

Inclusion, Diversity, Equity, and Accessibility for Climate Resilient Infrastructure:

Implications for Skills

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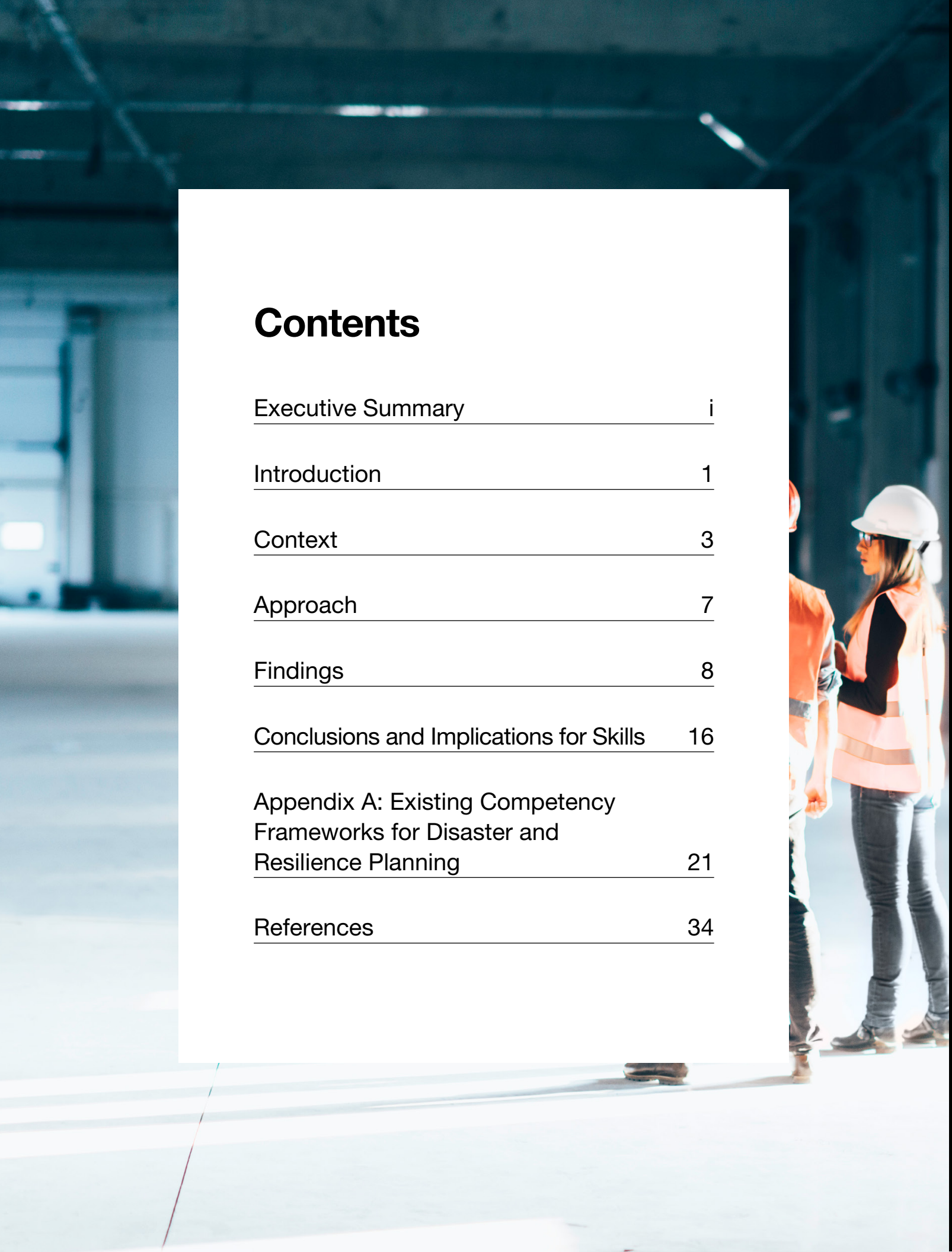
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Executive Summary

Context

Climate change is increasing in frequency and severity around the world and across Canada. While everyone feels the impacts of climate change, in many cases women, Indigenous Peoples, and equity-deserving groups are disproportionately negatively affected by climate change. This is the result of heightened exposure and sensitivity to climate impacts, along with barriers in adaptive capacity to prepare, adjust, and recover from impacts.

As municipalities play a core role in developing, providing, maintaining, and/or upgrading infrastructure for communities, investing in the planning, development and retrofitting of climate-resilient infrastructure is becoming an increasing priority. With that comes a responsibility, along with benefits, of embedding inclusion, diversity, equity, and accessibility (IDEA) within efforts to mitigate and reduce the disproportionate impacts on women, Indigenous Peoples, and equity-deserving communities (including persons with disabilities, racialized people, 2SLGBTQ+ people, immigrants, newcomers and refugees, and people living in poverty) who have historically and contemporarily experienced systemic barriers and inequities, resulting in unequal access to opportunities, resources, and outcomes.

This report applies an IDEA lens to the portfolio management and project design processes of climate-resilient infrastructure and recognizes that infrastructure resilience and disaster recovery are distinct but interconnected practices. Decisions made

*Decisions made **throughout the infrastructure lifecycle** influence how communities prepare for, respond to, and recover from **climate-related hazards**.*



throughout the infrastructure lifecycle influence how communities prepare for, respond to, and recover from climate-related hazards. This has significant implications for capacity building and training in municipalities.

Approach

The report uses an applied research approach combining a review of academic and practitioner literature, a scan of existing competency frameworks for disaster and resilience planning and desk research on municipal examples. It also draws on evidence and insights generated through the development of the 2025 Guide on Applying Inclusion, Diversity, Equity and Accessibility Within Climate-Resilient Infrastructure, which included research, a steering committee, targeted expert input and a public online review. The report further draws on additional inputs by subject-matter experts. The report examines:

> The importance and benefits of embedding IDEA in climate-resilient infrastructure projects and adaptation solutions.

> Existing climate-resilient infrastructure frameworks and practices, including a framework for embedding IDEA within processes.

> The skills and competencies needed to support these efforts, along with recommendations for strengthening municipal capacity.

Findings

1. Integrating IDEA with climate-resilient infrastructure has legal, economic, and social benefits for municipalities and communities including ensuring compliance with legal and regulatory frameworks, supporting local economic growth, responding to community needs, and reducing disparities.

2. Climate risk management and adaptation and asset management frameworks exist to support climate-resilient infrastructure, and the importance of embedding IDEA within these efforts is increasingly becoming recognized. Nevertheless, implementation varies across municipalities given various constraints.

3. To successfully apply IDEA within climate-resilient infrastructure efforts, municipalities should ensure broad education and communication on the importance and benefits of IDEA within climate-resilient infrastructure efforts, ensuring staff understand both climate risks and the importance of addressing disproportionate impacts on Indigenous Peoples and equity-deserving groups. From there, an IDEA lens must be tangibly embedded in core processes: risk assessments and project prioritization, design elements, ongoing community engagement, inter-departmental collaboration and municipal team representation, embedding IDEA considerations within procurement processes (including request for proposal (RfP) language), and maintenance and operations.

4. Capacity and skills gaps to implement commitments are a key barrier for municipal staff in embedding IDEA within climate-resilient infrastructure. Frameworks tend to be geared toward specialized practitioners, which does not reflect the reality of small municipalities, where staff often have multiple roles. Key skills are needed to embed IDEA within portfolio management and project design processes.

Conclusion and implications for skills

While everyone feels the impacts of climate change, women, Indigenous Peoples, and equity-deserving groups experience disproportionate negative impacts. Integrating an IDEA lens into climate-resilient infrastructure processes is critical for mitigating and addressing disproportionate climate impacts while also maximizing the value of infrastructure investments. Along with a framework for embedding IDEA within processes, education, competencies, and skills are needed to support implementation.

Capacity development is needed for municipal staff, particularly generalists who may have limited capacity, occupy several operational roles, and may not have formal skills training. The current competency frameworks focus on technical competencies for employees already working in climate adaptation and mitigation opportunities, but skills interventions are needed to improve IDEA knowledge and skills for municipal staff. Education, competencies and skills are needed:

- **To understand and make sense of data** to ensure social, demographic, environmental, and infrastructure data are integrated into evidence-based decision-making.
- **In relationship-building and engaging communities** to ensure diverse communities can meaningfully participate in infrastructure planning and decision-making.
- **In procurement** to ensure IDEA-related expectations are embedded into the vendor and supplier selection process.
- **In inter-departmental collaboration and decision-making** to ensure infrastructure decisions are informed by diverse expertise, lived experience, and cross-functional perspectives. This includes reducing organizational silos, fostering collaboration across departments, and identifying opportunities for multi-solving that advance climate resilience alongside other municipal priorities such as equity, accessibility, public health, and economic development.
- **In monitoring and evaluation** to ensure IDEA and resilience outcomes are tracked throughout the full infrastructure lifecycle.

While municipalities are increasingly recognizing the importance of integrating IDEA within climate-resilient infrastructure, leveraging a framework for integrating these principles within efforts and coupling this with skills and capacity development for municipal staff is key to sustained action.



Introduction

Climate change is increasing in frequency and severity globally and across Canada.[1] It has negative impacts for individuals and communities including loss of life, injury, health issues and damage to infrastructure.[2] Municipalities are on the front lines of these impacts. They are responsible for much of the infrastructure and services that shape how communities experience and respond to climate risks, including roads, water and wastewater systems, public buildings, parks, transportation systems and emergency services. As a result, strengthening the resilience of municipal infrastructure is an increasingly important component of climate adaptation.



Women, Indigenous Peoples, and equity-deserving communities have historically and contemporarily experienced ***disproportionate impacts related to health, loss of livelihood, displacement, socio-economic disparities****, and more.*

The impacts of climate change, however, are not experienced equally. Women, Indigenous Peoples, and equity-deserving communities (including persons with disabilities, racialized people, 2SLGBTQ+ people, immigrants, newcomers and refugees, and people living in poverty) have historically and contemporarily experienced disproportionate impacts related to health, loss of livelihood, displacement, socio-economic disparities, and more.[3] Adaptive capacity is influenced by access to financial and public resources, meaning that existing inequities can contribute to unequal climate outcomes.

These disparities have important implications for how climate-resilient infrastructure is planned, prioritized, designed, procured, implemented, and maintained. Applying an Inclusion, Diversity, Equity and Accessibility (IDEA) lens can help municipalities identify who is most affected by climate risks, whose needs and perspectives may be overlooked

in conventional planning processes, and how infrastructure investments can contribute to more equitable and resilient communities. The Publicly Available Specification (PAS) on Applying Inclusion, Diversity, Equity and Accessibility within Climate-Resilient Infrastructure,[4] developed by the Diversity Institute with the Digital Governance Council and supported by the Standards Council of Canada, provides a foundation for integrating IDEA considerations into climate-resilient infrastructure processes. The existing report builds on this work by examining what implementation requires in practice, particularly for municipalities.

This report examines how IDEA can be embedded within climate-resilient infrastructure planning, with particular attention to portfolio management and project design processes. Drawing on existing research, frameworks and examples of municipal practice, it identifies practical actions municipalities can take to integrate IDEA throughout these processes, as well as the competencies and skills needed to support effective implementation.





Context

The impacts of climate change are shaped not only by the nature and severity of climate hazards, but also by the social, economic, geographical, and institutional conditions that influence how people experience and respond to them. As a result, the same climate event can have very different consequences across communities. Understanding climate vulnerability through the dimensions of exposure, sensitivity, and adaptive capacity helps explain these differences and provides a foundation for identifying where IDEA considerations are needed in climate-resilient infrastructure planning and implementation.

Disproportionate impacts of climate change on communities

While climate change is increasing across Canada, the impacts are not felt equally. Women, Indigenous Peoples, and equity-deserving groups face greater risks and impacts due to fewer resources, often lacking capacity to prepare for, respond to, and recover to climate change.[5] Climate vulnerability can be understood through the Climate Change Vulnerability Index (CCVI):

Vulnerability = Exposure + Sensitivity – Adaptive Capacity[6]

\+ According to ISO 14090, **exposure** refers to the "presence of people, livelihoods, species or ecosystems, environmental functions, services, resources, infrastructure, or economic, social or cultural assets in places and settings that could be affected" by climate hazards.[7]

\+ **Sensitivity** is the degree to which people are affected by climate change, which may vary depending on multiple factors such as age or chronic health conditions.[8, 9]

– According to ISO 14090, **adaptive capacity** is the ability of people, organizations, and systems to "adjust to potential damage, to take advantage of opportunities, or to respond to consequences" of climate change.[10]

Different levels of exposure

Climate change, including slow-onset disasters such as seasonal shifts, sea ice loss, and unpredictable weather, can disproportionately affect women, Indigenous Peoples and equity-deserving groups.[11] For example, Indigenous communities in northern Canada are increasingly exposed to the impacts of thawing permafrost, which damages homes and buildings.[12] Research also shows that Indigenous reserve lands are highly exposed to flooding risks, with around 22% of residential properties located within a 1-in-100-year flood zone.[13] In addition, historical and colonial displacement forced many Indigenous communities onto reserves in remote areas exposed to flood and wildfires, where limited infrastructure, capacity and resources have increased their vulnerability to climate impacts and repeated displacement.[14] Indigenous communities also experience the negative legacies and harms of colonialism, including aging and inadequately maintained housing and infrastructure, increasing vulnerability to extreme weather events.[15]

Different levels of sensitivity

Many factors influence the sensitivity of individuals to climate-related risks, including biological characteristics (e.g., age), health status (e.g., chronic health conditions), and social determinants of health such as income, food security, and access to services.[16] As a result of the barriers they face, women, Indigenous Peoples, and equity-deserving groups may have less access to resources and be more susceptible to loss and damage induced by climate events.[17] For example, immigrants and people with lower incomes are more likely to live in urban heat islands, making them more susceptible to extreme heat and its impacts.[18] In addition, wildfire smoke can disproportionately affect people with pre-existing health conditions, babies and young children, older adults, pregnant women, some people with disabilities, and people experiencing homelessness or living in homes with limited protection from smoke, increasing their risk of adverse health impacts.[19]

Different abilities to adapt and recover

Adaptive capacity is shaped by access to financial, technical, and public resources that support preparedness, response, and recovery.[20] Past and present political, economic, and environmental conditions, including historical disparities, discrimination, poverty, and limited access to resources, can reduce adaptive capacity by limiting people's ability and resources to adapt and recover from climate hazards.[21] For example, remote Indigenous communities often face challenges and vulnerabilities following wildfire evacuations due to limited community connectivity and challenges in maintaining livelihoods, among other difficulties.[22]

IDEA lens in infrastructure planning and climate adaptation

IDEA stands for inclusion, diversity, equity, and accessibility. IDEA recognizes the

historic and ongoing barriers, exclusion, and discrimination of individuals and communities based on identity, background, and other circumstances, and promotes fair treatment and full participation.[23, 24] Examples of climate-resilient infrastructure projects include shade structures in parks, outdoor cooling facilities, and flood-proofing buildings. Applying the IDEA lens to planning practice is essential for identifying and addressing systemic barriers and forms of exclusion in the governance systems, practices and policies. Municipalities are uniquely positioned to advance equitable climate adaptation that involves building resilience while addressing existing inequities, fostering inclusive community engagement and developing collaborative partnerships, particularly with women, Indigenous Peoples and equity-deserving communities.[25]

Benefits of embedding IDEA within infrastructure

There is increasing awareness of the importance of embedding IDEA within municipal processes for climate-resilient infrastructure. An IDEA lens brings economic and social benefits to municipalities and communities, and mitigates associated risks.

Climate adaptation measures with IDEA considerations can support local economies and workforce development, and can help communities better withstand economic disruptions caused by climate events. Climate-change-related disasters affect unemployment and have detrimental effects on wages and working hours for months and years following the event.[26]



Some municipalities are leveraging social procurement in climate efforts to support the local economy. Within their coastal flooding adaptation projects, the City of Surrey is allocating 20–30% of employment hours to be carried out by women, Indigenous Peoples, and equity-deserving groups, and 50% of purchasing from small, medium or social enterprises.[27] Ultimately, equitable climate adaptation could help communities withstand shocks and support investment and growth.[28]

Considering IDEA also often involves prioritizing multi-solving projects, which are projects that address multiple challenges and achieve benefits across sectors simultaneously;[29] for example, a project that concurrently reduces emissions while supporting community connectivity and healthier communities.[30] Multi-solving supports collaboration across governments, businesses, and communities[31] and leads to co-benefits like job creation, biodiversity support and improved health and well-being.[32] Principles of multi-solving design include centering equity, engaging with communities, and creating new narratives.[33] Multi-solving projects can address interconnected climate and societal challenges by designing policies and projects that deliver multiple economic, health, equity, and resilience benefits simultaneously.[34]

Further, the United Nations Declaration of Rights of Indigenous Peoples (UNDRIP),[35] the Accessible Canada Act[36] and the Canadian Human Rights Act[37] impose a constitutional duty to ensure human rights and accessibility are protected for all persons.[38] Ensuring compliance to legal and regulatory frameworks reduces the risk for municipalities.

Overall, embedding an IDEA lens into climate-resilient infrastructure supports broader social outcomes by reducing disparities, promoting equitable participation in community life, and reducing social vulnerabilities, helping communities become more connected and resilient to current and future climate and infrastructure challenges.[39, 40]



Approach

The report uses an applied, multi-source research approach to examine how IDEA can be embedded in climate-resilient infrastructure and what this means for municipal skills and capacity. The analysis draws on four sources of evidence:

> A review of academic, government and practitioner literature on climate vulnerability, adaptation, climate-resilient municipal infrastructure, IDEA and related skills and competencies.

> A scan of existing climate-resilience, infrastructure and competency frameworks to identify common practices, strengths and gaps relevant to municipalities.

> Desk research on publicly available municipal examples to illustrate how IDEA considerations are being incorporated into engagement, procurement, project design, prioritization and monitoring.

> Insights from the development of the *2025 Guide on Applying Inclusion, Diversity, Equity and Accessibility Within Climate-Resilient Infrastructure,* which involved research, a steering committee, targeted expert input and a public online review. The report also incorporates additional review by subject-matter experts.

These sources are used to examine where IDEA considerations intersect with existing climate-resilient infrastructure practices, where current frameworks provide limited guidance, and the skills and capacity municipalities need to support implementation in practice.

The report focuses particularly on portfolio management and project design processes and has three objectives:

> Examine the importance and benefits of embedding IDEA in climate-resilient infrastructure projects and adaptation solutions.

> Review climate-resilient infrastructure frameworks and practices and propose a framework for embedding IDEA within processes.

> Identify the competencies, skills, and capacity-building needs that can support municipalities in putting these approaches into practice.



Findings

The integration of IDEA into infrastructure is essential to address disproportionate risks and vulnerabilities among women, Indigenous Peoples, and equity-deserving groups.[41] An IDEA lens is needed to help ensure that these groups are supported in a systemic and systematic way.

The following sections examine existing climate-resilient infrastructure and competency frameworks, identifying common practices and gaps in how IDEA is addressed. Building on the PAS on Applying Inclusion, Diversity, Equity and Accessibility within Climate-Resilient Infrastructure, the analysis considers how IDEA can be embedded across key infrastructure processes and identifies the competencies and skills municipalities need to support implementation.

There are several examples where municipalities have integrated IDEA into infrastructure planning, thereby reducing liability and risk for municipalities and infrastructure professionals as well as climate exposure risk for women, Indigenous Peoples and equity-deserving groups, while bolstering participation for these groups in infrastructure decision-making processes:

Northeast False Creek Project, City of Vancouver, British Columbia:

- **Climate problems identified:** Adapt and prepare for rising sea levels and flooding along shoreline and the Fraser River, and prevent damage on buildings and infrastructure in low-lying coastal areas.[42]

- **Engagement process and impact on design:** The project involved ongoing engagement with the Musqueam, Squamish, and Tsleil-Waututh Nations, as well as urban Indigenous, Chinese Canadian, and Black communities with longstanding historical and contemporary connections to the project area. The engagement strategies included open houses, workshops, online surveys and online engagement tools.[43]

- **Social procurement strategies:** The project incorporates requirements that support local hiring and procurement, with commitments to create employment opportunities for people facing barriers to employment.[44]

- **Multi-solving and community benefits:** The project delivers multiple community benefits by creating affordable housing, parks and open spaces, employment opportunities, and more.[45]

Wastewater Treatment and Biosolids Management Master Plan, City of Guelph, Ontario:

- **Climate problems identified:** The City of Guelph is updating its Wastewater Treatment and Biosolids Management Master Plan to support population growth, protect waterways, and reduce greenhouse gas emissions.[46,47]

- **Engagement process and impact on design:** The project engaged residents, businesses, Indigenous communities, municipal staff, and regulatory review agencies through liaison groups, meetings, virtual open houses, and surveys. The decision-making process of the project leveraged feedback received from communities through engagement activities and the community liaison group.[48] The engagement period ultimately helped the municipality develop solutions that included community perspectives and values within the decision-making.[49]

- **Social procurement strategies:** Social value was embedded into the selection process of strategies and technologies by evaluating infrastructure alternatives not only on technical performance and resilience, but also on their social, cultural, environmental, technical, and economic impacts.[50]

Coastal Flood Adaptation Strategy, City of Surrey, British Columbia

- **Climate problems identified:** The strategy was a multi-year initiative that identified current and future climate change impacts on Surrey's coastal floodplain and developed a long-term approach to reduce coastal flooding risks and strengthen community resilience.[51]

- **Engagement process and impact on design:** The strategy used a structured, community-driven engagement process involving over 30 organizations, agencies and governments and more than 2,000 residents through workshops, open houses, focus groups, project surveys and other engagement events. Their input directly informed project decision-making. The strategy also recognizes community feedback as a key component of monitoring, using ongoing engagement to assess public expectations and awareness and adapt actions over time.[52]

- **Social procurement strategies:** The project delivers community employment benefits by ensuring apprentices, Indigenous Peoples and equity-deserving groups have access to employment opportunities, as well as targeted procurement opportunities for small, medium or social enterprises.[53]

- **Multi-solving and community benefits:** The strategy delivers multiple community co-benefits, including recreation, food security, agricultural productivity, transportation safety, congestion relief, emergency access and economy.[54]





Existing competency frameworks for climate-resilient infrastructure

There are a variety of frameworks to support municipalities to develop and adapt climate-resilient infrastructure, with considerations for addressing and supporting the needs of diverse communities. The PAS on Applying Inclusion, Diversity, Equity and Accessibility within Climate-Resilient Infrastructure brings together elements of various frameworks to provide a holistic approach to project prioritization and design and delivery leveraging an IDEA lens.

Broad education: Foundational knowledge and communication on IDEA

Before delving into steps to embed IDEA within portfolio management and project design steps and then developing or strengthening competencies and skills to support this effort, municipal staff and leadership require foundational knowledge and understandings of what IDEA is, how principles link and interact with climate change, the purpose and benefits of leveraging equitable practices, and broad ways to incorporate this thinking into processes. Through this foundational knowledge, leadership can proactively communicate to staff ways to integrate IDEA into their processes, and support staff can develop competencies and skills to support integration. Understanding what IDEA means tangibly is also key amid changing landscapes and pushback against IDEA broadly, helping municipal staff stay the course.

Community engagement

Community engagement is a foundational component of climate-resilient infrastructure processes. Technical assessments alone cannot fully identify vulnerabilities, community priorities, lived experiences, or barriers to adaptation; the perspectives and realities of local and diverse communities are needed as well. This can be supported through engagement.

Traditional municipal engagement processes often benefit people with greater time, resources, and influence.[55] Using inclusive approaches to meaningfully engage diverse communities can help ensure projects are informed by various lived realities and needs. The PAS emphasizes that engagement should take place during project prioritization, incorporating community perspectives into the selection of a project, and the project design process, ensuring that infrastructure is developed or retrofitted with community needs in mind. The PAS emphasizes leveraging the IAP2 Spectrum of Public Participation, which provides insights on how different levels of participation in community engagement can affect project decision-making.[56]

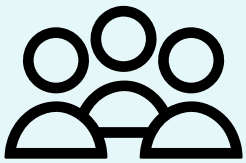
When planning for engagement, the PAS emphasizes that municipalities should begin with community mapping and engagement planning, followed by internal coordination to leverage previous engagement findings and insights. Municipalities should then ensure sufficient budget and resources are allocated for engagement and maintain ongoing, accessible communication with communities to better understand and respond to their needs. The PAS emphasizes the importance of inclusive engagement across all project phases: to help prioritize projects, to provide perspectives on the execution of the project, and to ensure communities share feedback on whether the infrastructure is benefiting them. Inclusive engagement means mitigating barriers to participation (e.g., accessibility, time, location, etc.).



Inter-departmental collaboration

Climate adaptation requires strong inter-departmental coordination.[57] When departments within municipalities or different levels of governments are siloed, evidence-based decision-making is more difficult.[58] Research shows that cross-functional collaboration, which brings expertise from multiple disciplines, is critical in capital projects.[59] The Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol emphasizes collaboration across diverse professional and scientific disciplines, bringing together infrastructure managers, operators, maintenance personnel, and other relevant practitioners to support more practical risk assessment.[60] Further, ensuring diverse representation on project teams is essential as it can reduce "groupthink" and foster innovative and critical thinking in the decision-making process.[61] Collaboration between practitioners, subject matter experts, staff from across municipal departments, and people with relevant lived experience is needed to develop more innovative, equitable, and resilient climate-infrastructure solutions.

The PAS recognizes that collaboration between municipal departments is essential to support capacity needs and ensure various forms of expertise and knowledge are involved in projects. Projects require multiple components, including risk assessments, planning, budgeting, community engagement, and communications, which can put pressure on various departments. The PAS also highlights that any team built for a project should reflect the diversity in the community that the project is serving, emphasizing that diversity on project teams can help identify creative solutions for climate-resilient infrastructure. Diverse teams and advisory committees can offer valuable perspectives toward the project and should be leveraged.



*Ensuring **diverse representation on project teams** is essential as it can **reduce "groupthink" and foster innovative and critical thinking** in the decision-making process.*

Risk and vulnerability assessment

A core component across nearly all frameworks is the need to systematically identify risks, vulnerabilities, and exposure to climate- and disaster-related hazards. For example, the PIEVC Protocol provides a structured methodology for climate vulnerability assessment, risk identification, probability and likelihood analysis, climate thresholds, and engineering analysis.[62] The PAS highlights the different aspects of risks that might be missed during a conventional risk assessment process, including legal, relationship, connectivity, health, livelihood, financial, and accessibility risks, helping to better apply an IDEA lens to the risk assessment process that municipalities follow.

Planning and project prioritization

Frameworks including the PIEVC Large Portfolio Assessment Manual provide guidance on asset prioritization through risk identification.[63] The Infrastructure Pathways resource provides guidance on considerations to maximize environmental, equity and social co-benefits and minimize negative impacts at the design stage.[64, 65] The PAS highlights that prioritization should include infrastructure maintenance and condition data, climate change and demographic projections, and outcomes from climate risk assessments to understand how the infrastructure and the community would be affected by climate change.

IDEA in infrastructure design

The PAS emphasizes that infrastructure design should incorporate climate resilience and IDEA considerations throughout the design process. Infrastructure should emphasize universal design principles and consider the proximity of the adaptation solution to transit and services, protection of culturally significant sites, financial accessibility, emergency evacuation routes, communication of project impacts in accessible formats and languages, availability of local skills and technologies required for operation, among other considerations.

Procurement

Municipalities may procure all or some components of an infrastructure project from vendors and suppliers, meaning that embedding IDEA-related considerations within requests for proposal (RfPs) is critical for holding vendors and suppliers accountable.

Municipalities can consider leveraging social procurement questionnaires that embed community benefits expectations, climate and environmental commitments, Indigenous and equity-related policies, and governance and ethical responsibilities within RfPs, for example whether a bidder has a diverse team and/or offers job opportunities and apprenticeships to Indigenous Peoples and equity-deserving groups broadly and through this project, whether the bidder has specific equity-related policies, and more.[66, 67] It can also include requiring bidders to demonstrate within their proposal how they would embed reconciliation within their project, for example, their Indigenous engagement strategy.[68] Further, municipalities should reduce application barriers for businesses owned by women, Indigenous Peoples, and equity-deserving groups, as well as small and/or local businesses by unbundling large contracts,[69] engage Indigenous communities early and build trust,[70] and use plain language.[71]



Many municipalities have incorporated social procurement practices within their broad procurement processes, such as through community benefit agreements (CBAs).[72] However even if this has not been realized for some municipalities, the PAS highlights the importance of asking questions within the RfP to ensure that vendors and suppliers uphold expectations for IDEA within project components. The PAS emphasizes that municipalities should embed IDEA considerations throughout procurement processes. Procurement mechanisms should consider contracts with local suppliers and vendors that are majority-owned or majority-led by women, Indigenous Peoples and equity-deserving groups. Additional considerations include creating apprenticeship, employment, and contracting opportunities that support these communities.



Procurement mechanisms should consider contracts with local suppliers and vendors that are ***majority-owned or majority-led by women, Indigenous Peoples and equity-deserving groups****.*

Maintenance and operations

The maintenance and operations phase of a project focuses on ongoing asset managementthrough inspections, maintenance, day-to-day operations and emergency response to respond to changing climate conditions. Ongoing maintenance provides opportunities to continuously improve existing infrastructure, reducing their vulnerability and enhancing their resilience to climate change.[73] The PAS highlights the importance of monitoring systems to track the health, economic, environmental, and social stability impact of the project on women, Indigenous Peoples, and equity-deserving groups. Additionally, key performance indicators (KPIs) need to be established to track and evaluate the performance of the infrastructure.



Conclusions and Implications for Skills

Integrating IDEA within climate-resilient infrastructure portfolio management and project design processes helps reduce climate risks and address the disproportionate impact of climate change on women, Indigenous Peoples, and equity-deserving groups. Support for competency and skills development helps municipal staff integrate IDEA principles within portfolio management and project design processes.

A competency is the ability to effectively perform a task and achieve intended outcomes by applying knowledge, skills, abilities, and attributes.[74] On the other hand, a skill is a specific capability,[75] such as data analysis or engagement facilitation. Competencies are more context-dependent and outcome-oriented, focusing on overall effectiveness in a role rather than proficiency in specific tasks. In this section, we speak to both competencies and skills.

Frameworks for competencies and for climate-resilient infrastructure and adaptation planning exist (Appendix A). While some include mentions of IDEA, research on the competencies and skills required to integrate IDEA within climate adaptation and resilience planning is relatively new. In the following section we map competencies and skills onto the steps to integrate IDEA into portfolio management and project design of the PAS. These are competencies and skills that municipal staff should have to support IDEA efforts.

Coupled with the need for IDEA-related competencies and skills is the need for learning approaches that move beyond knowledge transfer toward practical application.

Foundational competencies and skills required for municipal staff

Data understanding and analysis competencies and skills

To support risk assessment and project prioritization, municipal staff need skills to find and interpret data on communities (for example, to determine which communities are affected). While climate scenario modelling and forecasting requires a specific set of skills, understanding populations within a region can often leverage existing data. Municipal staff need to be able to source accurate and available data and analyze it for insights, and identify women, Indigenous Peoples and equity-deserving groups that may experience disproportionate climate risks and infrastructure barriers. General municipal staff can be upskilled to understand more simplified data from Statistics Canada on community projections and existing community demographics to improve their ability to forecast and track infrastructure needs in communities.

Key competencies and skills in this domain include:

- Identifying relevant public data and interpreting findings to identify communities vulnerable to climate change
- Identifying women, Indigenous Peoples and members of other equity-deserving groups that may face disproportionate risks and infrastructure needs
  - Understanding demographic disaggregated data

Community relationship-building and engagement competencies and skills

Building strong relationships with communities takes time, commitment, and transparency.[76] Competencies are also needed to determine the appropriate level of engagement and the influence of communities over decisions, as this helps set clear expectations and supports trust-building. For Indigenous engagement in particular, skills are needed to support data governance principles (e.g., First Nations Principles of Ownership, Control, Access and Possession) and engagement requirements (e.g., UNDRIP) toward sustained partnerships and shared decision-making. Municipal staff need competencies to communicate with communities in clear, plain, and inviting ways; to synthesize community feedback and lived experiences into infrastructure planning and design; to embed perspectives into decision-making processes; and to close the feedback loop by transparently communicating how community input influenced outcomes.

Key competencies and skills in this domain include:

- Ability to leverage data and undertake community mapping to understand which communities (particularly women, Indigenous Peoples, and other equity-deserving groups) are affected by specific climate hazards (leveraging the demographic data used during risk assessment and project prioritization)
  - Ability to find and understand disaggregated data
- Ability to create or adapt plain language communication materials that are targeted to various audiences, and communicate project goals and updates using plain language
  - The ability to condense information into key, digestible messages, share importance and impact, and encourage engagement
- Accessible and inclusive engagement design to mitigate engagement barriers
  - The ability to identify barriers (e.g., time, location, etc.) to engagement across communities
- Mindful facilitation practices to promote accessible, welcoming spaces during engagement, noting that often municipalities will manage engagement aspects themselves
- Integrate community knowledge and lived experiences into planning, design, and decision-making, and close the feedback loop by transparently communicating how community input influenced outcomes

Procurement competencies and skills

Skills to embed IDEA considerations into vendor selection, contracting, performance monitoring, along with knowledge of supplier diversity programs and CBAs, are essential for integrating considerations into RfP processes. This ensures that IDEA is integrated into vendor and supplier expectations should components of a project be procured. General municipal staff should be able to identify and communicate the requirements to vendors and suppliers, then work with the municipal procurement team to embed specific language and criteria within RfP documentation to hold vendors and suppliers accountable.

Key competencies and skills in this domain include:

- Develop and integrate IDEA- and community benefits-related questions within RfPs
- Developing or updating procurement policies, templates, and procedures to embed IDEA requirements as standard procurement practice across the government
  - Ability to identify the needed IDEA commitments required of potential vendors and suppliers, as well as associated questions for the RfP
- Accountability and metric setting for vendors and suppliers
  - Ability to set metrics that the vendor or supplier must follow to demonstrate compliance with IDEA expectations (e.g., inclusive engagement metrics)

Inter-departmental collaboration and decision-making competencies and skills

Advancing climate-resilient infrastructure requires municipalities to align climate resilience with broader goals, including public health, affordability, equity and inclusion.[77] Municipal staff need to be able to leverage their municipality's existing strategies, plans, policies, and documents to guide their efforts and to ensure alignment with overall municipal goals.[78] Coupled with this, municipal staff require "policy entrepreneurship" which is the ability to work collaboratively across government to develop innovative approaches to implementing policy requirements.[79, 80]

Linking inclusive climate resilience strategies with broader goals requires collaboration between internal teams, recognizing that various internal departments and teams each have expertise and can support various components of a project (e.g., the procurement team can embed IDEA considerations within RfPs, the communications team can support engagement and inclusive information-sharing with communities, etc.).

Diverse teams can improve problem-solving, enhance creativity and innovation, and improve flexibility and adaptability.[81] Municipal staff therefore require collaborative, teamworking skills to identify synergies across departments and coordinate implementation across disciplines, and project management skills to facilitate inter-departmental decision-making.

Key competencies and skills in this domain include:

- Policy entrepreneurship skills to leverage existing strategies, policies, and plans to find innovative ways to embed IDEA within their frameworks
  - Competencies to initiate inter-departmental collaboration, mobilizing different perspectives, and redefining issues and solutions
- Interpersonal and professional skills on negotiation, collaboration, strategic planning, and decision-making are needed for climate-resilient work. Similar skills, including conflict resolution, budgeting, and asset ownership skills are needed to work across departments and support collaboration
- Ability to communicate project needs with leadership is a core competency, linked back to aligning climate actions with an organization's strategic plan, mission, and vision. The ability to communicate IDEA integration within climate-resilient infrastructure projects to leadership is a core competency that municipal staff require
  - Ability to communicate IDEA in terms of community outcomes, resilience benefits, and co-benefits
  - Ability to adjust messaging in response to changing political and organizational contexts

Monitoring and evaluation competencies and skills

Monitoring tracks progress over time against planned targets and outcomes, while evaluation assesses the extent to which those targets and outcomes have been achieved.[82] This requires setting outcome- and impact-focused key performance indicators from the outset of a project that will demonstrate its effectiveness, the ability to develop data collection methods, and the ability to analyze and understand findings.

Involving communities at this stage to provide their perspectives on project efforts is key, including that data in the evaluation and reporting-back processes. Effective monitoring and evaluation also require staff to be able to share findings internally and with communities in clear, accessible ways to support transparency and accountability.[83]

Maintenance and operations

The maintenance and operations phase is when the infrastructure delivers its intended service for the remainder of its life. During this phase, opportunities exist to continue to enhance climate resilience within the infrastructure through inspections, maintenance, day-to-day operations, and emergency response.[84] Maintenance and operations with climate-informed codes and standards can extend asset life, reduce long-term costs, and prevent avoidable repairs.[85]

Key competencies and skills in this domain include:

- Establishing impact-driven metrics at the beginning of a project
  - Understanding nuances between outcome/output metrics and impact/performance indicators
- Data collection and analysis processes to complement established metrics
- Tangible reporting on findings, including analyzing data and inclusive communications
- Maintain ongoing engagement and relationships with communities



Appendix A: Existing Competency Frameworks for Disaster and Resilience Planning

Competencies and skills to embed IDEA into environmental resilience and disaster recovery

To meet the growing need for resilience and disaster recovery within Canada and ensure that diverse groups can participate in the transition, this report aims to develop an environmental resilience and disaster recovery competency framework with embedded inclusion, diversity, equity, and accessibility (IDEA).

A review of existing frameworks reveals several common competency domains, including risk and vulnerability assessment, collaboration and integrative approaches, planning and strategy, capacity building and knowledge sharing, as well as adaptability and resilience. Risk and vulnerability assessment refers to the technical process of determining and assessing risk, often employing advanced analytics in economic forecasting, downscaling climate and flooding models, and developing risk management strategies in response.[86] Missing from frameworks is often competencies and skills that support embedding IDEA within climate-resilient infrastructure processes.

Table 1

Overview of key competency frameworks for climate change adaptation and mitigation, disaster recovery and management, as well environmental resilience planning.

Association of Climate Change Officers (ACCO)	
Framework	**Target Audience**
Core Competencies for Climate Change Officers and Professionals[87]	Climate change officers and professionals
Framework Elements	
Foundational knowledge and skills: Science and environmental literacy; the ability to understand the policy landscape and organizational commitments; and management acumen, including the ability to undertake cost/benefit analyses. **Organizational knowledge and experience:** Strategic planning and the ability to leverage data; decision-making; compliance and enterprise risk management; asset management; supply chain management, including considering climate change in product design/delivery; communications and corporate social responsibility, including sharing credible information and emphasizing the organization's commitment to addressing climate change and corporate governance. **Strategic execution competencies:** Mitigating risk; change management support within the organization; stakeholder engagement, including effective communications; and advocacy beyond the organization, including efforts to influence legislation and regulations.	
Strengths	**Limitations**
Provides a tiered approach that supports basic to strategic competencies.	While the framework notes the importance of addressing bias and exclusion in efforts, the framework and competencies do not link to integrating IDEA within climate-resilient infrastructure.

<table>
<tr><th colspan="2">Adaptation Learning Network</th></tr>
<tr><th>Framework</th><th>Target Audience</th></tr>
<tr><td>Climate Adaptation Competency Framework[88]</td><td>Indigenous and non-Indigenous leaders, educators, professionals across sectors, and human resource professionals working in organizations focused on climate adaptation</td></tr>
<tr><th colspan="2">Framework Elements</th></tr>
<tr><td colspan="2">Climate adaptation science and practice literacy: Climate change science literacy; climate adaptation literacy; Indigenous knowledge systems literacy; research.

Climate adaptation leadership: Professional practice; leadership; change management; decision-making.

Collaboration for climate adaptation: Climate communication; cultural agility; facilitation; engagement; collaboration.

Understanding Climate adaptation challenges: Vulnerability and impact assessment; risk assessment; futures thinking; economic analysis; personal resilience.

Climate adaptation planning and implementation: Strategy and planning; solution design; policy and governance; building capacity; program management; mainstreaming.</td></tr>
<tr><th>Strengths</th><th>Limitations</th></tr>
<tr><td>Structured using tiered competencies from general knowledge to expert-level knowledge to support implementation.

Includes competencies for supporting diverse perspectives and community engagement.

Provides competencies for different staff roles.</td><td>Assumes workers have pre-existing in-depth environmental knowledge.

Discusses equity and inclusion in competency areas, but details on operationalization or specific skills unclear.</td></tr>
</table>

American Society of Adaptation Professionals	
Framework	**Target Audience**
Knowledge and Competencies Framework for Climate Change Adaptation and Climate Resilience Professionals[89]	Existing professionals, students, and learners
Framework Elements	
Using information: Problem identification; intervention identification and analysis; scenario development; capacity building; metrics development and tracking. **Communicating climate adaptation concepts and actions:** Identifying audiences; framing climate information; using engagement models; appropriate communication. **Cross-cutting strategies for climate goals:** Identifying opportunities; mainstreaming climate adaptation. **Psychological strength:** Embracing uncertainty; supporting loss, trauma, change and renewal dialogue; empowering stakeholders; personal resilience. **Planning and managing action:** Problem identification; intervention identification and analysis; scenario development; capacity building; metrics development and tracking. **Inclusive planning and action:** Leadership; team creation; building trust, legitimacy and social capital; fostering collaboration; stakeholder engagement; pursuing just and equitable outcomes; frontline and marginalized community engagement; active listening; facilitating difficult, emotional and value-laden dialogue. **Orienting efforts to achieve change:** Framing climate information; enabling creativity and innovation; scaling lessons learned; evaluating past interventions; operational limits.	
Strengths	**Limitations**
Framework includes several skills applicable to each core competency, to support operationalization. Tiered off foundational knowledge in environment, climate, risk and risk management, and equity.	Competencies and skills required are only presented, not elaborated upon. Inclusive competencies may not provide sufficient information to support practitioners to operationalize IDEA within climate-resilient infrastructure projects.

United States Fish and Wildlife Service (USFWS)	
Framework	**Target Audience**
Climate Change Response Competency Model And Developmental Framework[90]	Employees of the USFWS
Framework Elements	
Fundamental technical competencies: Climate science and climate change impacts; ecological transformation literacy; climate change mitigation, resilience, vulnerability, risk, and adaptation. **Applied technical competencies:** Scenario planning; planning for uncertainty; public planning; monitoring, evaluation and adaptive management; downscaling and applying climate models; using Indigenous knowledge and climate science; applying nature-based solutions. **Universal competencies:** Decision-making; climate communication; partnership building; supporting co-benefits; environmental justice and equity; systems thinking; change management; systems thinking; mainstream adaptation.	
Strengths	**Limitations**
Tiered competencies from fundamental technical requirements, applied technical competencies, and universal competencies to support progression. Provides training resources to support learning and implementation.	Developed for USFWS employees, which may limit applicability to the participants in the Canadian regulations. While referenced broadly, IDEA is not integrated across competencies.

Scottish Government, International Institute for Environment and Development	
Framework	**Target Audience**
Climate Adaptation Competences Framework[91]	Not specified
Framework Elements	
Visioning goals, targets and outcomes through policy and leadership: Identifying policies and legislation; ensuring vertical and horizontal integration; leadership to drive change. **Defining and developing pathways from the present toward envisioned outcomes:** Fostering innovation and learning; sharing knowledge and experiences; cooperation and consensual; funding for solutions. **Synthesis and utilization of knowledge:** Knowledge of policy-makers including risk assessments to support decision-making; knowledge synthesis; knowledge availability and the availability of tools to support decision-making. **Facilitation of cross-sector and cross-organizational collaboration via stakeholder and public engagement:** Inclusion of multiple stakeholders in decision-making; ensuring the adaptation strategy links to/supports any poverty reduction and development efforts; reflecting on collaboration efforts. **Consideration of ethics and justice via normative competence:** Ensuring political attention cycles do not impede efforts and identifying champions to drive the efforts forward; awareness of equity and impacted communities in efforts.	
Strengths	**Limitations**
Provides information on drivers, inhibitors, and determinants for competencies to guide skills development.	Developed for Scotland public service employees which may limit applicability to the Canadian regulatory context. IDEA is addressed in its own competency, not integrated across the framework.

Asian Cities Climate Change Resilience Network	
Framework	**Target Audience**
Urban Climate Resilience Framework[92]	City-level planners and professionals
Framework Elements	
Institutional competencies: Water management; floodplain land development; government coordination; technical support; public education; climate and risk forecasting; climate warning systems; engaging communities in resilience planning. **Agent capacities:** Build awareness; engage communities; train community groups; public health surveillance; climate curriculum development. **Ecosystem competencies:** Restoration and protection; watershed planning; forest protection; groundwater recharge; riverbank stabilization. **Infrastructure systems:** Flood monitoring; early warning systems; climate-resistant housing development; flood modelling and prevention; flood shelters; rainwater harvesting.	
Strengths	**Limitations**
Based upon review of articles and priority areas for global city resilience planning. Emphasizes engaging with marginalized groups to ensure their needs are embedded within resilience efforts.	Specifically designed with cities across Asia in mind, thus may not be fully applicable to Canadian contexts. Limited discussion on skills and competencies, particularly with an IDEA lens. Competencies are regionally specific to climate risks and may not be applicable to many Canadians. Competencies are specific to land use planners. Equity considerations and disproportionate risk among equity-deserving groups not addressed. Details on operationalizing competencies are not clear which may limit applicability.

Diversity Institute	
Framework	**Target Audience**
Green Skills Competency Framework[93]	Small and medium-sized enterprise (SME) employees and operators
Framework Elements	
The framework is divided into the following tiered competencies, and within each tier, further divided by foundational, intermediate, and advanced competencies. **Foundational skills and basic green literacy:** Basic environmental knowledge and awareness; awareness and understanding of sustainability principles and how this informs an SME's functions. **Transformational skills:** Ability to take foundational knowledge into a net-zero strategy for an SME, including leveraging technical solutions to understand the impacts of net zero on SMEs business elements. **Deep green skills:** Enhanced knowledge to support sector transition and expertise of green technology and infrastructure.	
Strengths	**Limitations**
Emphasizes tiered pathway from knowledgeable to highly-skilled technical proficiencies for SME employees and operators. Framework is aligned with existing frameworks to ensure compatibility with broader Canadian skills landscape and trajectories.	Applied broadly to a green skills transition and to climate adaptation solutions. While barriers to equity-deserving groups and Indigenous Peoples are discussed, the framework focuses on guidelines for SMEs and not specific competencies for embedding IDEA.

United Nations Institute for Training and Research	
Framework	**Target Audience**
Skills Assessment for National Adaptation Planning[94]	Decision makers and planners working on the National Adaptation Plans formulation process
Framework Elements	
Technical skills: Understanding climate change, vulnerability, and risk, then using this information to prioritize actions. This includes climate change science and policy; disaster risk management; modelling and scenarios. **Management skills:** Managing processes and people. Includes leadership; visioning; advocacy; project management; reporting. **Participatory skills:** Sustain cooperation and action. Includes coordination; communication; team building; public speaking; active listening; relationship-building; gender mainstreaming.	
Strengths	**Limitations**
Provides a tiered approach of technical and human-centered competencies and skills. Gamification approach to competencies identification helps participants position themselves in relation to competencies and requisite skills.	The audience is intentionally broad and may not be tailored enough to consider local risk priorities. Does not embed IDEA-related competencies and skills into the framework.

Government of the United Kingdom	
Framework	**Target Audience**
Climate and Environment Advisers Competency Framework[95]	Environmental and climate change advisers
Framework Elements	
Core knowledge across all advisers includes: Ability to demonstrate knowledge in climate resiliency and related topics; development planning; the political economy and governance of climate change; an understanding of the relationship between poverty, the environment, and climate and social issues; principles of sustainable development. Framework then offers more specific knowledge and credentials, broken down by required and desired competencies and needs.	
Strengths	**Limitations**
Provides educational requirements and a blend of technical and cross-cutting skills.	Targeted to those with specialized climate and resilience roles, which may not be applicable to municipal staff. While IDEA is discussed, specific skills or methods to operationalize are not included.

Engineers Canada and Natural Resources Canada	
Framework	**Target Audience**
Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol[96]	Infrastructure and asset owners, climate experts, federal, provincial, municipal government representatives, local utilities, academics, standards organizations, and non-government organizations involved in climate change adaptation
Framework Elements	
While broader than a traditional competency framework, PIEVC is a tool to identify climate risks. Nevertheless, the tool has PIEVC steps and main tasks across preparation; project definition; data collection, compilation, and analysis; risk assessment; engineering analysis; conclusions and recommendations; and reporting. These main tasks could be linked to competencies and skills.	
Strengths	**Limitations**
Structured and widely adopted methodology for climate risk assessment in Canada. Integrates climate information and future climate projections into infrastructure planning and adaptation decision-making. Flexible and applicable to individual assets, systems, and infrastructure portfolios across sectors. Supports evidence-based adaptation planning and prioritization of climate resilience investments.	Technical requirements may create capacity barriers for smaller municipalities. Primarily focuses on engineering, infrastructure performance, and physical vulnerabilities, with limited consideration of social vulnerability and disproportionate impacts on Indigenous Peoples and equity-deserving groups. Does not explicitly integrate IDEA principles, community engagement practices, or inclusive decision-making approaches throughout the assessment process.

<table>
<tr><th colspan="2">International Coalition for Sustainable Infrastructure, The Resilience Shift, and Arup</th></tr>
<tr><th>Framework</th><th>Target Audience</th></tr>
<tr><td>Infrastructure Pathways[97]</td><td>Infrastructure practitioners including governments, owners and operators, investors, designers, contractors, and community organizations/civil society</td></tr>
<tr><th colspan="2">Framework Elements</th></tr>
<tr><td colspan="2">While not a traditional competency framework, this resource provides steps and considerations across a project lifecycle:

> Policies and plans
> Prioritization
> Feasibility and preparation
> Funding and financing
> Design
> Procurement
> Construction
> Operation and maintenance
> End of life

Within each step, it provides a description of the step and the lead practitioners involved in the step, along with the actions they need to implement. These actions could be translated into competencies and skills.</td></tr>
<tr><th>Strengths</th><th>Limitations</th></tr>
<tr><td>Considers environmental, social, and equity co-benefits throughout the infrastructure lifecycle. Encourages systems thinking and multi-solving approaches that deliver resilience, social, and environmental outcomes simultaneously.

Provides practical guidance that can be integrated into existing infrastructure planning and asset management processes.</td><td>Not a traditional competency framework, with information on the competencies and skills needed for execution.</td></tr>
</table>

ECO Canada	
Framework	**Target Audience**
Competencies for Environmental Professionals in Canada[98]	Environmental professionals
Framework Elements	
Technical competencies: Competencies directly related to protecting, managing, and maintaining the environment including impact assessments; policy development; and corporate environmental program planning. **Transferable competencies:** Professional skills including professional ethics; work style; communication; collaboration; organization; leadership; critical thinking; learning and creativity; and business acumen.	
Strengths	**Limitations**
Comprehensive technical and transferable competencies relevant to environmental and climate-related work. Includes competencies related to Indigenous engagement.	Limited integration of IDEA principles, including accessibility, anti-racism, gender equity, and intersectionality.

<table>
<tr><th colspan="2">ICLEI Canada, Federation of Canadian Municipalities</th></tr>
<tr><th>Framework</th><th>Target Audience</th></tr>
<tr><td>Integrating Equity, Diversity and Inclusion into Municipal Climate Action[99]</td><td>Municipal staff and community partners</td></tr>
<tr><th colspan="2">Framework Elements</th></tr>
<tr><td colspan="2">While not a traditional competency or skills framework, this resource does offer guidance that can be leveraged to identify competencies and skills.

Lesson 1: Foundation and context building: Establishing equity foundations and understanding local context

Lesson 2: Relationship-building and collaboration: Partnerships; community engagement; cross-sector collaboration; trust-building

Lesson 3: Continuous improvement: Feedback loops; communication; responding to concerns

The framework provides key questions for each lesson that learners can consider.</td></tr>
<tr><th>Strengths</th><th>Limitations</th></tr>
<tr><td>Focus on operationalizing IDEA in municipal climate planning.
Emphasizes collaboration and relationship-building.
Encourages meaningful engagement with communities and consideration of differential impacts.
Provides practical examples and considerations for municipalities beginning IDEA integration.</td><td>Limited guidance on competencies and skills needed to execute the actions provided.</td></tr>
</table>



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