches, which is in the early stages in both countries, is the focus on monitoring and evaluation. A challenge many cities in both countries are facing is translating indicators from theoretical studies into practical, measurable and relevant information; it is likely that this is in part due to a lack of capacity and expertise in long-term monitoring and evaluation protocols.

Despite the similarities in planning approaches, there are some differences in the way adaptation has unfolded at the local level in the two countries. Perhaps the most significant of these is the level of guidance from national governments on addressing adaptation. Since 2011, with the adoption of Germany's Strategy for Adaptation to Climate Change and the subsequent state-level adoption of adaptation strategies, cities in Germany have had a higher-level policy framework to contextualize municipal-level activities. This has created additional knowledge, technical and financial support opportunities to not only reduce and eliminate sources of CO<sub>2</sub> emissions, but work to adapt the physical and social environment to a changing climate. In contrast, the Canadian federal government only began the process of creating a National Adaptation Strategy in early 2021, with completion slated for summer 2022. This has meant that Canadian cities, though working on adaptation since the early 2000s, have done so without strategic direction from national or provincial governments.

### Potential Focus area for Intra-country Exchange

Due to the overwhelming similarities in approaches to adaptation in both countries, there is enormous potential for intra-country exchange on the issue. Potential areas to explore include the following:

**Understanding Social Impacts and Building Resilience:** Climate change is impacting individual and community health and well-being in both countries' cities and towns. However, the negative impacts from climate change are not affecting all members of society equally. Considering social equity in adaptation decisions will help reduce vulnerability of those at highest risk and will ensure that benefits are distributed fairly. Creating a mechanism for bilateral exchange on this would be beneficial to cities in both countries.

**Co-creation and communication strategies:** Core to planning processes in both countries is an integrated and effective stakeholder engagement. Providing opportunities for exchanging best practices on how cities and towns are working with various population segments on behavior change and awareness raising would help create the global systemic change needed to effectively impact climate change.

**NBS and Green and Blue Infrastructure:** Green infrastructure, such as parks, wetlands and green roofs, increase the physical, mental, and emotional health of residents and improve climate resilience. Communicating the value of benefits associated with green and blue infrastructure and NBS will be useful in advancing their use to reduce impacts from climate change and other stressors. Cities in both Canada and Germany are pursuing green and blue infrastructure approaches and collaboration between the countries would help to identify opportunities to advance these initiatives further.

**Monitoring and Evaluation:** Monitoring and evaluation methods are required to track adaptation progress, and measure whether adaptation efforts are resulting in their desired outcomes. While promising approaches exist in both Germany and Canada, monitoring and evaluation of adaptation projects and outcomes are still rare, and there is value in helping cities and towns (in both countries) to develop approaches that are effective and comprehensive. Establishing mechanisms for adaptation experts, as well as municipal practitioners in both countries, to exchange on evolving approaches to monitoring and evaluation would help to advance this topic.

- 
- <sup>xc</sup> Bush, E., & Lemmen, D. S. (Eds.). (2019). Canada's Changing Climate Report. Government of Canada. [http://publications.gc.ca/collections/collection\\_2019/eccc/En4-368-2019-eng.pdf](http://publications.gc.ca/collections/collection_2019/eccc/En4-368-2019-eng.pdf)
- <sup>xcii</sup> IPCC. (2021). Summary for Policymakers. In V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, Berger, S. Caud, N. Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, Leitzell, K. Lonnoy, E., Matthews, J.B.R., Maycock, T.K., T. Waterfield, O. Yelekçi, R. Yu, & B. Zhou (Eds.), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (p. 41). Cambridge University Press. [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf)
- <sup>xciii</sup> Julia Laukkonen, Paola Kim Blanco, Jennifer Lenhart, Marco Keiner, Branko Cavric, Cecilia Kinuthia-Njenga, Combining climate change adaptation and mitigation measures at the local level, *Habitat International*, Volume 33, Issue 3, 2009, Pages 287-292, ISSN 0197-3975, <https://doi.org/10.1016/j.habitatint.2008.10.003>. (<https://www.sciencedirect.com/science/article/pii/S0197397508000623>)
- <sup>xciv</sup> Adaptation to Climate Change Team (2021). A Low Carbon Resilience Decision Tool for Local Government. Retrieved August 2021, from [https://act-adapt.org/wp-content/uploads/2021/05/ICABCCI\\_LCRDecisionToolLocalGovernment\\_WEB-2.pdf](https://act-adapt.org/wp-content/uploads/2021/05/ICABCCI_LCRDecisionToolLocalGovernment_WEB-2.pdf)
- <sup>xcv</sup> European Commission and European Environmental Agency. *EU adaptation strategy*. Climate Adapt. Retrieved September 2021, from <https://climate-adapt.eea.europa.eu/eu-adaptation-policy/strategy>.
- <sup>xcvi</sup> Gerstetter, C., Herb, I., Matei, A. (2020) Mainstreaming Nature-Based Solutions: Sustainable Development Goals, NATURVATION Guide. [https://naturvation.eu/system/files/mainstreaming\\_nbs\\_for\\_sdg.pdf](https://naturvation.eu/system/files/mainstreaming_nbs_for_sdg.pdf)
- <sup>xcvii</sup> Environment and Climate Change Canada, Federation of Canadian Municipalities, & Municipal Climate Services Collaboration. (2020). Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation. Environment and Climate Change Canada. [https://publications.gc.ca/collections/collection\\_2021/eccc/En4-409-2020-eng.pdf](https://publications.gc.ca/collections/collection_2021/eccc/En4-409-2020-eng.pdf)
- <sup>xcviii</sup> Bertoldi P. (editor), Guidebook 'How to develop a Sustainable Energy and Climate Action Plan (SECAP) – Part 1 - The SECAP process, step-by-step towards low carbon and climate resilient cities by 2030, EUR 29412 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-96847-1, doi:10.2760/223399, JRC112986
- <sup>xcix</sup> Federation of Canadian Municipalities. (2019). Integrating Climate Considerations: Governance and Operations. Retrieved March 22, 2020 from <https://fcm.ca/en/resources/mcip/integrating-climate-considerations-servicedelivery-planning>
- <sup>c</sup> Umwelt Bundesamt. (2019). Monitoring Report on the German Strategy for Adaptation to Climate change. [https://www.umweltbundesamt.de/sites/default/files/medien/421/publikationen/das\\_2019\\_monitoring\\_report\\_bf.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/421/publikationen/das_2019_monitoring_report_bf.pdf)
- <sup>ci</sup> Hanania, S. & Latinos, V. (2018). Standardisation in local climate change adaptation: benefits, myths and recommendations. Retrieved September, 2021 from [https://resin-cities.eu/fileadmin/user\\_upload/Papers/RESIN-policy-brief-2-www.pdf](https://resin-cities.eu/fileadmin/user_upload/Papers/RESIN-policy-brief-2-www.pdf).
- <sup>cii</sup> Maddalen Mendizabal, Nieves Peña, Gemma García-Blanco, et al. (2017). Ramses Transition handbook and training package, [https://ramses-cities.eu/fileadmin/uploads/Deliverables\\_Uploaded/RAMSES-Handbook-and-Training-Package-final-www.pdf](https://ramses-cities.eu/fileadmin/uploads/Deliverables_Uploaded/RAMSES-Handbook-and-Training-Package-final-www.pdf).
- <sup>ciii</sup> ICLEI Canada. (2008). Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation. ICLEI Canada. <https://icleicanada.org/wp-content/uploads/2019/07/Guide.pdf>
- <sup>civ</sup> *Ibid*
- <sup>civ</sup> Warren, F., & Lulham, N. (Eds.). (2021). Canada in a Changing Climate: National Issues. Government of Canada. [https://epe.lac-bac.gc.ca/100/201/301/weekly\\_acquisitions\\_list-ef/2021/21-32/publications.gc.ca/collections/collection\\_2021/rncan-nrcan/M174-24-2021-eng.pdf](https://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2021/21-32/publications.gc.ca/collections/collection_2021/rncan-nrcan/M174-24-2021-eng.pdf)
- <sup>cv</sup> *Ibid*
- <sup>cvi</sup> *Ibid*
- <sup>cvi</sup> Environment and Climate Change Canada, Federation of Canadian Municipalities, & Municipal Climate Services Collaboration. (2020). Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation. Environment and Climate Change Canada. [https://publications.gc.ca/collections/collection\\_2021/eccc/En4-409-2020-eng.pdf](https://publications.gc.ca/collections/collection_2021/eccc/En4-409-2020-eng.pdf)

- 
- <sup>cxviii</sup> Endo, I., Magcale-Macandog, D. B., Kojima, S., Johnson, B. A., Bragais, M. A., Macandog, P. B. M., & Scheyvens, H. (2017). Participatory land-use approach for integrating climate change adaptation and mitigation into basin-scale local planning. *Sustainable Cities and Society*, 35, 47–56. <https://doi.org/10.1016/j.scs.2017.07.014>
- <sup>cxix</sup> Heaviside, C., Macintyre, H., & Vardoulakis, S. (2017). The Urban Heat Island: Implications for Health in a Changing Environment. *Current Environmental Health Reports*, 4(3), 296–305. <https://doi.org/10.1007/s40572-017-0150-3>
- <sup>cx</sup> Huang, K., Li, X., Liu, X., & Seto, K. C. (2019). Projecting global urban land expansion and heat island intensification through 2050. *Environmental Research Letters*, 14(11), 114037. <https://doi.org/10.1088/1748-9326/ab4b71>
- <sup>cxii</sup> City of Toronto. (2019). Hot Weather Response Framework. City of Toronto. [https://www.toronto.ca/wp-content/uploads/2019/05/9030-2019-HWR-Framework-updated-05-22-19.AODA\\_.pdf](https://www.toronto.ca/wp-content/uploads/2019/05/9030-2019-HWR-Framework-updated-05-22-19.AODA_.pdf)
- <sup>cxiii</sup> Warren, F., & Lulham, N. (Eds.). (2021). *Canada in a Changing Climate: National Issues*. Government of Canada. [https://epe.lac-bac.gc.ca/100/201/301/weekly\\_acquisitions\\_list-ef/2021/21-32/publications.gc.ca/collections/collection\\_2021/rncan-nrcan/M174-24-2021-eng.pdf](https://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2021/21-32/publications.gc.ca/collections/collection_2021/rncan-nrcan/M174-24-2021-eng.pdf)
- <sup>cxiii</sup> Government of Ontario. (2016). *Ontario Climate Change and Health Vulnerability and Adaptation Assessment Guidelines: Technical Document*. Government of Ontario. <https://www.deslibris.ca/ID/10090488>
- <sup>cxiv</sup> Vargo, J., Stone, B., Habeeb, D., Liu, P., & Russell, A. (2016). The social and spatial distribution of temperature-related health impacts from urban heat island reduction policies. *Environmental Science & Policy*, 66, 366–374. <https://doi.org/10.1016/j.envsci.2016.08.012>
- <sup>cxv</sup> Government of Ontario. (2016). *Ontario Climate Change and Health Vulnerability and Adaptation Assessment Guidelines: Technical Document*. Government of Ontario. <https://www.deslibris.ca/ID/10090488>
- <sup>cxvi</sup> Hedegaard, C. et al. Proposed Mission: A Climate Resilient Europe Prepare Europe for climate disruptions and accelerate the transformation to a climate resilient and just Europe by 2030. 3 (2020).
- <sup>cxvii</sup> European Commission and Covenant of Mayors Office. *Financing opportunities for Sustainable Energy and Climate Action Plans*. Covenant of Mayors for Climate and Energy Europe. Retrieved September 2021, from <https://www.covenantofmayors.eu/support/funding.html>.
- <sup>cxviii</sup> ICLEI Canada. (2018). *On the Money: Financing Tools for Local Climate Action*. <https://fcm.ca/sites/default/files/documents/resources/guide/financing-tools-local-climate-action-pcp.pdf>
- <sup>cxix</sup> European Commission and Covenant of Mayors Office. (n.d.). *Financing opportunities for Sustainable Energy and Climate Action Plans*. Covenant of Mayors for Climate and Energy Europe. Retrieved September 2021, from <https://www.covenantofmayors.eu/support/funding.html>.
- <sup>cxx</sup> Brown, C., Jackson, E., Harford, D. and Bristow, D. (2021): Cities and Towns; Chapter 2 in *Canada in a Changing Climate: National Issues Report*, (ed.) F.J. Warren and N. Lulham; Government of Canada, Ottawa, Ontario.
- <sup>cxxi</sup> Environment and Climate Change Canada, Federation of Canadian Municipalities, & Municipal Climate Services Collaboration. (2020). *Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation*. Environment and Climate Change Canada. [https://publications.gc.ca/collections/collection\\_2021/eccc/En4-409-2020-eng.pdf](https://publications.gc.ca/collections/collection_2021/eccc/En4-409-2020-eng.pdf)
- <sup>cxxii</sup> City of Selkirk. (2019). *Climate Change Adaptation Strategy 2019–2029*. City of Selkirk. <https://www.myselkirk.ca/wp-content/uploads/2019/07/Climate-Change-Adaptation-Strategy-Final-May2019.pdf>
- <sup>cxxiii</sup> Environment and Climate Change Canada, Federation of Canadian Municipalities, & Municipal Climate Services Collaboration. (2020). *Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation*. Environment and Climate Change Canada. [https://publications.gc.ca/collections/collection\\_2021/eccc/En4-409-2020-eng.pdf](https://publications.gc.ca/collections/collection_2021/eccc/En4-409-2020-eng.pdf)
- <sup>cxxiv</sup> ICLEI European Secretariat. (2021). *Urban Transitions Alliance*. Retrieved September 2021. [https://iclei.org/en/UTA\\_cities.html](https://iclei.org/en/UTA_cities.html)
- <sup>cxxv</sup> V. Dembianny, personal communication, October 8 2021,

# Emerging Issues



## Emerging Action Areas

This section captures emerging themes through which local governments are engaging on climate change work and which are new or burgeoning areas of activity or interest. They are not as well established as the buildings, transportation, adaptation or just transition action thematic areas described previously, however they are definitely gaining momentum and have the potential to become more mainstream in the future. Some of the Emerging Action Areas reported have a more fulsome report, depending on the level of interest, duration of prominence, and relevance in each country.

### Low Carbon Resilience

One way to overcome many issues related to siloed climate change action (e.g. mitigation issues dealt with separately from adaptation ones) is by applying a Low Carbon Resilience (LCR) approach that encourages proper coordination, integration and co-evaluation of mitigation and adaptation measures to reduce GHGs while also building resilience.<sup>cxxvixxxvii</sup> Applying a LCR lens bridges the gap between mitigation and adaptation silos by identifying synergies, trade-offs and conflicts in order to find alignment in planning, policies and programs.

LCR brings with it a number of operational benefits and climate action synergies including cost savings and resource efficiencies, reduced reliance on grey infrastructure, improved flood and heat management, improved carbon sequestration, as well as a number of co-benefits for health, air quality, infrastructure, equity, preserving ecosystem health and biodiversity.<sup>cxxviii</sup> For example, investing in urban forests increases access to shade for city inhabitants during heat waves while also having a cooling effect that helps counteract heat island effects in city centres, while simultaneously expanding the size of urban carbon sinks to sequester GHG emissions. Nature-based LCR approaches also provide a number of co-benefits including encouraging healthy and active lifestyles, improved air quality, reduced urban noise, improved soil health, and increased habitat for wildlife.<sup>cxxix</sup>

LCR is still an evolving approach to climate action in both Canada and Germany, with a number of promising and innovative practices beginning to emerge at the local level. While not always named specifically as LCR (other terms include “integrated climate action” or “decarbonized resilience”), a number of municipalities have begun applying an integrative approach as a guiding policy direction within their climate action plans. For example, the City of Port Moody (BC) uses a LCR lens to guide their procurement policy which greatly streamlined their planning processes.<sup>cxxx</sup> Meanwhile, in Germany, some cities are becoming European frontrunners in LCR-type concepts, such as Hamburg having both mitigation and adaptation within the same department,<sup>cxxxi</sup> Würzburg co-creating its climate neutrality ambitions through iterative public participation,<sup>cxxxii</sup> Munich applying a lens similar to LCR for sustainable urban development<sup>cxxxiii</sup> or Mannheim currently developing an inclusive and truly integrated climate strategy.<sup>cxxxiv</sup>

### Energy Communities/Energy Co-operatives

With the number of climate change mitigation strategies increasing across German local governments, energy communities continue to be considered as an attractive option to engage citizens into the local energy transition and to increase the acceptability of renewable energy technologies. German local governments traditionally are obligated to secure the energy supply of their citizens and many are running dedicated city energy utilities to carry out this function. Local governments also have the possibility to make available areas especially for energy production, build their own renewable energy installations and to act on their exemplary character towards citizens and businesses, not least by engaging them as shareholders in new projects.

Energy communities take many different forms in Germany. The most common form being energy cooperatives, and most citizen-owned windparks take the shape of limited liability companies. Communities between different local electricity producers, so called tenant electricity (“Mieterstrom”) are also models which receive increased attention. A long period of fixed remuneration has allowed local energy communities to sprout up all over Germany. However, ever since a switch was made to remuneration through tenders, the number of newly founded community(-led) energy

projects has plummeted. This is mostly because they are often volunteer-based and do not have the resources to compete with more established energy companies on the free-market. Currently, the new Renewable Energy Sources Act ("EEG2021")<sup>cxxxv</sup> already calls on wind project developers to give parts of the profits to affected municipalities, but there is a chance that the newly formed government, from the late 2021 election, will promote generally better framework conditions for energy communities. Currently, it seems that regulatory and financial support for energy communities in Germany is likely to increasingly come from the federal states. For example, the state of Schleswig Holstein has recently created a revolving fund to support the early stages of the development of citizen energy projects,<sup>cxxxvi</sup> which has resulted in interest from other regions to implement similar approaches.

Despite the currently not very favourable framework, German energy communities, often together with cities, are looking for postFIT (feed-in tariff) business models and are working together with private or public energy suppliers. A promising example is the case of the county of Neustadt an der Waldnaab in Bavaria where 17 municipalities have formed an energy cooperative called NEW (Neue Energien West) eG in order to jointly implement renewable energy projects. The 17 member municipalities have purchased shares and also allow for direct citizen investments. NEW eG works with a licensed electricity supplier (Grünstromwerke GmbH) to provide electricity through its own regional tariff at a fair price.<sup>cxxxvii</sup>

In the Bauland area in Baden-Württemberg, five municipalities have recently come together and formed a cooperative called "Bürgerenergie-Genossenschaft Bauland eG". Citizens can become co-owners of this cooperative and receive an estimated dividend on their investment of around 2.3%. The legal form of a cooperative was chosen in particular due to its low entry hurdles and shares can be bought from 300 Euros upwards (430 CAD).<sup>cxxxviii</sup> A 9,9 hectare PV-installation is currently being planned and is being developed together with an established project developer and energy supplier, which also provides most of the initial capital. This also means that the energy cooperative is, in fact, the co-owner of this overall project. City utilities also sometimes take the lead on new renewable energy projects where they give parts of the shares to an energy cooperative to allow local citizens to co-invest, contributing to the local value creation and acceptance, as is the case in the city of Wolfhagen.<sup>cxxxix</sup>

While municipally-led community energy planning has grown extensively in Canada over the years, direct citizen ownership of renewable energy has not been a major component of these plans. Municipalities have also not played a significant role in establishing, promoting or supporting energy communities in Canada outside of providing the necessary land use planning approvals for renewable energy installations, or demonstrating support for proposed projects. Energy co-ops are not commonly part of municipal climate or energy action plans, nor is it common for a municipality to own a share in an energy co-op. In some cases municipalities may make municipally-owned land or rooftops available to host co-operative renewable energy projects. However, it should be noted that municipalities are no stranger to co-operative models, as co-operative housing is a common model used for the provision of social housing on municipally-owned land.

#### Key thematic policy and programming mechanisms in place

While various co-operative legal structures are used in the energy sector across Canada, limited liability renewable energy producer co-operatives that feed into provincial grids are the most common form of energy community employed.<sup>cxli</sup> Ontario has the largest concentration of energy co-ops due to the establishment of a FIT in 2009, with 80 incorporated energy co-ops in Ontario currently. To date there are only 30 active co-ops in Ontario and 60-65 active energy co-ops across the whole country. With the cancellation of the FIT program in 2016, activity in this sector has significantly decreased and energy co-ops have begun to search for alternative business models to remain active into the future, including exploring roles of co-ops as climate action financing organizations in partnership with municipalities.<sup>cxlii</sup> Strict provincial regulations and definitions for co-ops, particularly in Ontario, have hindered expansion of these new business models.

One of the most notable co-operative developments in recent years is [ZooShare Biogas Co-operatives Inc.](#), a non-profit, non-share capital renewable energy co-operatives, combining Toronto Zoo animal waste and food waste from a major grocery retailer to be converted into electricity, heat and fertilizer. It represents an investment of \$5.4 million, the majority of which will be raised from the community through the sale of Community Bonds. The project will be the first cooperatively owned biogas plant in Canada and the first zoo-based biogas plant of its kind in North America. A first of its

kind farmer-owned energy co-operative in Quebec Agri-Energie is also producing biogas from manure and is upgrading to renewable natural gas for injection into the natural gas grid. The [Ottawa Renewable Energy Co-operative](#) has also begun to expand its business model from an energy generation co-op to also providing energy efficiency services.

While Germany has had a long history of citizen participation in energy and energy co-operatives, in Canada citizen participation has mainly been driven by the presence of the FIT program in Ontario. The energy co-operative sector in Canada and Germany share many similarities in that both are currently in post-FIT business models in unfavourable policy and regulatory landscapes.

In order for energy communities to become more prevalent in Canada, Canadian municipalities will need to take a much more active role in supporting and investing in energy communities and could have much to learn from past and ongoing extensive involvement of German municipalities in co-operatives. German municipalities may take interest in the emerging biogas cooperative models, and both countries could benefit from exchange around how energy communities are pursuing new business models for energy communities in a post-FIT environment.

### Nature-Based Solutions

In recent years, nature-based solutions (NBS) have been gaining traction as a way to address urban challenges and adapt to climate change. The EC defines NBS as a response to challenges that benefit biodiversity, support a range of ecosystem services and are ‘inspired and supported by nature, while simultaneously providing environmental, social, and economic benefits that help build resilience. Such solutions bring diverse nature and natural features and processes into cities, landscapes, and seascapes through locally adapted, resource-efficient and systemic interventions.’ There is significant evidence on many known advantages and successes of NBS. However, some NBS solutions remain relatively novel and require further policy support, testing and monitoring to better understand their co-design, co-benefits, operation, maintenance and implementation needs.<sup>cxlii</sup>

In October 2018, the [Global Commission on Adaptation](#) was launched to catalyze a global movement to accelerate climate adaptation solutions, including both Canada and Germany as two of 23 participating countries. Canada and Mexico are co-leading the Nature-Based Solutions Action Track in recognition of the untapped potential for nature to reduce climate risks. This action track focuses on accelerating the uptake of NBS by profiling the leadership of countries and cities, by identifying innovative finance options and engaging Indigenous peoples and youth.<sup>cxliii</sup> The [Urban Nature Atlas](#) has collected more than 1000 inspiring NBS from European cities and beyond, including 150 in Germany and 4 in Canada.

Municipalities across Canada are engaged in area-based conservation efforts to the benefit of their residents as well as national conservation efforts. This was documented recently by [Pathway to Canada Target 1](#)’s National Steering Committee via the Conservation Close to Home: The Role of Local Governments in the Canadian Conserved Areas Network.<sup>cxliiv</sup> The [Municipal Natural Assets Initiative](#) also guides municipalities in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and in developing leading-edge, sustainable and climate resilient infrastructure.

Integrated urban development concepts (ISEK) are a cornerstone of the Urban Development Promotion Programmes of the German Federal Government and states. ISEKs are a prerequisite for any funding, and are considered to be the central working basis for the development of an area. Their interdisciplinary and integrated approach supports the efforts of local and regional authorities to develop sustainable regions, cities and municipalities.<sup>cxliv</sup> They also connect urban planning with social and economic strategies. Recent reports and pilot studies indicate the alignment between NBS and integrated urban development concepts, such as ‘Addressing climate change in cities: policy instruments to promote urban NBS’<sup>cxlvi</sup> and ‘NBS in European and national policy frameworks.’ However, they also point out the need for quantitative and qualitative measurable targets to ensure broad uptake and high quality projects in order to maximise the potential of NBS.

## Climate Emergencies

Since 2019, 105 German local governments have declared a state of climate emergency. These include some larger cities like Berlin, Munich, Cologne or Bonn, but the main fraction are small and medium-sized cities and towns (e.g. Heidelberg, Konstanz, Ludwigsburg, Bühl, Münster or Bochum). In Canada, 507 local governments have made these declarations, including one of the first cities in the world to act, Vancouver, as well as all major urban centres and many small and medium sized communities. These world-wide statistics are tracked by a network of [climate emergency action advocates](#).

Calling a state of climate emergency serves a dual purpose. First, it aims at communication and awareness-raising in order to increase participation among citizens and other local stakeholders, declaring the need for urgent action to mitigate climate change, the first priority. Moreover, the climate emergency declaration is used by many local governments to increase their emission reduction targets to align with the 1.5° target outlined in the Paris Agreement. This often results in improved or updated local climate plans and giving science-based target-setting the utmost priority. While some cities focus on boosting their 2030 reduction targets and developing new implementation measures, some cities in Germany also focus on organizational or structural changes to complement and enable the augmented action plans. Examples include the introduction of a mandatory climate impact assessment of all council decisions, or the organizational restructuring of the administration and organizational set-up in order to ease bureaucracy and mainstream the topic of climate change across all municipal departments (i.e. horizontal integration). Many local governments in Canada use the climate emergency declarations in support of setting net-zero targets and/or to advance their climate adaptation efforts.

## Circular Economy

Activity in transitioning to a circular economy is accelerating in Canada, but it has not evolved to Europe's level. Canada does not have the same land and resource constraints or landfill limitations that drive the need for circularity in Europe. Canadian municipalities are experimenting to find the right balance of intervention points to drive circularity. Toronto, Montreal, Guelph and (Metro) Vancouver are among the early leaders applying circularity to their work. [Circular Cities - A Scan of Global Approaches and Key Takeaways for Canadian Local Governments](#) was commissioned by the National Zero Waste Council, a leadership initiative supporting Canada's transition. The National Zero Waste Council has also partnered with Recyc-Québec, Recycling Council of Alberta, and Federation of Canadian Municipalities to pilot the [Canadian Circular Cities and Regions Initiative \(CCCRI\)](#), which is working with 15 municipalities to advance knowledge sharing and capacity building via direct support, guidance and peer-to-peer exchange. The [Circular Innovation Council](#) (formerly the Recycling Council of Ontario) is also putting circular economy concepts into action through collaboration and inclusion, discovering solutions through circular business models that design waste out of production and consumption.

The circular economy has gained increased attention at the EU level over the past six years. Besides the energetic use of resources (e.g. fossil fuels), resource consumption and all its connected life-cycle stages represent a main driver for carbon emissions globally. Around 45% of global emissions can be attributed to non-energy use of resources, according to the [European Environment Agency](#), making resource-focus climate policy a necessity if Europe wishes to be in fact climate neutral by 2050.<sup>cxlviii</sup> There are numerous EU initiatives recognizing the need to decrease virgin resource consumption and to increase material efficiency through augmenting sharing, reuse and recycling practices. In 2020, as part of the [European Green Deal](#), the European Commission has developed a new [EU Circular Economy Action Plan \(CEAP\)](#), outlining key strategic targets for resource efficiency, eco-design as well as recycling and reuse in different sectors. The EU's flagship programme for cities and regions in this field, also outlined in the CEAP, is the [European Circular Cities and Regions Initiative \(ECCRI\)](#), which aims to support 10 European cities and regions in the transition to a more circular economy. Furthermore, it will function as a knowledge hub for all circular economy related project work at a European level.

Whilst having a [National Bioeconomy Strategy](#) (2020) as well as a Bioeconomy Research Strategy (2010), Germany does not yet have a dedicated political circular economy strategy, systemically outlining key changes for the transformation

of the economy. There are, however, increasing national debates around the importance of sustainable resource and land use management and circular economy practices for climate change mitigation, as well as for other environmental targets, according to the German Environment Agency.<sup>cxlvi</sup> At the local level, while there are some cities aiming to implement innovative practices, e.g. sharing models, reuse and repair shops and circular public procurement, the topic is still widely understood by many as being essentially 'improved waste management'. This is largely due to the fact that waste management is a municipal mandate in Germany and thus the core field of action for circular economy interventions remains at the local level. The regulatory and financial portfolio to drive circular economy transition is seemingly limited for cities in Germany. A starting point to integrate circular economy with climate action at the local level is to increase the evidence base, e.g. by introducing carbon accounting methods and practices that account for carbon embodied in the material consumption, which would enable impact monitoring of circular economy interventions, thereby allowing for integrated circular economy and climate action planning and informed political decision making.

## Embodied Carbon

Embodied carbon are the emissions associated with the extraction, manufacture, and transportation of a product. Since these emissions result from activities occurring outside the administrative boundary of a community they are not required under community-scale protocols and have not traditionally been considered in climate planning by local governments in Canada. The embodied carbon resulting from the manufacture of various building materials utilized in construction has been recognized by industry experts in green building design for many years, and has recently been included in the [Canada Green Building Council's](#) latest update to [the Zero Carbon Building Standard](#). Under current projections for new construction globally, [Architecture2030](#), an organization dedicated to decarbonizing the building sector, estimates that between 2020 and 2040, emissions from embodied carbon would be significantly higher (57%) than those resulting during a building's occupancy (43%).<sup>cxli</sup> In a recent report from the Builder's for Climate Action, a coalition of builders and developers in Canada, found similar results, that in a full life-cycle assessment of a building, embodied carbon can make up most of a building's emissions even after several decades of a building's occupancy.<sup>d</sup> Furthermore, when high-carbon materials are utilized in building retrofit projects the emission reduction from energy efficiency improvements will be negated if not entirely lost. Embodied carbon emissions can be significantly avoided by utilizing low-carbon and carbon storing materials, such as sustainable timber, waste textiles, and cellulose, rather than high carbon materials like steel, concrete, aluminum.

Inclusion of embodied carbon into municipal climate planning has been a recent development in Canada, though remains in a nascent phase with only three municipalities having standards, policies, or incentives in place (Toronto, Vancouver, and the Township of Duoro-Dummer). The City of Vancouver was an early leader, implementing a rezoning policy in 2017 requiring all major new developments to calculate and report on embodied carbon at the project level and has recently established the first embodied carbon strategy in Canada as part of its [Climate Emergency Action Plan](#) in 2020, which set a 40 percent reduction target in embodied carbon by 2030. The City of Toronto has included embodied carbon in its 2021 update to its green development standard, requiring projects at the higher tiers to complete an assessment of the materials used in construction and landscape design. The Township of Duoro-Dummer in Ontario launched an embodied carbon program in 2020 with permit fee rebates for projects that meet certain emission targets. While limitations exist to include scope 3 emissions in community inventories, many online tools and resources exist for designers and developers to conduct project level assessments. It is uncertain at this time how many cities in Canada are considering the inclusion of embodied carbon within climate plans, though the idea appears to be gaining traction and with tools readily available alongside other development standards and policies, embodied carbon policies appear to be an emerging area with significant potential to reduce emissions from the building sector.

## Carbon Budgeting

In 2016, Oslo, Norway's capital, was the first city to apply a climate budget as a complement to a traditional financial budget. Since then, Oslo has inspired action in carbon accounting to monitor progress towards net-zero goals in cities around the world. Approximately 10 Canadian municipalities are planning to pilot this approach in their coming budget cycles including Montreal, Vancouver, Edmonton, Toronto, Barrie, Waterloo and Durham. ICLEI, FCM and researchers at

the University of Waterloo are collaborating with these municipalities to support the process, develop supporting resources, and disseminate knowledge and learning to other municipalities across the country.

In Germany, carbon budgeting is largely used by researchers and activists of the net-zero movement (e.g. [German Zero](#)), thereby presenting the carbon budget as the amount of emissions still allowed to be emitted by a given country in order to be compliant with the 1.5 degree reduction target outlined in the Paris Agreement taking into account environmental effectiveness, equity, national capacity and ability, political feasibility, economic efficiency and technical requirements. The German Advisory Council on the Environment estimates the remaining 1.5-degree-compliant carbon budget (50% probability) for Germany to be around 4200 Mt.<sup>cl</sup> Unlike the targets outlined in the German National Climate Plan or the Climate Protection law, the carbon budgeting approach represents a science-based target setting approach considering the need to limit global warming as a starting point to derive the necessary emission reductions. ICLEI is also promoting a science-based [target-setting framework for cities](#). While some European cities (e.g. Manchester, Oslo and Vienna) have looked into such approaches, carbon budgeting remains rather underexploited among German cities. However, in the framework of the EU URBACT Zero Carbon Cities project, seven cities are setting up a local carbon budget and a Zero Carbon strategy and action plan by 2022 – among them, the City of Frankfurt.

## Migration

Canada is often viewed internationally as a model for crafting sound immigration policy in a multicultural democracy. Canada has among the largest foreign-born populations in the world, with more than one of every five residents born outside the country. In 2020, 30,000 refugees were resettled in Canada. Canada is one of the most popular destination countries for international migrants – ranking 8th among the top 25 countries in 2017.

Canadian municipalities are on the frontline when it comes to welcoming newcomers. They have a role to play in attracting and retaining immigrants, ensuring integration and social cohesion, providing access to vital urban infrastructure and services (e.g. transport, housing) and establishing a cultural landscape that addresses underlying systems of injustice and inequity while celebrating diversity. While migration and action on climate change are not often a point of collaboration among municipalities, this is an emerging issue with the rise of the international climate migrant issue and recent Canadian focus on the need for stronger equity, inclusion and diversity in municipal climate action. [Cities of Migration](#) was established at Ryerson University in Toronto to improve local integration practice in major immigrant receiving municipalities worldwide through information sharing and learning exchange.

Germany has always had refugees enter the country. However, along with the rest of the EU, it experienced a particularly high influx of refugees in 2015/2016. In 2015 alone, close to 900,000 asylum seekers entered Germany.<sup>clii</sup> Since then, many projects to integrate refugees into German society have been developed by the government but, in particular, also by civil society. Local projects and initiatives by engaged private citizens have been the backbone of Germany's refugee policy.

One such project was initiated in Leipzig by the interkulturelle Frauentreff ("intercultural meeting space for women"). They offered multiple cycling classes for women and children from countries such as Syria and Afghanistan. In these countries, women often don't know how to ride bikes. By teaching them this skill, these women attain a completely new level of independence and mobility and thus are also better able to be an active part of society in Germany. Similar projects are also offered in other German cities and are sometimes linked to bike shops that teach refugees how to maintain and repair their bike, including those bikes that might have been donated to the shop and that the refugees then get to keep.

## Climate Related Financial Disclosure

Canadian industry has been leading the way in [Climate-Related Financial Disclosure](#). In December 2015, the Financial Stability Board (FSB) established the Task Force on Climate-related Financial Disclosure (TCFD) to develop voluntary, consistent climate-related financial risk disclosures for companies to use when providing information to investors, lenders, insurers and other stakeholders. Recommendations were established in 2017 that address which organizations,

asset owners and managers should disclose, where their disclosures should be made, what specifics should be disclosed, how materiality should be determined and how the recommendations interact with other regulator disclosure requirements.

In 2019, Chartered Professional Accountants of Canada released [Enhancing Climate-related Disclosure by Cities: A Guide to Adopting the Recommendations of the Task Force on Climate-related Financial Disclosures \(TCFD\)](#). Some of Canada's largest cities have formed the Canadian Municipal Network for TCFD to work together to develop professional practice in this area, including carbon budgeting.

In Europe the idea of TCFD is still new but spreads mainly through efforts of the financial sector and financial taxonomy. However, in the public sector and in particular for local governments this is not yet applied. There is considerable potential for the approach, and it is expected to grow in the coming years. The Carbon Disclosure Project has already announced that they intend to make this a compulsory part of their reporting mechanism for local governments. The European Bank for Reconstruction and Development (EBRD) has recently launched a tender to support Cities for TCFD in relation to their Green City Programme. TCFD will become crucial to rate the risk for intended infrastructure investments, to prioritize infrastructure investment needs for risk mitigation and to underpin the need for climate risk mitigation investments in comparison to the risk of non-action. This can help to make the case for climate protection and adaption measures.

---

<sup>cxxvi</sup> Environment and Climate Change Canada, Federation of Canadian Municipalities, & Municipal Climate Services Collaboration. (2020). Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation. Environment and Climate Change Canada. [https://publications.gc.ca/collections/collection\\_2021/eccc/En4-409-2020-eng.pdf](https://publications.gc.ca/collections/collection_2021/eccc/En4-409-2020-eng.pdf)

<sup>cxxvii</sup> Adaptation to Climate Change Team (2019). Low Carbon Resilience Interventions. Retrieved August 2021, from <https://act-adapt.org/wp-content/uploads/2021/05/ICABCCI-LowCarbonResilienceInterventions-WEB.pdf>

<sup>cxxviii</sup> *Ibid.* and Adaptation to Climate Change Team (2019). Low Carbon Resilience Interventions. Retrieved August 2021, from <https://act-adapt.org/wp-content/uploads/2021/05/ICABCCI-LowCarbonResilienceInterventions-WEB.pdf>

<sup>cxxix</sup> Akbari, H., Cartalis, C., Kolokotsa, D., Muscio, A., Pisello, A. L., Rossi, F., Santamouris, M., Synnefa, A., Wong, N. H., & Zinzi, M. (2016). Local climate change and urban heat island mitigation techniques—The state of the art. *Journal of Civil Engineering and Management*, 22, 1–16. <https://doi.org/10.3846/13923730.2015.1111934>

<sup>cxix</sup> Adaptation to Climate Change Team (2021). A Low Carbon Resilience Decision Tool for Local Government. Retrieved August 2021, from <https://act-adapt.org/wp-content/uploads/2021/05/ICABCCI-LCRDecisionToolLocalGovernment-WEB-2.pdf>

<sup>cxix</sup> Hamburg city website. Klima. [www.hamburg.de/themen-umweltpartnerschaft-klima](http://www.hamburg.de/themen-umweltpartnerschaft-klima)

<sup>cxix</sup> Würzburg city website. Klima und Energie – Strategien und Ziele. [www.wuerzburg.de/themen/umwelt-verkehr/klimaundenergie/klimaschutz-in-wuerzburg](http://www.wuerzburg.de/themen/umwelt-verkehr/klimaundenergie/klimaschutz-in-wuerzburg)

<sup>cxix</sup> Munich city website. Klimaschutz und Klimaanpassung [www.muenchen.de/rathaus/Stadtverwaltung/Referat-fuer-Stadtplanung-und-Bauordnung/Stadtentwicklung/Nachhaltig/Klima.html](http://www.muenchen.de/rathaus/Stadtverwaltung/Referat-fuer-Stadtplanung-und-Bauordnung/Stadtentwicklung/Nachhaltig/Klima.html)

<sup>cxix</sup> Mannheim city website. Klimaschutz-Aktionsplan 2030 [www.mannheim-gemeinsam-gestalten.de/vorhaben/klimaschutz-aktionsplan-2030](http://www.mannheim-gemeinsam-gestalten.de/vorhaben/klimaschutz-aktionsplan-2030)

<sup>cxix</sup> Bundesministerium für Wirtschaft und Energie (2021). Gesetz zur Änderung des Erneuerbare-Energien-Gesetzes und weiterer energierechtlicher Vorschriften – Gesetzentwurf der Bundesregierung. <https://www.bmwi.de/Redaktion/DE/Artikel/Service/gesetz-zur-aenderung-des-eeg-und-weiterer-energierechtlicher-vorschriften.html>

<sup>cxix</sup> IB.SH. (2021). Bürgerenergiefonds (<https://www.ib-sh.de/produkt/buergerenergiefonds/>)

<sup>cxix</sup> C4S. (2021). Energy Cooperative in Neustadt an der Waldnaab County, Germany.

<sup>cxix</sup> Rhein-Neckar-Zeitung. (2021). Sonne beflügelt die interkommunale Idee. [https://www.rnz.de/nachrichten/buchen\\_artikel.-buergerenergie-genossenschaft-bauland-sonne-befluegelt-die-interkommunale-idee-.arid.657070.html](https://www.rnz.de/nachrichten/buchen_artikel.-buergerenergie-genossenschaft-bauland-sonne-befluegelt-die-interkommunale-idee-.arid.657070.html)

<sup>cxix</sup> Agentur für Erneuerbare Energien. (2016). Stadtwerke und Bürgerbeteiligung: Energieprojekte gemeinsam umsetzen. [https://www.unendlich-viel-energie.de/media/file/444.VKU\\_AEE\\_Broschuere\\_Buergerbeteiligung.PDF](https://www.unendlich-viel-energie.de/media/file/444.VKU_AEE_Broschuere_Buergerbeteiligung.PDF)

<sup>cxli</sup> The Cooperative Difference Research Network. (2012). Renewable Energy. <http://www.cooperativedifference.coop/co-operatives-in-canada/renewable-energy/>

<sup>cxli</sup> Toronto Renewable Energy Co-operative. (2019). Evolving business models for renewable energy co-operatives. <http://www.trec.on.ca/reports/>

<sup>cxlii</sup> European Commission (2020). Nature-Based Solutions: State of the Art in EU-funded Projects

<sup>cxlii</sup> Government of Canada (2021) Canada's Action on Nature-Based Solutions for Climate Adaptation

<https://www.canada.ca/en/environment-climate-change/services/climate-change/adapting/plans/action-nature-based-solutions-climate-adaptation.html>

<sup>cxlii</sup> To be published soon on <https://www.conservation2020canada.ca/home>

- 
- <sup>cxliv</sup> Federal Institute for Research on Building, Urban Affairs and Spatial Development (2021), Retrieved from [https://www.bbsr.bund.de/BBSR/EN/research/programs/GeneralDepartmentalResearch/UrbanDevelopment/ISEK/01\\_Start\\_dossier.html](https://www.bbsr.bund.de/BBSR/EN/research/programs/GeneralDepartmentalResearch/UrbanDevelopment/ISEK/01_Start_dossier.html)
- <sup>cxlvi</sup> Naumann, Sandra; Davis, McKenna. Addressing Climate change in cities: policy instruments to promote urban nature-based solutions.' 2020
- <sup>cxlvii</sup> The Finnish Innovation Fund Sitra et al, 2018. The circular economy – a powerful force for climate mitigation. Sitra. URL <https://www.sitra.fi/en/publications/circular-economy-powerful-force-climate-mitigation/> (accessed 4.16.20).
- <sup>cxlviii</sup> Günther, J., Lehmann, H., Nuss, P., Purr, K., 2019. RESCUE Summary Report.
- <sup>cxlix</sup> Architecture 2030 (2021) Embodied Carbon Actions. Retrieved from <https://architecture2030.org/embodied-carbon-actions/>
- <sup>cl</sup> Builders' for Climate Action & Natural Resource Canada (2021). Achieving Real Net-Zero Emission Homes. Retrieved from <https://www.buildersforclimateaction.org/>
- <sup>cli</sup> Kobiela, D.G., Samadi, D.S., Kurwan, J., Tönjes, A., n.d. CO2-neutral bis 2035: Eckpunkte eines deutschen Beitrags zur Einhaltung der 1,5-°C-Grenze 113.
- <sup>clii</sup> <https://www.bmi.bund.de/SharedDocs/pressemitteilungen/DE/2016/09/asylsuchende-2015.html>

# Conclusion and Recommendations



## Conclusion and Recommendations

The timing of this research brief is ideally positioned to meet growing momentum on climate change. Nations of the world came together, virtually if not physically, in Glasgow at the UNFCCC COP 26 in November 2021. Canada and Germany were both represented at the national, sub-national, and local level. This is the first time since 2015 at COP 21 where nations committed to enhanced ambition levels, as scheduled in the Paris Agreement. To realize this enhanced ambition, nations will need to act quickly. Local governments are key allies in the effort for fast action and meet national and international climate commitments.

This research brief highlights the long foundation of national level multilateral cooperation between Germany and Canada, particularly as it relates to climate change. The newly formed Energy Partnership and the Transatlantic Climate Bridge are existing mechanisms through which intra-country collaboration and climate and energy policy exchange take place. These mechanisms could be leveraged or heightened to delve deeper into the issues facing local authorities. Each thematic chapter of this research brief examines the areas of local government influence and key policy and programming mechanisms in place in each country. An intra-country compare and contrast section then leads to the recommendation of potential focus areas for intra-country exchange, including:

- Energy Performance in Buildings - Energy efficiency retrofitting, new buildings, district and planning infrastructure, and smart solutions
- Mobility and Transportation - Active transport, distribution of goods, and electric vehicles
- Just Transition - Energy poverty, socio-economically minded phase-out of fossil fuels and hydrogen and emerging technologies
- Adaptation - Understanding social impacts and building resilience, co-creation and communication strategies, NBS and green and blue infrastructure, and monitoring and evaluation

The Emerging Action Areas chapter highlights burgeoning areas of activity or interest in one country or both. The areas of low carbon resilience, energy communities/energy co-operatives, NBS, climate emergencies, circular economy, embodied carbon, carbon budgeting, migration, and climate related financial disclosure are likely to play a larger role in future climate action at the local level. Each of these areas are rich with innovation and growth opportunities, yet lacking a common understanding or widespread implementation in one or both countries, making them ideally suited for multilateral cooperation to help shape their design, implementation and collaboration.

In addition to the Energy Partnership and the Transatlantic Climate Bridge mechanisms, international local government exchange mechanisms could be leveraged or heightened to support city-to-city multilateral cooperation on climate change. While international local government networking and exchange is a very active space, with many organizations and programs playing active roles, there is no mechanism that supports Canada - Germany exchange specifically or exclusively. This research brief lays a foundation for such exchange by explaining the governance models in each country and how local governments in each country can use their power and influence to affect change. Without this basic mutual understanding, intra-country exchange has limited benefits. However, with a common understanding of local climate governance and action in each country, and some knowledge of how the countries compare and contrast, intra-country exchange can be a rich and powerful mechanism for enacting change.

The practice of local government intra-country exchange can manifest in a wide variety of ways. It can involve international travel to events, conferences or site-visits and meetings of peers from different cities. It might include staff secondments and trade missions, political alliances and collaborative advocacy. Intra-country exchange might lead to the co-development of projects, the production of case studies and the sharing of promising practices and lessons learned. Local government intra-country exchange to date between Germany and Canada has been limited to primarily conferences and site-visits, however there are many more ways to consider expanding the role intra-country exchange has in supporting local government climate action.

It is important to note that local governments do not act in isolation. In both Canada and Germany they are part of a complex system of governance, involving international, national, federal, provincial and local structures. The issue of climate change cannot be solved at one level alone. Multi-level governance (MLG) will ensure a problem as complex and

interconnected as climate change is addressed through appropriately complex and nuanced strategies. Efforts towards Canada - Germany local government intra-country exchange must recognize suitable MLG elements in their design and execution in order to be effective.

In researching, writing and publishing this research brief, ICLEI Europe and ICLEI Canada saw this as a starting point rather than an outcome. This is the first time such intense focus has been put on summarizing and comparing Germany - Canada climate action at the local level. Despite an ocean, mountain ranges and over 6,000 km between our nation's capitals, we find we have more commonalities than differences. By pursuing the many potential focus areas for intra-country exchange identified through this research, we can bring our countries even closer together, and closer to our mutual climate goals.